Version: December 11, 2013

Regional Innovation Monitor Plus

Regional Innovation Report (Central Denmark Region)

To the European Commission
Enterprise and Industry Directorate-General
Directorate B – Sustainable Growth and EU 2020
Regional Innovation Monitor Plus

Regional Innovation Report (Central Denmark Region)

technopolis [group] in cooperation with

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PREFACE

Launched in 2010, the Regional Innovation Monitor continues to be one of the flagship initiatives of European Commission’s DG Enterprise and Industry. From the outset, it aimed at supporting sharing of intelligence on innovation policies in some 200 regions across the EU20 Member States.

The Regional Monitor Plus (RIM Plus) aims to help regions to improve their innovation policies based on better and harmonised policy intelligence. The new contract aims to contribute to the development of more effective regional innovation policies and promote policy learning.

Building on the experience gained and results obtained during the implementation of the RIM in the period 2010-2012, the RIM Plus service revolves around providing practical guidance to regions on how to use the collected information, establishing a network of regional experts with thematic specialisation, and organising specialised workshops, taking into account the relevance and potential interests of the regional innovation policy makers.

The RIM Plus covers the EU-20 Member States Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, the Netherlands, Poland, Portugal, Romania, Slovakia, Spain, Sweden and the United Kingdom.

This means that the RIM Plus will not concentrate on Member States where the Nomenclature of territorial units for statistics (NUTS 1 and 2) levels are identical with the entire country, i.e. Estonia, Latvia, and Lithuania; Malta which only has NUTS 3 regions; Slovenia which has a national innovation policy or Cyprus and Luxembourg which are countries without NUTS regions.

The main aim of the 30 regional reports is to provide a description and analysis of contemporary developments in regional innovation policy, taking into account the specific context of the region as well as general trends. All regional innovation reports are produced in a standardised way using a common methodological and conceptual framework to allow for horizontal analysis with a view to preparing the Annual EU Regional Innovation Monitor Plus report.

The European Commission official responsible for the project is Mr Alberto Licciardello (Alberto.LICCIARDELLO@ec.europa.eu).

The present report was prepared by Danish Technological Institute by a team consisting of Stig Yding Sørensen (stys@teknologisk.dk), Simon Mikael Fuglsang Østergaard (sfd@teknologisk.dk), and Samuel Michael Olsen (sml@teknologisk.dk). The contents and views expressed in this report do not necessarily reflect the opinions or policies of the Regions, Member States or the European Commission.

The Regional Innovation Access Point and Knowledge Hub presenting further details of the regional innovation measures, policy documents and regional organisations in Central Denmark is accessible through the RIM Plus online inventory of policy measures here: [http://ec.europa.eu/enterprise/policies/innovation/policy/regional-innovation/monitor/region/select](http://ec.europa.eu/enterprise/policies/innovation/policy/regional-innovation/monitor/region/select)

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Executive Summary

1. Main Trends and Challenges in the Regional Innovation System

The Central Denmark Region scores well on several economic performance indicators as well as in the EU27 context. For instance, GDP per capita was as high as €38,800 in 2010 (60% above EU27 average) and the unemployment rate is the lowest among all Danish regions and significantly below the EU27 average. In terms of labour productivity, the Central Denmark Region outperforms the EU27 average across all sectors.

With regard to framework indicators for innovation, the picture is somewhat varied. Around 30% of the population has a tertiary education, which is just below the EU27 average, even though higher education R&D expenditure is 78% above the EU27 level. Even though business R&D expenditure is significantly below the EU27 average, the innovative performance of the businesses in the region is impressive. SMEs in the region innovate to a much higher degree than their EU27 counterparts do, and the number of EPO patent applications accounts for almost 25% of all applications in Denmark.

Overall, the Central Denmark Region has good framework conditions to foster innovation. Good economic performance, good performance on educational indicators, and a high level of patenting and business innovation activities create a solid base for future innovation performance.

However, the Central Denmark Region faces some challenges. The main challenges are assessed to be the following:

**Challenge 1: Support new business models to cope with increased global competition**

Global competition has sharpened challenging the competitiveness of the region. Given Central Denmark Region’s ambition to be a competitiveness region on a global scale, innovation and productivity have become increasingly important. Some companies in the region have a tendency to be rather short-sighted in their business concepts and there is a general need for companies to rethink their business models.

**Challenge 2: Focus on skill upgrading of the workforce**

The region must have a strong focus on attracting and retaining talent and ensuring that the workforce becomes better educated to meet the demand of the companies. It is important for the region to make sure that the workforce has the right skill set to be competitive in a global setting.

**Challenge 3: Continued growth in start-ups**

Even though the entrepreneurial climate is good in the Central Denmark Region, not many start-ups manage to grow substantially. The survival rate of start-ups is high in the region, but the experience is that it is very difficult for companies to take the next step and grow to become global companies.

2. Innovation Policy Governance

Following a major reform in 2007, national and regional growth forums were created to handle regional innovation policies. The growth forums bring together representatives of the business community, knowledge and educational institutions, the labour market parties and local and regional authorities. The Central Denmark Region Growth Forum is thus the most important institution for developing and implementing innovation policy measures in the region.

The central actor for regional business policies in Denmark is the Danish Growth Council that ensures coherence between national and regional growth efforts. The
Danish Ministry of Business and Growth collaborates with the region on making a yearly evaluation of the regional strategy.

All growth forum activities are financed by foundation grants as a mix of regional economic development funds and EU structural funds. Out of all the EU27 countries, Denmark is the country that earmarks the largest portion of EU Structural Funds for innovation. From 2007 – 2013, around 17% of the investments in development and innovation was founded by the EU’s Structural Funds at a national level.

3. Innovation Policy Instruments

The current business development strategy runs from 2010 to 2020. The strategy primarily revolves around four sectors that play or have the potential to play an important role in Region Central Denmark’s economy, even in the region’s remoter areas. These sectors are energy and environment, foodstuffs, welfare innovation, and tourism. In addition, there are four other areas that are not related to a specific sector, i.e. innovation and business development, digitalisation, entrepreneurship, and education and skill development.

The growth forums do not implement the different initiatives and projects they launch. These are implemented by others, for example public partners, research institutions and other independent entities. The innovation activities are primarily concentrated in the sectoral layers in a few large framework projects.

A series of initiatives have been put in place to promote innovation and meet the challenges of the region.

4. Conclusions: future actions and opportunities for innovation policy

The future business development strategy will look different from the present strategy. Amendments to the national legislation require that the Business Development Strategy for the growth forums and the Regional Development Strategy for the Regional Councils be merged. There is currently no time limit for the formulation of a new strategy.

The following possible future orientations and opportunities for the region have been identified:

- **A more integrated regional development strategy**
  The future merger of the two strategies creates new opportunities to address societal challenges and business development. This can be valuable in a global context if the region’s companies manage to seize the opportunities.

- **Orienting policies towards territorial cohesion**
  It is important to avoid that the peripheral areas of the region lag behind. Relying heavily on tourism to create growth in the remote areas in dangerous and a more creative and innovative approach is needed. Support of entrepreneurship and business innovation are, however, important activities especially outside city-areas.

