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Trade Specialisation  
and Policies to Foster  
Competition and Innovation  
in Denmark

**Müge Adalet McGowan**

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**TRADE SPECIALISATION AND POLICIES TO FOSTER COMPETITION  
AND INNOVATION IN DENMARK**

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**By Müge Adalet McGowan**

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**ABSTRACT/RÉSUMÉ****Trade specialisation and policies to foster competition and innovation in Denmark**

Danish productivity has grown only weakly over the past two decades, both historically and in relation to other countries, despite sound policies and institutions. At the same time, the country has lost export market shares. Denmark needs to continue its efforts to reap the benefits of globalisation, which would contribute to invigorating productivity growth. Fostering competition by removing regulatory barriers and improving public procurement would help. In addition, innovation policy needs to become more efficient and more in line with the growing importance of the service sector and knowledge-based capital. Small and medium-sized enterprises could be better integrated into global markets by improving their access to finance and developing the entrepreneurship culture.

This Working Paper relates to the 2013 *OECD Economic Survey of Denmark* ([www.oecd.org/economic-survey-denmark.htm](http://www.oecd.org/economic-survey-denmark.htm)).

JEL Classification: D24; F1; F6; O3; O4.

Keywords: Denmark, productivity, trade specialisation, global value chains, export market shares, competition, regulation, innovation, small and medium sized enterprises.

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**Spécialisation commerciale et politiques de promotion de la concurrence et de l'innovation au Danemark**

La productivité danoise n'a progressé que modérément au cours des deux dernières décennies, en comparaison aux périodes passées et aux autres pays, malgré des politiques et des institutions de bonne qualité. En outre, le Danemark a perdu des parts de marché à l'exportation. Le pays doit poursuivre ses efforts pour tirer parti des retombées positives de la mondialisation, ce qui contribuerait à stimuler la croissance de la productivité. Il faudrait également promouvoir la concurrence en supprimant les obstacles réglementaires et en améliorant les procédures de marchés publics. En outre, les politiques d'innovation doivent gagner en efficacité et prendre davantage en compte l'importance croissante du secteur des services et du capital intellectuel. L'intégration des petites et moyennes entreprises dans les marchés mondiaux pourrait être renforcée en améliorant leur accès aux financements et en développant la culture entrepreneuriale.

Ce Document de travail se rapporte à *l'Étude économique de l'OCDE du Danemark*, 2013 ([www.oecd.org/fr/eco/etudes/etude-economique-danemark.htm](http://www.oecd.org/fr/eco/etudes/etude-economique-danemark.htm)).

Classification JEL : D24 ; F1 ; F6 ; O3 ; O4.

Mots clés : Danemark, productivité, spécialisation commerciale, chaînes de valeur mondiales, parts de marché à l'exportation, concurrence, réglementation, innovation, petites et moyennes entreprises.

## TABLE OF CONTENTS

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|   |    |
|---|----|
| TRADE SPECIALISATION AND POLICIES TO FOSTER COMPETITION AND INNOVATION IN DENMARK ..... | 6  |
| Productivity growth has been sluggish.....  | 7  |
| Trade specialisation as a source of growth.....   | 9  |
| Assessing the decline in market shares.....   | 11 |
| Participation in global value chains.....   | 12 |
| Getting more from trade specialisation.....   | 14 |
| Trade and green growth.....   | 15 |
| Fostering competition.....  | 16 |
| Addressing regulatory barriers.....   | 16 |
| Improving the public procurement process further.....                                   | 18 |
| Strengthening and streamlining the competition framework.....                           | 20 |
| Promoting innovation.....   | 20 |
| Assessing Denmark’s innovation performance.....   | 20 |
| Raising the efficiency of innovation policies.....                                      | 23 |
| Improving access to funding.....  | 26 |
| Facilitating SME growth and internationalisation.....                                   | 27 |
| Promoting high-growth firms and entrepreneurship.....                                   | 28 |
| Increasing internationalisation further.....  | 30 |
| Bibliography.....   | 32 |
| ANNEX 1. DENMARK’S INNOVATION STRATEGY.....   | 38 |

### Tables

|   |    |
|---|----|
| 1. Labour productivity, total factor productivity and capital deepening.....                    | 9  |
| 2. Destination of Danish exports.....   | 10 |
| 3. Contribution of structural and performance effects to total export market shares growth..... | 11 |
| 4. Revealed comparative advantage in manufacturing.....   | 13 |
| 5. Gazelles in Nordic countries.....  | 29 |

### Figures

|   |    |
|---|----|
| 1. Gaps in GDP per capita and productivity to the upper half of OECD countries..... | 6  |
| 2. Growth in real GDP per hour worked, total economy.....                           | 7  |
| 3. Participation in global value chains.....  | 12 |
| 4. Bilateral trade balance between Denmark and its main trading partners.....       | 13 |
| 5. Restrictions on international trade in services.....                             | 14 |
| 6. Per capita production and consumption-based CO <sub>2</sub> emissions.....       | 15 |
| 7. Renewable energy patents.....  | 16 |
| 8. Regulation in the retail sector.....   | 17 |
| 9. Public procurement spending.....   | 19 |
| 10. Comparative performance of national science and innovation systems.....         | 21 |
| 11. Total factor productivity growth and business R&D intensity.....                | 22 |
| 12. Service-related trademark applications.....                                     | 22 |

|   |    |
|---|----|
| 13. Investment intensity in knowledge-based capital.....                      | 23 |
| 14. Direct government funding of business R&D and tax incentives for R&D..... | 24 |
| 15. Firms' success rate in obtaining loans .....                              | 26 |
| 16. Venture capital investment.....   | 27 |
| 17. Innovation by small and medium enterprises.....                           | 28 |

## Boxes

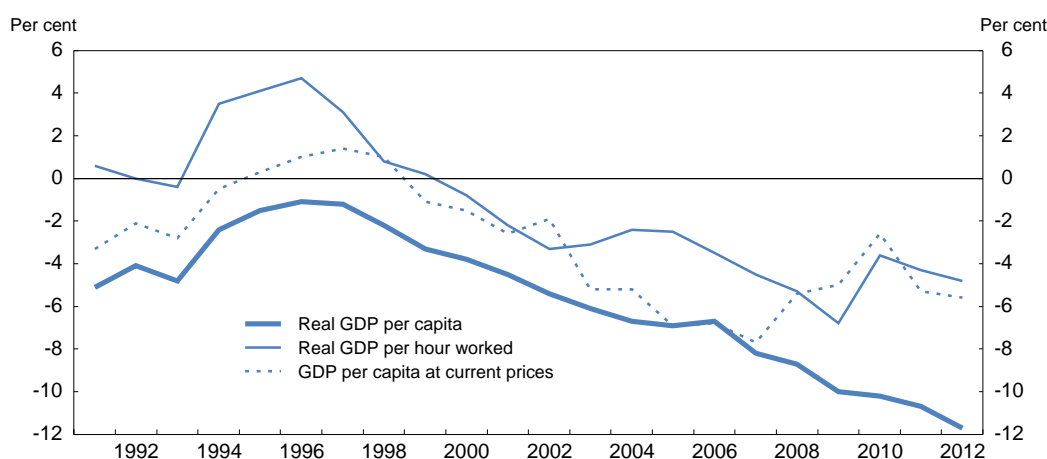
|  |    |
|--|----|
| Box 1. Productivity commissions in selected OECD countries .....                   | 8  |
| Box 2. Globalisation and productivity .....  | 10 |
| Box 3. Market share analysis .....   | 11 |
| Box 4. Regulatory reform of the Danish book market .....                           | 17 |
| Box 5. Recommendations to foster competition, innovation and entrepreneurship..... | 31 |

## TRADE SPECIALISATION AND POLICIES TO FOSTER COMPETITION AND INNOVATION IN DENMARK

Müge Adalet McGowan<sup>1</sup>

Weak productivity growth over the past two decades has contributed to a widening of the income gap *vis-à-vis* leading OECD economies, although the gap is smaller when terms of trade gains are taken into account (Figure 1). Reinvigorating productivity growth is a key challenge to achieve stronger growth and sustain Denmark's welfare system. Over the same period, the country has also lost export market shares. The slowdown in productivity growth and losses in market shares are closely linked. On the one hand, there is a need to be productive in order to be competitive and reap the benefits of globalisation. On the other hand, being open to trade and foreign direct investment and participating in global value chains (GVCs) help to become more productive.

**Figure 1. Gaps in GDP per capita and productivity to the upper half of OECD countries<sup>1</sup>**



1. Percentage gap with respect to the simple average of the highest 17 OECD countries in terms of real GDP per capita (in constant 2005 PPPs), real GDP per hour worked (in constant 2005 PPPs) and GDP per capita at current prices (in current PPPs). The income gap is smaller at current than at constant prices partly because of terms of trade gains.

Source: OECD, *Going for Growth Database*.

The highest value from participating in trade is generally created in upstream activities, such as R&D and product design, or downstream activities such as in marketing and branding (OECD, 2013a). Denmark already has some comparative advantage in these activities, but there is room to do better on innovation and maintain or even increase participation in GVCs, and thereby raise productivity growth.

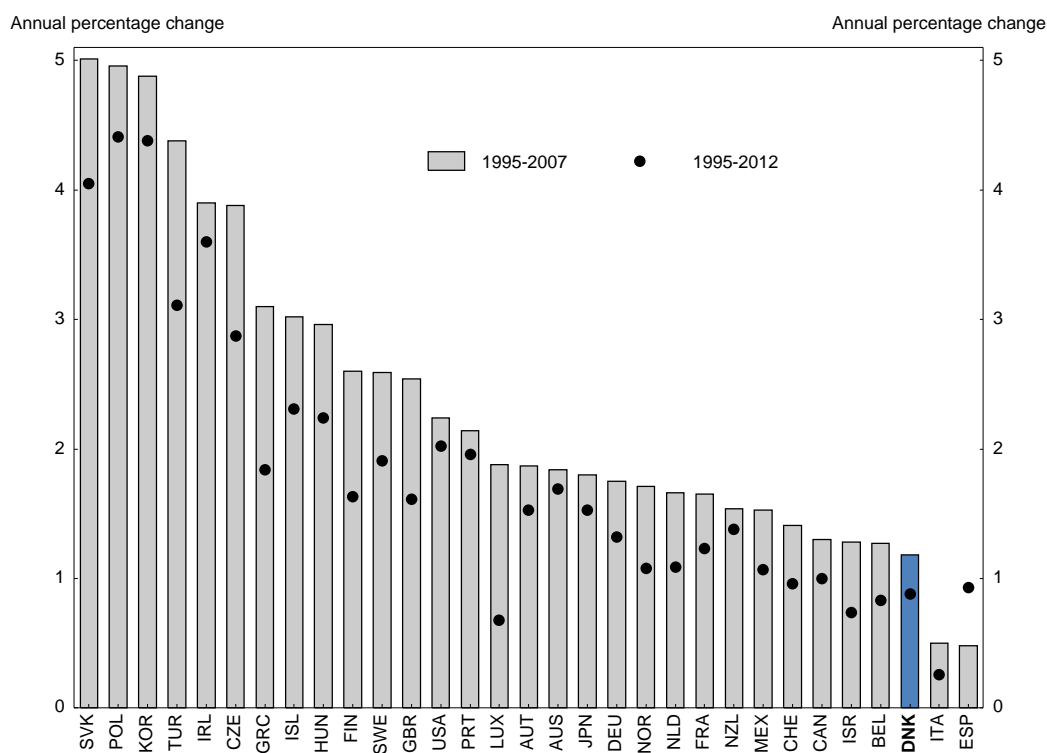
1. Müge Adalet McGowan is an economist in the Economics Department of the OECD. This paper was originally produced for the 2013 *OECD Economic Survey of Denmark* published in January 2014 under the authority of the Economic and Development Review Committee (EDRC) of the OECD. The author would like to thank Andrew Dean, Koen de Backer, Jørgen Elmeskov, Robert Ford, Stéphanie Jamet, Vincent Koen, Pierre LeBlanc, Sébastien Miroudot and Jeremy West, as well as officials from the Danish government, for valuable discussions and comments on earlier drafts. Special thanks go to Lutécia Daniel for technical assistance and to Nadine Dufour and Mikel Inarritu for technical preparation.

Well-designed general framework policies and institutions are crucial for productivity growth and help the country benefit from globalisation. After looking at productivity developments and the pattern of Danish trade specialisation to identify areas for improvement, this paper discusses some of these policies. Stronger product market competition, policies to foster a dynamic business sector that make it easier for new, innovative firms to emerge, experiment and grow, and policies to boost investment in knowledge-based activities all will help to develop new products and become more productive. Policies to nurture the right skills and make good use of them will also contribute.

