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Main Messages and Results For Belgium From the European Innovation Survey CIS 2014

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EXECUTIVE SUMMARY - MAIN MESSAGES

This report presents the main teachings from the European innovation survey 2014 (CIS2014), which investigates the innovation behaviour and performances of firms all across Europe and Beyond for the 3-years period between 2012 and 2014. We focus here on the Belgian results and put them in a European perspective as often as possible. In short our main findings are as follows:

The population of Belgian firms, as compared to European standards, is characterized by a relatively high proportion of firms belonging to a group, and in particular to an international group (whose headquarter is located abroad).

Belgian firms are very innovative. However, their innovation pattern is mostly geared towards technological (product or process) innovation. In particular, the process innovation rate is remarkably high in Belgium. On the contrary, Belgian firms seem less inclined towards marketing innovations. Some sectors, such as Chemicals and pharmaceuticals are significantly more innovative than the average economy.

After a decline in 2010-2012, innovation rates in Belgium are on the rise again in 2012-2014. However, innovation expenditures seem to have somewhat slowed down.

Belgian firms, though very innovative, fail to fully reap the returns from their product innovation. The share of turnover linked to these product innovations is rather low in comparison with most other European countries.

Belgian firms mostly develop their technological innovations internally or in collaboration. They are among the most collaborative firms in Europe. In absolute terms, preferred cooperation partners include other enterprises within the group and suppliers. In relative terms, Belgian firms tend to cooperate more often with universities and public or private research centres. They also undertake cooperation links with enterprises or institutions located in other European countries more often than what is observed in the rest of Europe.

To develop their technological innovations, Belgian firms are mostly geared towards technical activities such as intra- or extra-mural R&D and training for innovation. They are less inclined towards market-related activities, such as market introduction of innovations or design. This is also reflected in the structure of innovation expenditures: intra- and extra-mural R&D together make up for about 70% of innovation expenditures. Innovation expenditures are, besides, highly concentrated in the hands of a few players in some specific, technologically advanced, sectors such as Chemicals and Pharmaceuticals. At total, the four largest players account for more than one-fourth of innovation expenditures.

Public authorities increasingly provide financial support for innovation. The structure of this support reflects the peculiarities of Belgium, i.e. given the high decentralization of the country, the importance of local and regional authorities is higher than in the other European countries.

Technological and non-technological (marketing or organisational) innovation are highly complementary. Belgian firms, however seem to favour organisational innovation and in particular the introduction of new methods for decision making and of new business practices for organizing procedures. Marketing innovations are less frequent.

In the conclusion, we sketch a possible explanation that could bind all these results together: Belgian firms often belong to groups that use them for the technical development of innovations and their production, but it may be the case that these innovations are mostly sold on other markets by other entities from the group. This would solve the puzzle of high innovation rates but low return from innovations, explain why marketing innovation is somewhat low in Belgium, explain the importance of international collaborations, and also explain the dominance of technical innovation activities, such as R&D, as opposed to more market-related activities.

I. INTRODUCTION

The present report describes the main results and lessons from the European Innovation Survey 2014 (CIS 2014). This survey is run by the various national authorities in Europe under the aegis of the European Commission. It covers the corporate innovation behaviour in all EU countries over the three years 2012-2014 (included). We focus here on Belgian firms and put them in an international perspective. Only the main results are reported. The interested reader may refer to the Belgian Science Policy Office (BELSPO) website for more detailed results[1].

II. METHODOLOGY

The survey was run following the prescriptions of the Oslo Manual (OECD, 2005), which is the official international reference, as well as the methodological recommendations of Eurostat. The Oslo Manual defines 4 categories of innovations: product innovations, process innovations, marketing innovations and organisational innovations. The two first categories are called "technological innovations" whereas the two latter ones are coined "non-technological innovations". Though the survey covers all four types of innovations, the present document puts a special emphasis on technological innovations. Section III below explains these classifications.

The survey is a stratified survey. Firms are sampled along 3 dimensions: their regional location (at NUTS2 level), their size, and their sector. Three size classes are defined: small enterprises (10-49 employees), medium-sized enterprises (50-249 employees) and large firms (250 or more employees). Sectors are defined at NACE 2-digits level. Not all sectors are covered, but only the main and most significant ones as regards innovation activities, which are coined "core sectors", and only firms with market activities are covered. Public administrations are explicitly excluded. A list of the "core sectors" is provided in the Annex.

The reference population was provided by the business register from the National Social Security Office (RSZ-ONSS) as extracted on 31 December 2014. At total the frame population has 15443 enterprises. From this population, 7572 firms were sampled as explained above. The overall response rate in the survey was 56%. The results presented here are extrapolations to the whole population.

In Belgium, the survey was coordinated by BELSPO in close cooperation with the Regional authorities: InnovIRIS for the Brussels Region, ECOOM for the Flanders Region, and the DGO6 (SPW) for the Walloon Region.

[1] http://www.stis.belspo.be/en/statisticsCIS.asp

III. DEFINITIONS AND CLASSIFICATIONS

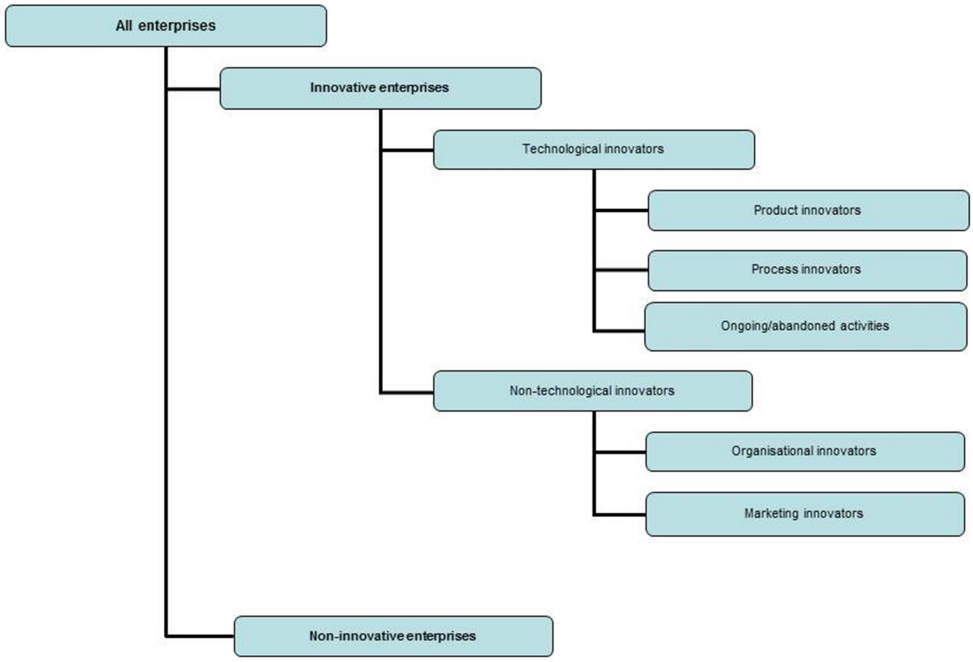
According to the Oslo Manual (OECD, 2005), an innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method or a new organisational method in business practices, workplace organisation or external relation.

This definition opens the floor to 4 broad types of innovations, defined as follows:

- Product innovation: introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses.
- Process innovation: implementation of a new or significantly improved production or delivery method (including support activities).
- Marketing innovation: implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion, or pricing.
- Organisational innovation: implementation of a new organisational method in the firm's business practices, workplace organisation, or external relations (excluding mergers and acquisitions).