- **Communicating visible strengths**
  It is important to focus more on branding and communicating the international position of the prioritized regional position of strengths, such as the energy and environment sectors as well as food stuff. The region has big expectations to Aarhus as European Capital of Culture in 2017, and it is expected that the event will benefit regional development and innovation by strengthening the regional international position and growth prospects.
• Tackling the skills mismatch

The skill mismatch of the current and future workforce is an area that should receive increased attention moving forward. Focus should be on both developing and attracting the needed skills.
1.1 Recent trends in economic performance

The Central Denmark Region accounts for around 20% of the total Danish GDP and ranks second among Danish regions behind the Capital Region of Denmark in terms of GDP per capita. In 2010, GDP per capita in the region was €38,800, which is around 10% lower than the average for Denmark but almost 60% above the EU27 average. Export accounts for around 60% of regional GDP.

From 2000 to 2010, the average regional growth in GDP was 3.12%, which is very similar to the rest of Denmark. This growth level is marginally above the EU27 average for the same period.

The rather low 10-year growth rate should be seen in the context of the financial crisis, after which Denmark, and the Central Denmark Region, experienced a recession. The financial crisis is also the main reason why the unemployment level in the region increased by 3.3 percentage points (from 2.1% to 5.4%) from 2008 before the crisis to 2012. However, the unemployment rate is relatively low in the region, both when compared to the rest of Denmark, but especially when compared to the EU27. Thus, with an unemployment rate of 5.4% in 2012 the Central Denmark Region is significantly below all other regions in Denmark.

In terms of the sectorial structure, the Central Denmark Region more or less mirrors that of Denmark in general. Compared to the EU27, a relatively large part of the workforce is employed in the public sector (32% compared to 25%). This is a direct consequence of Denmark's broad-reaching welfare system.

With an average labour productivity growth of 3.16% in the period 2000 – 2010, the region performs well above the national average and more than 40% above the EU27 average. However, Denmark has experienced a decrease in the growth in labour productivity in recent years and has even experienced a negative growth from 2007 to 2009 (OECD, 2013). In the period from 1999 to 2009, the number of hours worked contributed more to economic growth than productivity (Ministry of Business and Growth, 2011).

Looking at sector productivity in 2010 it becomes clear that the Central Denmark Region presents relatively high labour productivity across all sectors, when compared to the EU27. Especially labour productivity within construction is much higher than in the EU27 and the rest of Denmark. However, after consulting with the Danish Construction Association it is clear that the productivity in the construction sector is associated with reliability problems.

The EU Regional Competitiveness Index 2013 ranks Denmark at number 7 (down from number 2 in the 2010 edition). The Central Denmark Region ranks 69 overall in the regional list, which is only enough for a third place among the five Danish regions and far behind the Capital Region of Denmark. The Central Denmark Region ranks second among the Danish regions in the Innovation sub-index. However, the region is still far behind the Capital Region of Denmark (European Commission, 2013).

Internally in the region, it is expected that the population will decrease in the years to come, thus also the labour force. The Western part will be worst off in terms of decreasing labour force. This challenge can possibly be an impediment to future growth and this trend puts even more emphasis on increasing productivity and innovation in order to be globally competitive in the future. In general, West is much more peripheral than East, which is also evident in differences highlighted below.

Being the largest geographical region in Denmark there are huge differences in population density and the sectorial structure across the region. For the entire region the number of employed persons was just above 600,000 in 2012. Industry is an important base for employment, export and value creation. The industry employs
around three out of ten in the private sector and accounts for more than two thirds of export in the region. The industry also acts as an important platform for value creation in the service sector.

Focusing on regional positions of strength, the Central Denmark Region is strong in sectors such as the textile, furniture- and wood industry, foodstuffs, and energy and environment sectors. However, there is also a fairly strong division between East and West in the region at this level.

When heading towards the Western part of the region the leather and textile industry, as well as agriculture, forestry and fishery, becomes more important. Moving towards the East in the region, important sub-sectors include business support, trade, and ICT. (Danish Confederation of Trade Unions, 2012).

Figure 1 Economic Performance Indicators for the Central Denmark Region

The Eastern part, with Aarhus as the main city, is a growth centre in a regional and a national context, and the important sub-sectors are generally characterized by being knowledge-intensive. It is also evident that many companies in the Eastern part of the
region have already evolved from industrial- to service and trade companies. Focus is increasingly on adding value further downstream in the value chain. The region’s main research and knowledge institutions (Aarhus University and VIA University College) also situated in the Eastern part.

It is important for the region to develop future strategic sectors and areas of priority that matches this transitional trend. Four areas have been identified as focal point for future growth in the region. These areas are: Energy and environment, food, welfare technology, and tourism. It is our assessment that these are areas that are already playing, or have the potential to play, a major role in regional growth, also in the peripheral areas in the region. The four areas will be discussed later in the report.

Figure 1 above presents Central Region Denmark’s performance relative to national average and the EU27 average on select economic performance indicators.

1.2 Recent trends in regional innovation performance

Denmark is a knowledge-intensive country with generally strong framework conditions for innovation. However, part of the story is that the Capital Region of Denmark belongs in the very top among European regions in terms of innovation performance (European Commission, 2013), which distorts the national picture.

The Central Denmark Region has a number of knowledge intensive companies, especially within energy and environment (VESTAS, Siemens Windpower, Grundfos) and foodstuffs (ARLA Foods, Danish Crown, Läntmannen) as well as good research institutions. Aarhus University is the largest university in the region and attracts students, young employees and public R&D funding.

The Central Denmark Region generally performs well in terms of innovation in the EU27 context. For instance, 29% of the region’s employees have a tertiary education, just below the EU27 average of 30%, while higher education R&D expenditure is 78% above the EU27 average.

One of the challenges in the region is that the level of business R&D expenditure is significantly below the national and EU average and has had a falling tendency in recent years. The national business R&D is 2.1% of GDP, which is around seven times higher than in the region. Business R&D seems low in a national context because of distorting effects from the Capital Region of Denmark, which can mainly attributed to Danish industry flagships such as NOVO who alone invests about a fifth of the total business expenditure in Denmark (Danish Ministry of Science, Innovation and Higher Education (2013)), while the EU27 average is almost four times higher. Part of the explanation is that the Central Denmark Region is home to relatively few companies from sectors that normally invest a lot in R&D, such as pharmaceutical and technology companies. Regional flagships such as Vestas and Grundfos are among the top-10 R&D investing companies in Denmark.

In a Danish context, the Capital Region of Denmark accounted for almost 70% of total business R&D expenditure, while the Central Denmark Region ranks second among Danish regions with around 17% (Statistics Denmark, 2013). Business R&D is the innovation indicator with the highest national inter-regional variation. But even though the Capital Region definitely distorts the picture, it does not change the fact that this is a problem area for the Central Denmark region that is important to address.