### Productivity growth has been sluggish

While labour productivity is still high compared with many countries, it has increased less than in some of the leading OECD economies and Denmark's geographic peers, although there have been some improvements in recent years (Figure 2). Statistics Denmark recently released a preliminary productivity growth time series for the whole economy incorporating new estimates of productivity in the public sector based on direct measures of output instead of input-based measures (Statistics Denmark, 2013). While these data point to a slightly better productivity record than suggested by previous data, sluggish productivity growth remains a problem. In 2012, the government appointed a temporary Productivity Commission to help address these issues (Box 1). This is welcome, but independent work on policies to enhance productivity should continue, either by setting up a permanent Productivity Commission or by giving this mandate to another independent institution.

Figure 2. Growth in real GDP per hour worked, total economy



Source: OECD, *Productivity Database*, December 2013.



### Box 1. Productivity commissions in selected OECD countries

In 2012, a temporary productivity commission consisting of independent experts was set up in Denmark to analyse productivity trends and make specific recommendations to enhance productivity in Denmark's private and public sector. Its mandate stated that the proposals made must not impair the structural fiscal balance in 2020 or the sustainability of public finances. The Commission is composed of a chairman and eight other members, served by an independent secretariat, and takes advice from a board of international experts. The Commission has debated its work and conclusions publicly, and has published several interim reports during 2012-13.

Some other OECD countries have permanent productivity commissions that act as review and advisory bodies on microeconomic policy reform and regulation with the aim of achieving better informed policy decisions through independent analysis and advice:

- The Australian Productivity Commission, created as an independent authority in 1998, provides research and advice on a range of economic, social and environmental issues affecting the welfare of Australians. Twelve commissioners (one of which acts as Chair) are appointed for periods of up to five years and associate commissioners are appointed by the Treasurer. The Commission holds public inquiries and carries out research studies requested by the government, undertakes performance monitoring and benchmarking services to government bodies, provides advice to the government on private sector complaints of unfair competition from the public sector and reports on productivity, industry assistance and regulation every year. Its reports, including those on power sector, innovation, export credits and business regulation have been used in parliamentary inquiries, contributing to policy discussions and some of the recommendations were implemented by the government (Australian Productivity Commission, 2013; OECD, 2009a).
- The New Zealand Productivity Commission is an independent body created in 2011, with the purpose to provide advice to the government on improving productivity in a way that is directed to supporting the overall well-being of New Zealanders. It has a three member board, which is supported by fifteen staff. It undertakes in-depth inquiries on topics referred to it by the government, carries out research to help improve productivity over time and promotes the understanding of productivity issues. For example, its main recommendations based on inquiries on housing affordability and the international freight transport system were implemented by the government (New Zealand Productivity Commission, 2013).

Labour productivity growth since 1995 has been held back by total factor productivity (TFP), which on average has contributed negatively (OECD, 2009b; IMF, 2010; Danish Economic Council, 2010). In contrast, capital deepening has contributed substantially to labour productivity growth in Denmark (Table 1).

Both productivity growth within sectors and productivity growth due to reallocation of resources across sectors have contributed to the deceleration in labour productivity over the past 15 years (Andersen and Spange, 2012; Danish Economic Council, 2010). The contribution of the service sector to aggregate productivity growth has been very small, while the share of this sector in total gross value added has increased from 48% in 1995 to 55% in 2012. According to the Danish Productivity Commission, if productivity growth in the private service sector had matched that in the United States between 1995 and 2011, total productivity growth in Denmark would have been 0.7 percentage points per year higher over this period (Productivity Commission, 2013a). Low productivity growth in services also affects the rest of the economy as services are inputs to other sectors, but this effect is not accounted for in this type of calculation.

**Table 1. Labour productivity, total factor productivity and capital deepening**

|                | 1995-2011                  |                                   |                     |
|----------------|----------------------------|-----------------------------------|---------------------|
|                | Labour productivity growth | Contribution of capital deepening | Contribution of TFP |
| Italy          | 0.36                       | 0.58                              | -0.22               |
| Spain          | 0.77                       | 0.90                              | -0.12               |
| Belgium        | 0.88                       | 0.63                              | 0.25                |
| <b>Denmark</b> | <b>0.94</b>                | <b>1.07</b>                       | <b>-0.13</b>        |
| Switzerland    | 0.97                       | 0.43                              | 0.53                |
| New Zealand    | 1.00                       | 0.61                              | 0.39                |
| Canada         | 1.07                       | 0.73                              | 0.35                |
| Netherlands    | 1.23                       | 0.78                              | 0.45                |
| France         | 1.28                       | 0.62                              | 0.67                |
| Germany        | 1.37                       | 0.48                              | 0.88                |
| Japan          | 1.54                       | 0.81                              | 0.74                |
| Austria        | 1.56                       | 0.61                              | 0.95                |
| Australia      | 1.64                       | 0.76                              | 0.98                |
| Finland        | 1.78                       | 0.29                              | 1.50                |
| United Kingdom | 1.89                       | 1.05                              | 0.83                |
| Portugal       | 1.92                       | 1.37                              | 0.58                |
| Sweden         | 1.98                       | 0.75                              | 1.23                |
| United States  | 1.99                       | 0.73                              | 1.27                |

Source: OECD (2013), *OECD Compendium of Productivity Indicators 2013*.

Reallocation of resources towards the most productive firms is crucial for productivity growth within a sector. Cross-country analyses find that allocative efficiency has been relatively low in Denmark, especially in the services sector. The most productive firms do not attract a large share of employment (Bartelsman, 2013; Andrews and Cingano, 2012; Productivity Commission, 2013b). Many sectors have a large number of low-productivity firms, partly due to this low allocative efficiency (Danish Economic Council, 2010). Recent analysis shows that during the recession, the exit of low-productivity firms improved this allocation slightly and contributed positively to labour productivity growth, although the full effects are yet to be seen (Danish Economic Council, 2013).

### Trade specialisation as a source of growth

Trade and globalisation contribute to economic and productivity growth through several channels (Box 2). Denmark is a very open economy, with total exports and imports at 104% of GDP in 2012 and approximately one job in four depending on exports, directly or indirectly (Kristensen *et al.*, 2010). According to the Ernst and Young index of global connectedness, using indicators of openness to trade, capital flows, exchange of technology and ideas, labour movements and cultural integration, Denmark ranked eighth amongst 60 countries in 2012.

### Box 2. Globalisation and productivity

Globalisation and increased international trade in goods and services can contribute to higher productivity (Hausman *et al.*, 2005; Jones and Olken, 2008). The long-term benefits of trade can be through several channels, including technology diffusion, competition and allocation of resources (Kiriya, 2012):

1. Imports allow domestic firms access to foreign technology which can be a basis for product innovation, process innovation with superior capital goods, and marketing and organisational innovation through the effective deployment of information and communications technology. Foreign direct investment (FDI) can also serve as a channel for domestic firms to access inputs from upstream foreign affiliates or to superior technologies from downstream foreign affiliates. Moreover, trade and FDI both tend to accompany intangible knowledge flows.
2. Trade, FDI and licensing can affect competition in the domestic market. In turn, competition can improve innovation by increasing incentives to innovate, especially if the firm is closer to the technology frontier (Aghion *et al.*, 2001).
3. Firm-level studies show that exporting firms are more productive than non-exporting firms and firms tend to be more productive when they start exporting, though the main reasons are debated (Bernard and Jensen, 2004; Wagner, 2007). Similar links between productivity and exports and FDI in services have been established, but the causality remains to be determined (Wagner, 2013).

Denmark specific analysis using firm-level data to look at the third channel shows that exporting firms are more productive than non-exporting firms. Whether this is due to learning-by-exporting or self-selection is not clear. Bryla (2010) documents learning-by-exporting among manufacturing firms in Denmark but Smeets and Warzynski (2010) find evidence of self-selection but not of learning. Innovative activities, especially product innovation, are another determinant of export behaviour in Denmark, both for manufacturing and service firms (Laursen, 2008). Skill-intensive firms that engage in product and marketing innovation grow faster than skill-intensive firms that do not and may be more likely to export (Junge *et al.*, 2012).

Manufacturing accounts for about three quarters of exports of goods and about half of total exports, according to gross trade statistics. In terms of products, Denmark remains relatively specialised at the low-tech end with the combined share of high and medium-high tech manufacturing being far below the OECD average despite a gradual shift to more medium and high-tech products over the past two decades. The relative importance of services has increased over time, as evidenced by the higher share of services in value-added terms. In 2009, 54% of Danish exports were services. Furthermore, Danish trade is highly concentrated, with 58% of exports going to European Union (EU) partners in 2012. Denmark's major export markets are Germany, Sweden, the United Kingdom, Norway and the United States (Table 2).

**Table 2. Destination of Danish exports**  
In per cent of total exports

|                | 1995 | 2000 | 2012 |
|----------------|------|------|------|
| European Union | 63.0 | 63.8 | 57.8 |
| Germany        | 21.9 | 17.3 | 14.2 |
| Sweden         | 10.4 | 12.3 | 12.7 |
| United Kingdom | 7.3  | 9.1  | 8.7  |
| Norway         | 5.9  | 5.4  | 6.7  |
| United States  | 3.4  | 5.1  | 5.6  |
| Netherlands    | 4.2  | 4.6  | 4.1  |
| France         | 4.8  | 4.3  | 3.0  |
| China          | 0.5  | 0.8  | 2.5  |
| Italy          | 3.3  | 2.8  | 2.3  |
| Poland         | 1.2  | 1.5  | 2.2  |
| Finland        | 2.5  | 3.1  | 2.2  |
| Russia         | 1.1  | 0.8  | 1.7  |
| Brazil         | 0.3  | 0.4  | 0.6  |
| India          | 0.7  | 0.2  | 0.4  |

Source: OECD, *Trade Database*.

Openness to foreign direct investment (FDI) can contribute to enhancing productivity. Despite high wages and taxes, Denmark remains an attractive FDI destination thanks to its location as a gateway to the Nordic market, its well-educated labour force and its flexible labour market. In terms of stocks, the ratio of Denmark's inward FDI to GDP was above the EU average in 2012. However, FDI inflows to Denmark have not been very high in recent decades compared to countries like Sweden and Finland that have seen an increase in their stock of FDI as a share of GDP. This is not necessarily a cause for concern, but suggests that Denmark could have benefited more from its external openness insofar as wholly or partially foreign-owned firms are more productive and innovative than the average Danish enterprise (Ebersberger and Lööf, 2005; Dachs *et al.*, 2007; Pedersen, 2011). In 2012, sectors such as retail trade, professional services and construction had much lower shares of foreign-owned companies, than those in manufacturing and transport as well as compared to some of Denmark's Nordic peers.

### *Assessing the decline in market shares*

Since 1995, Denmark has recorded a persistent current account surplus, which stood at 5.9% of GDP in 2012. This surplus has been driven by strong exports of goods and services and an increase in the income balance. Even so, Denmark has not fared that well in terms of export market shares. Over 1995-2010, the loss in market share in volume terms for goods and services combined was 20%. This partly reflects emerging markets' integration into the global economy (OECD, 2014), but the loss has been large compared with that in Sweden and the Netherlands. During the same period, the market share loss in value terms was 14%, smaller than that in Sweden, as Denmark was able to charge relatively high prices for its products and its terms of trade improved.

#### **Box 3. Market share analysis**

It is possible to break down the change in market shares (in value terms) into three components to better understand the underlying drivers. The sectoral component is the part of export growth that is explained by the predominance in a country's export basket of the products benefitting from relatively high world demand. The geographical component is the contribution to export growth derived from the extent to which a country's exports are oriented towards markets with dynamic demand relative to the rest of the world. Together, these two effects measure the variations in a country's market shares resulting from the structure of world demand. The performance (residual) term explains the gain or loss in export market share that would have resulted if the sectoral and geographical components remained unchanged. Table 3 shows that the loss of export market shares in Denmark is relatively large compared with similar countries and is not explained by sectoral and geographical factors.