The two first categories are termed technological innovations, whereas the two latter ones are termed organisational innovations. An *innovative firm*, or *innovator*, is a firm that has introduced one of these four types of innovations during the period under consideration. As the introduction of a technological innovation is a risky and sometimes lengthy adventure, we also consider firms that only have had on-going or abandoned technological innovation projects as innovators. Figure 1 summarizes these classifications.

Figure 1. Typology of innovative enterprises



IV. WHAT ARE THE CHARACTERISTICS OF THE BELGIAN FIRMS' POPULATION ?

Belgium, as a small open economy, is characterized by a large share of firms belonging to a group and with their headquarters abroad, as compared to the other European countries (see Figure 2). It is also characterized by a large proportion of small firms in absolute terms (more than 70%). This share is however slightly lower than the one for the EU as a whole (see Table 1). On the contrary, Belgium has a higher relative share of medium-sized enterprises.

Figure 2. Group characteristics of the firms

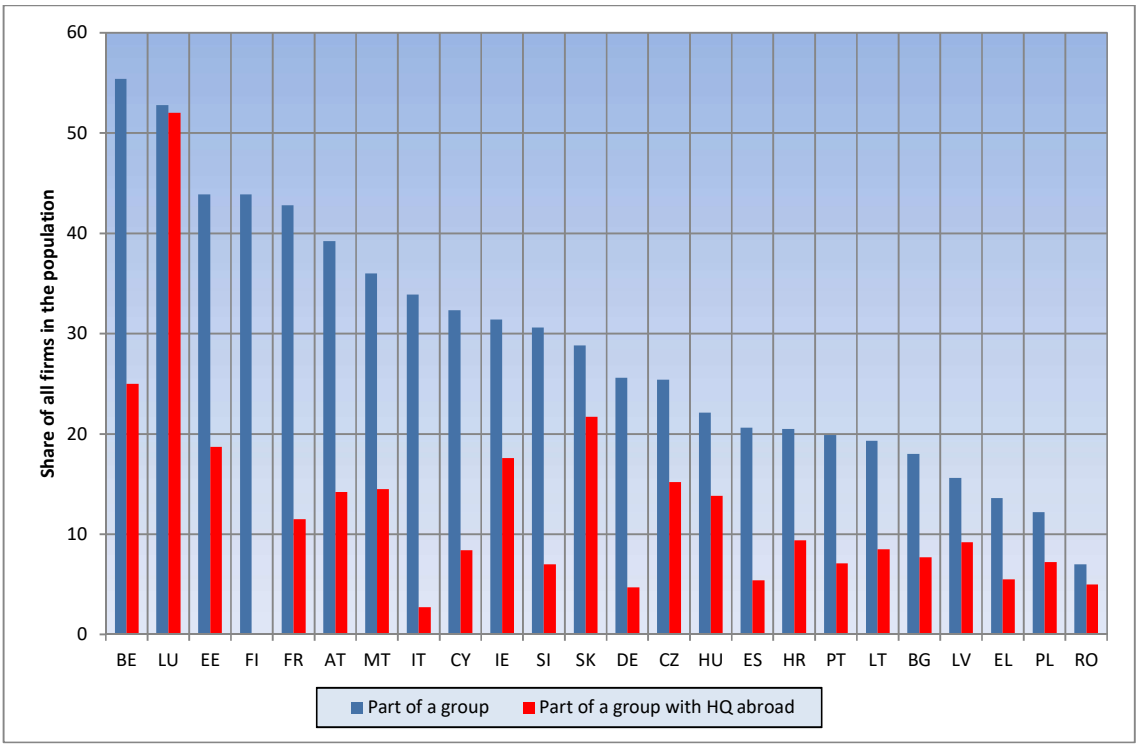


Table 1. Size characteristics of the firms

	% Small enterprises	% Medium-sized enterprises	% large enterprises
EU28	78.9	17. 5	3.7
BE	71.3	24.6	4.1

To assess the structural composition of the Belgian firms' population, we have regrouped the NACE 2-digits sectors of the "core NACE" legal base into larger and economically more meaningful sector. Table ?? below gives the definitions and relative shares of these sectors. For the sake of benchmarking, we also provide the relative shares for the EU-28 as a whole[2].

[2] Both figures are not exactly comparable, however. Figures for EU-28 are drawn from Eurostat's structural business statistics. Also because of confidentiality issues, sector 32 was removed from the "Other industries" and added to Paper, wood and Furniture in the EU-wide statistics. The impact of this modification should only be marginal.

Table 2. Sector grouping and relative importance

Nace	Label	Share in BE (%)	Share in EU28 (%)
8,9	Mining and quarrying	0.4	0.6
[10-12]	Food, drinks, tobacco	8	7.7
[13-15]	Textiles	2.6	4.3
[16-18], 31	Paper, wood, furniture	6	8.2
19, 22, 23	Petroleum, plastics, minerals	4.8	4.8
20, 21	Chemicals and pharmaceuticals	2.5	1.5
24, 25	Metals, repair and installation of machinery	8.5	9.1
26, 27	ICT, electronics	2	2.9
29,30	Transport equipment	1	1.4
28, 33	Other machinery, repair and installation	3.6	6.4
32, [35-39]	Other industries	2.7	2.9
46	Wholesale trade	25.2	20.6
[49-53]	Transportation, storage	15.1	13.7
[58-60],73	Publishing, audio-visual, broadcasting, market studies	3.2	4.1
[61-63]	Telecoms, IT, information services	6	6
[64-66]	Financial services	3.9	3.2
71, 72	Architecture, engineering, technical testing, RD	4.3	2.6

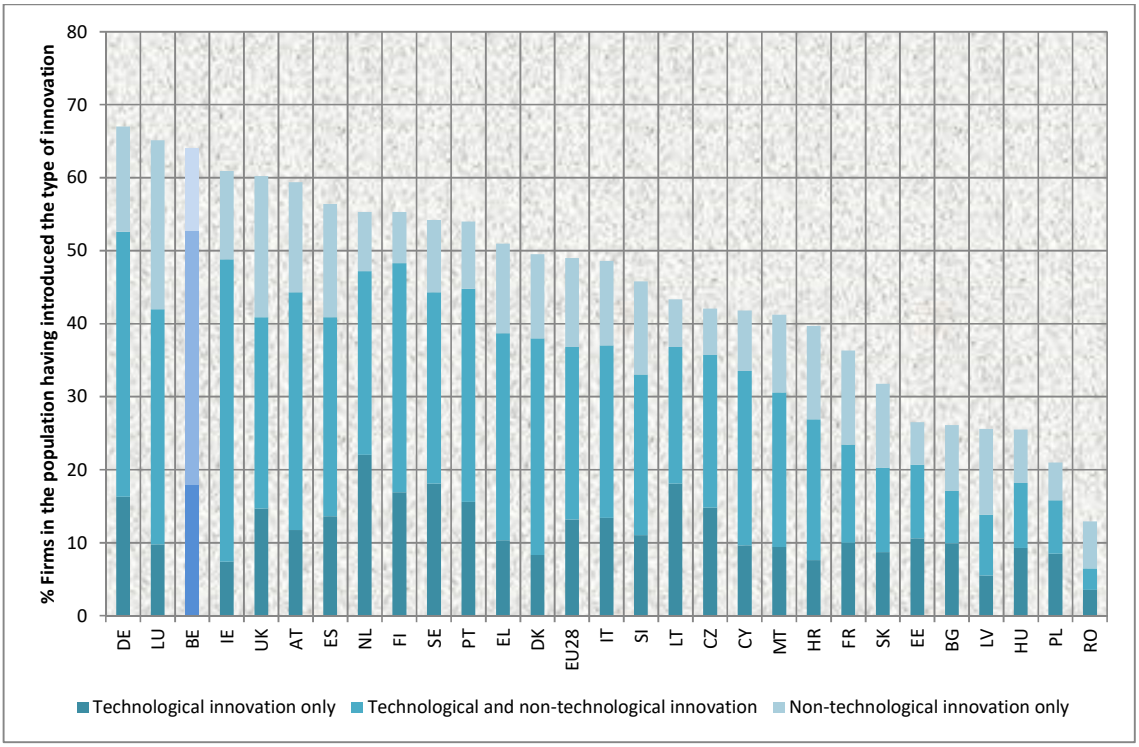
It appears that Wholesale trade, Transportation and Storage, Chemicals and pharmaceuticals, as well as Architecture, engineering, technical testing and R&D are more present in the Belgian population than in the European one. The converse is true for Paper, wood, furniture, ICT and electronics; Textiles, and Publishing, audio-visual, broadcasting and market studies.