The picture is more positive when looking at the level of patents. Even though the level of business R&D is low, the Central Denmark Region presents a high level of innovation. Almost 25% of the EPO filings in Denmark are filed by the region, and the number of EPO patent applications per million in the region was 210 in 2011 – about 80% higher than the EU27 average.

The innovative performance of the region’s businesses is impressive with high scores on all parameters. SMEs in the region innovate to a much higher degree than their
EU27 counterparts do, both in technological as well as non-technological products. 65% of all SMEs in the region have in-house innovating activities.

Entrepreneurship is equally important and plays a key role in the regional innovation performance. The Central Denmark Region is home to relatively many entrepreneurs. In 2008, the start-up rate in the region was 9.4%, which corresponded to 4924 new companies. The number of start-ups in the region in 2006 and 2007 was 4852 and 5171 respectively. Being the growth centre of the region, Aarhus also by far accounted for the largest share of start-ups. The survival rate after two years is impressive: 71% of all start-ups in 2006 were still operating in 2008, compared to the national average of 68% (Central Denmark Region, 2011).

Supporting the fact that Denmark is a knowledge-intensive country is the high volume of scientific publications per capita. The high number of citations per paper is an indication that the research is of high quality. However, the degree to which private companies co-finance public research is very low at 2.4% (FORA, 2011). The interaction and synergies between private R&D and public R&D is arguably insufficient in Denmark, hence also in the Central Denmark Region.

Innovation performance is becoming increasingly important as a driver of economic growth in the Central Denmark Region. Since the demographic development does not allow for labour supply to be the main driver, increasing productivity simply has to be the primary driver of growth. In other words, the assessment is rather clear and applies to the Central Denmark Region as well as the rest of Denmark. The region’s companies’ ability to compete on the global market depends heavily on the companies’ ability to innovate products and processes in order to adapt to increased sophistication and complexities of global value chains.

Innovation in the Central Denmark Region will not be driven by big companies with huge R&D departments and R&D budgets. The innovation model for most companies has a strong element of collaboration. The business demography of the region is dominated of a huge diversity of SME’s and innovation happens to a high degree at a more operational level and is user-driven to a large extent. It is an innovation model which requires agile business models that can be adapted quickly to customer needs, application of new technologies and highly competent employees. It is also evident in the data, as spending on Business R&D is relatively low, while business innovation activities are high. See Figure 3 and Figure 6.

Overall, the Central Denmark Region has decent framework conditions to foster innovation. It has good performance on educational indicators; a high level of patenting and business innovation activities and good conditions for starting a new business creates a solid base for future innovation performance. But at the same time it is important to note, that the region have to maintain focus on the framework conditions and also focus on how the framework conditions translates into actual increased innovation and productivity.

Below the Central Region Denmark’s performance relative to the national average and the EU27 average on key innovation performance indicators is presented in Figure 2. Selected data on the development in R&D expenditure and business innovation indicators is also presented in the following figures.
Figure 2 Innovation Performance Indicators for the Central Denmark Region

Source: Eurostat
Figure 3 R&D Expenditure per Sector of Performance

Source: Eurostat
Figure 4 Share of R&D Expenditure per Sector of Performance

Source: Eurostat

Figure 5 GERD and GDP change

Source: Eurostat
1.3 Identified challenges

Given Central Denmark Region’s ambition to be a competitive region on a global scale, better innovation performance is a key factor. The overall challenge for the region is to make sure that the good framework conditions manifest itself in a better innovation performance. In overall terms, the Central Denmark Region shares this challenge with the other Danish regions. Throughout the last 10 years the productivity in all Danish regions has not followed pace with the OECD-average. The productivity challenge is well documented and it is important point on the political agenda on both the regional- and the national level.

In order to overcome the main overall challenge, the following three key challenges faced by the region should be addressed in the coming years:

1. Increased global competition

Global competition is increasing and this challenges the competitiveness of the region. Companies need to be attentive and willing to adapt and increase productivity through the use of for instance digitalisation and automation, which is a challenge for the small companies with limited resources. It also highlights the importance of a broad and inclusive innovation effort from the regional authorities in order to also foster innovation in the SME’s in the peripheral, western areas of the region.

According to the interviewed regional stakeholders, many companies only think in the short term and are too traditional when it comes to developing and adapting business concepts. Seen in the light of the global competition, many companies need to rethink their business concept, both in terms of product development and business model development.

2. Skill upgrading of the workforce

To most sectors it is a challenge to ensure that the skill set of the workforce is constantly upgraded to match the demand for an increasingly specialised and highly competent workforce. Comparatively high wage levels means that companies are forced to either increase efficiency (e.g through digitalisation and automation), increase the value of products and services through innovation processes or to outsource part of production to countries with lower wages. The more advanced production facilities increases the demand for skilled workers. E.g. the food sector, which is one of the focus areas of the region, is characterised by many unskilled
workers. It is a constant challenge to ensure that the region has enough qualified labour that matches the businesses’ skill demands.

The region has to focus on attracting and retaining talent in general. An example is a food cluster initiative that seeks to address the problem. Better education is also one of the areas that need focus. The region must make sure that more people get a tertiary education or a vocational education, and that more people participate in continuing education.

3. Continued growth in start-ups

Even though the entrepreneurial climate is good in Central Denmark Region, most start-ups do not grow large. The survival rate of start-ups is high in the region, but the experience is that it is very difficult for companies to take the next step and grow into global companies.

It is a big challenge for the region to facilitate and advance the budding entrepreneurial culture. This could be achieved through more information and counselling, more focus on the aspects of entrepreneurship in the education, and better facilitation of capital. As it is now, companies and start-ups in the Central Denmark Region does not attract enough venture capitalist investments, compared to the Capital Region (Ministry of Business and Growth, 2011).
2. Innovation Policy Governance

The governance structure of the regional business development is defined by law in Denmark and is thus the same for all regions. The central actor for regional business policies in Denmark is the Danish Growth Council. It ensures coherence between national and regional growth efforts, launches initiatives to implement the national growth policy at regional level, and it must be consulted regarding regional business development strategies.

2.1 The Regional Growth Forum

There are six regional growth forums – one for each region in Denmark. The Central Denmark Region Growth Forum is one of these growth forums. These forums are the most important organisations for developing and implementing the regional innovation strategies. The growth forum defines a strategy for regional business development, monitor regional and local growth conditions, recommend co-financing to the regions and recommend structural assistance.

In other words, the growth forums are responsible for innovation policies in the regions while the national government is responsible for improving the general business framework conditions in Denmark.

The growth forum brings together representatives of the business community, knowledge and educational establishments, the labour market parties and local and regional authorities. In the Central Denmark Region, the Regional Council (the democratically elected assembly that controls the affairs of the Central Denmark Region) appoints three members of the growth forum. Six members are appointed on the recommendation of the local councils in the region. Six members from the business community are appointed on the recommendation of a number of industrial organisations selected by the regional council. The Regional Council identifies three members from the knowledge and educational institutions. Finally, two members representing the employers are appointed on the recommendation of the employer organisations and employee organisations.