**Table 3. Contribution of structural and performance effects to total export market shares growth, 1995-2007**

|                | Market share growth | Performance  | Geographical | Sectoral   |
|----------------|---------------------|--------------|--------------|------------|
| <b>Denmark</b> | <b>-21.9</b>        | <b>-22.9</b> | <b>-1.7</b>  | <b>3.0</b> |
| Finland        | 7.5                 | -8.9         | 16.7         | 1.1        |
| Germany        | -1.0                | -14.9        | 5.2          | 10.6       |
| Netherlands    | -19.9               | -20.8        | -6.5         | 8.2        |
| New Zealand    | -24.3               | 5.7          | -8.8         | -21.4      |
| Norway         | -17.1               | -19.3        | 1.7          | 1.0        |
| Sweden         | -14.6               | -26.9        | 4.1          | 12.3       |

Source: Beltramello *et al.* (2012), "The Export Performance of Countries within Global Value Chains", *OECD Science, Technology and Industry Working Papers*, No. 2012/02.

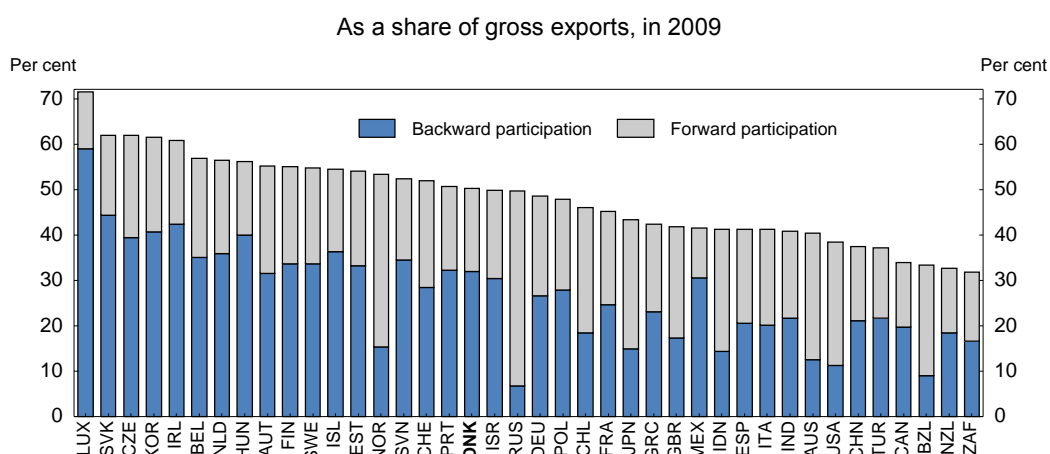
Decomposing goods export growth in terms of existing and new trade flows sheds some light on the sources of the market share losses before the crisis (Beltramello *et al.*, 2012; Box 3). The largest contribution to export growth came from the expansion of existing trade flows. The sale of new products or to new destinations only accounted for 37% of growth, almost all of which was due to firms trying new combinations of existing products in existing markets. Contrary to other countries such as Germany and

Finland, the contribution from the introduction of existing products to new markets was small. Denmark's deteriorating competitiveness, as proxied in this quantification, more than fully explains the market share losses, as with Sweden and the Netherlands. However, in contrast to Sweden, this negative effect has barely been compensated by sectoral and geographical factors, suggesting that there is scope to improve the product and geographical diversification of Danish exports.

### *Participation in global value chains*

World trade is increasingly organised around global value chains (GVCs), which include the full range of activities that firms engage in to bring a product to market. Participation in trade and GVCs can boost productivity growth by enhancing competition and the diffusion of knowledge. Denmark's participation in GVCs through exports of goods and services is close to the median among OECD economies, but less than other small open economies (Figure 3; OECD, 2013b). It is mainly driven by the use of foreign intermediates in Danish exports (backward participation) rather than the use of Danish inputs in other countries' exports (forward participation). Similar to most EU member states, there is also some evidence that around half of the participation of Denmark in GVCs is due to trade in intermediate goods within the EU (de Backer *et al.*, 2013).

**Figure 3. Participation in global value chains**



Note: Backward participation shows the use of foreign intermediates in a country's exports and forward participation the use by other countries of a country's inputs in their exports.

Source: OECD (2013), *Interconnected Economies: Benefiting From Global Value Chains*.

The existence of GVCs makes it important to look at trade flows not just in gross terms, but also in value-added terms. Denmark's export share in value-added terms is roughly the same as in gross terms, at around 0.9% of world exports in 2009. Looking at various recent measures of competitiveness based on real effective exchange rates with value-added data does not show a big difference to that based on gross trade data for Denmark (IMF, 2013). According to the revealed comparative advantage indicator, which is one measure of international specialisation and competitiveness based on export market shares, Denmark's comparative advantage in manufacturing appears to be larger in high-tech sectors and smaller in other ones when using value-added instead of gross trade data (Table 4).

**Table 4. Revealed comparative advantage in manufacturing**

In 2009

|  | Based on gross exports | Based on value-added exports |
|--|------------------------|------------------------------|
| Food products, beverages and tobacco                 | 3.17                   | 2.76                         |
| Textiles, textile products, leather and footwear     | 0.32                   | 0.28                         |
| Wood, paper, paper products, printing and publishing | 0.69                   | 0.63                         |
| Chemicals and non-metallic mineral products          | 1.22                   | 1.33                         |
| Basic metals and fabricated metal products           | 0.51                   | 0.49                         |
| Machinery and equipment                              | 1.59                   | 1.51                         |
| Electrical and optical equipment                     | 0.79                   | 0.84                         |
| Transport equipment                                  | 0.23                   | 0.20                         |
| Other manufacturing; recycling                       | 1.16                   | 1.12                         |

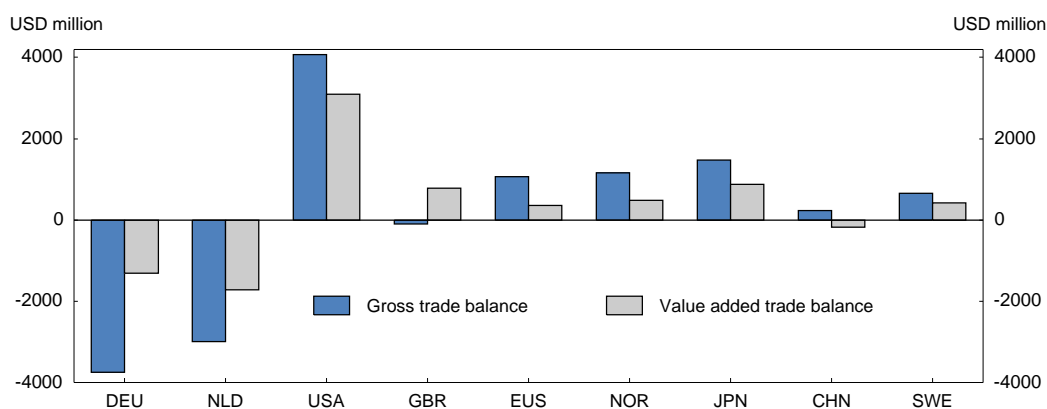
Note: Revealed comparative advantage is calculated as the share of exports of a certain industry by a specific country and the world in relation to the total exports of that country and the world. A value greater than 1 indicates a comparative advantage by a country in a certain industry.

Source: OECD-WTO TiVA Database, June 2013.

Denmark's bilateral trade balances with its main trading partners differ markedly depending on the measure used (Figure 4). The biggest change in Denmark's bilateral trade balance is in relation to Germany and the Netherlands, highlighting the fact that their intermediate exports to Denmark are embodied in Denmark's own exports. In value-added terms, the United States was a more important partner as a market for Danish exports, reflecting Danish value added embodied in the exports of other countries to the United States, as well as a more important source for imports, resulting in an overall smaller bilateral trade surplus.

**Figure 4. Bilateral trade balance between Denmark and its main trading partners**

In 2009



Source: OECD-WTO TiVA Database, May 2013.

The estimates of trade in value-added terms confirm that services play a far more significant role than suggested by gross trade statistics, as manufacturing exports include significant value-added from services. In value-added terms, 54% of Denmark's exports consist of services, higher than the 48% OECD average. Between 1995 and 2009, the contribution of services to exports rose in almost all industries, but most notably in transport equipment, textiles and apparel, and chemicals and minerals. Policies exclusively focusing on manufacturing may thus ignore the growing importance of services for value creation in GVCs, including for the production of manufactured goods.

### Getting more from trade specialisation

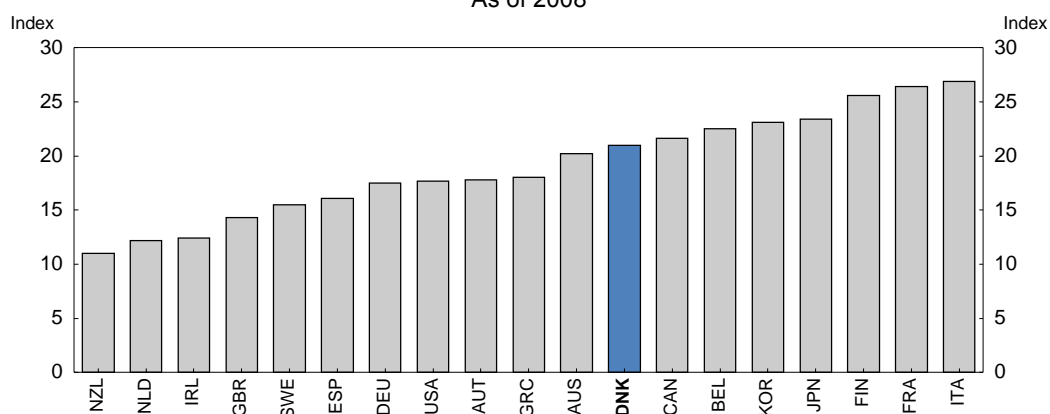
As noted, the share of Danish exports to fast-expanding markets has been smaller than for a number of other OECD economies. For example, in 2010, only 5% of Danish goods exports went to BRIC countries, compared to 11% for Germany. In May 2012, an ambitious export strategy was adopted to boost exports of goods to emerging markets by more than 50% and to double the amount of FDI in Denmark from emerging markets compared to 2005-10 by 2015. Priority is given to sectors where Denmark has specialised competences or a competitive advantage.

Whether Denmark has a competitiveness problem that mainly explains the loss of market shares has been widely debated (Ministry of Economic Affairs and the Interior, 2013; Whitta-Jacobsen *et al.*, 2013). Price competitiveness has deteriorated, while non-price competitiveness has improved. The overheating of the economy between 2004 and 2006 is likely to have led to unsustainable wage increases that have already started to be offset by wage moderation in recent years. Hence, the loss in price competitiveness is expected to be temporary. Weak productivity growth over the past two decades is a more important concern.

Greater trade openness in services would raise productivity growth by exposing Danish firms to foreign competition, which would boost productivity in the service sector. In addition, manufacturing firms increasingly use and produce services as inputs in their products, with a growing importance of services for manufacturing competitiveness. Services also help manufacturing firms gain a competitive edge as they differentiate, customise and upgrade their products and develop closer and more longstanding relationships with customers (Nordås, 2010). Firm-level analysis for Denmark finds a positive relationship between firms that export services and productivity and size as measured by employment (Malchow-Møeller *et al.*, 2011 and 2013).

There are large potential benefits from service trade liberalisation given the greater restrictions compared to those in trade in goods and the large role played by services in national economies (Dihel and Shepherd, 2007; Borchert *et al.*, 2012). According to the World Bank's restrictions on international trade in services indicator, which includes policies concerning entry and licensing, Denmark has more restrictive policies than some similar countries (Figure 5). An analysis to measure the impact of the barrier reductions from the implementation of the EU Services Directive on the level of productivity shows an effect of 2.7% for Denmark (Monteagudo *et al.*, 2012). Other analyses have shown that by raising the costs of entering a market, regulatory barriers might deter small and medium sized enterprises (SMEs) from engaging in international trade in services (Kox and Nordås, 2007; Borchsenius *et al.*, 2010).

**Figure 5. Restrictions on international trade in services**  
As of 2008



Note: A higher value of the index indicates a more restrictive policy. The index covers the financial sector, telecommunications, retail trade, shipping, aviation and business services.