V. WHAT IS THE STATE OF PLAY REGARDING INNOVATION IN BELGIUM AND IN THE EU ?

V.1. Belgium is a very innovative country….

Some 64.2% of the Belgian firms have introduced an innovation between 2012 and 2014. This is the third largest innovation rate in Europe, behind Germany (67%) and Luxembourg (65.1%), way above the EU average (49.1%). Figure 3 illustrates this. It also shows the large complementarity between both forms of innovations as a large majority of innovators have introduced both types of innovations. In Belgium, 54% of innovators have introduced both technological and non-technical innovations over the period 2012-2014.

Figure 3. Innovation rates in the EU (2012-2014)



Also, as can be seen in Table 3, innovative enterprises have a much larger economic weight (share of turnover and of employment) than their demographic weight. The economic importance of innovative enterprises has risen between 2012 and 2014. The demographic and economic weight of innovative enterprises is much larger in Belgium than in the European Union in general.

Table 3. Economic weight of innovative enterprises (2012 and 2014)

	Nb. Enterprises		Turnover		Employment	
Year	**EU28**	**BE**	**EU-28**	**BE**	**EU-28**	**BE**
2012	48.9	55.9	70.9	76.3	70	78.7
2014	49.1	64.2	78	84.2	71.2	80.3

V.2. ….Mostly as regards technological innovation, and in particular process innovation

Figure 4 separates between the technological innovation rate (share of firms that introduced technological innovation) and the non-technological innovation rate. Belgian firms have the highest technological innovation rate in the EU are clearly more geared towards technological innovation, though they have also importantly introduced non-technological innovations. The 45° line in the

middle separates countries that are more specialized in technological innovation (Belgium, Germany, Finland, The Netherlands, Sweden, etc.) and countries that are more specialized in non-technological innovation (Luxembourg and Ireland, e.g.).

Figure 4. Technological vs. non-technological innovation rates in the EU (2012-2014)

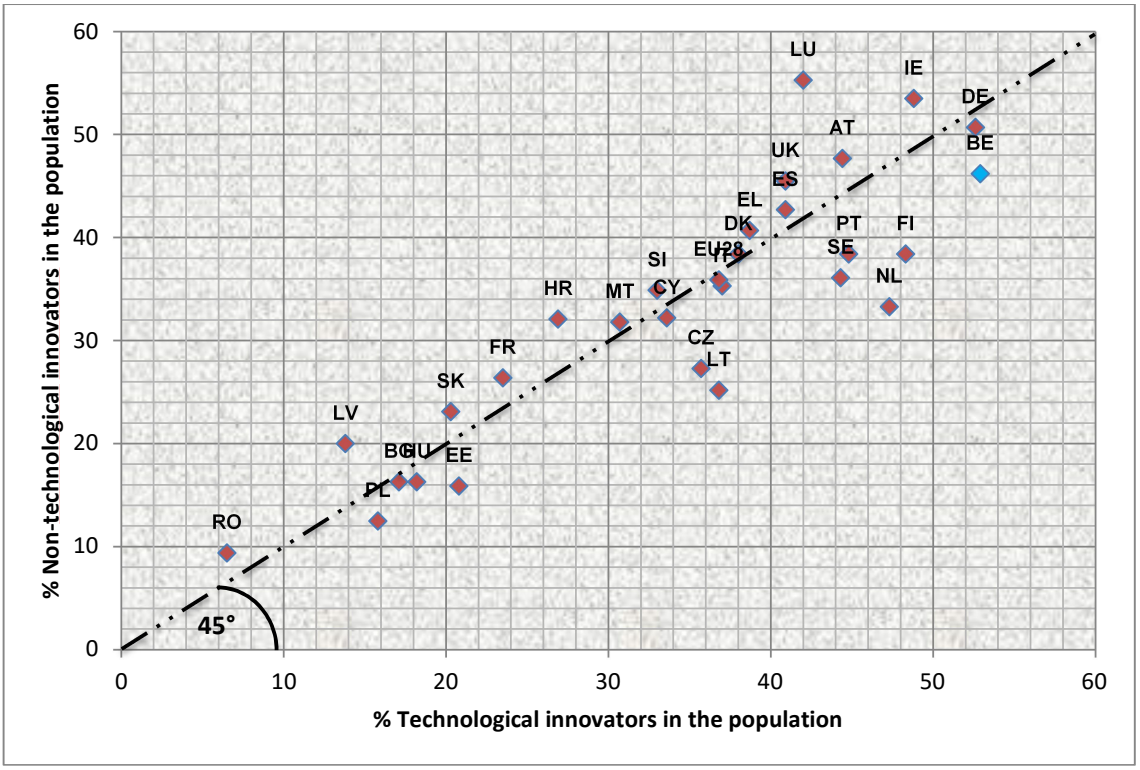
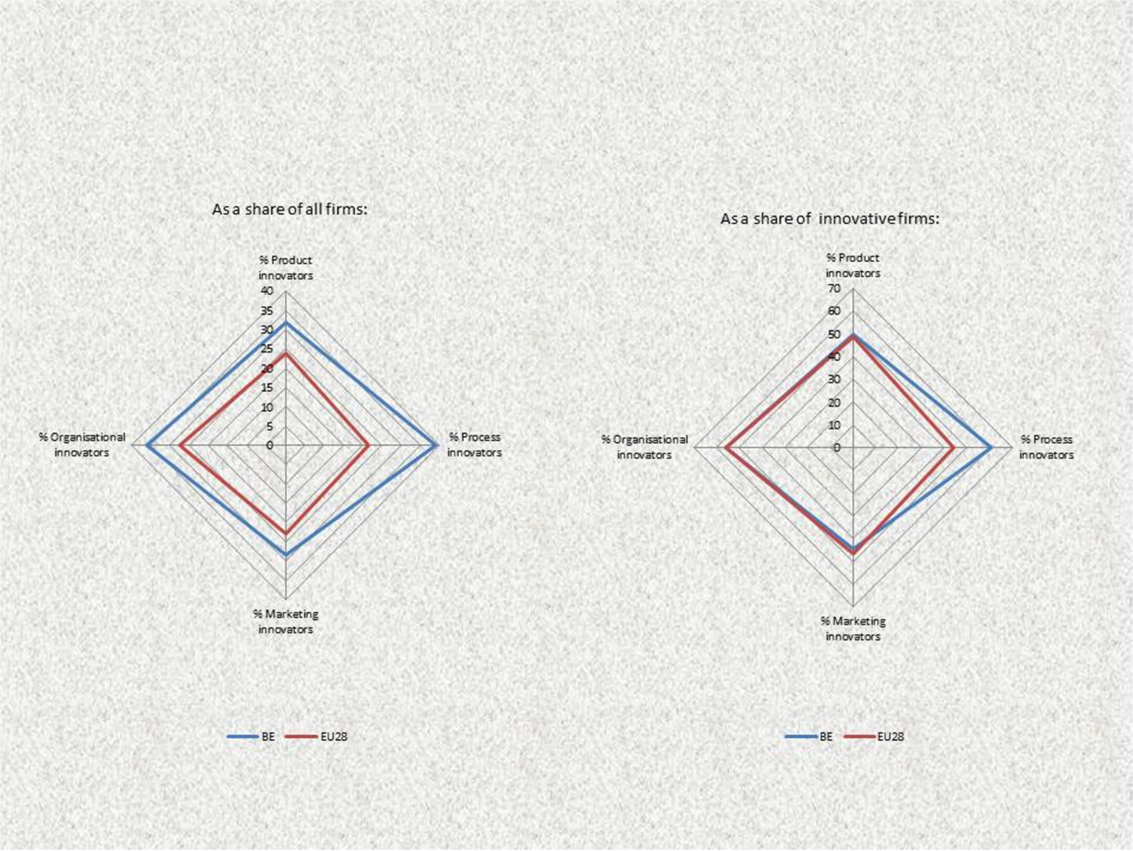