The Central Denmark Growth Forum’s secretariat is a part of the administration of the Central Denmark Region. The secretariat administrates projects on innovation, knowledge-building, new technologies, and tourism under the strategic priorities of the Central Denmark Growth Forum. Its business development activities are financed by the Regional Council’s business development funds, EU Structural Funds, national schemes and contributions from project partners. The Central Denmark Growth Forum selects the projects that they believe should receive funding from the Regional Economic Development Funds and the Structural Funds and present them to the relevant authorities. The Regional Council manages the Regional Economic Development Funds and the Danish Business Authority manages the Structural Funds.

Out of all the EU27-countries, Denmark is the country that earmarks the largest portion of the EU structural funds for innovation. From 2007 to 2013, it is estimated that around 17% of investments in development and innovation were funded by EU structural funds (OECD, 2012).

The Danish Ministry of Business and Growth collaborates with the Region of Central Denmark on making a yearly evaluation of the regional strategy. Every year new adjustments are made in accordance with the economic situation. This setup ensures a high degree of coherence between national and regional strategies. In the future, it is the ambition that the evaluation will become an integrated and natural part of the efforts to develop the regional strategy.
All in all, the Central Denmark Region Growth Forum has a relatively high level of autonomy to create the framework conditions for innovation and business development in the region.

2.2 Strategy development and implementation mechanisms
The Danish institutional setup underwent a major reform in 2007. Certain responsibility areas were allocated to the regions, business development being one of them. In terms of development and implementation of innovation policies, the most important result following the reform was the growth forums. A key task of the growth forums is to design the strategy for business development in the regions. The strategy sets the course for the business and innovation development within the region for a ten-year-period. The current business development strategy covers the period from 2010 to 2020, but will be replaced by a new growth- and development strategy in 2015, due to revised national legislation. Part 3 will go more in-depth with the main focus areas in the current strategy.

The growth forums do not implement the different initiatives and projects they launch. These are implemented by others, for example public partners, research institutions and other independent entities. Monitoring and evaluating of the individual initiatives are overseen by the Growth Forum, but normally carried out by external evaluation partners.

In order to link the regional strategy to a broader national strategy within business, innovation and education (the Danish Globalisation Strategy) the Danish Ministry of Business and Growth has entered into a voluntary partnership agreement with the Central Denmark Region. The partnership agreement ensures that the goals of the regional strategy fit the broader national goals and strategies.

The Danish state governs and finances universities, research institutions and educational institutions centrally. However, the Regional Growth Forum and the universities collaborate closely to enhance the synergies between the universities and business development in the region.

2.3 Inter-regional collaboration
Inter-regional collaboration has been a focus since the Danish regions were established in 2007. The Central Denmark Region has cooperated with the other Western Denmark regions on specific initiatives and projects.

Due to OECD recommendations, the collaboration across regional borders is increasing. Thus, the OECD has recommended that regions should join forces in focusing on clusters based on regional strengths (OECD, 2012). This has resulted in closer interregional collaboration between the Central Denmark Region and the neighbouring regions of the North Denmark Region and the Region of Southern Denmark.

The cooperation seeks to create stronger synergies among the regional clusters because they face some of the same problems, e.g. skill upgrading. The cooperation agreement has been approved by the three growth forums and eight focus areas where cooperation should be strengthened have been identified, i.e. health and welfare innovation, food production, energy, creative industries, capital and entrepreneurship, industry of the future, tourism, and specialised analysis.

The Central Denmark Region also has a number of strategic cooperation agreements with international regions, to support local business growth through globalisation. The international regions are Leningrad Oblast (Russia), Gyor-Moson-Sopron and Bacs Kiskun (Hungary) and the province of Shanghai (China).

See table 1 below for a quick overview of the regional innovation policy governance and table 2 for the innovation policy institutional setup.
<table>
<thead>
<tr>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Degree of general regional autonomy</strong></td>
<td>• Regional authorities have responsibilities in selected areas only</td>
</tr>
<tr>
<td><strong>Degree of autonomy with regard to innovation policy</strong></td>
<td>• Legal framework from the Danish Growth Council.</td>
</tr>
<tr>
<td><strong>Set-up of regional governance system</strong></td>
<td>• The Regional Council is the governing body in the regions</td>
</tr>
<tr>
<td></td>
<td>• The Regional Growth Forums develop and implement the innovation strategy</td>
</tr>
<tr>
<td></td>
<td>• The secretariat of the Growth Forum administrates projects under the strategic priorities of the Growth Forum</td>
</tr>
<tr>
<td><strong>Nature of the process of strategy development</strong></td>
<td>• The Growth Forum designs the long term strategy for business development</td>
</tr>
<tr>
<td><strong>Intra- and inter-regional co-operation</strong></td>
<td>• Inter-regional cooperation on specific projects</td>
</tr>
</tbody>
</table>
Table 2 Innovation Policy Institutional Set-Up and Available Human Resources

<table>
<thead>
<tr>
<th>Policy stage</th>
<th>Primary organisation</th>
<th>Number of personnel directly in charge</th>
<th>Total number of employees</th>
<th>Change in the number of personnel directly in charge over the last five years</th>
<th>Summary assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategy development</strong></td>
<td>The Central Denmark Growth Forum</td>
<td>20 members in the regional Growth Forum</td>
<td>N/A</td>
<td>No change</td>
<td>The regional Growth Forum consists of 20 appointed members and does not have any employees as such.</td>
</tr>
<tr>
<td><strong>Programming</strong></td>
<td>The Central Denmark Growth Forum</td>
<td>1 person – The Head of Department of Innovation and Research</td>
<td>19 employees in the Innovation department and the Business Development department</td>
<td>N/A</td>
<td>Programming process is run in cooperation with external partners and stakeholders.</td>
</tr>
<tr>
<td><strong>Implementation</strong></td>
<td>The Central Denmark Growth Forum</td>
<td>1 person – The Head of Department of Innovation and Research</td>
<td>16 employees in the Innovation department and the Business Development department</td>
<td>N/A</td>
<td>Managed by external implementing partners on the different programmes, e.g. public partners and research institutions.</td>
</tr>
<tr>
<td><strong>Monitoring and evaluation</strong></td>
<td>The Central Denmark Growth Forum</td>
<td>1 person – The Head of Department of Innovation and Research</td>
<td>16 employees in the Innovation department and the Business Development department</td>
<td>N/A</td>
<td>Evaluation of programmes is often handled by external evaluation partners. The Innovation strategy is evaluated regularly.</td>
</tr>
</tbody>
</table>


3. Innovation Policy Instruments and Orientations

3.1 The Regional Innovation Policy Mix

The vision of the regional industrial policy is that “in 2020, the Central Denmark Region will be a globally competitive region – amongst the best in Europe”. The priorities of the regional industrial policy are formulated in the Business Development Strategy 2010-2020 for the Central Denmark Region.