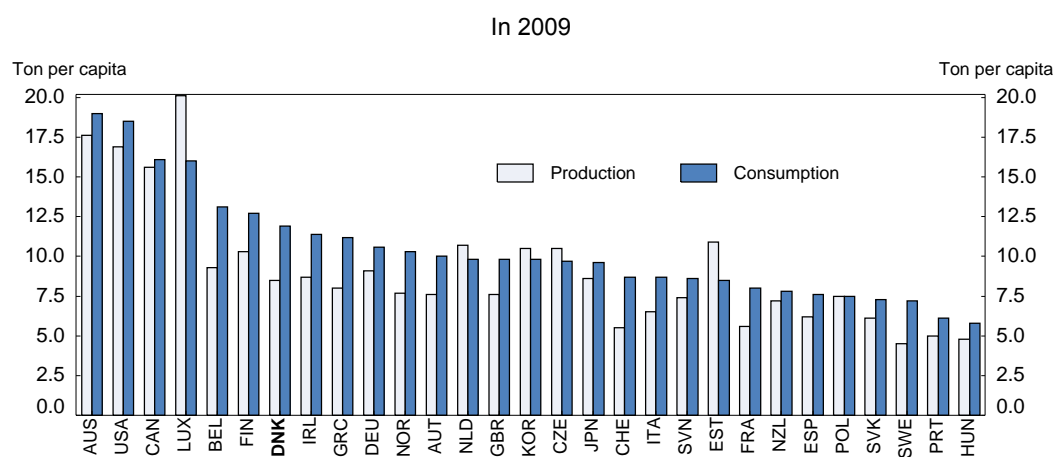
Source: World Bank, *Service Trade Restrictiveness Index*.

Maintaining participation or even further integration in GVCs becomes more important as international competition intensifies and is closely related to innovation. Investment in knowledge-based capital (KBC) that supports higher capabilities in production processes, technology, or knowledge-intensive activities is an important determinant of value creation in GVCs. Market regulations that hamper competition or market entry are likely to reduce the incentives of incumbent firms to invest in KBC. Policies that facilitate the flow of resources to their most productive use can improve the ability of economies to capitalise on the growth opportunities implied by the rising importance of KBC.

### Trade and green growth

There are close links between trade and green growth. A country can trade CO<sub>2</sub> emissions through its exports and imports. CO<sub>2</sub> emissions associated with consumption are higher than those associated with production of emissions in Denmark (Figure 6), as its imports are more carbon-intensive than its exports. This is typical for many OECD countries. Furthermore, in Denmark, the gap between consumption and production has been growing since 1995. Denmark stands out as one of the few countries that have recorded trade surpluses in goods and services at the same time as a trade deficit in CO<sub>2</sub> emissions, reflecting in part the relatively low carbon intensity of electricity generation and the relatively low energy intensity of GDP (Nakano *et al.*, 2009).

**Figure 6. Per capita production and consumption-based CO<sub>2</sub> emissions**



Source: OECD, STAN, Input-Output Database.

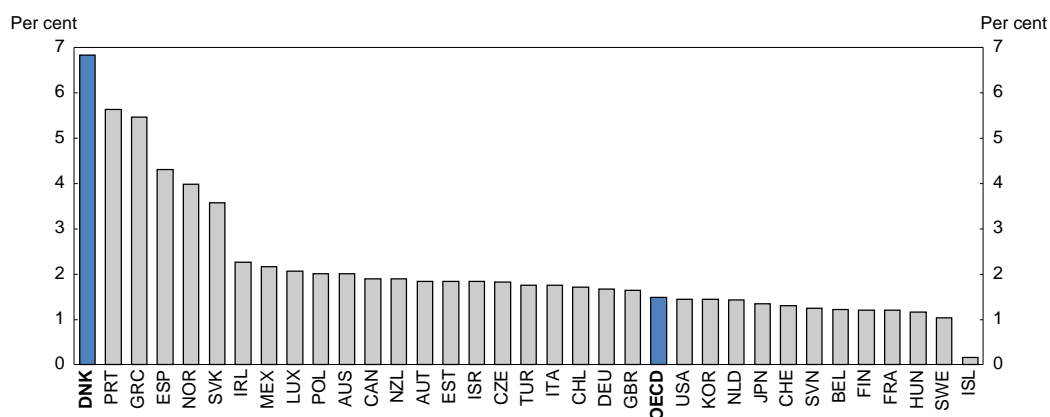
By acting as a “leader” in developing and exporting technologies that will help reduce greenhouse gas (GHG) emissions, Denmark can contribute to addressing climate change worldwide, although there are risks and costs associated with this strategy (OECD, 2012a; Jamet, 2012). In 2011, government R&D spending for energy and environment as a share of the total government R&D budget stood at 6.9%, above the OECD average of 6.4%. There is some evidence that stricter environmental policies lead to specialisation in innovative activities and diffusion of green technologies via technology transfer through international trade in intermediate goods, foreign direct investment and licensing (OECD, 2013c; UNCTAD, 2011). In addition, well-designed environmental policies do not seem to be harmful to the export competitiveness of the manufacturing sector (Constantini and Mazzanti, 2012). However, strict environmental regulations can create barriers to competition (see below). In Denmark, green exports constituted 11% of total goods exports in 2011, and increased faster than total exports in recent years. Denmark has been at the frontier in the area of renewable energy technologies, especially those related to wind (Figure 7). The country has been successful in diffusing its knowledge to other countries, for instance



in wind technology (Botta, 2013). However, this also means that part of the return to innovation has been captured abroad, which, in return, lowers the incentives for Danish firms to innovate.

**Figure 7. Renewable energy patents**

As a per cent of total Patent Co-operation Treaty patent applications, 2005-2011



Source: OECD, *Green Growth Indicators*.

### Fostering competition

Enhancing competition can boost productivity and spur innovation. Denmark ranks well on overall competition indicators, including the OECD Product Market Regulation (PMR) and World Bank Doing Business indicators. Barriers to entrepreneurship, regulatory and administrative opacity and burdens on start-ups are low. Over the past decade, competition problems in the services and construction sectors have been identified and analysed extensively, including in the chapter on competition in the 2005 *OECD Economic Survey* (OECD, 2005). However, reform has not made much progress in these areas. Lack of competition and the large number of low-productivity firms in many sectors have been highlighted as one of the sources of weak productivity growth by various institutions, including the Productivity Commission, which has presented recommendations to improve competition (Productivity Commission, 2013b; OECD, 2012a; Danish Economic Council, 2010).

In October 2012, the government unveiled a policy package to improve competition and enhance compliance with international standards, involving: *i)* strengthening competition law; *ii)* increasing competition in domestic-oriented sectors; and *iii)* improving the effectiveness of public procurement. Competition legislation was stiffened in December 2012, with higher fines and the possibility of imprisonment for cartel behaviour, and Denmark ranks well according to a set of new OECD indicators of competition law and policy (Alemani *et al.*, 2013).

### Addressing regulatory barriers

Weak domestic competition has resulted in high prices of goods and services in Denmark. Corrected for taxes and levels of prosperity, prices are 7% higher for goods and 14% higher for services, compared to an average of OECD countries (Ministry of Business and Growth, 2013). Improved competition in the service sector will have spillovers to the rest of the economy through three main channels. *First*, improved competition in the non-tradable sectors would provide cheaper inputs to globally-competing sectors. *Second*, it will contribute to the reallocation of resources to more efficient firms. *Third*, as noted in Box 2, it will also enhance innovation, especially for firms that are closer to the technological frontier.

The large number and characteristics of some regulations are a major hindrance to competition in Denmark (McKinsey, 2010; Productivity Commission, 2013b). Regulations can impede competition if they restrict the number of suppliers and their ability to compete, reduce the incentives to compete or curb the choices and information available to customers. They can also limit firm entry and reduce incentives to compress costs. An example of how removing regulatory barriers has been successful is the book market (Box 4). The Danish Competition and Consumer Authority (DCCA) has identified a number of industries where regulation can be eased: pharmacies, taxis, construction, retail trade and professional services (lawyers, dentists, general practitioners, real estate agents) (Nordic Competition Authorities, 2013). An inter-ministerial taskforce has been appointed to review more than 100 professions, regulated by law to determine whether the regulatory system can be made more effective.

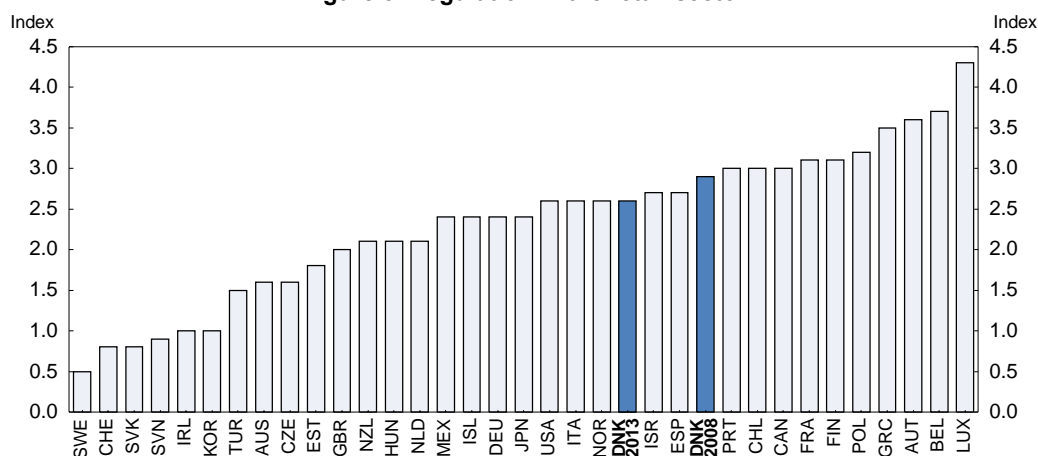
Professional services still have potential for improvement, despite some recent relaxation of barriers to entry in the legal service sector (Monteagudo *et al.*, 2012; Productivity Commission, 2013b). Even if the small size of the domestic market prevents the exploitation of economies of scale, further progress can be made to remove anticompetitive regulations in these sectors. Regulatory barriers should be reviewed and removed when they create barriers to competition and are not well justified by other objectives or harmonised with international ones.

#### Box 4. Regulatory reform of the Danish book market

Until 2001, the book market in Denmark was heavily regulated, with books being sold only in bookstores and at fixed retail prices. In response to the recommendations from the Danish Competition and Consumer Authority (DCCA), the regulations in this sector were relaxed gradually, with full deregulation coming in January 2011. A 2010 evaluation by the DCCA found that the regulatory reform did not harm cultural policy objectives or consumer access to books and that the variety in the supply of books increased whilst the price of books relative to other goods and services fell.

In response to a request for a reintroduction of fixed retail prices in the book market, for example for a period of three to four months for new publications, by some parts of the book sector in February 2013, the DCCA sent an open letter to the Minister of Culture advising against this.

Figure 8. Regulation in the retail sector



Note: Index scale is 0 to 6, from least to most restrictive. The reference year is 2008 for all countries. The PMR indicator for Denmark for 2013 is preliminary, and for purposes of comparability is calculated on the basis of the 2008 methodology. For more details, see OECD (2014).

Source: OECD (2014), "The 2013 Update of the OECD Product Market Regulation Indicators: Policy Insights for OECD and non-OECD Countries", *OECD Economic Policy Papers*, forthcoming.

Between 1995 and 2010, average annual productivity growth in the retail sector in Denmark was 1.5 percentage points lower compared to the average for Germany, the Netherlands and Sweden. At the same time, grocery prices are higher in Denmark than on average in Belgium, Finland, France, Italy, the

Netherlands and Germany when corrected for taxes (Danish Competition and Consumer Authority, 2012). The Danish Shop Closing Act in 2010 relaxed the rules on shop opening hours as of 2012, but the Danish retail sector remains highly regulated (Figure 8).

Regulations in the retail sector include permit requirements to engage in some commercial activity, specific regulations for large outlets and some forms of protection of existing firms. The importance of zoning regulations as a barrier to competition has been highlighted by several studies (OECD, 2005; McKinsey, 2010; Copenhagen Economics, 2013). By limiting the location and the size of stores, they hinder entry and exit, thus restricting competition and economies of scale. Furthermore, the small scale of firms due to strict zoning regulations might prevent the adoption of new technologies, further limiting productivity gains. In Sweden, for instance, the relaxation of zoning regulations in the 1990s improved productivity growth (Maican and Orth, 2012). Hence, the impact of these regulations should be assessed and the government should look at ways to increase the flexibility for the size and location of stores and to relax permit obligations, while taking into account other objectives such as the quality of the environment.

The pharmacy sector in Denmark is also subject to many regulations, including entry and ownership restrictions, price and profit controls and the equalisation scheme between pharmacies which implies that pharmacies with higher revenues have to subsidise low-revenue ones in rural areas through a special sales tax. The number and location of pharmacies is determined by the state through a system of licenses to set up a pharmacy tied to a specific location. In addition, one pharmacist can own no more than four pharmacies. These regulations result in a high number of inhabitants per pharmacy compared to other European countries and significantly less competition (Danish Competition and Consumer Authority, 2013a). Removing such ownership restrictions should be considered.