Figure 5 goes a little deeper in the analysis and shows the proportion of the various subtypes of innovators, both for Belgium and EU-28 as a whole. To correct for the lower overall innovativeness of EU28, we also report the figures both as a share of all firms (left) and of innovative firms (right), which allows benchmarking the structure of Belgian innovators with the structure of European innovators in general.

Figure 5. Types of innovators, BE vs. EU-28 (2012-2014)

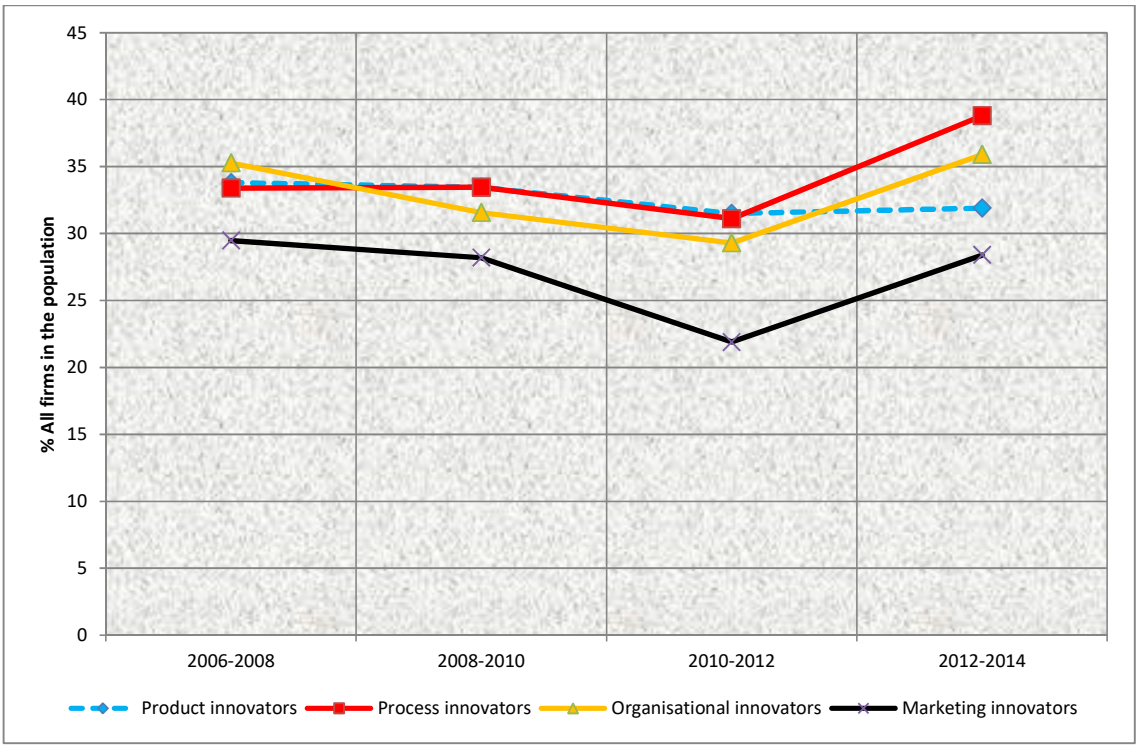


The high proportion of technological innovators in Belgium is mostly due to the prevalence of process innovators. This is visible both in absolute and in relative terms. Belgium has more innovators in each category than the EU in general, but the structure is rather similar, though in relative terms marketing innovation is slightly less present in Belgium.

V.3 Innovation rates are on the rise again

Figure 6 shows the evolution of the various types of innovation rates in Belgium over the last 8 years. After an overall decrease in 2010-2012, which is probably a lagged effect of the 2007-2008 crisis, innovation rates are on the rise again. This is however much less pronounced in the case of product innovation, which rather stagnates (from 31.5% to 31.9%).

Figure 6. Evolution of innovation rates in Belgium (2008-2014)



V.4. Innovation rates are not homogeneous across sectors and size classes.

Table 4 depicts the technological and non-technological innovation rates across sectors. Obviously, both rates are strongly correlated (R2 = 0.54). The technological innovation rate is always higher than the non-technological one except in the "Publishing, audio-visual, broadcasting, and market studies" sector, where non-technological innovation is high (55%) both in relative and absolute terms. The correlation between innovation rates allows identifying highly innovative sectors. The two most remarkable ones are "Chemicals and Pharmaceuticals" and "ICT, electronics". At the lower end of the spectrum, "Transportation and storage" and "Mining and quarrying" appear as the less innovative sectors.

Table 4. Innovation rates by sector (2012-2014)

Sector	% technological innovators in the sector	% non-technological innovators in the sector	% innovative firms in the sector
Chemicals and pharmaceuticals	74.2	68.4	85.2
ICT, electronics	71.9	59.2	79.1
Textiles	66.1	53.2	75.2
Telecoms, IT, information services	66.5	45.9	74.8
Architecture, engineering, technical testing, RD	65.5	56.1	72.7
Food, drinks, tobacco	59.6	50.9	72
Petroleum, plastics, minerals	61	52.6	71.1
Transport equipment	59.8	48.1	70.1
Other machinery, repair and installation	59.5	48.6	69.5
Other industries	59.7	37.6	68.6
Publishing, audio-visual, broadcasting, market studies	47.1	55	64.7
Paper, wood, furniture	57.4	44	64.7
Metals, repair and installation of machinery	52.7	46.6	64.4
All sectors	**52.9**	**46.2**	**64.2**
Financial services	50.7	46.2	61.7
Wholesale trade	46.5	44.7	60.2
Mining and quarrying	43.4	35.8	50
Transportation, storage	37	34.7	48.6

Firms' size also plays a role in their innovativeness. Table ??? clearly shows that larger enterprises innovate more than smaller ones. This is true for all types of innovations. As Belgium has a larger share of medium-sized and large enterprises than the EU as a whole (see Table ??), this influences its relative innovation performances.

