Quarterly Newsletter of the Federal Planning Bureau

Short Term Update (STU) is the quarterly newsletter of the Belgian Federal Planning Bureau. It contains the main conclusions from the publications of the FPB, as well as information on new publications, together with an analysis of the most recent economic indicators.

HEADLINES BELGIAN ECONOMY

The European Union set up the Europe 2020 Strategy as the successor to the Lisbon Strategy to monitor and stimulate structural reform by the Member States. In the first semester of each year (the so-called European Semester), the Member States compile their Stability & Convergence and National Reform Programmes. At the turn of the semester the European Council develops policy recommendations to be implemented, preferably during the second semester. Sound performance on structural issues lays a foundation for healthy potential growth around which the business cycle oscillates.

Following the calendar of this renewed strategy, the Federal Planning Bureau decided to move the structural performance update – traditionally published in December - to the March issue and adapt the calendar of the business-cycle updates accordingly. The present December issue is, however, a one-off issue exclusively devoted to the system of innovation. Innovation has been recognised in the Europe 2020 strategy as the first of seven 'flagships' that should secure smart, sustainable, and inclusive growth. Innovation should have a positive impact on productivity growth and hence encourage potential GDP growth and employment. Measured in terms of R&D, not more than a few Member States achieve an innovation effort that is comparable to that of the other advanced economies of the world.

The system of innovation is an assembly of six interlinked dimensions: knowledge development by R&D; human resources; valorisation of R&D, e.g. through patents; innovation absorption capacity within and among enterprises; entrepreneurship; and financing. A good performance on each of the six is needed for a system to perform optimally. This December issue monitors the performance of Belgium on each of the dimensions. Other EU countries, the USA, and Japan serve as a benchmark. The performance seems to be mixed, so efforts are still needed to drive further improvement of the Belgian innovation system as a condition for growth and jobs.

STU 04-11 was finalised on 16 December 2011.

The Federal Planning Bureau (FPB) is a public agency under the authority of the Prime Minister and the Minister of Economic Affairs. The FPB has a legal status that gives it an autonomy and intellectual independence within the Belgian Federal public sector.

FPB activities are primarily focused on macroeconomic forecasting, analysing and assessing policies in the economic, social and environmental fields.

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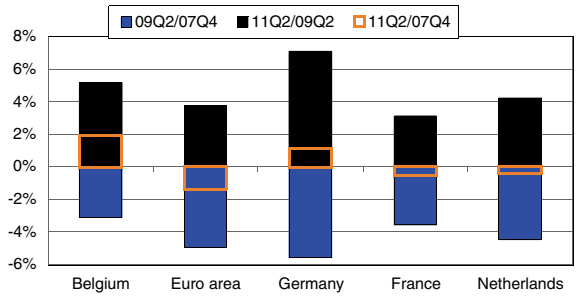
Relative performance of Belgian GDP since the onset of the financial crisis

The financial crisis has led to more prominent differences in economic growth across euro area Member States. Two groups of countries can be distinguished, i.e. southern Europe and Ireland on the one hand and the northern member countries on the other. The economic growth divergence between both groups was particularly pronounced during the short-lived recovery of the northern Member States, but cross-country differences in northern Europe have also mounted. In this Special Topic the performance of the Belgian economy is compared to that of its three main trading partners (Germany, France, and the Netherlands). This is done by examining the changes in real GDP and its main expenditure categories (consumption, gross capital formation, and net exports) between 2007Q4 and 2011Q2.

The choice of 2007Q4 as the reference quarter is motivated by the fact that economic growth turned negative in many large economies during the first half of 2008. Note that the gain or loss in GDP since the beginning of the financial crisis should not be considered as an accurate measure of the economic damage related to the crisis. That kind of impact should be calculated by comparing the current level of GDP to the level that would have been reached in the absence of that event[1].

Graph 1 - Performance of GDP in volume
growth rates

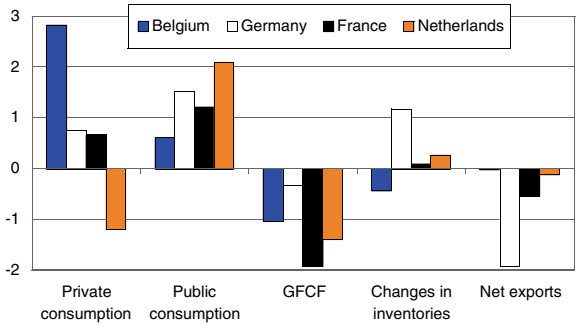


Source: Eurostat, INR/ICN, FPB

As shown in Graph 1, Belgian GDP exceeded its pre-crisis level by 2% in 2011Q2, a performance that was matched by few other euro area countries. In spite of a more pronounced recovery between mid-2009 and 2011Q1, growth in the German economy (1.2%) remained significantly below the Belgian figure as it suffered from a deeper recession. GDP levels in France (-0.5%) and the Netherlands (-0.4%) were still below their pre-crisis levels in 2011Q2. The euro area average (1.3%) was dragged down by Ireland and the southern economies, where private debt deleveraging, a lack of competitiveness, soaring government debt levels, and (resulting) fiscal austerity weighed heavily on economic activity. As economic growth in Belgium and other euro area countries was hampered much less by such problems, Belgium's economic performance will be compared to that of its three neighbouring countries.

When comparing the contributions of the main expenditure categories to economic growth, private consumption appears to be the main reason by far for the better performance of the Belgian economy as compared to its neighbouring countries (see Graph 2). It more than compensates for the relatively lower contribution of other expenditure components. The relatively modest contribution of public consumption is probably related to the rather limited scope of the Belgian fiscal stimulus in response to the financial crisis. The contribution of changes in inventories to economic growth was negative in Belgium. As a large part of inventories is imported, this is more or less compensated by a less negative contribution of net exports. Comparing the performance of gross fixed capital formation (GFCF) provides a mixed image: Belgian investment exerted a smaller drag on GDP growth than in France and the Netherlands, but it lagged behind German GFCF. German investment activity plunged by 13% in reaction to the financial crisis, but bounced back to be much stronger (+13%) than in other countries during the subsequent recovery. Apart from the relatively more dynamic recovery in GDP, the catch-up of German investment was also supported by the strong pick-up in capacity utilisation and the higher profitability of German enterprises, implying that they were probably less exposed to tighter credit conditions.

Graph 2 - Contributions to GDP growth
percentage points; 11Q2/07Q4



Source: Eurostat, INR/ICN, FPB

The outperformance of Belgian private consumption relative to its neighbouring countries could be due to diverging developments in households' real disposable income and/or saving rate. Comparing the saving rate

1. See the Special Topic of STU 2-11 for a detailed discussion of this issue.

in 2010 to its 2007 level shows that it roughly stabilised in Belgium (-0.2%-points), Germany (+0.2%-points) and France (+0.5%-points), whereas it decreased by 2.1%-points in the Netherlands. However, as shown in Table 1, differences in the evolution of real disposable income were more pronounced: while it increased by 4.6% between 2007 and 2010 in Belgium, it went down by 0.8% in the Netherlands. A moderate increase was registered in Germany and France (1.1% and 2.4%, respectively).

Table 1 - Contributions to nominal disposable income growth
2010/2007, percentage points

	BE	DE	FR	NL
Compensation of employees	7.6	4.7	4.3	7.0
Non-labour income[a]	1.1	-0.3	0.0	-7.1
Net current transfers	0.4	0.5	1.9	1.3
of which: direct taxes	-1.4	0.0	-0.3	-3.1
Nominal disposable income growth (%)	9.0	4.9	6.1	1.2
Real disposable income growth (%)	4.6	1.1	2.4	-0.8

a. Calculated as the sum of gross operating surplus, mixed income, and net property income

Source: Eurostat, INR/ICN, FPB

Between 2007 and 2010, the disposable income of Belgian households was mainly supported by compensation of employees. This increase in the wage sum was related to employment by only a small extent as the number of hours worked barely exceeded its pre-crisis level in 2010. By contrast, the (automatic) indexation of wages accounted for about two thirds of the aggregate wage increase. Taxes on wages grew more strongly than wages, which is in line with the progressive income tax system, although this was partly offset by a decline in other current tax categories. Due to automatic stabilisers, social benefits increased more strongly than social contributions, resulting in a positive contribution of net current transfers (excluding direct taxes) to disposable income growth.

Nominal disposable income in Germany and France increased 3-4%-points less than in Belgium, mainly due to a lower contribution by compensation of employees. This is mainly related to slower growth in compensation per employee and also (in the case of France) slower growth in employment. A lower contribution from non-labour income, mainly explained by slower growth in dividends paid by corporations, also played a role. The effect of these lower (positive) contributions was partially compensated by a smaller negative contribution from direct taxes. Disposable income growth in the Netherlands strongly differs from that in the other countries, acting as a significant drag on private consumption. The relatively high contribution of compensation of employees, mainly related to increases in hourly wages, is wiped out by the negative contribution of non-labour income (related to mixed income as well as net property income).

All in all, it appears that Belgium has outperformed its neighbouring countries in terms of GDP since the beginning of the financial crisis due to private consumption, which is related to stronger growth in households' disposable income. This is mainly explained by the relatively strong increase in (nominal) wages and the fact that the Belgian labour market suffered relatively less from the crisis.

Looking ahead, it should not be taken for granted that the Belgian economy will continue to outperform its neighbouring countries in terms of GDP growth. Firstly, this would be at odds with observations prior to 2008. Between 2000 and 2007, for example, Belgium recorded GDP growth that was in line with growth in France, the Netherlands, and even the euro area as a whole. Secondly, as stronger growth in Belgium over the last few years has been mainly due to stronger wage growth, this could hamper its future external competitiveness, resulting in a lower contribution of (net) exports to economic growth. Finally, the Belgian government needs to implement rigorous fiscal consolidation in the coming quarters in order to maintain financial markets' confidence in its sovereign debt. These measures are likely to weaken domestic demand. This issue is of lesser importance for Germany as its budget deficit is rather limited and as financial markets consider it the safe haven in the euro area.