The construction sector in Denmark exhibits low productivity growth, but prices, driven by high labour costs and material prices, are high. The existence of some Danish-specific standards makes it harder for foreign firms to enter the market, limiting competition. Harmonising national standards that hinder foreign firm entry, with international ones would spur competition in the sector. Apart from some regulatory barriers, the small size of the Danish market also limits entry by foreign firms due to a lack of knowledge of projects. In addition to sector-specific initiatives to remove regulatory barriers, more general policies to attract more foreign firms should be considered, such as increasing awareness of public construction tenders abroad, perhaps through *Invest in Denmark* (which facilitates the entry of foreign firms in the Danish market).

While network industries have undergone a significant process of opening to competition since the early 1990s, as in several other EU countries, there is still scope for further deregulation (Productivity Commission, 2013b). The main remaining potential for deregulation lies in the passenger rail system, which is mainly dominated by a state-owned company, as in many other EU countries. Denmark has some experience with tendering since a few lines are operated by another supplier. The 2013 European Commission package on rail liberalisation aims at opening EU passenger railways to new entrants by 2019. To achieve productivity and consumer welfare gains, the country should continue to open the rail system to competition by increasing tendering and to deregulate other network industries as proposed by the Productivity Commission.

### ***Improving the public procurement process further***

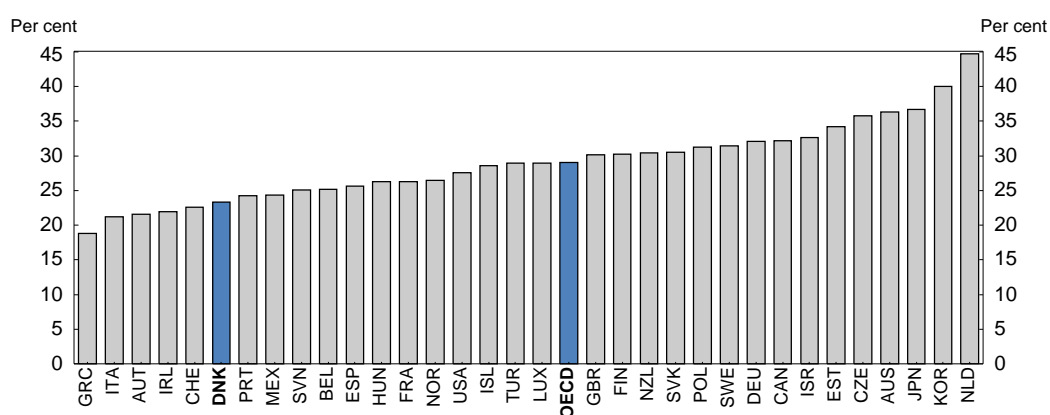
Healthy competition in public procurement would reduce costs to the public and enhance incentives to innovate and the quality of goods and services. Danish public spending is one of the highest in the OECD, making competition in the public sector crucial for nationwide productivity. According to new estimates, productivity growth in the public sector has been relatively strong over 2005-12, amounting to close to 2% per year on average (Statistics Denmark, 2013). Further productivity gains in the public sector will help

better contain public expenditures and the tax burden, which would generate some positive feedback on the whole economy (Adalet McGowan and Jamet, 2012). A productive public sector also leads to productivity gains in other sectors as public services are used by firms and workers.

Government procurement as a share of government expenditures in Denmark is low (Figure 9). The extent of competition for public services has improved in recent years. In the municipalities, 26% of publicly-provided services were subject to competition in 2010. However, large differences exist between municipalities with respect to their use of private suppliers. A December 2012 report from the DCCA on competition in the public sector indicates that the greatest potential for further opening up to competition is within the health care and social services areas, which are administered by the regions and municipalities.

**Figure 9. Public procurement spending**

As a percentage of government expenditures, 2011



Source: OECD (2013), *Government at a Glance*.

Public authorities find procurement rules difficult to apply, especially since complaints can impose large costs on the civil servants concerned. The DCCA has provided municipalities with guidance notes covering interpretation of legislation, how to apply legislation in practice as well as exchange of best practices. In late 2013, the appeals procedure was made more efficient by increasing fees and shortening deadlines for the filing of complaints. A working group on public procurement was set up in June 2013 to produce clearer, simpler and more flexible draft legislation on public procurement and to reduce transaction costs for the participating parties. Its mandate is to formulate a comprehensive legislative package to implement the public procurement directive into Danish law. The group is to report by mid-2014. Legislation on public procurement should be simplified as soon as possible, in line with the recommendations of the working group.

Recently, much emphasis has been put on public-private partnerships (PPPs) – which are less developed than in other Nordic economies (Weihe *et al.*, 2011) – to improve the public procurement process. In 2011, a strategy to promote public-private cooperation was initiated. The Council for Public-Private Cooperation was established in April 2013 to support competition for public sector contracts and to promote cooperation between public authorities and private companies. In 2012, the DCCA studied the Danish experience with PPPs in 13 projects and found them to be effective, which suggests that efforts should continue to develop them further.

Public procurement could be better harnessed to encourage innovation, especially for SMEs. Danish SMEs account for 45% of the value of public procurement contracts, as against 38% in the EU at large (Danish Competition and Consumer Authority, 2013b). However, there still exist some barriers that may constrain the participation of SMEs such as limited knowledge of procurement rules, exacting

documentation requirements and tight deadlines, making the bidding process costly for firms with limited expertise. Greater use of e-procurement would help cut transaction costs and make the process more uniform. Some countries have established small business innovation research (SBIR) programmes in order to increase procurement to SMEs, which would also help spur competition. Denmark should consider setting up a similar programme. One potential risk involved with SBIR programmes is the crowding out of privately-financed R&D (Wallsten, 2000). Hence, these schemes should be designed carefully and target proposals that are unlikely to receive funds from private sources.

### ***Strengthening and streamlining the competition framework***

Until recently, the weakness of sanctions and fines undermined the competition framework, as discussed in the *2012 OECD Economic Survey* (OECD, 2012a). The recent changes to the Competition Act, which came into effect in March 2013, increase the minimum fine for a cartel violation by 10% and introduce prison sentences for cartellists for up to six years. The new legislation enhances compliance with international standards and will help promote competition.

Despite these improvements, some gaps still remain in the competition framework and its enforcement. In June 2013, the Productivity Commission recommended that competition law be aligned on the best practices of other EU members. There have also been problems of enforcement of competition in 2012 as investigations can take a long time, decreasing the effectiveness of enforcement (Global Competition Review, 2013). Hence, going forward, it will be important to ensure that competition law is effectively enforced.

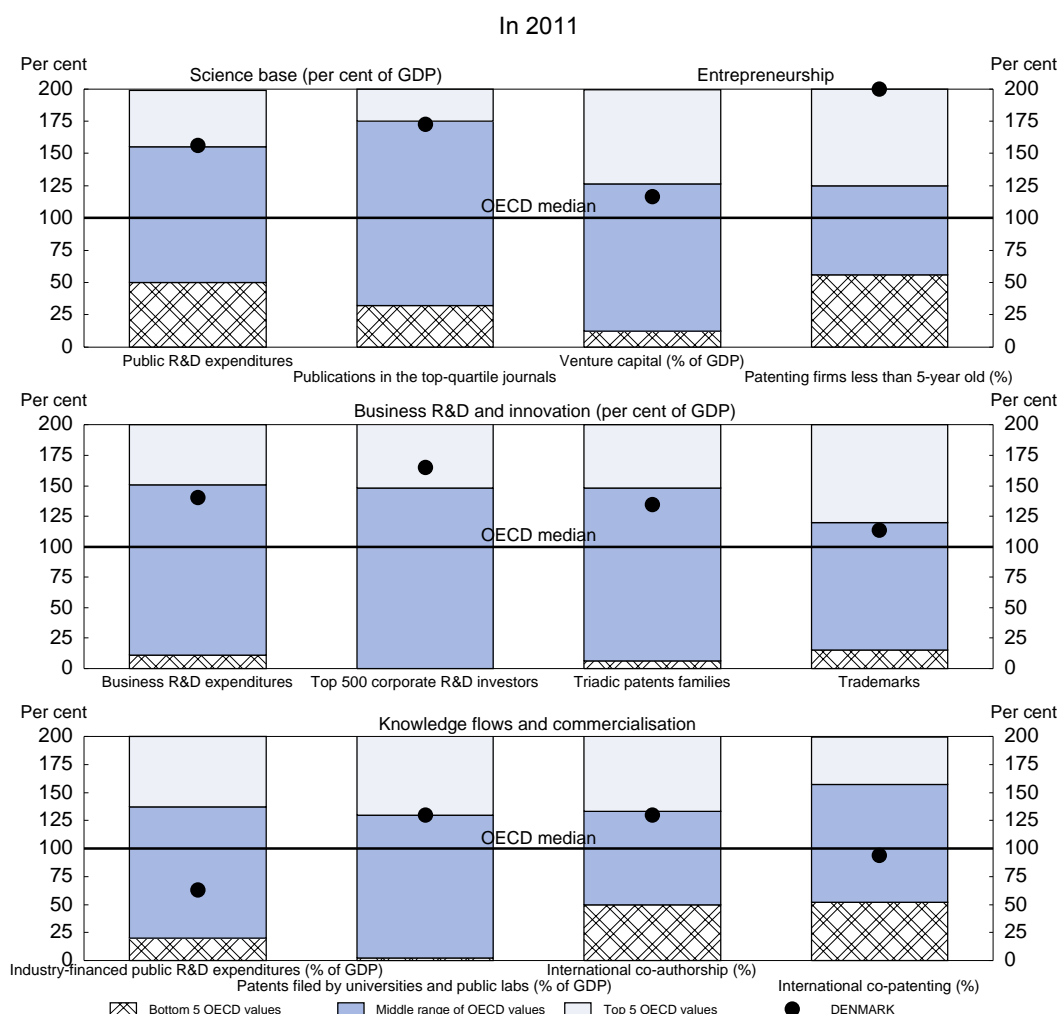
The DCCA is the main regulator. The Competition Council can grant and revoke individual exemptions, review mergers and certify that conduct is not anti-competitive, and the Appeals Tribunal acts as a check on Council and Authority decisions before they get appealed to the regular court. This institutional set-up may undermine decisions made by the DCCA. It should be streamlined in order to improve the independence and impact of the competition authorities, as recommended by the Productivity Commission. Furthermore, the Competition Council has 17 members, including experts and consumer and industry representatives, but its effectiveness would benefit from a better representation of legal and economic experts (OECD, 2012a).

### **Promoting innovation**

Innovation is key to foster TFP and remain internationally competitive in an increasingly globalised world. This requires strong investment in R&D and innovation and a well-functioning innovation system. Sound framework conditions for innovation, including a stable economy, a skilled labour force, a robust financial system, well-functioning product and labour markets, competition, international openness to trade and investment and low barriers to entrepreneurship, are also crucial.

### ***Assessing Denmark's innovation performance***

Denmark fulfills most of these conditions and is in many respects on the innovation frontier. Both public and business R&D expenditure as a share of GDP are amongst the highest in the OECD (Figure 10). Business innovation is strong, particularly in emerging and renewable energy technologies. Denmark is among the “innovation leaders” according to the EU Innovation Union Scoreboard 2013, ranking third behind Sweden and Germany, and just ahead of Finland (European Commission, 2013). Furthermore, between 2008 and 2012, Denmark's innovation performance as measured by this set of indicators has improved fast compared to the other leading countries.

**Figure 10. Comparative performance of national science and innovation systems**

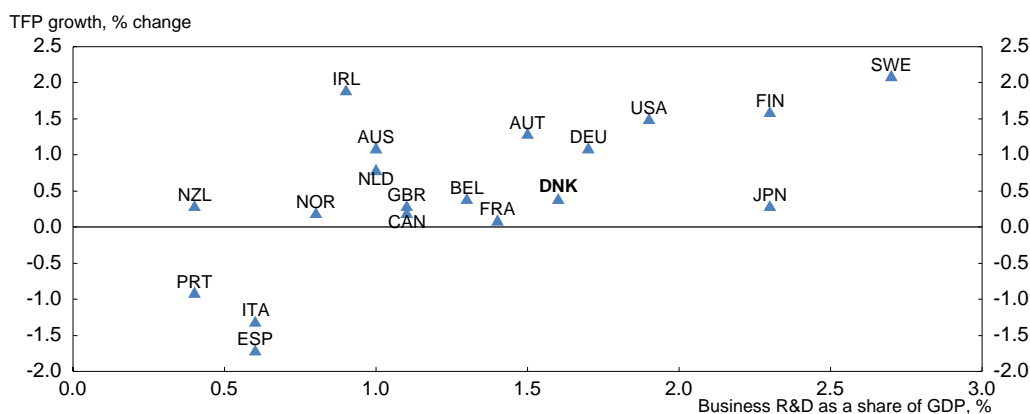
Note: Normalised index of performance relative to the median values in the OECD area (Index median = 100).