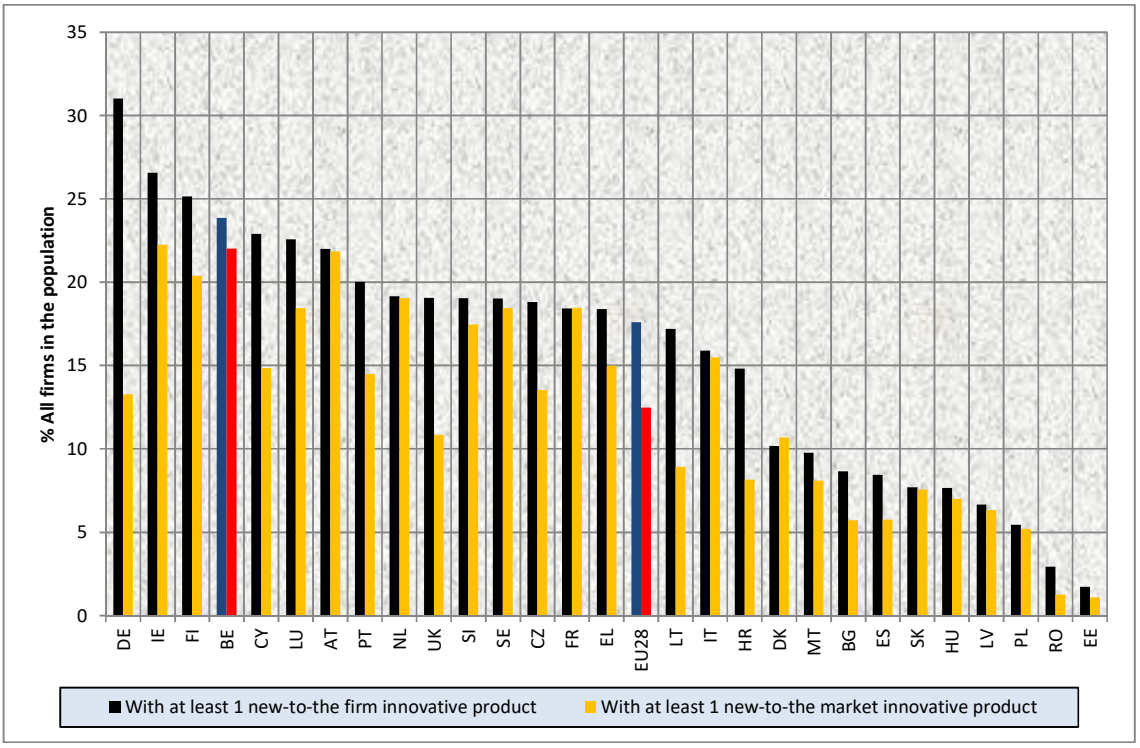
Table 5. Innovation rates by size (2012-2014)

	Share of innovative enterprises in the size class (%)				
Size class:	**Product**	**Process**	**Organisational**	**Marketing**	**Any type**
Small firms	29.1	34.9	31.1	26.3	59.44
Medium-sized firms	35.9	46.3	45.6	32.4	74.2
Large firms	56.1	62.9	61.8	40.7	85.99

V.5 Belgian firms, however, fail to reap the returns from their product innovations

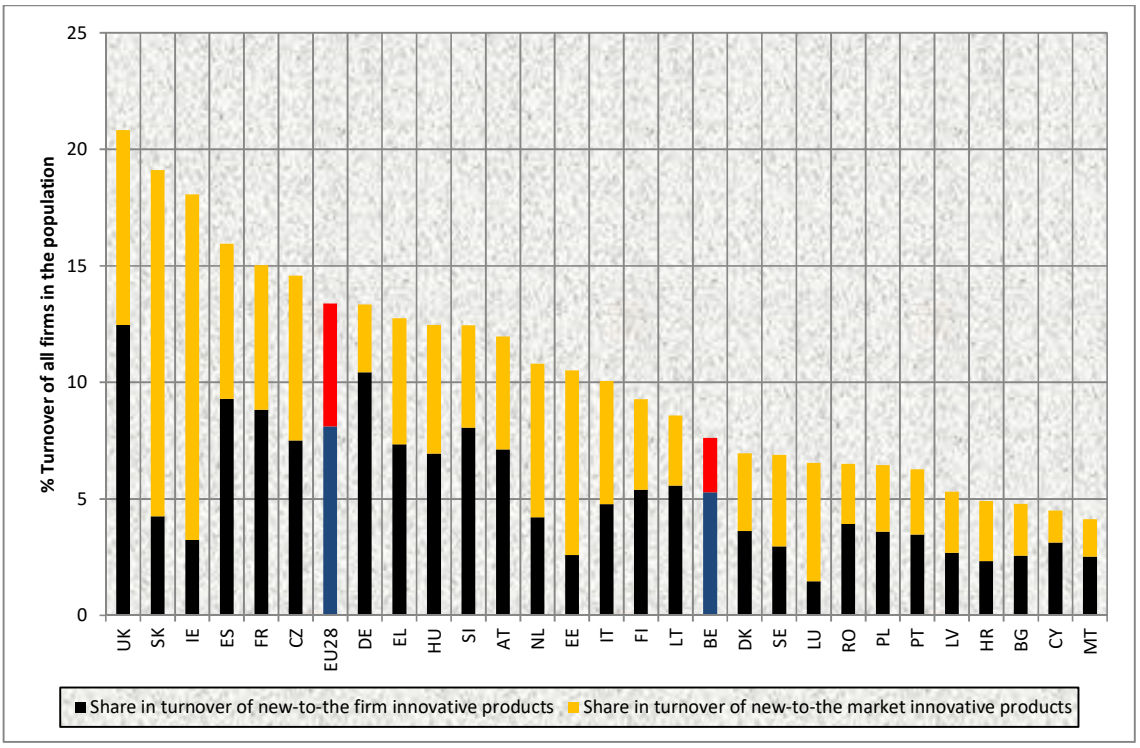
Figure 7 shows the share of firms that introduced at least one product innovation, according to the degree of novelty of the innovations. These may be new to the firm's market, or only new to the firm itself. Accordingly, Belgian firms score rather high in both dimensions.

Figure 7. Degree of novelty of product innovations in the EU (2012-2014)



However, the turnover from these innovations represents a rather low share of the total turnover, as compared to what happens in many other European countries. Figure 8 displays the share of total turnover linked to product innovations, according to their degree of novelty to support this point. This is especially true for the turnover linked to "radical innovations" (new-to-market products).

Figure 8. Turnover from product innovations in the EU by degree of novelty (2014)



VI. HOW DO BELGIAN FIRMS DEVELOP THEIR TECHNOLOGICAL INNOVATIONS?

VI.1. Mostly by themselves or in collaboration with others

The introduction of a technological innovation may result from various processes. The firm may have developed the innovation itself, through formal internal R&D or other activities. It may also have collaborated with other firms of institutions in order to co-develop the innovation. As the innovation only needs to be new to the firm, it may also have adapted, or slightly modified, an already existing product or process. Finally, it may merely have taken off the shelf an existing product or process developed by others and implemented it without modification. Table 6 gives, for each type of innovation, the proportion of innovative firms that pursued these various strategies.

Table 6. Who developed the product innovations (2012-2014) ?