Economic forecasts for Belgium by different institutions

	GDP-growth		Inflation		Government Balance		Date of
	2011	2012	2011	2012	2011	2012	update
Federal Planning Bureau [1]	2.4	1.6	3.5	2.0	.	.	09/11
INR/ICN [1]	2.4	1.6	3.5	2.0	.	.	09/11
National Bank of Belgium [2]	2.6	2.2	3.4	2.2	-3.5	-4.1	06/11
European Commission [2]	2.2	0.9	3.5	2.0	-4.6	-4.5	11/11
OECD [2]	2.0	0.5	3.4	2.3	-3.5	-3.2	11/11
IMF [2]	2.4	1.5	3.1	2.0	-3.5	-3.4	09/11
ING [1]	2.1	0.3	3.5	2.1	-3.0	-2.2	11/11
BNP Paribas [2]	2.0	0.0	3.5	2.0	-3.6	-3.1	11/11
Dexia [1]	2.4	0.8	3.4	2.3	.	.	11/11
KBC Bank [1]	2.1	0.7	3.6	2.0	-3.6	-2.8	12/11
Deutsche Bank	1.9	-0.6	3.4	2.0	-3.9	-5.0	11/11
IRES [1]	2.6	2.4	3.6	1.9	-3.4	-3.9	07/11
Consensus Belgian Prime News [2]	2.5	1.5	3.5	2.2	-3.6	-3.4	10/11
Consensus Economics [2]	2.3	1.0	3.4	2.3	.	.	11/11
Consensus The Economist [2]	2.3	-0.1	3.3	2.1	.	.	12/11
Consensus Wirtschaftsinstitute [2]	2.4	0.8	2.6	1.6	-3.8	-4.6	10/11
Averages							
All institutions	2.3	0.9	3.4	2.1	-3.6	-3.7	
International public institutions	2.2	1.0	3.3	2.1	-3.9	-3.7	
Credit institutions	2.2	0.4	3.5	2.1	-3.5	-3.3	

[1] Inflation forecasts based on the evolution of the national index of consumer prices

[2] Inflation forecasts based on the evolution of the harmonised index of consumer prices

Economic forecasts for the euro area by different institutions

	GDP-growth		Inflation		Government Balance		Date of
	2011	2012	2011	2012	2011	2012	update
European Commission	1.5	0.5	2.6	1.7	-3.3	-2.8	11/11
OECD	1.6	0.2	2.6	1.6	-4.0	-2.9	11/11
IMF	1.6	1.1	2.5	1.5	-4.1	-3.1	09/11
ING	1.4	0.0	2.6	1.8	-4.3	-3.7	11/11
BNP Paribas	1.5	0.0	2.7	1.9	-4.3	-3.1	11/11
Dexia	1.6	0.5	2.7	1.8	.	.	11/11
KBC Bank	1.6	0.5	2.6	1.5	.	.	12/11
Goldman Sachs	1.5	-0.8	2.7	1.7	-4.7	-4.0	12/11
Deutsche Bank	1.6	-0.5	2.7	1.9	-4.2	-3.6	11/11
Morgan Stanley	1.6	-0.2	2.7	1.5	-4.3	-3.9	11/11
Consensus AIECE	1.5	0.6	2.6	1.9	.	.	10/11
Consensus Economics	1.6	0.4	2.7	1.8	.	.	11/11
Consensus Wirtschaftsforschungsinstitute	1.5	0.4	2.5	1.5	-4.0	-3.7	10/11
Consensus The Economist	1.6	-0.3	2.7	1.8	.	.	12/11
Averages							
All institutions	1.6	0.2	2.6	1.7	-4.1	-3.4	
International public institutions	1.6	0.6	2.6	1.6	-3.8	-2.9	
Credit institutions	1.6	-0.1	2.7	1.7	-4.4	-3.7	

Introduction

This scoreboard offers a comparative assessment of innovation performances of Belgium inside the European Union. Innovation is at the heart of the Europe 2020 initiative, the EU's growth strategy for the coming decade. In a changing world, this strategy is designed to generate smart, sustainable, and inclusive growth in the EU with high levels of employment, productivity, and social cohesion. Concretely, the Union has set five ambitious objectives - on employment, innovation, education, social inclusion, and climate/energy - to be reached by 2020. Each Member State has adopted its own national targets in each of these areas. The Europe 2020 innovation Union flagship has indeed presented innovation as the best means of successfully tackling major societal challenges such as climate change, energy and resource scarcity, and health and ageing. Quantitative objectives have been fixed in terms of resources devoted to R&D and in terms of highly-qualified human capital. These objectives are monitored yearly in the National Reform Program. Work is still in progress at the Commission level to identify other relevant quantitative objectives in the field of innovation.

The purpose of this scoreboard is to take into account all dimensions of innovation performances by considering the innovation process as a system of six interlinked pillars. These pillars are: Knowledge development, Human resources, Valorisation of R&D, Innovation absorption capacity, Entrepreneurship, and Financing of innovation. Knowledge development captures the capacity to mobilise resources in favour of research and innovation; Human resources cover the functioning of education and training systems and the offer of highly-qualified workers; Valorisation of R&D includes the capacity to protect research results and give them economic or social finality; Innovation absorption capacity encompasses capacities for diffusion, integration, and use of progress; Entrepreneurship involves the capacity to launch or develop economic activities; and Financing of innovation reflects the accessibility of capital needed to implement innovative projects. These pillars being interconnected, each of them has to reach a sufficient level of development to guarantee the good functioning of the whole system of innovation.

The six pillars are analysed through widely-accepted and reliable statistical indicators, which are brought together at http://indicators.plan.be/. The majority of these indicators cover the years 2008 and 2009. Therefore they may not capture the possible impact of the current financial crisis on innovation performance.

A synthetic vision of the development of the Belgian innovation system is provided by the following radar graphic in which each axis represents a specific indicator of the innovation system. For each indicator, the score of Belgium relative to the EU27 average performance is indicated on the axis. A value above (below) 1 indicates that Belgium has realised better (worse) performance than the European average. Two years are represented: 2005 and the latest available year (generally 2009), to provide a dynamic vision of the development of the Belgian innovation system.

Belgium shows results above the European average for seven out of the 12 indicators considered for the latest available year. This is the case for R&D intensity, R&D personnel as a percentage of total employment, percentage of the population with tertiary education, percentage of firms with technological innovation, share of employment in high-tech and medium-high-tech manufacturing and in knowledge intensive services, percentage of innovative firms with cooperation agreements, and % of households with broadband Internet access. In contrast, the results are below the European average for public financing of R&D (10% below the EU), venture capital investment intensity[1] (20% below the EU), percentage of new tertiary education graduates in science and engineering (23% below the EU), Total Entrepreneurship Activity index (32% below the EU), and the share of high-tech exports in total exports (48% below the EU). The main strengths of the Belgian innovation system are therefore: its capacity to mobilise resources - human and capital - in favour of R&D, mainly by the private sector; the qualifications of its labour force; its capacity to generate innovation; the large technological base of its enterprises; the quality of new technology infrastructures; and the worldwide insertion of its innovative firms. The main weaknesses are in: the mobilisation of public financing in favour of R&D; the renewal of scientific qualifications of the labour force by new entrants and also in the use of the life-long learning; the lack of entrepreneurship able to convert innovation into economic activities; and the lack of transformation of innovation into international comparative advantages.

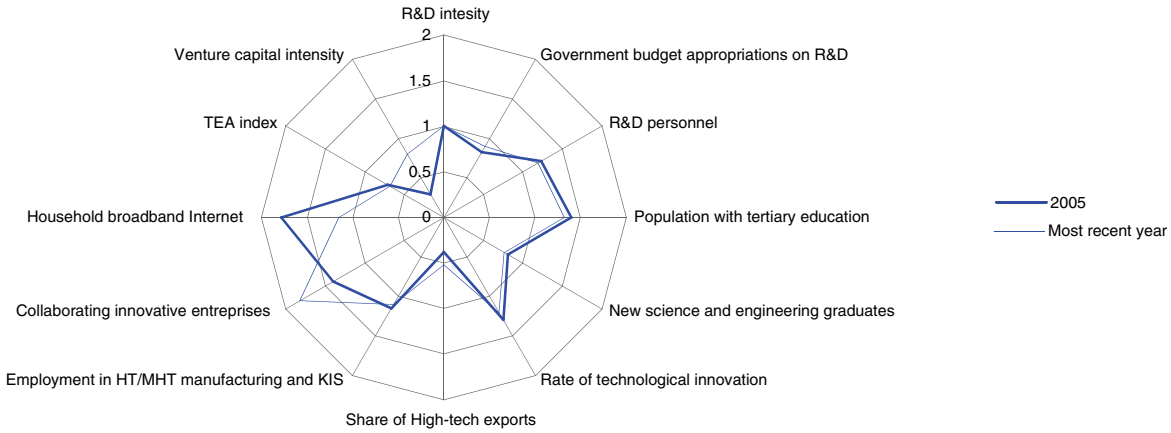
In comparison with other European Member States, Belgium seems to belong to a group of European countries that are not innovation leaders as are the Scandinavian countries or Germany, but that are good innovation followers, such as France, the Netherlands or Austria.

1. Given the cyclical behaviour of venture capital investment and the desynchronization of business cycles in the EU, 2008 has been preferred to 2009 as the year of comparison.

Since 2005, the relative position of the Belgian innovation system has remained quasi stable. A slight deterioration is visible for seven indicators that mainly cover the relative quality of human resources. This is because the relative deterioration of their flow has begun to play on the stock. The deterioration also hits the relative quality of infrastructure while the other Member States have rapidly improved their ICT networks. The improvements in relative performances mainly include the public financing of R&D efforts, the capacity of innovative firms to cooperate, and the capacity to export high-tech products.

As innovation has become a central objective of the European Union, all Member States have attempted to improve their performances. Therefore the relative position of Belgium has remained more or less the same despite efforts realised to improve some aspects of the innovation system.

Graph 1 - The relative position of the Belgian innovation system inside the EU (EU=1)*



Source: FPB, based on Eurostat, CFS/STAT and OECD
*) The EU average is given for the EU27 except for the TEA index (EU12) and Venture capital investment intensity (EU15); the most recent year is 2009 except for R&D personnel, Rate of technological innovation, Employment in HT sectors, Collaborating innovative enterprises, and Venture capital investment (2008) and Population with tertiary education and Households connected to the Internet (2010). The comparative year is 2004 for Rate of technological innovation and Collaborating innovative entreprises.

The following sections detail each pillar of the Belgian innovation system through a dynamic international comparison of the main indicators.