The strategy contains the fundamental principles for future efforts to promote business in the region and highlights four strong (or potentially strong) sectors (sectorial layer). The sectors in focus are:

1. Energy and environment.
2. Foodstuffs.
3. Welfare innovation.
4. Tourism.

In addition to the four mentioned sectors, four cross-cutting areas (horizontal layer) are in focus in the innovation strategy. The areas are not related to a specific sector. They are:

1. Innovation and business development.
2. Digitalisation.
3. Entrepreneurship.
4. Education and skill development.

These sectors play or have the potential to play an important role in the region’s economy – even in the region’s remote areas. With regards to the energy and environment sector, the Central Denmark Region’s businesses account for 67% of Danish export within the sector. The market for sustainable energy solutions is increasing and it is important that the region maintains the position of strength that they hold in the sector. The Central Denmark Region has the potential to become an international pioneer region in this area, which is also underlined in the current innovation strategy (Central Denmark Growth Forum, 2010).

As mentioned earlier The Central Denmark Region also holds a position of strength in the foodstuffs sector. The region’s businesses accounts for 55% of Danish export within foodstuffs. Global competition within the sector is high, which is why the Central Denmark Region focuses on innovation and differentiation of products and services and increasing the competency level, in order for the sector to be globally competitive (Central Denmark Growth Forum, 2010).

The international market for welfare innovation is rapidly increasing in pace with change in the old age dependency ratio in the old advanced industrial societies. The welfare innovation sector will also play an important role in the Central Denmark Region down the road. Initially the focus will be on the health sector but the focus will gradually be expanded to cover innovation within other welfare areas (Central Denmark Growth Forum, 2010). In the years to come the number of tax-payers relative to welfare service receivers will change dramatically. It is therefore paramount to identify solutions that can increase the productivity and efficiency in the welfare

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2 (Central Denmark Growth Forum, 2010)
sector and re-organisation, social innovation and technological development (automation and digitalisation) will be part the innovation process.

Tourism has the potential to contribute to accelerate growth in the region as a whole, and also in the peripheral areas. The tourism potential will mainly be realised through a focused effort to further develop few strong destinations (Central Denmark Growth Forum, 2010). The innovation activities are primarily concentrated in the sectorial layer in a few large framework projects involving businesses, research and public partners. For each area the Growth Forum for the Central Denmark Region has made initiatives, some small and some big, and many initiatives have already reached their end.

A number of major projects has been initiated to meet the challenges:

As of September 2013 the energy and environment area had five notable ongoing initiatives with an innovation focus. IMPLEMENT is a joint Nordic project on the municipal level. The objective is to develop tools that can better utilise the potential of biomass in the energy supply in the participating Nordic municipalities. Local and regional businesses will be involved when possible and feasible to also foster economic growth. The initiative runs from January 2012 to December 2013.

**Wind Power Industry in the Central Denmark Region** focuses on strategic business development in the within wind power. The initiative consists of six parts being; Analysis of Denmark as a Wind Power Hub; Strategy for business leaders within the area; Business development in networks; Introduction to the global wind power market; Competence development; Promoting the region as a Wind Power Hub. The initiative runs from June 2011 to May 2014.

**Biomass-to-Energy** aims at creating new business models, new businesses and improving the opportunities for SMEs to deliver to future biomass-to-energy installations. The initiative runs from October 2010 to December 2014.

**CleanTEKmidt** focuses on offering independent consultancy within technology development in energy and environment for SME's in the Central Denmark Region. The initiative runs from August 2011 to December 2014.

**Challenge:Water** aims at increasing the global competitiveness of regional companies by strengthening the opportunities to develop and produce solutions to the societal challenges in the water sector. The initiative runs from May 2012 to December 2014.

For Foodstuffs, the innovation activities are concentrated in the programme **Future Food Innovation**. The aim of the Future Food Innovation programme is to develop and commercialise new innovative products and services. The activities include support for innovation in food companies via the Differentiation Fund, internationalisation of food companies, knowledge exchange, supporting business-focused Ph.d.s, inventing non-traditional working relationships and focusing on open and radical innovation. The initiative is yet to be evaluated. Originally, the programme had a timeframe from December 2009 to December 2013, but the programme has been extended with an additional year.

In welfare innovation the central activity is the **MedTech Innovation Center (MTIC)**, which was established at the initiative of an association of biotech and medtech companies in the Central Denmark Region. The association lacked a platform with heavier focus on commercialisation in the public sector. MTIC has innovation staff placed at hospitals and at their own office in Aarhus to coordinate internal innovation activities with companies. The initiative initially ran from February 2012 to December 2013, but has been granted an extension for another year.

In the tourism area, the innovation focus is somewhat limited. An action plan has been formulated, but few initiatives have been initiated as per September 2013. A range of strategic efforts to increase the competitiveness of tourism in the region has been
identified and the main focus is to modify already existing “tourism products” to accommodate the market. Increased professionalism in the profession is also in focus.

The fifth priority area – innovation and business development – is the only area in the horizontal layer with a dedicated innovation focus. In this area, a number of small innovation projects have been initiated. The programme **Shortcut to new Knowledge** aims to increase the innovative capacity of SME’s in the region through cooperation with research institutions. The programme has been granted a one year extension and ends at the end of 2014.

**Marketplace for highly educated** is another initiative that has the objective to connect people with a higher education with SMEs, as well as improving the collaboration between SMEs and knowledge institutions. The initiative ended mid-2013. These two projects have received positive evaluations for their combination of hands-on operations and creating case stories for communication of successes. In general, all innovation initiatives in place are aimed at stimulating the supply-side, i.e. the business community. Much focus is on business development and innovation within the specified sectors.

Last, but not least, the Central Denmark Region has initiated efforts under the headline “Circular Economy”. In its simplicity, the concept is to think of production and consumption in an environmentally and commercially sustainable way. One of these efforts is the **Rethink Business** initiative, which focus on green business development. The idea is to identify parts in a company’s production, where the company can utilize the resources more efficiently as well as promoting so-called industrial symbiosis, through the development of innovative business models. In other words, the goal is to promote the creation of innovative symbiotic relationship between companies, where one company’s waste product is used in another company’s production, to secure sustainable commercial growth in an environmentally friendly way.

The interviewees state that it is more difficult to gather financing for an innovation project than for business implementation projects in a political environment that demands tangible results in the short term. For the small projects, it is a challenge to find an economically, sustainable form to continue the work after the formal finalisation of the project. A number of other factors can also act as barriers to the continuation of projects, including competences, status, organisation, culture and habits. Consequently, the Research and Innovation Department now focuses on moving innovation design from the business level to “a whole systems design, where more factors can be taken into account.

The Central Denmark Region has approximately €20m available for business development per year in the period from 2013 to 2016. Around €10m comes from EU structural funds (Central Denmark Region, 2013).