	BE				EU^			
	By themselves	In collaboration	By adaptation	By others	By themselves	In collaboration	By adaptation	By others
Goods innovations*	71.3	46.9	15.8	14.6	70.5	35.4	18	10.7
Services innovations**	73	42.2	22.1	10.2	57.2	32.1	16.3	12
Process innovations***	48.9	51.3	16.5	19.1	59.3	40	12.9	14.6

Note: ^ without SE for goods and services innovations; * Share of goods innovators; ** share of services innovators, ***share of process innovators

As far as Belgian firms are concerned, the two preferred strategies are clearly internal development and co-development in collaboration with other firms or institutions. Internal development is the dominant strategy as regards product innovations, whereas collaborative development is the most frequent strategy as regards process innovations. For the EU as a whole, the structure is rather similar, as internal development and co-development are also the most prevalent strategies. However, the share of internal developers for product innovations is higher in Belgium, especially as regards services innovations. The opposite is true for process innovations, where the Belgian share of internal developers is lower than the European one, but the share of co-developed innovations is higher in Belgium.

VI.2. In collaboration with whom?

Belgian firms are among the most collaborative in the EU to develop their technological innovations. Figure 9 shows the proportion of technological innovators that develop their innovations in collaboration with other partners. Belgium is one of the four countries where more than half of the technological innovators developed their innovations in collaboration (together with the UK, Estonia and Austria).

Figure 9. Collaborations for technological innovation in the EU (2012-2014)

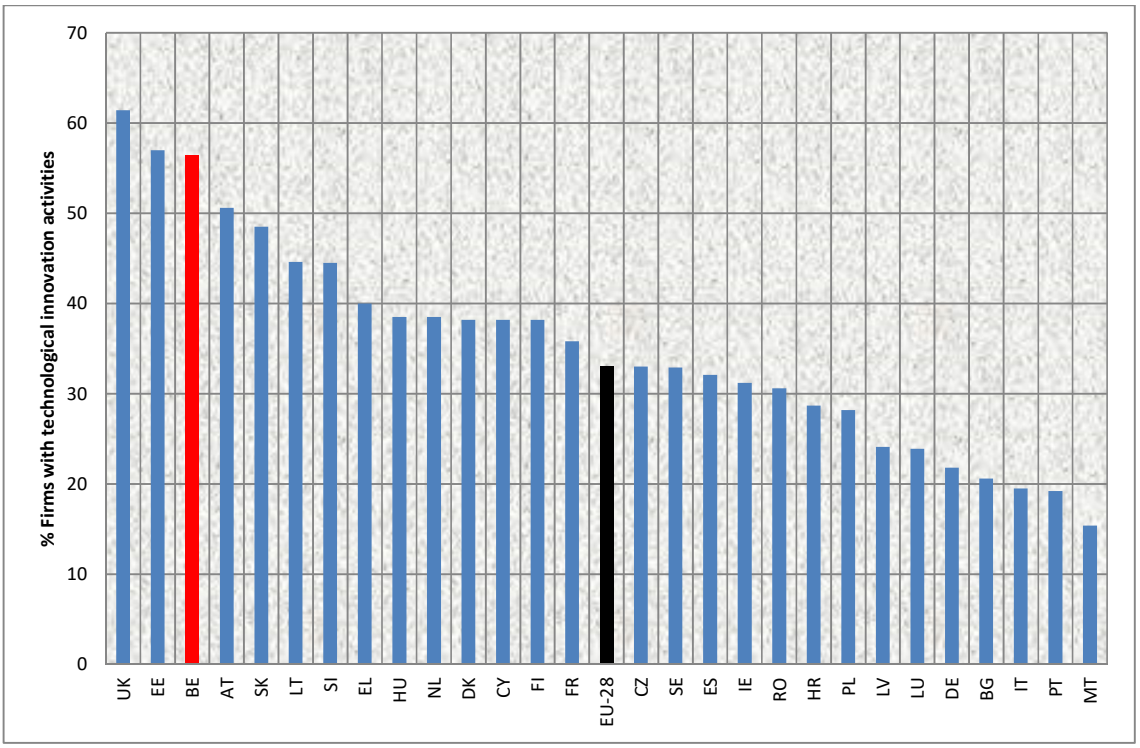
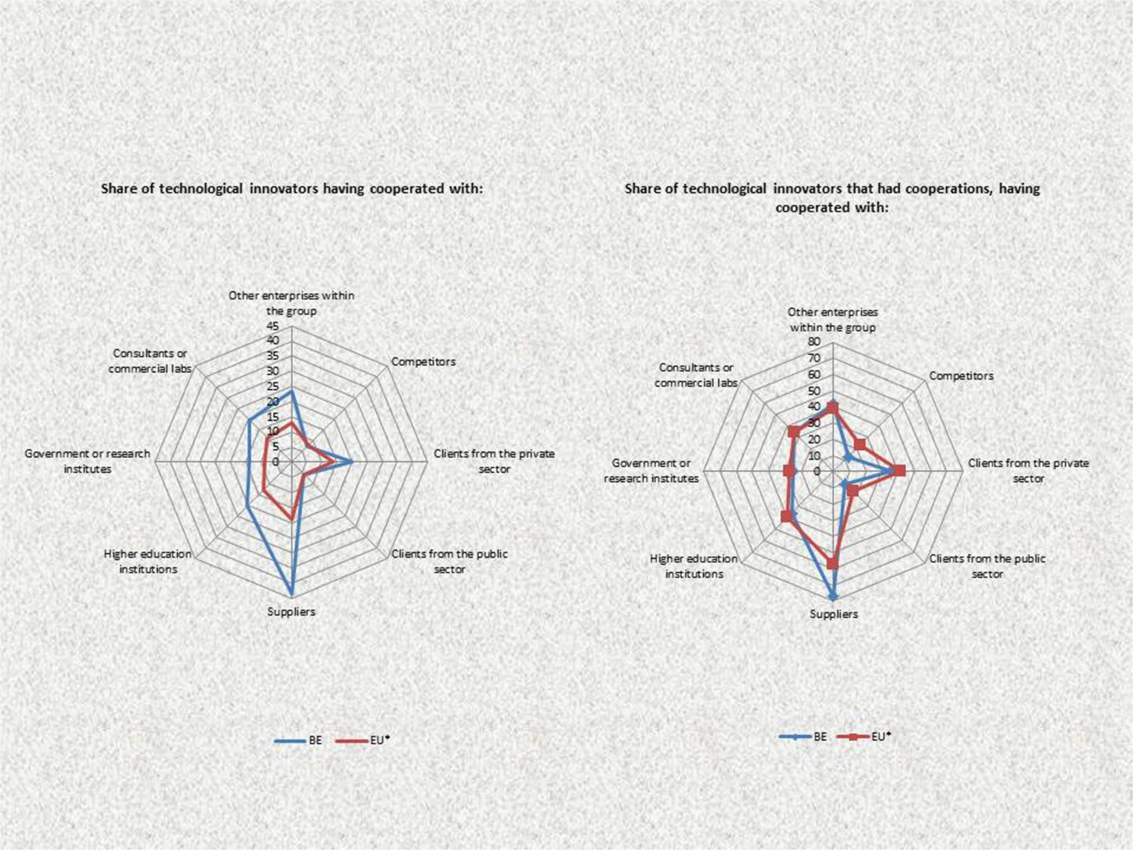


Figure 10 analyses cooperation patterns by type of partner both for Belgium and available EU countries. The left panel indicates the share of technological innovators that collaborated with each type of partner. To correct for the lower overall propensity to cooperate within EU as a whole, the right panel gives the cooperation pattern of technological innovators *that entered cooperation agreements*.