Knowledge development

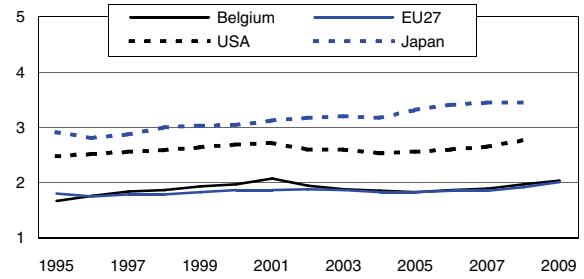
Table 1 - Business enterprise R&D expenditure in high- and medium-high-technology sectors, as a % of total business R&D expenditure [1]

	Belgium (2008)	France (2007)	Netherl. (2007)	Germany (2008)	UK (2008)	USA (2007)	Japan (2008)
HT sectors	**51,8**	**52,8**	**42,7**	**25,8**	**58,3**	**50,6**	**44,0**
Pharmaceutical products	27,4	14,3	8,6	7,4	27,2	.	9,5
Office machinery and computers	0,3	0,7	.	1,5	0,5	2,6	3,7
Radio, television and communication equipment	5,5	10,4	19,9	7,1	4,2	11,6	17,9
Medical, precision and optical instruments	3,8	6,3	3,1	7,1	3,7	9,5	5,1
Aircraft and spacecraft	1,8	10,8	.	.	10,8	6,8	0,0
Telecommunications	4,8	3,2	.	.	.	1,2	.
Computer and related activities [2]	8,0	7,0	5,0	.	9,4	12,6	1,8
Research and development	0,1	0,2	6,1	2,7	2,5	6,3	5,9
MHT sectors	**23,1**	**29,4**	**29,2**	**53,9**	**20,9**	**10,6**	**39,0**
Chemicals and chemical products [3]	12,0	5,7	14,9	7,0	3,9	:	6,1
Machinery and equipment n.e.c.	5,5	4,6	10,6	10,9	5,2	3,7	8,3
Electrical machinery and apparatus n.e.c.	3,7	4,4	1,2	3,1	3,6	1,0	7,6
Motor vehicles, trailers and semi-trailers	1,8	14,0	2,5	32,8	7,9	6,0	16,8
Transport equipment [4]	0,2	0,7	.	.	0,2	.	0,2
Total	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**

Source: OECD (Research and Development) and Belgian Science Policy
[1] When no data is available for one industry in the MHT and HT sectors, the total is underestimated
[2] Excluding software
[3] Excluding manufacture of pharmaceuticals, medicinal chemicals, and botanical products
[4] Excluding building and repairing of ships and boats and excluding manufacture of aircraft and spacecraft

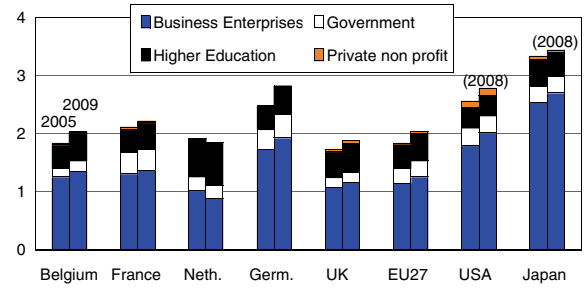
Knowledge development

Graph 2 - Total intramural R&D expenditure, as a % of GDP



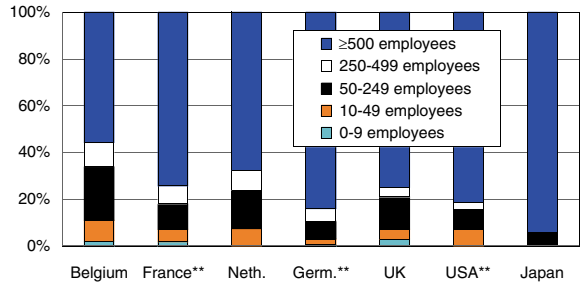
Source: Eurostat (Research and Development), Belgian Science Policy and NAI

Graph 3 - Total intramural R&D expenditure by sector of performance, as a % of GDP



Source: Eurostat (Research and Development), Belgian Science Policy and NAI

Graph 4 - Business enterprise R&D expenditure by class of size (2008)*



Source: Eurostat (Research and Development) and Belgian Science Policy
*) Shares of total business R&D expenditure
**) 2007

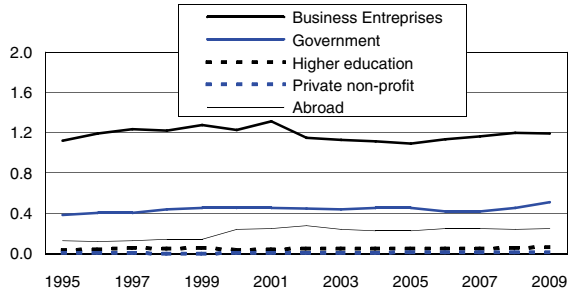
Research and experimental development (R&D) is one of the key factors of economic growth, competitiveness, and employment. Over the whole 1995-2009 period, Belgium recorded, on average, an increase in R&D expenditure measured as a percentage of GDP from 1.67% in 1995 to 2.03% in 2009 (Graph 2). Following strong growth in its R&D intensity until 2001, Belgium experienced a decrease until 2005. Since then, growth has been observed in every year. The impact of the recent crisis on R&D expenditure seems to be relatively contained so far. Belgium's R&D intensity was equivalent to or slightly above the European average over the whole period but substantially below the intensity of the USA and Japan. In 2009, R&D intensity in Belgium reached 2.03% of GDP, which was similar to the EU27 average (2.01%) but below the intensity in the USA, Japan, Germany, and France and below the Europe 2020 objective of 3% (Graph 3).

R&D activities can be performed by four main sectors: business enterprises, government, higher education, and private non-profit institutions. Business enterprise R&D accounts for the bulk of R&D activity in the majority of the countries. In 2009, Belgian firms achieved R&D at a level of 1.34% of GDP, which was above the EU27 average (1.25%), the percentage observed in the Netherlands and in the UK. The higher education sector carried out as much R&D activity in Belgium (0.48% of GDP) as in Europe on average and in Germany and a higher rate of R&D than in France, the USA, and Japan. The role played by the government sector (public R&D institutions) as a performer of R&D activity is very limited in Belgium (0.18% of GDP) in comparison with the European average (0.27%) and the other countries, with the exception of the UK. Finally, R&D activities performed by private non-profit institutions were very low in each country.

Table 1 shows that in each country, R&D activities are concentrated in the medium- and high-technology sectors (MHT/HT). Compared with the other countries, Belgium is rather specialised in R&D in chemicals and, more specifically, in pharmacy (39.4% of total business R&D expenditure).

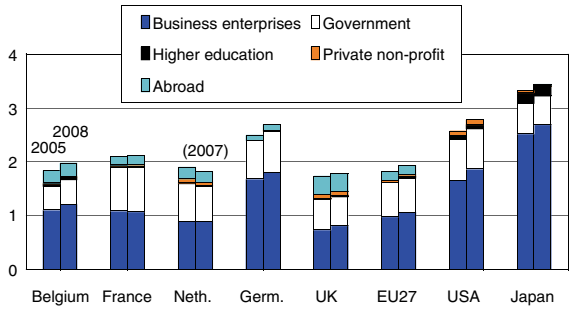
Another characteristic of Belgium is the high share of R&D activities performed in small and medium-sized firms of less than 250 employees (33.9% of total business R&D expenditure), which is higher than that observed for the other countries (Graph 4). The majority of business R&D activity remains, however, carried out in large enterprises with more than 500 employees.

Graph 5 - Total intramural R&D expenditure by source of funds in Belgium, as a % of GDP



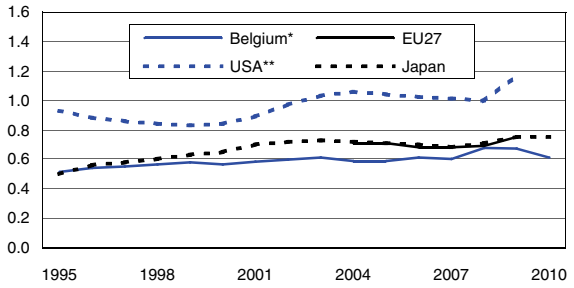
Source: Belgian Science Policy and NAI

Graph 6 - Total intramural R&D expenditure by source of funds, as a % of GDP



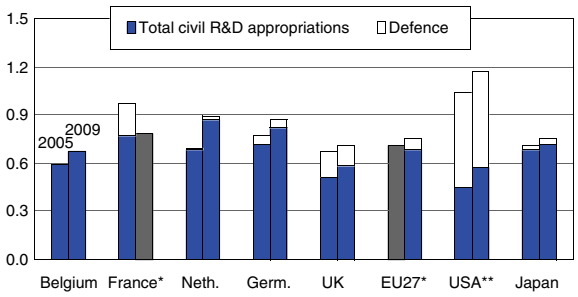
Source: Eurostat (Research and Development), Belgian Science Policy and NAI

Graph 7 - Government budget appropriations for R&D, as a % of GDP



Source: Eurostat (Research and Development), Belgian Science Policy and NAI
*) 2010 on the basis of the initial budget
**) Break in series in 2009

Graph 8 - Government budget appropriations for R&D, as a % of GDP



Source: Eurostat (Research and Development), Belgian Science Policy and NAI
*) The grey bars denote total R&D appropriations without details
**) Break in series in 2009

R&D expenditure can also be broken down by source of funds (Graph 5). The business enterprise sector is the main source of R&D funding (58.6% of total expenditure in 2009) and has played an import role in the fall in R&D expenditure since 2001 and in its recent rise. The share of R&D expenditure financed by enterprises decreased over the whole period (67.1% in 1995), unlike that of the government sector, which went from 23.1% in 1995 to 25.3% in 2009. This sector experienced, in fact, a strong growth in its financing over the latter two years. R&D expenditure financed by the other sectors was rather stable over the period, with the exception of strong growth in 2000 in R&D expenditure financed from abroad. In 2009, the financing of the "abroad" sector was constituted as follows: 65.1% by foreign business enterprises, 25.0% by the European Commission, and 6.0% by international organisations.

Belgian firms financed R&D at a level of 1.20% of GDP in 2008, which was above the EU27 average (1.05%), the percentage observed in France, the Netherlands, and the UK (Graph 6). R&D intensity financed by the public authorities reached 0.46% of GDP, which was significantly below the European average (0.65%) and all other selected countries[1]. Funds from abroad constitute an important source of financing of R&D activities in Belgium (0.24% of GDP, against 0.17% on average in the EU27). Finally, financing from higher education reached 0.06% of GDP, which was above the EU27 average, equivalent to the percentage observed in the USA, and below the percentage in Japan.