Table 3 below outlines the policy measures from the Central Denmark Region Growth Forum.
## Table 3: Existing Regional Innovation Support Measures

<table>
<thead>
<tr>
<th>Title</th>
<th>Duration</th>
<th>Policy priorities</th>
<th>Budget 2013</th>
<th>Organisation responsible</th>
<th>More information</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMPLEMENT</td>
<td>Jan. 2012 – Dec. 2014</td>
<td>• Product development and strategy development</td>
<td>€1.25m</td>
<td>Skive municipality</td>
<td><a href="http://www.tinyurl.dk/42407">Link</a> (In Danish)</td>
</tr>
<tr>
<td>Wind Power Industry in the Central Denmark Region</td>
<td>June 2011 – May 2014</td>
<td>• Strategic business development</td>
<td>€0.5m</td>
<td>Danish Wind Industry Association</td>
<td><a href="http://www.tinyurl.dk/42408">Link</a> (In Danish)</td>
</tr>
<tr>
<td>CleanTEKmidt</td>
<td>Aug. 2011 – Dec. 2014</td>
<td>• Technology innovation in SME's</td>
<td>€1.7m</td>
<td>Business Development Centre Central Denmark</td>
<td><a href="http://www.tinyurl.dk/42410">Link</a> (In Danish)</td>
</tr>
<tr>
<td>Challeng: Water</td>
<td>May 2012 – Dec. 2014</td>
<td>• Technology innovation and increased competitiveness</td>
<td>€1.3m</td>
<td>Ferskvandscentret</td>
<td><a href="http://www.tinyurl.dk/42411">Link</a> (In Danish)</td>
</tr>
<tr>
<td>Future Food Innovation</td>
<td>Dec. 2009 – Dec. 2014</td>
<td>• Establishment of an innovation environment within the foodstuffs sector</td>
<td>€5.3m</td>
<td>Agro Business Park</td>
<td><a href="http://www.tinyurl.dk/42412">Link</a> (In Danish)</td>
</tr>
<tr>
<td>Shortcut to New Knowledge</td>
<td>Jan. 2011 – Dec. 2014</td>
<td>• Increase innovation capacity in SME's</td>
<td>€3.5m</td>
<td>AU OutReach, Technology Transfer &amp; Entrepreneurship, Aarhus University</td>
<td><a href="http://www.tinyurl.dk/42414">Link</a> (In Danish)</td>
</tr>
<tr>
<td>Marketplace for highly educated</td>
<td>June 2011 – May 2013</td>
<td>• Increase the number of highly educated in SME's</td>
<td>€0.3m (first half of 2013)</td>
<td>Aarhus University</td>
<td><a href="http://www.tinyurl.dk/42415">Link</a> (In Danish)</td>
</tr>
</tbody>
</table>

Source: RIM Plus repository (The Central Denmark Region, Denmark).
3.2 Appraisal of Regional Innovation Policies

At the end of the first term of the growth forums (2006 – 2009), an evaluation was made to accumulate the experiences of the first term before entering the next term (2010 – 2020). Focus was solely on lessons learned and to ensure that the policy mix moving forward is suitable to match the needs of the region. The evaluation of the first term Growth Forum’s (and the policy mix) performance indicate that the measures achieved its intended targets. In some areas the support measure actually performed beyond the intended targets.

A midterm evaluation concerning the work of all five Growth Forums in Denmark investigated their performance on the goals set out in the European Union’s Structural Funds. The evaluation was carried out in 2011 and concerns the 2007 – 2013 Structural Fund period. From the evaluation it is evident that the work is well under way and the expectations to the results even exceed the targets in many cases. The evaluation highlights two “do’s” which are important for optimising the performance of the Forums w.r.t. the European Structural Funds: the creation of project-specific indicators and indicator-based project evaluation, which could allow for more detailed evaluation and comparison of projects, and the need for continued focus on cooperation between the forums for initiatives which extend beyond the regional borders.

The current regional innovation policy mix of the Central Denmark Region has not been thoroughly evaluated yet, although the individual projects are being monitored as they are obliged to deliver a yearly report to the Growth Forum secretariat.

The Danish regions and the Danish Business Authority have launched a project that evaluates and documents the results of the regional business development initiatives. A series of tangible development indicators has been set up to evaluate the outcomes and impacts of the current policy mix.

A tool for improving the overall regional innovation policy is the yearly evaluation of the partnership agreement between the Danish Ministry of Business and Growth and the Central Denmark Growth Forum. The main aim of this agreement is to make sure that the national and the regional business development policies correspond closely to each other. It is the ambition that the evaluation will become an integrated and natural part of the effort to develop the regional strategy in the future.

The first of the main challenges identified in section 1.3 was “increased global competition”. Several of the policy initiatives address this specific challenge by focusing on increased global competitiveness within the focus areas. Global competitiveness plays a big role in the regional innovation strategy, which is also evident in the vision of the overall Business Development Strategy. However, challenge 2 and 3, “skill upgrading of the workforce” and “continued growth in start-ups” are addressed to a lesser extent.

Some of the measures do focus on matching the workforce with companies, but only at the higher end of the educational scale, and not on skill upgrading as such. Increased cooperation with educational- and research institutions as well as the establishment of clusters addresses the problem of attracting and retaining talent. Skill upgrading and entrepreneurship are also addressed in the strategy as separate focus areas. However, it is the assessment that more focus on the latter two identified challenges could be incorporated in the policy mix with advantage.

The challenges identified in section 1.3 seem to indicate that a broader focus is needed, instead of mainly focusing on business development and framework conditions for business. More emphasis can be put on ensuring that the workforce in the region has the right competencies that the companies in the region demands and more measures to ensure that start-ups grow large and become global are needed as well.

The latest set of status reports from the mentioned initiatives is from September 2013. The individual status reports indicate that most initiatives are on target or even ahead.
of target. However, only **Future Food Innovation, MTIC, Shortcut to new Knowledge** and **Marketplace for highly educated** have been subject to midterm evaluation from external evaluators.

All four evaluations were very positive which have resulted in the extension of three of the initiatives. There are no final evaluations available since the current initiatives have not yet been completed. In conclusion, it is not clear if the current regional innovation policy mix is adequate to meet the future challenges facing the Central Denmark Region. The prospects of more evaluations on the outcome of individual programme initiatives are positive, but the regional policy mix as such has not been thoroughly evaluated yet. Therefore, it is difficult to conclude if the policy mix spurs synergies between the national and the regional innovation policy sufficiently and if the mix matches the needs of the region.

### 3.3 Good practice case

The ‘Genvej til ny viden’ (Shortcut to new knowledge) project aims to increase the number of SMEs in the Central Denmark Region working with academic and research institutions on innovation and thereby achieving a documented positive business development.

The objective is to set up concrete collaborations that will contribute to growth and innovation in the region, and at the same time explore and establish new methods and forms of cooperation that can be realised in other contexts. The facilitator is the Centre of Entrepreneurship and Innovation at Aarhus University.

The participating companies work with a wide range of different projects such as product development, optimisation of production methods and processes, or the development of new business models. Researchers from the university and other research institutions are affiliated to each project.

The programme consists of different phases. The first phase, phase 0, is a maturing phase where goals and contents are determined and ultimately decided if a certain company is suitable for phase 1. In the next phase, the concrete project is mapped and the companies can receive up to DKK 50,000 (€6,700) in grants to prepare the collaboration. The facilitator matches the companies’ needs within the specific projects with relevant researchers and experts. In the final phase, phase 2, the actual project is initiated and the companies may be granted up to DKK500,000 (€67,000) to fund the researchers’ time, external process facilitation and project management.