Figure 10. Collaborations by type of partner - BE vs. EU25 (2012-2014)

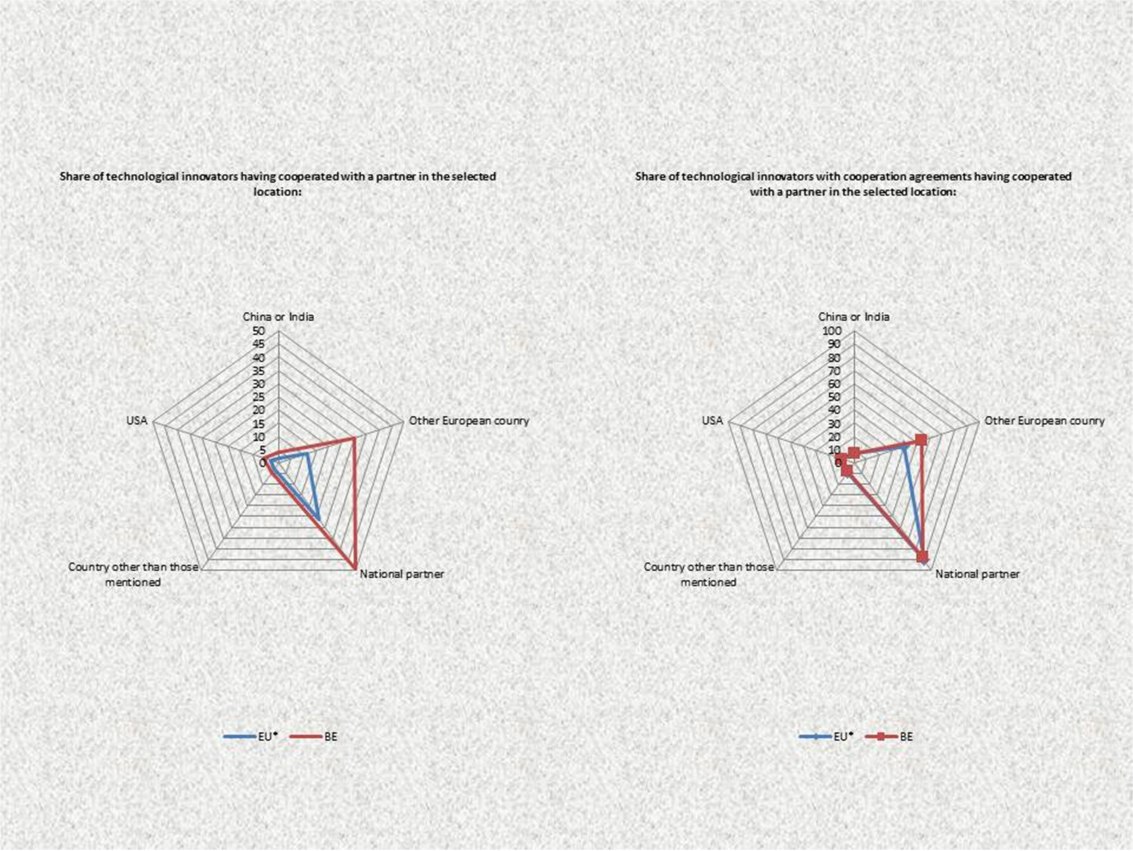


* EU-28 except IE, NL, SE.

Clearly, in absolute terms (left panel), Belgian firms collaborated intensively with suppliers and other enterprises within their group. More than one-third of the Belgian technological innovators also collaborated with higher education institutions, consultants and commercial labs, or clients from the private sector. The analysis in relative terms (right panel) confirms the dominance of suppliers. It also shows a weaker degree of cooperation in Belgium with clients from the public sector and with competitors. Results regarding higher education institutions, research institutes, consultants and commercial labs, or other enterprises within the group are comparable between Belgium and the EU as a whole.

Figure 11 turns to the geographical location of the partners. Again the analysis is provided in absolute terms (share of innovators) as well as in relative terms (share of innovators that entered cooperation agreements).

Figure 11. Collaborations by location of the partner - BS vs. EU28 (2012-2014)



*: without the UK

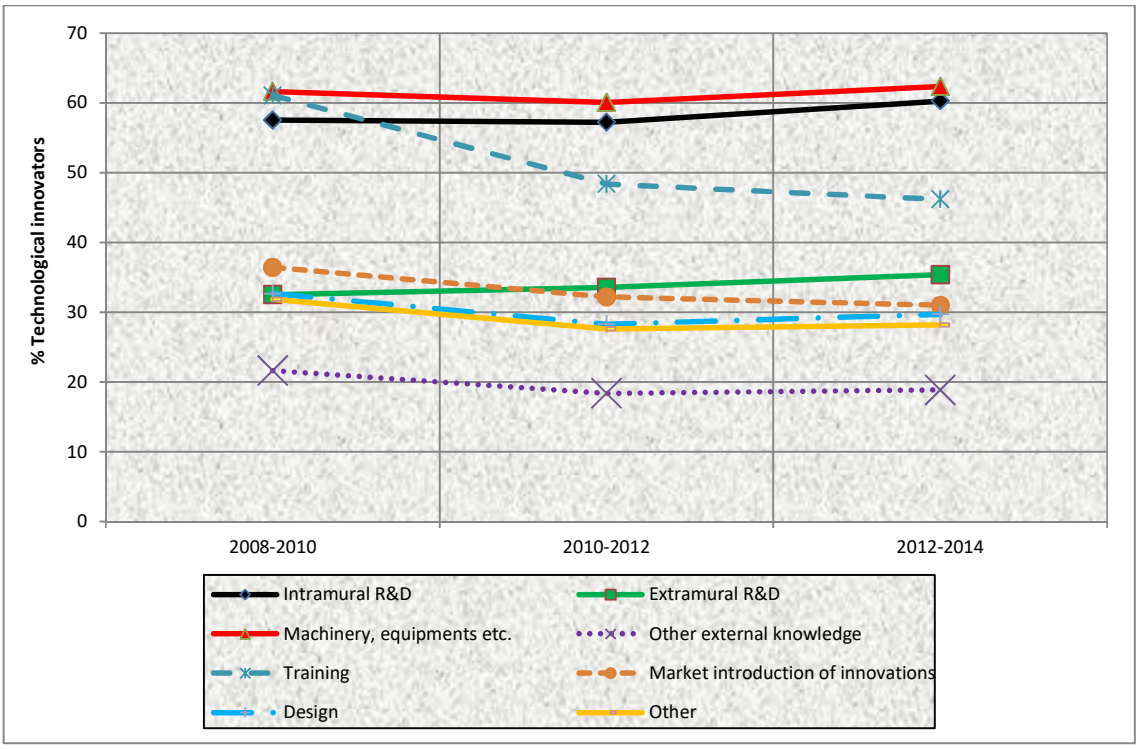
Both in Belgium and in the rest of the EU, preferred partners are located in the country itself or in other European countries. The most noticeable difference is the higher propensity of Belgian actors to interact with partners located in other European countries. This also reflects the fact that Belgium is a small open economy.

VI.3. What are the innovation activities pursued by Belgian firms ?

Another way to assess the innovative behaviour of Belgian firms is to examine the kind of activities they engaged in to implement their technological innovations. The European innovation survey considers the following categories of activities: (i) intra-mural (internal) R&D; (ii) extra-mural R&D (research contracted out to ether enterprises or institutions); (iii) acquisition of machinery, equipment, software & buildings for innovation purposes; (iv) acquisition of other external knowledge (licences, patents, knowhow, etc.); (v) training for innovation activities (in-house or contracted out); (vi) market introduction of innovations (including market research and launch advertising); (viii) design (activities to change the shape, appearance, or usability of products) and

(ix) other, non-specified, activities. Figure 12 gives the relative importance - frequency - of each of these activities among Belgian innovative firms in a dynamic perspective.