Source: OECD (2012), *Science, Technology and Industry Outlook*.

Although Denmark is an innovation leader in many aspects, the outcomes do not fully reflect the high level of spending in innovation policies:

- High R&D outlays and favourable framework conditions have not translated into strong TFP growth (Figure 11). Relative to other countries, the return on investment in R&D in Denmark has been low (McMorrow, 2011) or close to average for both low-tech and high-tech industries (Löf and Savin, 2012), although analysis suggests that, at the firm-level, R&D investment is associated with higher productivity (Christensen *et al.*, 2014).
- The share of high-growth enterprises is relatively low. Young and small firms may face some barriers in accessing finance. There has been a decline in the share of SMEs introducing organisational innovations and knowledge-intensive services exports.
- The service sector accounts for 26% of total trademarks, far below the 39% OECD average, which may indicate a weakness in service-related innovation in Denmark (Figure 12).

**Figure 11. Total factor productivity growth and business R&D intensity 1995-2011**



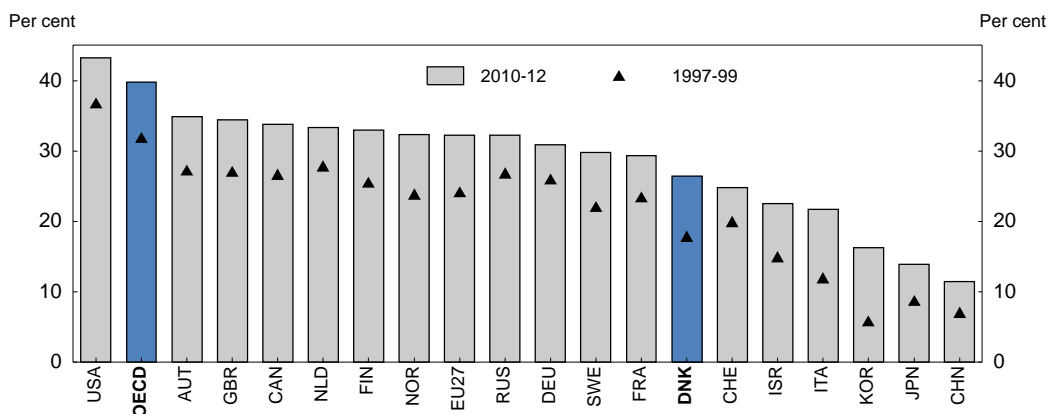
Note: Between 1995 and 2011, the average annual percentage change in TFP (calculated from a decomposition of GDP to labour, capital and human capital) in Denmark was 0.4%, while the ratio of business R&D spending to GDP at 1.6% was relatively high. Both indicators are calculated from data in constant 2005 PPP USD terms.

Source: OECD, *Analytical Database*; OECD, *Long-term Scenarios Database*, OECD, *Main Science and Technology Indicators*; calculations based on Johansson *et al.* (2012), "Long-Term Growth Scenarios", *OECD Economics Department Working Papers*, No. 1000.

Investment and growth are increasingly driven by KBC, which includes computerised information, innovative intellectual property and economic competencies such as organisational capacities. Investment in KBC as a share of GDP is relatively high in Denmark (Figure 13). Intangible investment in Denmark is concentrated in manufacturing, business services and wholesale and retail trade (O'Mahony *et al.*, 2012). Despite high levels of intangible investment, the contribution of intangibles to growth is lower than in Finland, Sweden and the United Kingdom, which have similar KBC investment (Corrado *et al.*, 2012). Enhancing competition as discussed above and policies to develop and better use the skills of the workforce would help achieve better outcomes in terms of innovation. In addition, there is room to improve the efficiency of innovation policies and access to funding, as well as to better adapt innovation policies to the service sector.

**Figure 12. Service-related trademark applications**

As a percentage of total trademark applications

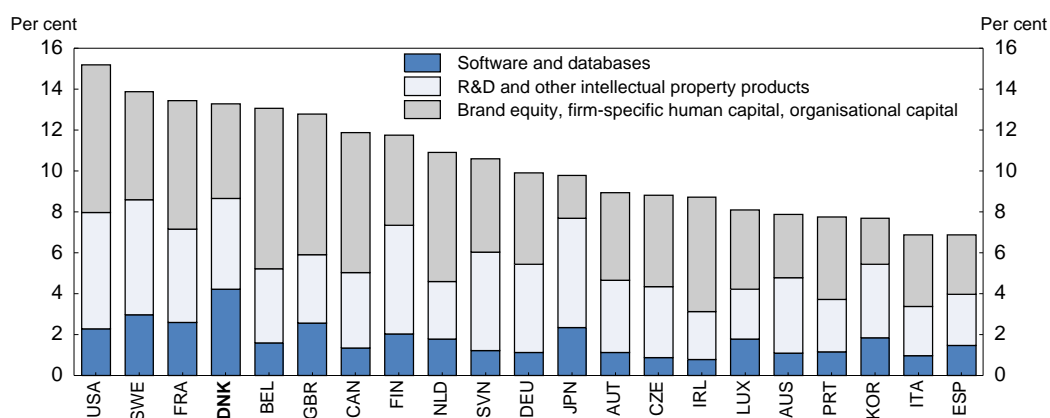


Note: In Denmark, the share of service-related trademark applications as a percentage of total trademark applications was 26.4% between 2010 and 2012.

Source: OECD (2013), *Science, Technology and Industry Scoreboard*. Based on US Patent and Trademark Office (USPTO) and OHIM (European Union) Community Trademark Databases.

**Figure 13. Investment intensity in knowledge-based capital**

Selected OECD countries in per cent of value added of the business sector, 2010 or latest data available



Source: OECD (2013), *Science, Technology and Industry Scoreboard*.

In December 2012, the government launched an *Innovation Strategy*. It identified some gaps in the innovation framework and proposed initiatives to help Denmark remain an innovation leader. The *Strategy* mainly focuses on innovation driven by societal challenges, translating more knowledge into value and education to improve knowledge capacity. The *Strategy* includes 27 initiatives and targets to put Denmark in the OECD top five by 2020 in terms of the share of innovative companies, private R&D spending as a share of GDP, and companies making use of high-skilled workers (Annex 1).

### ***Raising the efficiency of innovation policies***

#### *Streamlining institutions*

Public support to basic research is relatively high in Denmark, which is important as this spending is associated with higher firm-level productivity (Andrews and Criscuolo, 2013). However, until recently, basic public innovation policies were conducted via a bewildering number of funding institutions and instruments, making for a complicated institutional framework with many overlaps. In 2014, the three different funding bodies (Council for Strategic Research, Council for Technology and Innovation and Advanced Technology Foundation) will be merged into the Innovation Foundation with a view to improve efficiency, increase transparency and reduce red tape.

There is room for other improvements. The business-government task forces that were established in 2012 to make policy recommendations in various areas – such as better regulation, public-private partnerships and attracting FDI – add another layer to the institutions involved in innovation strategies. Their link to the implementation of innovation policies could be defined better.

#### *Improving instruments to support innovation*

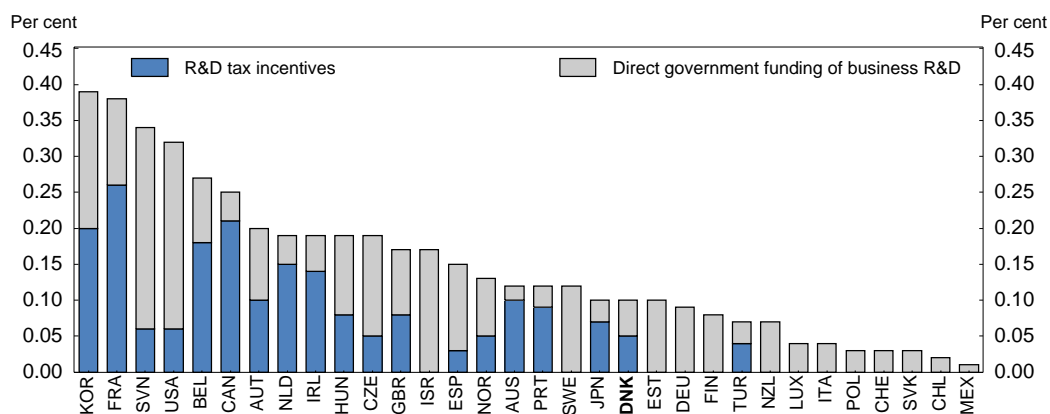
Denmark has a balanced mix of R&D tax incentives for firms and direct government support to business R&D (Figure 14). This is welcome as each has strengths and weaknesses. Although R&D tax credits avoid the “picking winners” problem associated with direct grants, they may have the unintended consequence of protecting incumbents at the expense of new firms, slowing down the reallocation process (Bravo-Biosca *et al.*, 2013). Furthermore, tax incentives might favour multinational companies rather than SMEs (Westmore, 2013; Clark, 2013). In contrast, recent evidence from Finland and Germany shows that direct support schemes do not preserve the dominance of market leaders and make small firms more likely to undertake R&D (Czarnitzki and Ebersberger, 2010). Evaluations are rare for Denmark and focus mainly



on manufacturing (Köhler *et al.*, 2012). The effectiveness of Denmark's R&D tax incentives ought to be assessed further using statistical methods that generate control groups to isolate the effect of the tax credit.

**Figure 14. Direct government funding of business R&D and tax incentives for R&D**

As a percentage of GDP; 2011 or latest year available<sup>1</sup>



1. For Australia, Belgium Chile, Ireland, Israel and Spain, figures refer to 2010. For Luxembourg, figures refer to 2009 and for Switzerland to 2008.

Source: OECD (2013), *Science, Technology and Industry Scoreboard*.

R&D tax credit programmes that lack carry-over provisions or cash refunds may provide less assistance to young and small firms than other forms of innovation support since such firms typically lose money in the early stages of an R&D project (OECD, 2013d; Elschner *et al.*, 2011). According to the interviews conducted for the latest ERAC review, this was a problem in Denmark (ERAC, 2012). In 2012, a new scheme was introduced allowing firms that spend on R&D and face after-tax income losses to benefit from a tax refund of 25% of these losses. The scheme is capped at DKK 5 million (about € 670 000), though the ceiling is to be increased to DKK 25 million by 2015. This scheme improves the effectiveness of the system, but the refunds remain quite limited compared to other countries. Furthermore, young firms may not fully benefit from it if upfront they lack the means to start an innovative project (Busom *et al.*, 2012). The government should continue to improve the access of young financially-constrained firms to funding, possibly by extending the tax refund scheme or increasing direct support.

#### *Enhancing the links between universities and industry*

Tighter links between industry and academia tend to push up firm-level TFP (Andrews and Criscuolo, 2013). According to the Global Competitiveness Index, in 2013, Denmark ranked 22<sup>nd</sup> amongst 144 countries in terms of R&D collaboration between university and industry. The share of higher education sector research financed by industry, which stands at 3.4% in Denmark, is far below the 6.3% OECD average. The concentration of higher education institution research in areas where business interest is low has been highlighted as one potential reason for the low share of private financing of Danish university research (Ministry of Science, Innovation and Higher Education, 2009a). The funding system of universities' research activities has been reformed in 2007 and 2010 to raise quality by developing competition between institutions to obtain funding. However, public funding to universities in Denmark is mostly targeted to institutions and less to projects (Steen, 2012). A move towards a more balanced mix of project and institutional-based funding could help nurture tighter links between industry and academia. The 2012 *Danish Innovation Strategy* includes various initiatives to encourage cooperation between business and education institutions, for instance through public-private partnerships.

Even when innovation gets close to the market, the commercialisation of public research results does not seem to be that successful (ERAC, 2012). The universities' links with business ought to have been strengthened by their merger in 2007 with the government research institutes, which had experience collaborating with private stakeholders, but this has not been the case (Solberg *et al.*, 2012). Universities do not patent and license much and they have limited experience with start-up companies, despite some recent improvements. The intellectual property right policies of universities may not give enough incentives to researchers to commercialise their research and therefore should be investigated. Further enhancing the links between the GTS (*Godkendt Teknologisk Service*) institutes, which are in charge of transferring applied research to industry, and universities would also help. The increased involvement of GTS staff in universities and placement of PhD students within the institutes in applied fields of research since 2009 has been effective and should continue (Ministry of Science, Innovation and Higher Education, 2009b and 2012).