More than 160 company contacts have been accomplished out of which 61 innovative companies have been granted support to phase 1 and 34 companies have been granted support to phase 2.

The midterm evaluation in 2012 was very promising and the Danish Ministry of Science, Innovation and Higher Education have already incorporated elements from the programme into the future strategy for development of SMEs. The evaluation stated that “the project fills a hole in the Danish innovation system” and that “the Central Denmark Region’s businesses have been given just as good conditions for knowledge cooperation as businesses in the countries that have the strongest general programmes for knowledge cooperation” (Region Midtjylland, 2012).

The programme is funded by the European Regional Development Fund and the Central Denmark Region. The project has been granted an extension until the end of 2014.

### 3.4 Towards Smart Specialisation Policies

According to the interviewed stakeholder, the Central Denmark Region view smart specialisation as an important tool in enhancing the innovation capacity of the region. It is acknowledged that smart specialisation should be incorporated in the strategy in order to qualify for EU structural funds as of 2014.
Central Denmark Region’s innovation strategy is to some extent organised in accordance with the principles of smart specialisation. The elements of national priorities, local strongholds, involvement of stakeholders are visible. The sectorial layer of the strategy focuses on sectors with a competitive advantage in the region as well as sectors with a strong business potential. However, the region’s innovation strategy was formulated before the era of smart specialisation.

A major initiative in the direction of smart specialisation is the creation the Danish Food Cluster. This cluster has been created an initiative to exploit the potential for business growth and synergies and strengthen cooperation with research and knowledge institutions. It is hoped that the initiative will contribute to food industry innovation, growth and employment in the Central Denmark Region and the rest of Denmark. It is also the hope that this cluster will open up for more clusters and more concrete smart specialisation initiatives in the region.

As mentioned above, the Central Denmark Region is also engaged in partnerships with other regions. The cooperation across regional borders seeks to create synergies among regional clusters, which is also one of the focal points of the smart specialisation concept.

However, according to the interviewees, the general view of the Danish Business Authority is that Denmark is already at a level where smart specialisation is incorporated in the way that innovation strategies are formed, and that the concept mainly applies to countries that have embraced the smart specialisation concept recently.

Consequently, at the national level the concept has been losing importance as a rigid and formalised instrument even though it is still important when grants from the Structural Funds are distributed. In a forward-looking perspective, the region wishes to work with a broad definition of smart specialisation, according to the interviewed stakeholder. Instead of looking at specific strong sectors, as the region does now, the region also wishes to work with the concept across sectors, by focusing on specific strong skills that characterizes the region.

3.5 Possible Future Orientations and Opportunities

In the Central Denmark Region there is a general contentment among the decision makers with the current innovation initiatives. The innovation activities follow the general strategy, and the strategy has been extended to combine a sector orientation with cross sectional initiatives on skills, digitalisation, entrepreneurship and business innovation. Therefore, the existing initiatives on innovation seem to address the identified regional challenges.

We have identified possible future orientations and opportunities for the region. The first opportunity is an improved integration of regional strategies to better support innovation processes; the second is to supplement the sector activities with cross-sectional initiatives on skills, digitalisation, entrepreneurship and business innovation. Therefore, the existing initiatives on innovation seem to address the identified regional challenges.

We have identified possible future orientations and opportunities for the region. The first opportunity is an improved integration of regional strategies to better support innovation processes; the second is to supplement the sector activities with cross-sectional activities which can benefit companies and citizens across the region; the third is to exploit the event of Aarhus as European cultural capital in 2017 to better position the Central Denmark Region; and, finally, to strengthen the focus on skills by following up on expected reforms of the vocational education system in Denmark. These four future opportunities will be treated in more detail below.

• A more integrated regional development strategy

Amendments to the Danish Business Promotion Act mean that the Danish regions are forced to revise their current strategies. The Growth Forum’s Business Development Strategy must now be combined with the Regional Development Strategy of the Regional Council. Initially, the deadline for incorporating the two strategies was 2016, but the time limit has now been removed. During the interviews it was emphasized that several opportunities are connected with the development of the future strategy. It creates a unique opportunity for combining the societal challenges with business challenges and proposing solutions for solving both types. This can be
valuable in a global context as the synergies created can put the region’s companies in a position where they become first movers in certain areas. Therefore, “Whole system design” is a priority and an opportunity for the region. This work should clearly continue and be prioritised in the region to increase efficiency and coherence in initiatives.

- **Orienting policies towards territorial cohesion**

One key recommendation from a series of recommendations from the OECD is to **put even more emphasis on avoiding that the peripheral areas of the region lag behind**. Relying heavily on tourism to create growth in the remote areas is a risky strategy and a more creative and innovative approach is called for (OECD, 2012). The Central Denmark Region is a relatively small area, so it is probably more relevant to discuss a West and an East part of the Region rather than taking a centre-periphery view, since very few areas can be considered to be “remote” (as compared to remote areas in e.g. Sweden or Norway). Aarhus can be reached in little more than 2 hours from almost anywhere in the region. The system of motorways has been extended considerably within and to/from the region in recent years. In its focus on skills, digitalisation, entrepreneurship and business innovation, in addition to selected sectors, the Central Denmark Region has put a strategy in place that is focused in its content, but covers the geography of the region well. Support of entrepreneurship and business innovation are important activities especially outside city-areas.

- **Communicating visible strengths**

The cluster approach and smart specialisation are also highlighted by the OECD as areas that need increased future focus. Especially the development of inter-regional cooperation within clusters is emphasised. This recommendation has subsequently been embraced by the region, as mentioned earlier, and it is an area of great importance for future growth. At the same time, as a consequence of the increased global competition, it is important to **focus more on branding and on communicating the international position of the prioritized regional strengths** (OECD, 2012). As mentioned above, Aarhus has been designated as European capital of culture for 2017. This is an opportunity for the entire region to brand regional strengths and it is important to prioritize clear strategies, especially in the area of tourism, before this event. But the platform could also be used as an opportunity to promote and brand regional skills within energy and environment sectors as well as foodstuffs.

- **Tackling the skills mismatch**

OECD also identifies the skill mismatch of the current and future workforce as an area that should receive increased attention moving forward. Focus should be on both developing and attracting the necessary skills (OECD, 2012). Developing The skills of the workforce are already clearly on the agenda and Aarhus University and VIA University College are relevant regional partners. A reform of the vocational educational system in Denmark is in the pipeline and the reform must be implemented quickly.
Appendix A: Bibliography

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7. Ministry of Business and Growth (2011), Regionalpolitisk vækstredegørelse 2011. Available at: [http://www.regioner.dk/~/media/Filer/Regional%20udvikling/V%C3%A6kstfor%20Regionalpolitisk%20vaekstredegoerelse%202011.ashx](http://www.regioner.dk/~/media/Filer/Regional%20udvikling/V%C3%A6kstfor%20Regionalpolitisk%20vaekstredegoerelse%202011.ashx).
Appendix B: Stakeholders consulted

1. Ellinor Bæk Thomsen, Head of Department, Department for Innovation & Research at Central Denmark Region (12 September 2013 and 10 December 2013).