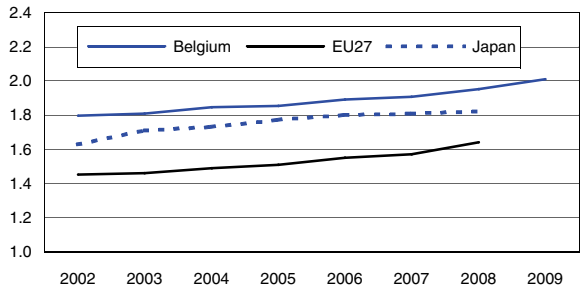
An alternative for measuring public support for R&D activities is the use of Government budget appropriations for R&D (Graph 7). According to the appropriations, Belgian public financing was below the financing in the EU27 on average and Japan and significantly below the financing in the USA over the whole period. The improvement observed in Belgium in 2008 did not continue for the last two years. The strong growth observed in the USA after 2001 is mainly explained by the increase in the R&D budget for defence.

In 2009, Belgium's total public R&D budget reached 0.67% of GDP, which was below all selected countries (Graph 8). If only the civil R&D budget is taken into accounted, the Belgian budget was equivalent to the EU27 average and above the UK and USA budgets.

1. Only direct financial flows (direct support) are included in R&D expenditure financed by the authorities. However, the Belgian Government also uses a policy of fiscal incentives (indirect support) to stimulate R&D that are not included in public R&D expenditure. Total public support is consequently underestimated.

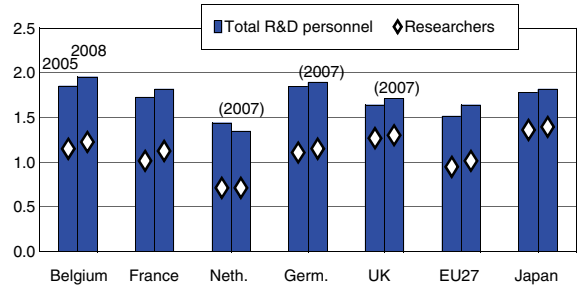
Human resources

Graph 9 - R&D personnel, as a % of total employment



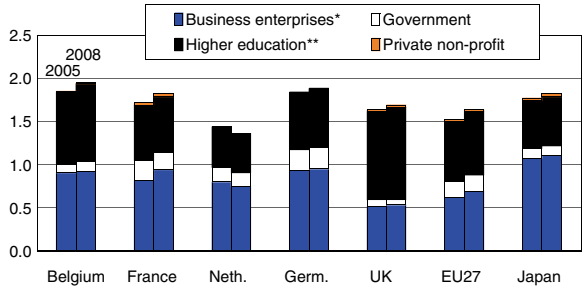
Source: Eurostat (Education and Training) and FPB

Graph 10 - R&D personnel and researchers, as a % of total employment



Source: Eurostat (Education and Training) and FPB

Graph 11 - R&D personnel by sector of performance, as a % of total employment



Source: Eurostat (Education and Training) and FPB
*) 2007 for Germany
**) 2007 for the Netherlands and the UK

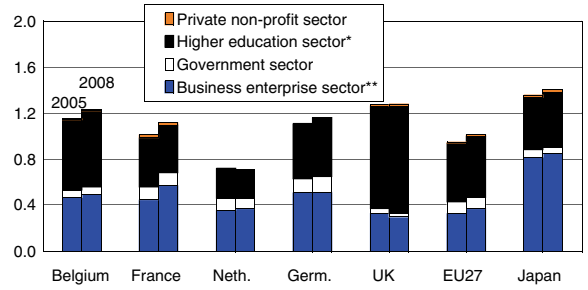
Human resources play a crucial role in the innovation process. Having sufficient and qualified human capital is essential to absorb, develop, and diffuse knowledge. Any potential deficit consequently has to be anticipated by the authorities.

R&D personnel include all persons employed directly in R&D. Three categories of R&D personnel are usually identified, according to their occupation: researchers engaged in the conception or creation of new knowledge, products, processes and in the management of the projects concerned; technicians who perform scientific and technical tasks, normally under the supervision of researchers; and other supporting staff including, notably, skilled and unskilled craftsmen, secretarial, and clerical staff.

In Belgium, R&D personnel as a percentage of total employment increased over the 2002-2009 period and reached 2.01% of total employment in 2009 (Graph 9). The share of R&D personnel in total employment in Belgium is above the EU27 average and the share observed in all the other comparison countries (Graph 10). Researchers constitute the largest part of R&D personnel, particularly in Belgium where this share (63.0% of total R&D personnel) is higher than that observed on average in the EU27, France, the Netherlands, and Germany. In 2008, researchers reached 1.23% of total employment, which is higher than the European average and the percentage in other countries, with the exception of the UK and Japan.

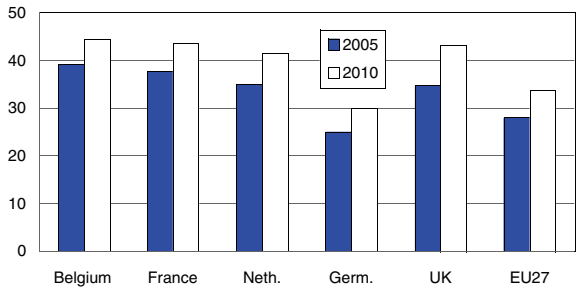
R&D personnel can be broken down by sector of performance (Graph 11). Data as percentages of employment have to be interpreted with caution. Indeed, the use of part-time jobs and the time devoted to R&D by each person (particularly in higher education) can vary from one country to another. As is the case with R&D expenditure, the biggest sector in Belgium, employing about half of the total R&D personnel, is the business enterprise sector (0.93% of total employment in 2008). This is not the case in the EU27 on average and in the UK, where the largest sector is the higher education sector. Higher education remains, however, an important sector for R&D personnel in Belgium (0.89% of total employment in 2008) in comparison with the other countries. Finally, the Government sector uses fewer R&D personnel than on average in the EU27, with this sector playing a very limited role in Belgian R&D activities.

Graph 12 - Researchers by sector of performance, as a % of total employment



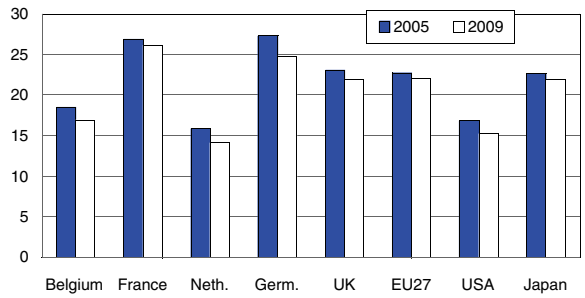
Source: Eurostat (Education and Training) and FPB
*) 2007 for the Netherlands and the UK
**) 2007 for Germany

Graph 13 - Population with tertiary education*



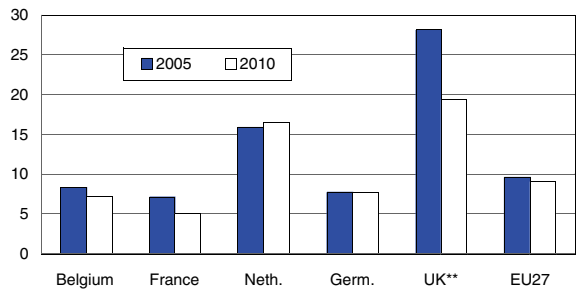
Source: Eurostat (Education and Training) and FPB
*) Percentage of the population aged 30-34 years

Graph 14 - New science and engineering graduates*



Eurostat (Education and Training) and FPB
*) Percentage of new tertiary education graduates

Graph 15 - Participation in life-long learning*



Source: Eurostat (Education and Training) and FPB
*) Percentage of the population aged 25-64 years
**) Break in series in 2007

Graph 12 classifies researchers by sector of performance. The main sector, using more than half of the researchers in Belgium and in the EU27 on average, is higher education. This sector uses, indeed, a higher proportion of researchers in the total R&D personnel than the other sectors. The second largest sector is business enterprises.

Education and learning are two important tools for maintaining a sufficient flow of human resources toward R&D and innovation activities.

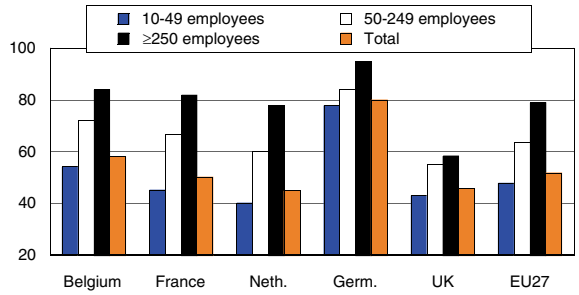
Graph 13 provides the share of the population aged 30-34 years who have successfully completed university or university-like (tertiary-level) education (International Standard Classification of Education, ISCED 1997, 5-6). A share of at least 40% is targeted for 2020 by the Europe 2020 strategy. Belgium has set its own objective at 47% for 2020. Belgium is, indeed, characterised by a high percentage of tertiary-level graduates (44.4% in 2010), significantly higher than the EU27 average (33.6%) and higher than the percentage observed in the other comparison countries. The target of 40% has therefore already been reached in Belgium. Since 2005, Belgium has improved its percentage.

By stimulating and reinforcing the innovation process, scientists and engineers play a very important role in the innovation and research capacity of a country. The arrival on the labour market of a sufficient number of new graduates in these fields is consequently indispensable. In 2009, new graduates in science and engineering in Belgium amounted to only 16.9% of the new tertiary education graduates, which is below the EU27 average (22.0%) and the percentage observed in all other selected countries, with the exception of the Netherlands and the USA (Graph 14). This percentage has even been declining since 2005. This weak rate of arrival of new scientists and engineers in Belgium could endanger the high quality of the human resources stock and, ultimately, the capacity of research of the country.

In a context of rapid technological change, life-long learning is necessary to ensure a highly skilled and knowledgeable workforce. The rate of participation in life-long learning is defined as the percentage of the population aged 25-64 years who participated in learning activity during the four weeks preceding the survey. Learning activity can be undertaken with the aim of improving knowledge, skills, and competences, from personal, civic, social, and employment-related perspectives. In Belgium, this rate reached 7.2% in 2010, which is significantly below the EU27 average (9.1%) and the rate observed in the other comparison countries, with the exception of France (Graph 15). This percentage has also been declining since 2005.