#### *Demand-side innovation policies*

In recent years, there has been a renewal of policy interest in so-called demand-side innovation policies, including innovation-oriented public procurement, regulations and standards (Beltramello and Nolan, 2014). In the presence of market imperfections, such policies can helpfully complement the supply-side instruments discussed above.

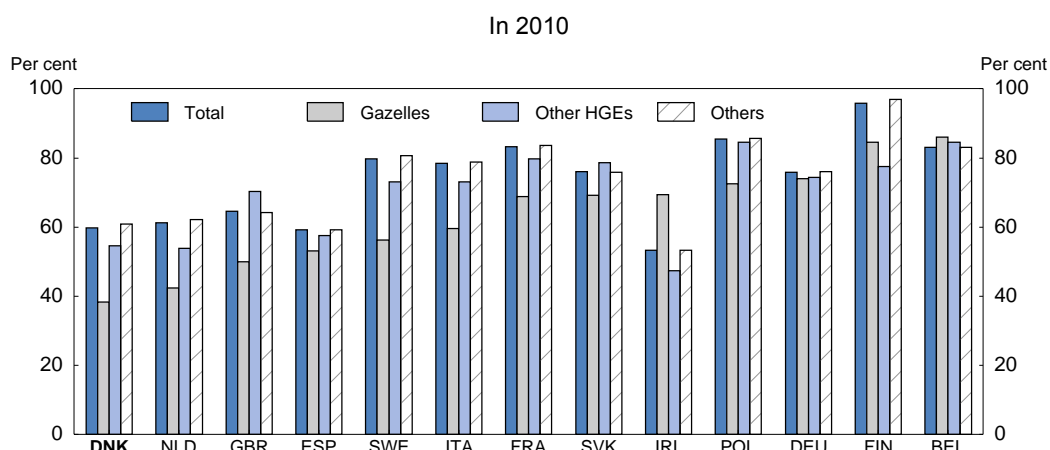
The concept of fostering innovation through demand-side policies is not new and Denmark has had some success in this area (Stern *et al.*, 2011). For example, strict environmental regulations have been used extensively and Denmark was among the first European countries to introduce a national standardisation strategy with an innovation perspective (ERAC, 2012). In recent years, Denmark has further increased its focus on innovative public procurement. The Danish Programme for user-driven innovation, which ran from 2007 to 2009, was launched to create a systematic approach to the development of new products and services based on user (such as consumers, enterprises, and cooperation partners) needs. An evaluation of the programme shows that it facilitated the creation of new goods by firms, cooperation across sectors as well as PPPs (Mollerup, 2011). In 2009, the programme was replaced by the "Business Innovation Fund", which was created to support the introduction of innovative green and welfare solutions to the market. In 2012, it implemented a pilot programme for innovative public procurement in the welfare sector, with the aim to contribute to market maturation of new welfare solutions. The initiative was replaced by the "Market Development Fund" in 2013. This fund is to support the introduction of innovative solutions to the market, including green and welfare solutions. In 2013, the government also established the "Green Transition Fund", to provide funding for the late-stage development of innovative solutions intended to increase resource efficiency, as well as funding for innovative green business models.

Demand-side innovation policies are hard to design, implement and evaluate (Beltramello and Nolan, 2014). There is still a lack of solid empirical evidence that demand-side policies can be harnessed to effectively promote innovation and lead to the development of substantial market opportunities. The design of procurement procedures must ensure sufficient competition and facilitate SME participation. Innovation-oriented regulation could be cost-ineffective compared to other policies and might hinder competition. The development of technical standards should take into account the possibility that inappropriate design or timing in the introduction of a standard could lock businesses into an inferior standard and limit innovation. Furthermore, there are technical challenges in the evaluation of demand-side policies, such as the difficulty of establishing a control group, inadequate data and time lags between implementation and effect, leading to their under-evaluation compared to other categories of innovation support (Edler *et al.*, 2012).

### Improving access to funding

Innovative start-ups and SMEs can face extra barriers to funding due to their lack of collateral, cash flows and track record. Financing of firms can become more difficult if the bank lending channel is impaired, as was the case during the recent crisis when banks tightened lending standards, making it more difficult for firms, especially SMEs, to obtain private financing (Figure 15). The share of SME loans in total business loans declined during the crisis and is below that in its Nordic peers (OECD, 2013e).

**Figure 15. Firms' success rate in obtaining loans**



Note: "Other HGEs" refer to other high-growth enterprises. Gazelles, a subset of high-growth enterprises, are enterprises that have been employers for up to five years, with average annualised growth in employees (or in turnover) greater than 20% a year over a three-year period, and with ten or more employees at the beginning of the observation period.

Source: OECD (2012), *Entrepreneurship at a Glance*.

Public support to SMEs has increased in recent years with the introduction of new measures by the *Vaekstfonden* (Growth Fund), the government investment fund created in 1992 which offers guarantees and loans to established SMEs and invests equity in young growing companies. Since 2009, the government has introduced initiatives to improve SME financing and export opportunities by strengthening loan guarantees, start-up loans and export guarantees, introducing subordinated loans targeted to young firms as well as improving access to risk capital, including through corporate bonds (OECD, 2013e). Since 2011, Danish pension funds have been allowed to allocate risk capital to new SMEs with growth potential through the investment fund, Danish Growth Capital.

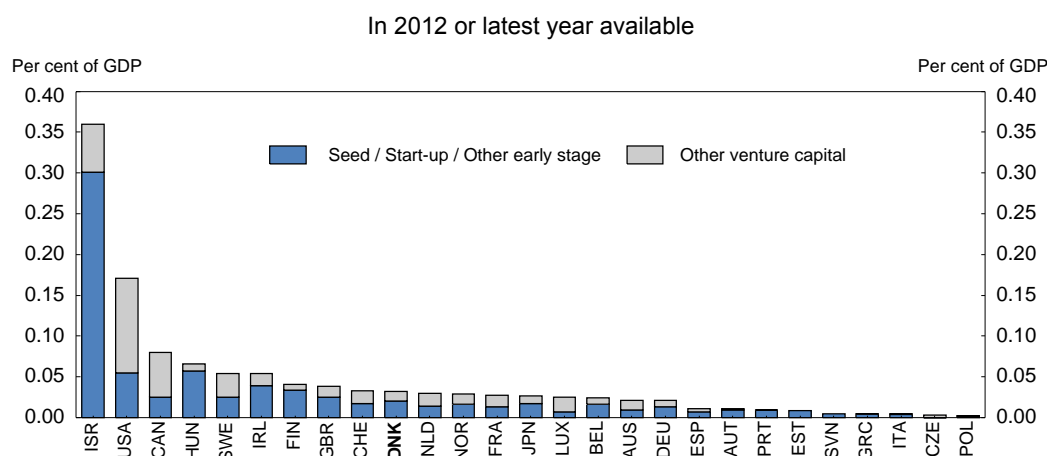
Government guaranteed loans increased from DKK 130.5 million in 2007 to DKK 940 million in 2012 and has been scaled back only to a limited extent. In 2013, the various loan guarantee schemes were merged into a single one. The share of government loan guarantees in total business loans to SMEs rose from 0.3% in 2007 to 2.4% in 2012. This can partly be attributed to increased knowledge of the scheme and partly to the fact that the scheme is attractive to banks, as it reduces the risk of lending. Another explanation is that it has become more difficult for businesses to get access to loans on normal terms. These difficulties highlight the importance of other types of financing for SMEs such as corporate bonds.

An analysis of credit guarantee schemes across OECD countries suggests that they have increased credit availability, but also expose guarantors to risk; and there is very little evidence that they boost SME sales, employment or innovation (OECD, 2013e). As the economy recovers and access to funding improves, the government should gradually withdraw some of these schemes and ensure that all public intervention schemes are mainly privately co-funded. Evaluation of government support to SMEs is

common in Denmark, but there should be a more unified and transparent approach to the monitoring and evaluation of these schemes.

The financing needs of new entrants and young firms that have no history of success or with KBC assets that are difficult to value can be filled by venture capital or business angel investment. Countries with developed seed and early stage venture capital are more likely to invest in KBC and more effective at distributing labour and capital to young innovative firms (Andrews and Criscuolo, 2013). Early-stage venture capital funding is relatively high in Denmark by OECD standards but lower than in some other Nordic countries and it declined by 60% between 2007 and 2012 due to the crisis (Figure 16).

**Figure 16. Venture capital investment**



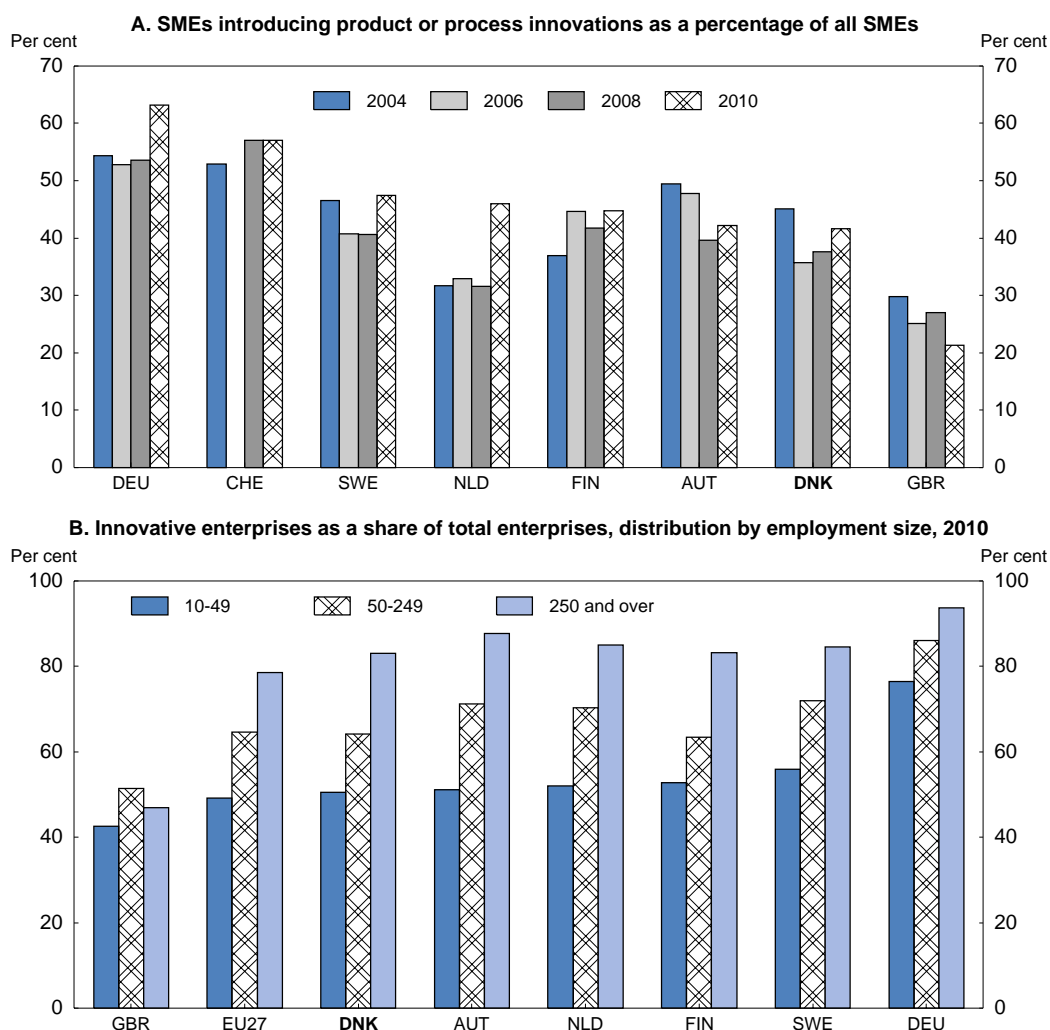
Source: OECD (2013), *Entrepreneurship at a Glance*.

However, business angel investment is relatively low in Denmark, compared to some other small countries. In 2009, only 7% of Danish growth entrepreneurs had received funding from a business angel at any time. The low share of high-growth firms in Denmark compared to some other countries could be linked to a weaker business angel culture in Denmark (FORA, 2009). Although the empirical evidence on the impact of angel investment on productivity is not clear-cut, angel investment can be useful, especially for young firms with little track record and collateral (OECD, 2011). With their lower cost structures compared to venture capital funds, angel investors can make smaller investments and spread out more geographically (Mason, 2009). Angel investors and venture capitalists also provide other benefits to SMEs beyond funding, including business expertise on commercialising an invention and creating connections that will facilitate an eventual sale. Specific measures such as co-investment funds and tax incentives have helped to successfully develop business angel networks in some other countries, but they also have drawbacks (OECD, 2011). Continuing efforts to foster a more entrepreneurial culture and improve the training of angel investors would contribute to developing business angel networks, thus also helping to address young firms' funding difficulties.