2. Christian Selmer Fredsø Jensen, Project Manager, Department for Innovation & Research at Central Denmark Region (12 September 2013).

### Appendix D: Statistical Data

<table>
<thead>
<tr>
<th>DK04 Midtjylland</th>
<th>Country</th>
<th>EU27</th>
<th>Year</th>
<th>Performance relative to</th>
<th>Performance relative to</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DK04</td>
<td>DK</td>
<td>EU27</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ECONOMIC INDICATORS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP per capita (Euros)</td>
<td>38800</td>
<td>42600</td>
<td>24500</td>
<td>2010</td>
<td>158,4</td>
</tr>
<tr>
<td>Long term unemployment rate</td>
<td>1,59</td>
<td>1,84</td>
<td>4,14</td>
<td>2011</td>
<td>260,4</td>
</tr>
<tr>
<td>Labour productivity growth (%)</td>
<td>3,16</td>
<td>2,77</td>
<td>2,20</td>
<td>2000-2010</td>
<td>143,7</td>
</tr>
<tr>
<td>RCI 2013</td>
<td>0,51</td>
<td>0,00</td>
<td></td>
<td>2013</td>
<td>100,0</td>
</tr>
<tr>
<td>Share of employment in agriculture</td>
<td>0,03</td>
<td>0,02</td>
<td>0,05</td>
<td>2011</td>
<td>63,8</td>
</tr>
<tr>
<td>Share of employment in industry (including construction)</td>
<td>0,23</td>
<td>0,20</td>
<td>0,25</td>
<td>2011</td>
<td>93,3</td>
</tr>
<tr>
<td>Share of employment in business</td>
<td>0,30</td>
<td>0,31</td>
<td>0,30</td>
<td>2011</td>
<td>98,7</td>
</tr>
<tr>
<td>Share of employment in public sector</td>
<td>0,32</td>
<td>0,33</td>
<td>0,25</td>
<td>2011</td>
<td>127,4</td>
</tr>
<tr>
<td>Share of employment in S&amp;T</td>
<td>0,07</td>
<td>0,08</td>
<td>0,09</td>
<td>2011</td>
<td>82,7</td>
</tr>
<tr>
<td><strong>RESEARCH &amp; TECHNOLOGY INDICATORS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employees with ISCED 5-6 (% all employees)</td>
<td>28,9</td>
<td>32,3</td>
<td>30,4</td>
<td>2011</td>
<td>95,0</td>
</tr>
<tr>
<td>Business R&amp;D (% GDP)</td>
<td>0,29</td>
<td>2,09</td>
<td>1,24</td>
<td>2010</td>
<td>36,1</td>
</tr>
<tr>
<td>Government R&amp;D (% GDP)</td>
<td>0,04</td>
<td>0,07</td>
<td>0,26</td>
<td>2010</td>
<td>15,4</td>
</tr>
<tr>
<td>Higher Education R&amp;D (% GDP)</td>
<td>0,87</td>
<td>0,92</td>
<td>0,49</td>
<td>2010</td>
<td>177,6</td>
</tr>
<tr>
<td>EPO patent applications (per mln population)</td>
<td>210,30</td>
<td>222,74</td>
<td>114,99</td>
<td>2008</td>
<td>182,9</td>
</tr>
<tr>
<td>Employment in medium-high &amp; high-tech manufacturing (% total employment)</td>
<td>6,35</td>
<td>5,73</td>
<td>6,39</td>
<td>2011</td>
<td>99,4</td>
</tr>
<tr>
<td>Employment in knowledge-intensive services (% total employment)</td>
<td>43,64</td>
<td>47,41</td>
<td>35,32</td>
<td>2011</td>
<td>123,6</td>
</tr>
<tr>
<td>Total R&amp;D personnel (% active population) - numerator in head count - all sectors</td>
<td>1,53</td>
<td>2,89</td>
<td>1,53</td>
<td>2010</td>
<td>100,0</td>
</tr>
<tr>
<td>Structural funds on business innovations (Euros per mln population)</td>
<td>18,84</td>
<td>19,19</td>
<td>77,74</td>
<td>2007-2013</td>
<td>24,2</td>
</tr>
<tr>
<td>Structural funds on core RTDI (Euros per mln population)</td>
<td>20,80</td>
<td>21,65</td>
<td>63,01</td>
<td>2007-2013</td>
<td>33,0</td>
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<tr>
<td><strong>LABOUR PRODUCTIVITY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-E - Industry (except construction)</td>
<td>73,607</td>
<td>110,597</td>
<td>71,853</td>
<td>2010</td>
<td>102,4</td>
</tr>
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<td>C - Manufacturing</td>
<td>65,498</td>
<td>79,249</td>
<td>56,378</td>
<td>2010</td>
<td>116,2</td>
</tr>
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<td>F - Construction</td>
<td>78,428</td>
<td>59,764</td>
<td>43,792</td>
<td>2010</td>
<td>179,1</td>
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<td>G-I - Wholesale and retail trade, transport, accomodation and food service activities</td>
<td>55,343</td>
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<td>37,843</td>
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<td>Activity</td>
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<td>2010</td>
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<tr>
<td>J - Information and communication</td>
<td>93.496</td>
<td>92.460</td>
<td>79.994</td>
<td>116.9</td>
<td>101.1</td>
</tr>
<tr>
<td>L - Real estate activities</td>
<td>422.911</td>
<td>399.640</td>
<td>387.941</td>
<td>109.0</td>
<td>105.8</td>
</tr>
<tr>
<td>M_N - Professional, scientific and technical activities; administrative and support service activities</td>
<td>64.290</td>
<td>66.427</td>
<td>39.717</td>
<td>161.9</td>
<td>96.8</td>
</tr>
</tbody>
</table>

**BUSINESS INNOVATION INDICATORS**

<table>
<thead>
<tr>
<th>Category</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technological (product or process) innovators (% of all SMEs)</td>
<td>0.50</td>
<td>0.50</td>
<td>0.40</td>
<td>125.5</td>
<td>100.4</td>
</tr>
<tr>
<td>Non-technological (marketing or organisational) innovators (% of all SMEs)</td>
<td>0.46</td>
<td>0.45</td>
<td>0.38</td>
<td>121.7</td>
<td>101.8</td>
</tr>
<tr>
<td>Innovative SMEs collaborating with others (% of all SMEs)</td>
<td>0.64</td>
<td>0.61</td>
<td>0.37</td>
<td>172.3</td>
<td>104.6</td>
</tr>
<tr>
<td>SMEs innovating in-house (% of all SMEs)</td>
<td>0.65</td>
<td>0.67</td>
<td>0.39</td>
<td>167.3</td>
<td>97.0</td>
</tr>
</tbody>
</table>