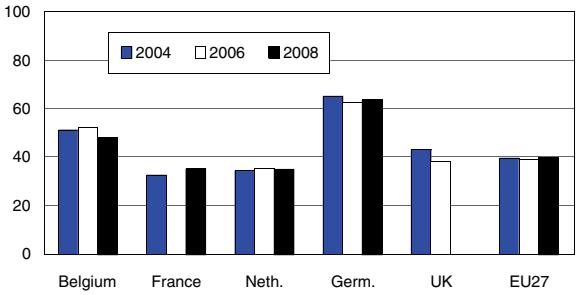
Valorisation of R&D

Graph 16 - Enterprises with innovation activities, as a % of all enterprises (2008)*



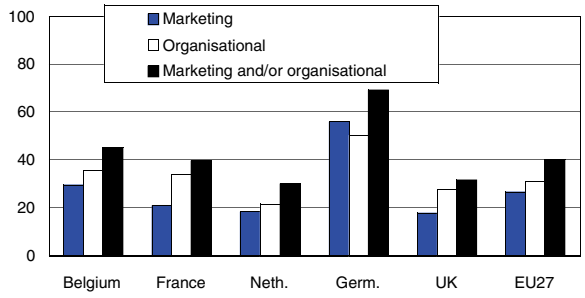
Source: Eurostat (Community Innovation Survey)
*) The term covers product innovators and process innovators, as well as enterprises with only on-going and/or abandoned innovation activities and enterprises with organisational and/or marketing innovation.

Graph 17 - Enterprises with technological innovation, as a % of all enterprises*



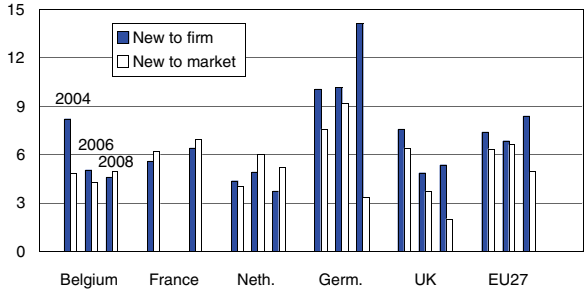
Source: Eurostat (Community Innovation Survey)
*) The term covers product innovators and process innovators, as well as enterprises with only on-going and/or abandoned innovation activities, regardless of organizational or marketing innovation

Graph 18 - Enterprises with organisational and/or marketing innovation, as a % of all enterprises (2008)



Source: Eurostat (Community Innovation Survey)

Graph 19 - Sales of new to market and new to firm innovations, as a % of turnover



Source: Eurostat (Community Innovation Survey)

This third pillar of the system includes two parts. The first one, concerning scientific and technological output, measures the short-term valorisation of R&D activities by knowledge developers themselves. The second part concerns the overall impact of R&D and innovation on the total economic activity.

Although R&D is an important input, it is far from being the only determinant of innovation. Moreover, innovative activities in terms of product, process, marketing or organisation can be implemented without input from R&D expenditure. To provide a broader picture, the Community Innovation Survey (CIS) publishes every two years the share of firms that conduct innovative activities.

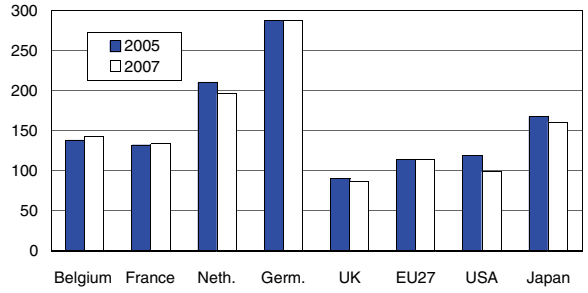
As shown in Graph 16, Belgium is relatively well-positioned in terms of innovation rate. In 2008, the Belgian innovation rate (58.1%) was above the EU27 rate (51.6%) and also above its neighbouring countries, with the exception of Germany (79.9%). For all countries, the share of enterprises with innovation activities increases strongly with the size of the company (83.8% of large firms - 250 or more employees - undertake innovation activities in the case of Belgium).

When the innovation activities are limited to technological innovations (product and/or process), Belgium (47.9% in 2008) is still far ahead of the EU27 average (39.8%) and its neighbours (except Germany). Belgium recorded, however, a decrease in its rate from 51.3% in 2004 to 47.9% in 2008 (Graph 17).

The 2008 edition of CIS introduced a new exhaustive definition of innovation that includes organisational and marketing innovation (Graph 18). Belgium is also performing well as far as organisation (29.5%) and marketing (35.3%) innovations are concerned, compared to 26.6% and 31.0% in the EU27, respectively, while Germany is the only country with more marketing (55.7%) than organisational innovators (50.3%).

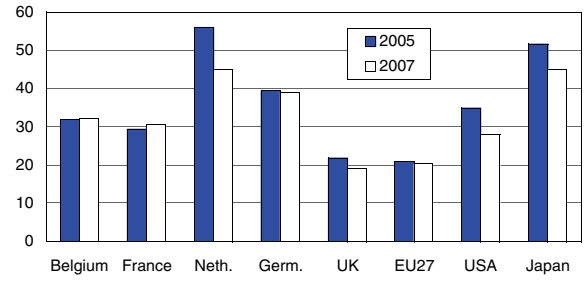
The indicator shown in Graph 19 measures the turnover of new or significantly improved products and includes both products that are new only to the firm and products that are also new to the market. The score for Belgium was 9.5% of turnover in 2008, while the average for the EU27 was 13.3%. Since 2004, Belgium has lost 3.4%-points on this indicator, mainly because of the fall in new to firm products in total company sales from 8.2% to 4.8%.

Graph 20 - Patent applications to the EPO, per million inhabitants*



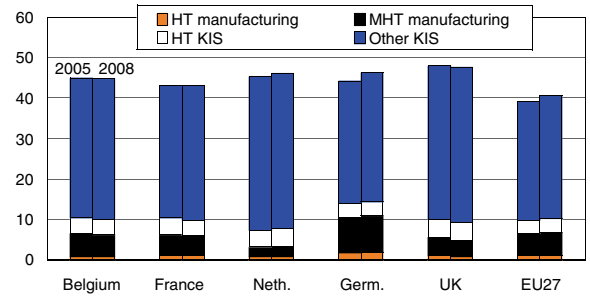
Source: OECD (Sciences, Technology and Patents) and Eurostat (Economy and Finance)

Graph 21 - High-tech patent applications to the EPO, per million inhabitants*



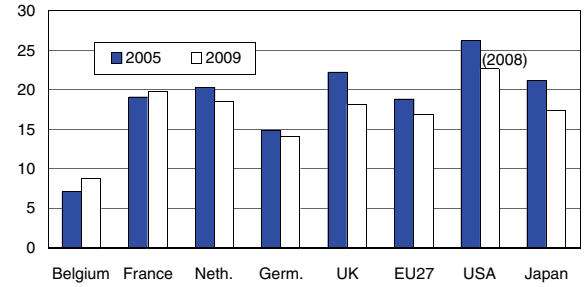
Source: Eurostat (Science, Technology and Innovation)
*) European Patent Office

Graph 22 - Employment in knowledge intensive industries, as a % of total employment*



Source: Eurostat (Science, Technology and Innovation)
*) KIS: knowledge intensive services; MHT: medium-high-technology; HT: high-technology

Graph 23 - High-tech exports, as a % of total exports



Source: Eurostat (Science, Technology and Innovation)

The number of patent applications is an indicator of the intellectual property protection conferred on innovation. Between 2005 and 2007, the number of patent applications to the European Patent Office from Belgium increased and remained above the European average (Graph 20). With 142.9 patent applications per million inhabitants, Belgium was above France, the UK, and the USA. However, Japan (160.3), the Netherlands (195.8) and, in particular, Germany (287.4) were greatly above the Belgian results.

The Belgian relative position is more or less the same when only high-tech patent applications are considered (Graph 21).

The valorisation of innovation and R&D can also be measured by examining the direct and indirect impact of innovation activities upon competitiveness and economic activity.

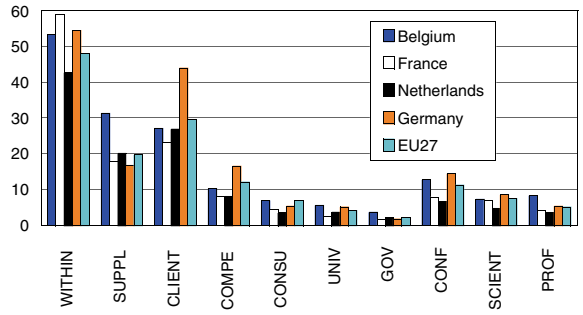
The technology sectors, which include high- and medium-high technology manufacturing and knowledge intensive services (KIS), accounted for 44.7% of total employment in Belgium in 2008. This percentage is higher than the EU27 average and also higher than the percentage reached by France, as shown in Graph 22. However, the Netherlands, Germany, and the UK had a higher share of their employment in technology sectors. This percentage remained stable in Belgium and France between 2005 and 2008 but increased in the Netherlands, Germany, the UK, and the EU27.

When the comparison only covers high-technology sectors, high-technology manufacturing, and high-technology KIS, where 4.5% of total employment was in these sectors in 2008, Belgian performance was in line with the EU27 average but below the percentage reached by all the compared neighbouring countries. This relative weakness of the high-technology sectors is mainly due to the very low share of employment occupied by high-technology manufacturing in Belgium in comparison with the other countries taken into consideration and in particular in comparison with what is observed in Germany.

High-tech exports measure the technological competitiveness of a country, i.e. the ability to commercialise the results of R&D and innovation in international markets. For this indicator, Belgium is not performing very well, with only 8.8% of total exports being high-tech products, compared to 16.9% in the EU27 and 22.6% in the USA. Nevertheless, between 2005 and 2009, Belgium and France were the only countries involved in the comparison that recorded an increasing share of high-tech exports (Graph 23).