### Facilitating SME growth and internationalisation

As in other OECD economies, SMEs account for a very large share of firms and employment. Their capacity to innovate, develop new products and attract skills is therefore central for the competitiveness of the Danish economy and productivity growth. The innovation activities of Danish SMEs are comparable to their Nordic peers, but below Germany's. Since the beginning of the global economic crisis, their access to funding has been hampered and they have introduced fewer marketing and organisational innovations (Figure 17).

Figure 17. Innovation by small and medium enterprises



Source: European Commission, *Innovation Union Scoreboard*, 2013; Eurostat, *Community Innovation Surveys*.

### ***Promoting high-growth firms and entrepreneurship***

A sign of entrepreneurial dynamism is the prevalence of both high-growth firms and young high-growth firms (gazelles), but in this respect Danish performance is not very strong. The share of high-growth firms decreased from 6% in 2008 to 2.5% in 2010. In 2009, 0.43% of all enterprises in manufacturing were gazelles and the average number of jobs created by gazelles between 2006 and 2009 was also relatively low in Denmark compared to its Nordic peers (Table 5). Furthermore, the share of gazelles that grows and reaches 50 employees, at 20%, is much lower than in Finland (48%). High-growth firms in Denmark face three main challenges: access to finance, ability to attract foreign high-skilled labour, and entrepreneurial culture (Nordic Innovation Centre, 2012). The Danish government has focused on strengthening the entrepreneurial environment and access to finance (see above) in order to foster the creation of high-growth firms, but there remains scope to improve their number and performance.

**Table 5. Gazelles in Nordic countries<sup>1</sup>**

|                | Number of gazelles <sup>2</sup> , 2009 | Share of gazelles that grow to reach more than 50 employees, 2009 | Number of jobs created by gazelles, 2006-09 | Number of gazelles, 2006-09 | Average jobs created per gazelle, 2006-09 |
|----------------|--|---|---|-----------------------------|---|
| Norway         | 0.87                                   | 38  | 10 594                                      | 214                         | 50  |
| Sweden         | 0.70                                   | 25  | 8 447                                       | 206                         | 41  |
| Finland        | 0.56                                   | 48  | 7 617                                       | 93                          | 83  |
| <b>Denmark</b> | <b>0.43</b>                            | <b>20</b>   | <b>2 800</b>                                | <b>84</b>                   | <b>33</b>                                 |

1. Gazelles are defined here as enterprises that have been employers for up to five years, with average annualised growth in employees greater than 20% a year over a three-year period and with ten or more employees at the beginning of the observation period.
2. As a share of enterprises with 10 or more employees.

Source: Nordic Innovation Centre (2012), *The Nordic Growth Entrepreneurship Review*, Report No. 25.

Improving framework conditions by enhancing competition and openness to FDI, easing access to finance and streamlining innovation policies, as discussed above, would foster the development of high-growth firms (OECD, 2010). In addition, there is a need to have certain policies targeted at these firms to address their specific needs. Cross-country analysis including Denmark shows that young and foreign-owned companies are more likely to be high-growth firms. In 2007, five Business Development Centres (*Væksthus*) were established to promote entrepreneurship and high-growth firms.

According to a recent study benchmarking policies for high-growth SMEs, the Danish system does well (OECD, 2013f). The Business Development Centres are generally well-designed and cover companies of all ages, industry and location (Lilischkis, 2011). A recent evaluation shows that enterprises using the Danish Business Development Centres perform better than those who do not (Danish Business Authority, 2013). However, even the firms receiving assistance do not reach the goals of achieving at least 15% higher growth in employment and turnover and at least 10% higher growth in exports than other firms in the region.

There is scope to improve some of the characteristics of the Business Development Centres. The number of services and advisors offered may be too large, making the system overly complex. Some regulations prevent Business Development Centres from providing support to firms for successive years (OECD, 2013f). Nonetheless, the longer-term effect of these services should be monitored more closely.

Barriers to entrepreneurship, including regulatory and administrative opacity and burdens on start-ups, are low in Denmark. As a result, start-up rates are high, around 10-12% as a percentage of all registered firms. Despite the sound conditions for entrepreneurship, the entrepreneurial culture in Denmark is not as supportive for high-growth firms as in the United States, Canada, and other Nordic countries (Nordic Innovation Centre, 2012). The Global Entrepreneurship Monitor indicates that entrepreneurship is not regarded as a good career choice in Denmark in a comparative perspective. According to recent surveys, 28% of respondents prefer to be self-employed in Denmark compared to an EU average of 37% (European Commission, 2012).

Denmark ranks 25<sup>th</sup> amongst OECD countries in terms of self-perceptions of entrepreneurial capabilities (OECD, 2012b). In 2010, the Danish Foundation of Entrepreneurship was set up to improve entrepreneurship education and competence. Despite these efforts, the supply of entrepreneurial skills and capabilities remains a barrier to entrepreneurship, with 21% of survey respondents citing lack of skills as the largest barrier, much higher than the EU average (OECD, 2013g). Efforts to foster a more entrepreneurial culture through the education system and the media should continue.

Denmark also lags behind in terms of female entrepreneurship (Global Entrepreneurship Monitor, 2012). The share of exporting firms founded by women is lower, at 15%, than the 20% average of several

OECD countries (OECD, 2012b). One reason is women's more than proportionate representation in the public sector compared to other OECD countries (OECD, 2012c; Nordic Innovation Centre, 2007). Some initiatives were launched as part of the Danish national action plan to promote women entrepreneurs between 2009 and 2011. The Danish Business Authority has set up a web portal to support the creation of networks for women, but the participation of Danish women in new enterprises remains below that of Sweden and the Netherlands. Efforts to encourage female entrepreneurship should continue, for instance with a specific focus on women entrepreneurs at universities to address cultural barriers and stereotypes about the role of women in society.

### ***Increasing internationalisation further***

While SMEs are more internationalised in Denmark than in the European Union at large, there is potential for more Danish SMEs to expand their export destinations from European to more global markets. The increasing role of KBC creates new challenges for innovation, entrepreneurship and SME policies for many countries (OECD, 2013h; Cox and Rigby, 2012). In order to address these challenges, it is important to better coordinate policies specifically targeted to SMEs, entrepreneurship policies and innovation policies.

The *Vitus Growth* export programme, run by the Trade Council, is meant to facilitate Danish SMEs' access to international markets. Moreover, several initiatives were launched following the onset of the global economic crisis with the same objective. A temporary scheme for short-term export credit guarantees to EU and OECD countries was established and extended until the end of 2015. A guarantee facility that specifically targets SMEs was created. A working capital scheme was introduced and made permanent in 2012 to help Danish firms access credit. These initiatives are useful, but an explicit overall internationalisation strategy for SMEs may be called for.

SMEs may face barriers in their involvement in FDI, given their limited financial, managerial and information resources. The Ministry of Business and Growth is currently working on improving the access of Danish SMEs to FDI, particularly from other EU countries. The 2013 *Growth Plan* features various initiatives, including lower corporate taxation, to create a more attractive business environment that can increase the ability of Danish firms to attract FDI. The Innovation Centres offer various consulting services on access to venture capital and investors, an overview of foreign competency clusters and networks, as well as access to suitable research and innovation partners to aid Danish innovative companies that wish to expand their business globally.

Clusters can contribute to improving the capability of businesses, especially SMEs, increase external linkages in terms of FDI and exports by building up a skills base, increase links between research and industry, improve access to finance and more generally create spillovers (OECD, 2007). However, the effects of clusters depend on a number of factors, including the industry, stage of development and location (Uyarra and Ramlogan, 2012; FORA, 2011). Studies on Danish clusters show that participation in clusters increases the probability to innovate by over 4.5 times and the probability to collaborate in R&D projects by four times (Danish Agency for Science, Technology and Innovation, 2011).

In April 2013, a new cluster strategy was launched to improve framework conditions for innovation and knowledge sharing, with a view to expanding clusters. It includes the establishment of a forum to increase collaboration in cluster development at local, regional and national levels and the strengthening of international activities of clusters (Ministry of Science, Innovation and Higher Education, 2013). This is in line with earlier OECD recommendations to improve cross-regional opportunities to build critical mass (OECD, 2012d). However, to maximise the effect of clusters on international activities of SMEs, special attention should be paid to sectoral needs in the implementation of the new cluster policy (Lämmer-Gamp *et al.*, 2011).

**Box 5. Recommendations to foster competition, innovation and entrepreneurship****Enhancing competition**

- Assess the impact of the regulations of professions and remove those that hamper competition and are not fully justified by other objectives. Harmonise national standards that hinder foreign firm entry with international ones. Relax ownership regulations and zoning and size regulations for stores.
- Simplify the legislation on public procurement and increase the use of e-procurement to lower transaction costs and make the process more uniform.
- Continue to open network industries, especially the rail passenger system, to competition.
- Streamline the institutional set-up of the authorities in charge of competition, while implementing closely the new Competition Act.

**Promoting innovation and entrepreneurship**

- Evaluate the recent merger of different innovation funding programmes and if needed, consider further streamlining innovation policy instruments and funding programmes after a thorough evaluation of the system.
- To support young and dynamic firms, further extend carry-over provisions and cash refunds in R&D tax credit programmes or increase direct support.
- Move towards a more balanced mix of project and institutional based research funding with the objective to increase the links between universities and industry.
- In the design of demand-side innovation policies, ensure sufficient competition and facilitate SME participation. Carefully evaluate these policies.
- Evaluate the effectiveness of the government loan guarantee schemes for SMEs in a unified and transparent manner and gradually withdraw those that are not economically efficient.
- Improve angel investor networks to increase the opportunities for early-stage financing of firms by continuing efforts to foster a more entrepreneurial culture and improving angel investor training networks.
- Streamline the services provided by Business Development Centres and monitor closely their long-term effects.
- Further enhance the entrepreneurship culture, including amongst women, through the use of the media and the education system.
- Consider developing an explicit internationalisation strategy for SMEs. Ensure that the new cluster strategy policies are tailored to the needs of different industries.



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## **Annex 1. Denmark's Innovation Strategy**

In December 2012, the Ministry of Science, Innovation and Higher Education launched an *Innovation Strategy*, with a view to create new jobs and growth through 27 initiatives in the areas of research, innovation and education. The *Strategy* has three main focuses: innovation driven by societal challenges, translating more knowledge into value and education to improve knowledge capacity.

### **Innovation driven by societal challenges**

- Implement a restructuring of the Danish councils for research and innovation
- Restructure the “Business Innovation Fund” to turn it into a “Market Development Fund” to support the introduction of innovative solutions to the market, including green and welfare solutions
- Strengthen Danish participation in European innovation efforts
- Establish "INNO+", a solid, professional basis for prioritisation of innovation policy
- Establish a model for societal partnerships on innovation
- Initiate pilot partnerships on innovation in 2013
  - a. Pilot partnership on sustainable and efficient pork production
  - b. Pilot partnership on better use of alternative water sources
  - c. Pilot partnership on innovative climate adaptation solutions
  - d. Pilot partnership on the development of an intelligent energy system
- Produce a national strategy for Danish participation in EU programmes

### **Translating more knowledge into value**

- Support more professional clusters and networks
- A collective programme for knowledge-based innovation in SMEs
- Prioritise R&D that supports Danish production
- Establish a “start-up pilot” to provide financial and advisory support to graduates wanting to work on a business idea, develop their entrepreneurial skills, and start their own company
- Establish three new international innovation centres
- Implement a simplification package for all public innovation schemes
- Increase the critical mass and gather competences in fewer innovation environments
- Strengthen knowledge cooperation and innovation in education through recognition and attractive career paths for researchers and educators
- Strengthen the framework and documentation for knowledge cooperation
- Strengthen commercial access to knowledge
- Promote cooperation with companies on practice-oriented innovation

### **Education as a means to improve innovation capacity**

- Increase practice-elements at all education levels to support innovation
- Support innovation in the education of teachers and educators
- Provide support to talented students
- Create a cohesive primary school system to promote talented and independent students
- Strengthen the build-up of competences in innovation and entrepreneurship in vocational education
- Strengthen the innovative and business-oriented competences of PhD students
- Develop new learning targets, and forms of teaching and exams
- Implement an innovation competition for students in primary and secondary education
- Strengthen the integration of innovation and entrepreneurship in education programmes

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