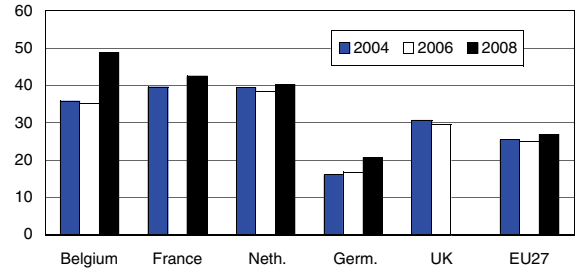
Innovation absorption capacity

Graph 24 - Sources of information for innovation (2008)* **



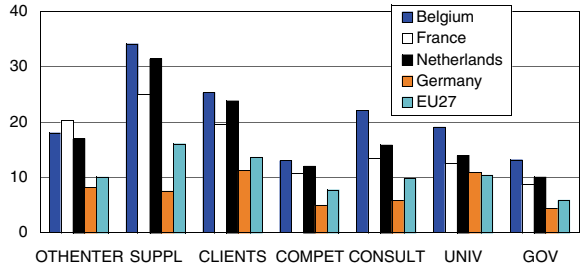
Source: Eurostat (Community Innovation Survey)
*) Percentage of enterprises with technological innovation that consider each source of information as highly important for innovation
**) WITHIN: Within the enterprise or enterprise group; SUPPL: Suppliers of equipment, materials, components or software; CLIENT: Clients or customers; COMPE: Competitors or other enterprises in the same sector; CONSU: Consultants, commercial labs or private R&D institutes; UNIV: Universities or other higher education institutions; GOV: Government or public research institutes; CONF: Conferences, trade fairs, exhibitions; SCIENT: Scientific journals and trade/technical publications; PROF: Professional and industry associations

Graph 25 - Innovative entreprises collaborating with others*



Source: Eurostat (Community Innovation Survey)
*) Percentage of the population of enterprises with technological innovation

Graph 26 - Types of innovation cooperation (2008)* **



Source: Eurostat (Community Innovation Survey)
*) Percentage of the population of enterprises with technological innovation
**) OTHENTER: Other enterprises within the enterprise group; SUPPL: Suppliers of equipment, materials, components or software; CLIENTS: Clients or customers; COMPET: Competitors or other enterprises in the same sector; CONSULT: Consultants, commercial laboratories or private R&D institutes; UNIV: Universities or other higher education institutions; GOV: Government or public research institutes.

The efficient functioning of the innovation system requires a wide diffusion of new technologies and knowledge. In practice, however, it is very difficult to measure the distribution and application of new knowledge and technological innovations. By examining information sources used for innovation, cooperation agreements on innovation activities within enterprises, and public financing in favour of innovation, the analysis of this fourth pillar concerns mainly the flow of knowledge, implicit and explicit, between the various actors of the innovation system.

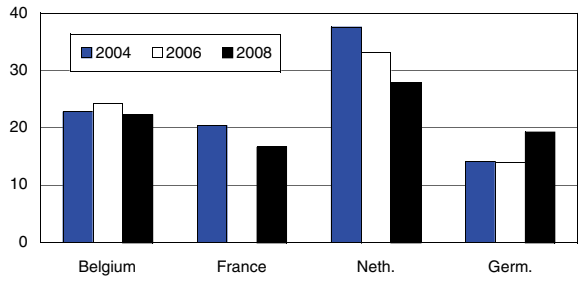
According to the CIS, for enterprises that introduce new or significantly improved products (goods or services) into the market or for enterprises that implement new or significantly improved processes, the main source of information is within the company itself or within companies in the same group (53% in the case of Belgium, compared with 48% in the EU27), as illustrated by Graph 24. If only external sources of information are taken into consideration, the most used is clients or customers (23% in Belgian firms and 30% in the EU27), followed by suppliers, with the exception of Belgium (27%).

The CIS also provides an indicator measuring the degree to which enterprises with technological innovation are involved in innovation cooperation. This indicator measures the flow of knowledge between public research institutions and private firms and between private firms themselves.

In 2008, almost one out of two Belgian technological innovators (49%) had cooperation agreements with other companies on innovation, far ahead of France (42%), the Netherlands (40%), and Germany (21%), underlining the openness of the country (Graph 25). Important progress has been accomplished in Belgium since 2004, when cooperation agreements among enterprises with technological innovation only reached 36%, while in the EU27, this score has remained quite stable at around 26%.

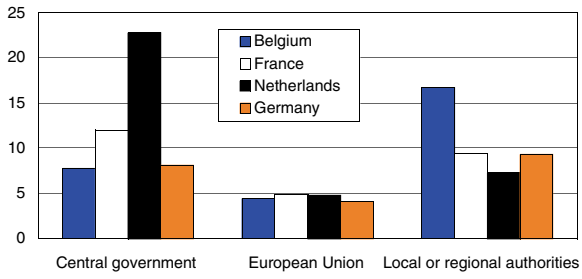
As shown in Graph 26, Belgian firms cooperate mainly with suppliers of equipment, materials, components or software (34%), followed by clients (25%). Except for Germany, where clients are more important than suppliers, this ranking is the same for all countries involved in this analysis. Other important cooperation agreements involve consultants, commercial laboratories or private R&D institutes (22% in Belgium and 10% in the EU27), and universities or other higher education institutions (19% in Belgium and 10% in the EU27).

Graph 27 - Enterprises receiving public funding for innovation*



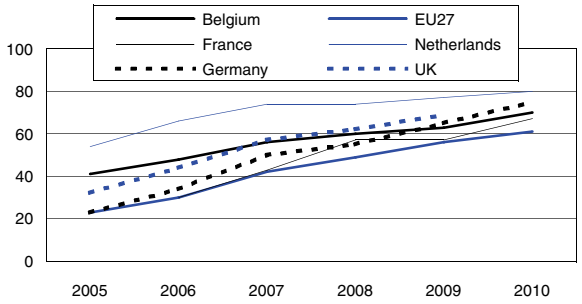
Source: Eurostat (Community Innovation Survey)
*) Percentage of the population of enterprises with technological innovation

Graph 28 - Type of public funding for innovation (2008)*



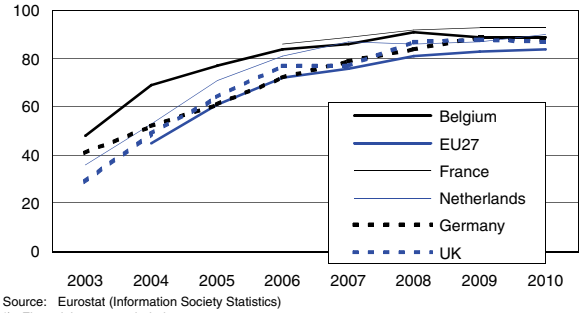
Source: Eurostat (Community Innovation Survey)
*) Percentage of the population of enterprises with technological innovation

Graph 29 - Households connected to broadband access, as a % of all households*



Source: Eurostat (Information Society Statistics)
*) Broadband connections are defined as those with a capacity equal to or higher than 144 Kbit/s

Graph 30 - SMEs connected to fixed broadband access, as a % of all SMEs* **



Source: Eurostat (Information Society Statistics)
*) Financial sector excluded
**) Broadband connections are defined as those with a capacity equal to or higher than 144 Kbit/s

Public authorities are also important players in innovation systems, especially through financial subsidies granted to companies to support their R&D and innovation efforts.

According to the CIS, one in five Belgian technological innovators (22%) received some kind of financial support from public authorities in 2008, a percentage that is relatively stable over time (Graph 27). Financial support via tax credits or deductions, grants, subsidized loans, and loan guarantees are included; while research and other innovation activities conducted entirely for the public sector under contract are excluded. Only in the Netherlands was this kind of support to innovative enterprises higher (28%).

As shown in Graph 28, local or regional authorities are the main source of support for Belgian innovative firms: 17% receive public funding from these sources, followed by funding from national authorities (7% of enterprises with technological innovation activities). This is consistent with the distribution of competencies, which puts the main tools for supporting innovation into the hands of the Regions. The main public support for Dutch companies comes from the central government, with up to 23% qualifying for public aid. Finally, as could be expected, the European Union has a similar role in all the countries surveyed, supporting between 4 and 5% of innovators across Europe.

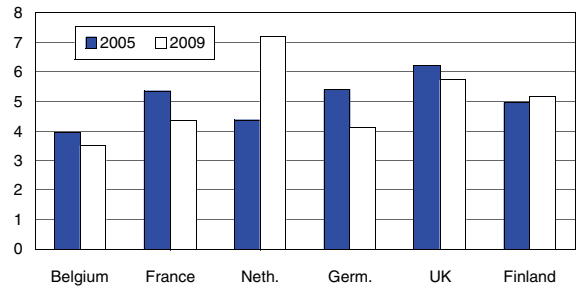
Developing quality infrastructure, especially in ICT, is also a condition for developing and sharing knowledge. It is also a way for public authorities to support research and innovation activities. Realising full e-potential depends on creating the conditions for electronic commerce and the Internet to flourish.

Since 2005, Belgian households have been far ahead of the EU27 average for broadband connections to the Internet, progressing from 41% in 2005 to 70% in 2010. Nevertheless, progress has been greater in France (from 30% in 2006 to 67% in 2010), in Germany (from 23% in 2005 to 75% in 2010), and in the UK (from 32% in 2005 to 69% in 2009), while the Netherlands was still the leader in 2010 with 80% of households having broadband access to the Internet. The Belgian relative position is therefore deteriorating, as illustrated by Graph 29.

As far as firms are concerned, in companies with 10 or more employees, performance on this indicator is relatively similar in all the countries surveyed (Graph 30). While Belgium was significantly ahead in 2005, in 2010 all countries reached around 90% for broadband Internet connection in SMEs (89% in Belgium, compared with 84% in the EU).

Entrepreneurship

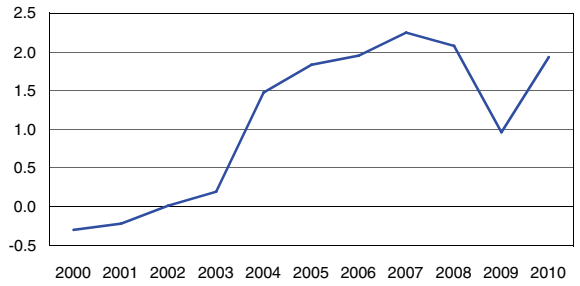
Graph 31 - Total entrepreneurial activity index (TEA)*



Source: Global Entrepreneurship Monitor, 2010 Global Report

*) The total entrepreneurial activity index (TEA) indicates the percentage of the labour force actively involved in setting up a new business, or being the owner/manager of a company less than 42 months old.

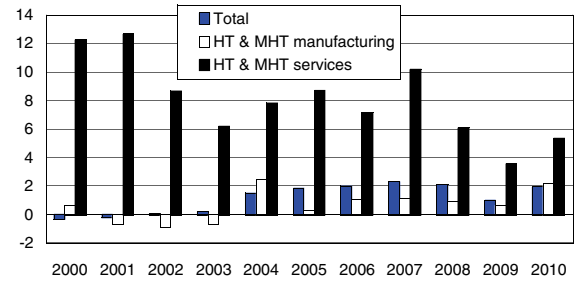
Graph 32 - Rate of net growth of active enterprises in Belgium*



Source: FPS Economy, SMEs, Self-employed and Energy

*) Difference between the number of created enterprises and enterprises that ended activities, divided by the number of active enterprises. It takes into account the enterprises that are liable for VAT for the first time, those liable again, those no longer liable for VAT, and the immigrations and emigrations on a monthly basis. This concept allows the rate of business creation to be developed and compared on both a monthly and a yearly basis. The yearly business creation rate equals the sum of the twelve monthly rates of the year considered.

Graph 33 - Rate of net growth of active enterprises in HT and MHT industries*



Source: FPB, based on FPS Economy, SMEs, Self-employed and Energy

*) Difference between the number of created enterprises and enterprises that ended activities, divided by the number of active enterprises in high-technology (HT) and medium-high-technology (NACE) sectors, expressed as a percentage of their active population. The following NACE Rev. 2 manufacturing industries are considered as high-technology industries by Eurostat: manufacture of basic pharmaceutical products and pharmaceutical preparations (NACE 21); manufacture of computer, electronic and optical products (NACE 26); and manufacture of air and spacecraft and related machinery (NACE 30.3). The following NACE Rev. 2 sectors are considered as high-tech knowledge-intensive services (KIS) by Eurostat: motion picture, video, and television programme production, sound recording and music publishing activities, programming and broadcasting activities, telecommunications, computer programming, consultancy and related activities, information service activities (NACE 59 to 63), and scientific research and development (NACE 72).

Entrepreneurship is an important element of the innovation system. Creating a new business is a means to insure the valorisation of new knowledge or new ideas. Moreover, the intensification of competitive pressures created by new enterprises potentially leads incumbents to increase their productivity and to become more innovative. However, this relation is not always empirically verified: the creation of new enterprises does not systematically have a visible impact on existing markets or on the innovative capacities of existing firms.

This pillar of the innovation system is one of the pillars that are the most poorly covered statistically. Data on self-employed persons, active businesses, start-ups, exits of firms, etc. are still often constructed on a national basis, which makes international comparisons rather problematic.

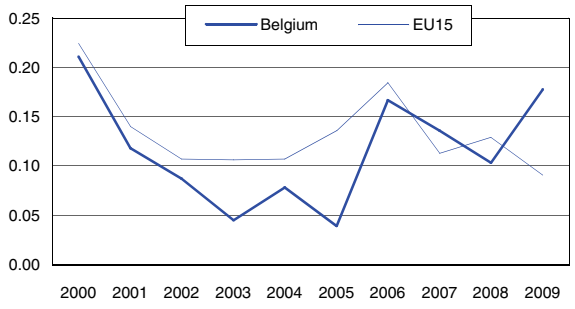
The Global Entrepreneurship Monitor (GEM) is a research project designed to measure entrepreneurial activity This survey provides the Total Entrepreneurial Activity index (TEA), which indicates the percentage of the labour force actively involved in setting up a new business or being the owner/manager of a company less than 42 months old. According to this index, entrepreneurial activity in Belgium is weak in comparison to the main European countries. At 3.51% in 2009, Belgium occupied the last position among the countries presented in Graph 31. Moreover, this index decreased in Belgium between 2005 and 2009.

This decrease in the TEA index could be due to the economic crisis that hurt the world at the end of 2008. As shown by Graph 32, the rate of net growth of active enterprises - which is the difference between the number of enterprises created and enterprises which ended activities, divided by the number of active enterprises - reached its peak in Belgium in 2007 before decreasing slowly in 2008 then more sharply in 2009. The renewal of economic growth in 2010 in Belgium was accompanied by a strong increase in the rate of net growth of active enterprises.

Graph 33 underlines that, contrary to what was observed during the economic crisis of 2001, the rate of net growth of active enterprises in high-technology manufacturing was never negative during the most recent economic downturn. Moreover, in 2010, the rate of net growth of active enterprises in high-technology sectors, both in manufacturing and in services, was higher than the rate of net growth in total active enterprises, testifying to the clear dynamism of the high-technology part of the economic activity.

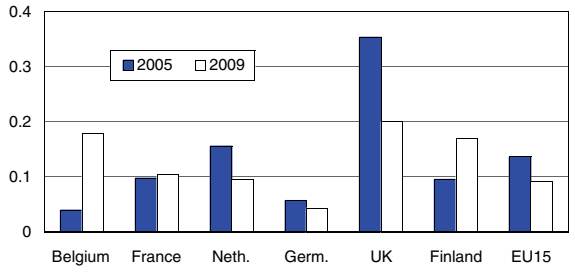
Financing of innovation

Graph 34 - Venture capital investment, as a % of GDP*



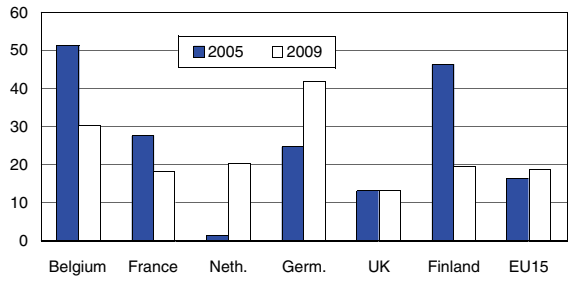
Source: FPB, based on Eurostat (Science, Technology and Innovation; High-tech Industry and Knowledge-Intensive Services) and economic statistics at national level
*) Private equity raised for investment in companies. Management buy-outs, management buy-ins, and venture purchase of quoted shares are excluded.

Graph 35 - Venture capital investment, as a % of GDP*



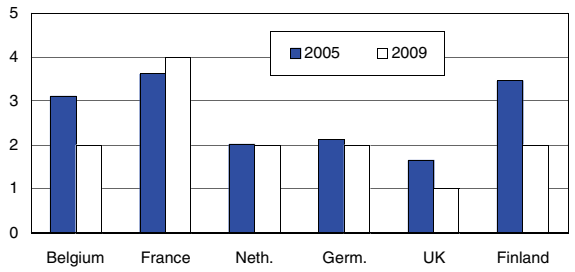
Source: FPB, based on Eurostat (Science, Technology and Innovation; High-tech Industry and Knowledge-Intensive Services) and economic statistics at national level
*) Private equity raised for investment in companies. Management buy-outs, management buy-ins, and venture purchase of quoted shares are excluded.

Graph 36 - Early stage venture capital, as a % of total venture capital investment*



Source: FPB, based on Eurostat (Science, Technology and Innovation; High-tech Industry and Knowledge-Intensive Services) and economic statistics at national level
*) Venture capital can be divided into two investment stages: early stage (seed and start-up capital); and expansion and replacement (expansion and replacement capital)

Graph 37 - Informal investors, as a % of 18-64 population*



Source: Global Entrepreneurship Monitor, 2010 Global Report
*) Percentage of 18-64 population who have personally provided funds for a new business, started by someone else, in the past three years

Innovation, R&D, and business creation are risky activities that are generally capital intensive. The start-up of new activities usually requires the mobilisation of financial resources greater than the own funds of the entrepreneur. Venture capital is a possible form of external financing for enterprises.

The deterioration of the economic environment and the burst of the speculative bubble on new technologies markets in 2001 caused a decrease in venture capital investment in the EU, a decrease that was even more pronounced in Belgium, as illustrated by Graph 34, which presents venture capital investment as a percentage of GDP. The improvement in economic and financial conditions led to an increase in venture capital from 2004 to 2006, when it reached its peak in both the EU15 and Belgium. The venture capital market then deteriorated again as early as 2007. This deterioration was still observable in 2009 for the EU15 but not for Belgium, where the return of economic growth went hand in hand with an increase in venture capital investment. The comparison with the relative importance of venture capital in the main neighbouring countries provided by Graph 35 shows this improvement in the Belgian relative position.

A high level of early stage venture capital is particularly important. It is precisely during the seed and start-up steps that firms need financial resources for research, prototypes, and other activities in connection with the development of a new product. As shown by Graph 36, the share of early stage venture capital in total venture capital is relatively high in Belgium and above the share observed in the EU15 on average. In 2005, early stage capital even represented more than the half of the total venture capital invested in Belgium. However, in 2009, this share decreased to 30%, with venture capital being invested more for expansion and replacement purposes.

In addition to venture capital, informal capital, which includes "friends, family, and fools" and business angels, also constitutes a non-negligible source of financing. This informal capital covers a very large spectrum of firms, conversely to formal venture capital, which is mainly invested in a small group of enterprises with high growth potential. According to the GEM survey, the percentage of the 18-64 population in Belgium in 2009 who personally provided funds for a new business, started by someone else, in the past three years was in line with that observed in the Netherlands, Germany, and Finland, above the percentage recorded by the UK but below the percentage in France, as illustrated by Graph 37. However, unlike the Netherlands and France, Belgium recorded a decrease in this percentage between 2005 and 2009.

Twenty years of political commitment to sustainable development?

The *Federal Report on Sustainable Development 2011* has been published to implement the Belgian Act of 5 May 1997 on the Coordination of Federal Sustainable Development Policy. It is the sixth sustainable development report and the first since the 2010 revision of the act. That revision stipulates that a report has to be drawn up during each five-year cycle of the act and that it consists of a status and evaluation part and a foresight part. The 2011 report presents the status and evaluation part. It examines three aspects: sustainable development trends for the past twenty years based on indicators, the Belgian federal sustainable development strategy for 1997-2010, and a series of policy measures selected from the Federal Plan for Sustainable Development 2000-2004 and the 2004-2008 Plan extended until 2011.

The first part of the report focuses on 25 headline indicators. They measure the evolution of Belgium at the federal level towards sustainable development. The starting point is the 1992 situation at the time of the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro. By evaluating the trends since then, the report contributes to Belgium's preparation for the 2012 UN Conference on Sustainable Development (UNCSD), also referred to as Rio+20.

The report shows that the average standard of living in Belgium has increased over the past twenty years, without increasing income inequality. Yet Belgian society faces serious social problems with, for instance, over two million people at risk of poverty or social exclusion. Environmentally, emissions of several pollutants in the air and water show a reduction but the state of environmental resources remains of concern. Economically, progress towards sustainable development means changing unsustainable production and consumption patterns. In this respect, the report points at some decoupling of resource use from GDP and qualifies this as moderate progress.

Ten of the 25 headline indicators of the report were provided with quantitative targets, adopted by policy makers and to be realised before or in 2010. All of these indicators show changes that travel in the direction of their target, but it seems that the target will be attained on time in only two cases (greenhouse gas emissions and the share of renewable sources in energy consumption). The evaluation suggests that the adoption of targets is good practice but that in most cases progress was insufficient (examples: employment rate and public debt). The report also examines the EU 2020 targets and raises the question of whether for Belgium they can be a step in a transition towards sustainable development by 2050. The report concludes that the EU 2020 targets are necessary but not sufficient to achieve the sustainable development goals regarding poverty and climate change by 2050.

The second part of the report evaluates the Belgian federal sustainable development strategy, resulting from a commitment made at the 1992 Rio Conference. Belgium has a well-developed legal framework for sustainable development with plans, reports, interdepartmental consultation, and civil society participation. Also positive is that in the near future a long-term vision with goals and indicators will be added to this. The report notes that the strategy contributes to the development of a monitoring and evaluation practice in the federal public services. Monitoring and evaluation show that after four years' duration of a plan, about half of its measures are implemented and this degree of implementation increases as follow-up continues. Room for improvement exists in systematically including a timetable and providing clear responsibilities for implementing the measures.

The third part of the report describes eighty measures, selected from the more than one thousand measures in the two adopted sustainable development plans, and evaluates their implementation. These measures are related to eleven sustainable development themes: demographic changes, consumption and production patterns, energy, transport, food, public health, poverty, atmosphere, biological diversity, global partnership, and governance. Due to a late policy decision or slow implementation it is too early to conclusively evaluate four of the eleven policy cases (for example, carrying out a sustainability impact assessment of Council of Ministers' decisions). The other seven cases were provided with a sufficient period of time for evaluation. In three cases the goals were not attained despite the implementation efforts (for example, promoting healthy food). In four cases the goals were reached or almost reached (for example, increasing the accessibility of healthcare). In these four cases the policies most likely favoured the realisation of the objectives, although their specific contribution could not be determined.

Finally, the report presents ten recommendations for renewing political commitment to sustainable development. For instance, all federal public services should contribute to the preparation and implementation of the commitments regarding the two Rio+20 themes: *a green economy in the context of sustainable development and poverty eradication* and *the institutional framework for sustainable development*. Furthermore, the federal government should adopt a sufficiently differentiated set of very long-term social, environmental, and economic sustain-

able development goals as well as sufficiently ambitious intermediate objectives.

"Développement durable: 20 ans d'engagement politique ? Rapport fédéral sur le développement durable 2011",
"Twintig jaar politiek engagement voor duurzame ontwikkeling? Federaal rapport inzake duurzame ontwikkeling 2011",
Task Force on Sustainable Development.

The report is published in French and Dutch. The "Synthesis and recommendations" will also be made available in English and German at sustdev.plan.be.
Along with the report, a website with sustainable development indicators has been published.

The future of energy, energy of the future

Climate change, E-mobility, offshore wind, dash for gas, nuclear revival: these are a few of the buzz words often heard when talking about Belgium's national energy provision. This publication presents, as it does every 3 years, a long term energy outlook for Belgium in which the above themes are tackled. Its purpose is to analyse the Belgian energy system and to investigate which factors and energy sources prevail in a world filled with energy insecurities.

The new long-term energy perspectives of the Federal Planning Bureau describe a "what if?" scenario analysis that quantifies what will happen to the national energy system if certain policy options or trends (do not) persist. For this purpose, a baseline is determined that represents the state of the Belgian energy system with policy unchanged. It is important to mention that this baseline integrates the ETS directive as well as the Belgian nuclear phase-out stipulated by law (2003). Next, a number of climate friendly scenarios are scrutinised. These can be subdivided into scenarios that integrate the European legislative Climate and Energy Package (the "*20/20 trajectory*") and scenarios that simulate an intensification of the European greenhouse gas emission reduction target from -20% to -30% by 2020 (the "*30/20 trajectories*"). Both types follow the long-term emission reduction trajectories from the "Roadmap 2050" of the European Commission. Objectives are achieved through the use of policies and measures. The key messages that can be drawn from this study are that the application of the greenhouse gas emission reduction trajectories proposed on European level:

- leads to a significant decrease in final energy demand: while final energy demand in the baseline remains almost equal to its 2005 level, it decreases by 5% in the 20/20 trajectory and 9% in the 30/20 trajectories. The residential sector seems to be the most affected.
- has a huge impact on the evolution of energy costs in the final demand sectors: although the unit energy costs (energy expenses divided by energy consumption) tend to increase in the trajectories, the energy expenses per unit of value added (industry, tertiary) or per household are not necessarily higher. This can be attributed to the fact that unit cost increases can be (and are, in fact) compensated by consumption cuts, leading to a status quo in expenses.
- does not, on its own, suffice to realise the Belgian energy efficiency target for 2020: in the context of the European energy efficiency target of 20% by 2020, Belgium has declared that it intends to reduce its primary energy consumption by 18%. The proposed emission reduction trajectories do not, then, on their own, allow this target to be realised.
- corresponds to a decrease in natural gas imports compared to the baseline: where the baseline anticipates a 29% expansion of gas imports by 2030, the trajectories ease this dependency and dwindle to 19% (resp. 13%) in the 20/20 trajectory (resp. 30/20 trajectories).
- does not inflate the share of renewable energy sources in Belgium after 2020: since no new target is specified for the period after 2020, the commitment year for the renewable energy targets, we see that without additional efforts or policies a rather modest increase in the share of renewable energy sources in gross final energy consumption can be noted. In 2030, whatever the trajectory, the share reaches 15%.
- does not cause a drastic change in the structure of electricity production by 2030, except for two events: the evolution of renewable energy sources and technology for carbon capture and storage. In 2030, the baseline provides for an electricity mix of 40% gas, one third coal, and one quarter renewables. The deployment of the trajectories does not alter the share of natural gas, but eats away the share of coal (to 28%) to the benefit of renewable energy sources (29%). Some coal plants will be equipped with carbon capture and storage technology by 2030.
- has a significant impact on the greenhouse gas emission reduction trajectories for Belgium: whereas in the baseline greenhouse gas emissions are expected to expand by 3% between 1990 and 2030, the 20/20 trajectory notes a decrease of 12% and in the 30/20 trajectories they fall by 22%.

"Energievooruitzichten voor België tegen 2030,
Perspectives énergétiques pour la Belgique à l'horizon 2030",
D. Devogelaer & D. Gusbin, November 2011.

Product market competition in Belgium: its intensity and evolution

Within the scope of its research on Belgium's structural competitiveness, the FPB studies the intensity and evolution of product market competition. A recent Working Paper discusses eight performance measures and analyses their evolution in Belgium and other EU Member States. It finds that market conditions appeared to have improved since the late nineties. However, and in contrast with other Member States, there seems to have been no favourable impact upon prices and price-cost margins.

In the economic literature, there is a consensus that competition and productivity are positivily related. Competition should stimulate producers to improve their efficiency, although there can be circumstances that make the opposite happen. Improving the intensity of competition could thus enhance productivity growth, which serves a country's competitiveness. However, the measurement of competition is not a straightforward task. It is done by assessing certain of its features, eight of which are discussed in the Working Paper. This should reveal whether competition is relatively intensive in that respect. One should, however, be aware that these assessments also have their limitations. There may be a certain ambiguity in interpretation, or data sources that do not match the theoretical requirements of the measure and/or are of limited quality. For these reasons, the measures provide a proxy of what they should measure from a theoretical point of view.

For each of the eight measures, the evolution in Belgium has been benchmarked against a sample of other EU countries. The samples are of between 7 and 26 countries and depend on the availability of data, although each includes a sufficient number of large economies. On half of the measures, Belgium performed below the sample average. Belgian entry and exit seemed to be weak, markets were prone to regulation and seemed to be highly concentrated, and monopoly rents seemed to prevail. On three more measures, Belgium was close to the sample average: variability of market shares, consumer price differences among countries, and sensitivity to cost changes. The latter measure indicates whether rivalry in the market makes a producer take advantage of its efficiency improvements. On only one measure did Belgium do better: import penetration. Here, Belgium outperformed all 15 other countries in the sample, implying that it also did better than the other mid-sized open economies.

The majority of the measures have evolved positively since the second half of the nineties. Such positive trends, however, have been found in other Member States as well. Hence, Belgium's relative performance has not improved. The sensitivity to cost changes was the only measure in which Belgium evolved better than the other countries. The initial arrears turned into a lead, although for services the differences were slight. Throughout the EU, markets were deregulated, market concentration fell, and the pressure of imported products increased during the sample period. The Belgian lead and arrears on these measures was not or hardly changed. The evolutions of price-cost margins suggest that, throughout the EU, monopoly rents should have increased. The increase in Belgium was, however, stronger than the average in the other Member States studied, in particular for services. Finally, Belgium lost most of its lead in consumer prices. For goods, the lead strongly diminished. For services, it even turned into arrears in 2005. Hence, although certain market conditions improved, there seemed to be no impact on important performance indicators such as prices and rents. This was more so in Belgium than in the other Member States studied.

To further improve the intensity of competition in Belgium, three strands of policy seem to be of relevance: entrepreneurship, market dominance, and market regulation. Support of entrepreneurship could promote market entry, while accepting the reality of exit. Although competition policy has been enhanced during the past two decades, the monitoring of dominant positions could still be further enhanced. In particular, the former incumbents of deregulated network industries are still exploiting their dominant positions. Finally, the remaining market regulation could be screened and adjusted where necessary. The screening should be based on theoretical reasoning to predict why a regulatory measure could have an adverse impact.

"Concurrentie in België: Intensiteit en evolutie tegen een Europese achtergrond",
J. van der Linden,
Working Paper 13-11, December 2011.