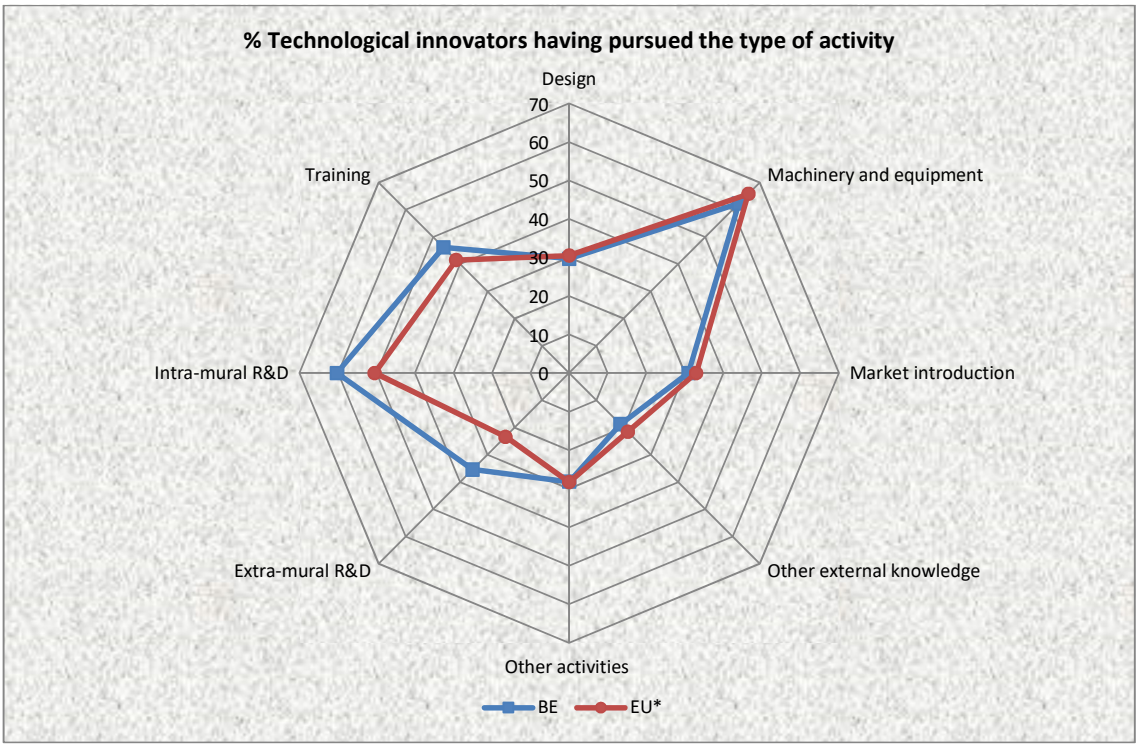
Figure 12. Activities for technological innovations in Belgium (2010-2014)



The two most favoured activities are intramural R&D and the acquisition of machinery and equipment. Their prevalence is rather stable, albeit slightly rising. Training activities, on the contrary, were very popular in 2008-2010 but their relative importance is decreasing. They arrive in the third place. The converse happens with extramural R&D, whose importance is slightly rising and who shows up in the 4th place. Marketing-related activities, such as market introduction of innovation or design appear to be less popular. Finally the least pursued activity is the acquisition of other external knowledge.

Figure 13 puts these results in an international perspective and compares Belgium to the EU as a whole for the period 2012-2014 only. Belgian firms are more oriented towards training, intra-mural R&D and extra-mural R&D, i.e. more technical activities. On the contrary they perform market introduction activities and buy other external knowledge less often than their European counterparts.

Figure 13. Activities for technological innovation, BE vs. EU (2002-2014)



*: without DK, DE, IE, ES, and UK

VI.4. How much do they spend for these activities and how?

Innovation expenditures are identified according to approximately the same scheme as innovation activities above: (i) intra-mural R&D; (ii) extra-mural R&D ; (iii) acquisition of machinery, equipment, software and buildings; (iv) acquisition of other external knowledge; and (v) an "other" category for all other innovation expenditures (training, market introduction, design and other, non-specified, activities.

Figure 14 presents the structure and evolution of innovation expenditures, expressed as a share of turnover (of all firms). At total, there has been a decrease between 2012 and 2014, whereas the innovation rate increased during this interval. Given the time lag between the actual implementation of an innovation and the investments uphill, it may make sense that firms invested more in the aftermath of the crisis to remain competitive and actually implemented their innovations some years later. Not all categories of expenditures, however, decreased: investments in extra-mural expenditures as well as in acquisition of other external knowledge increased. It is the decrease in heavy "internal" investments, intra-mural R&D and acquisition of machinery and equipment, that tipped the scales.

Figure 14. Evolution and structure of innovation expenditures in Belgium (2012-2014)

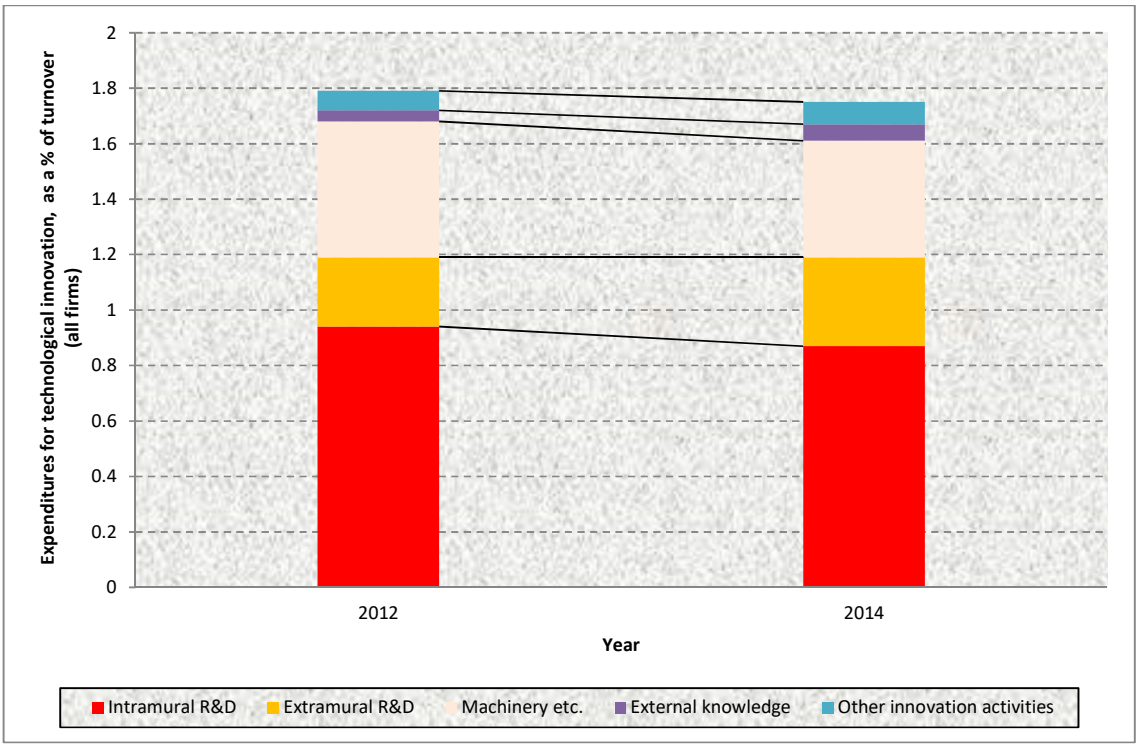
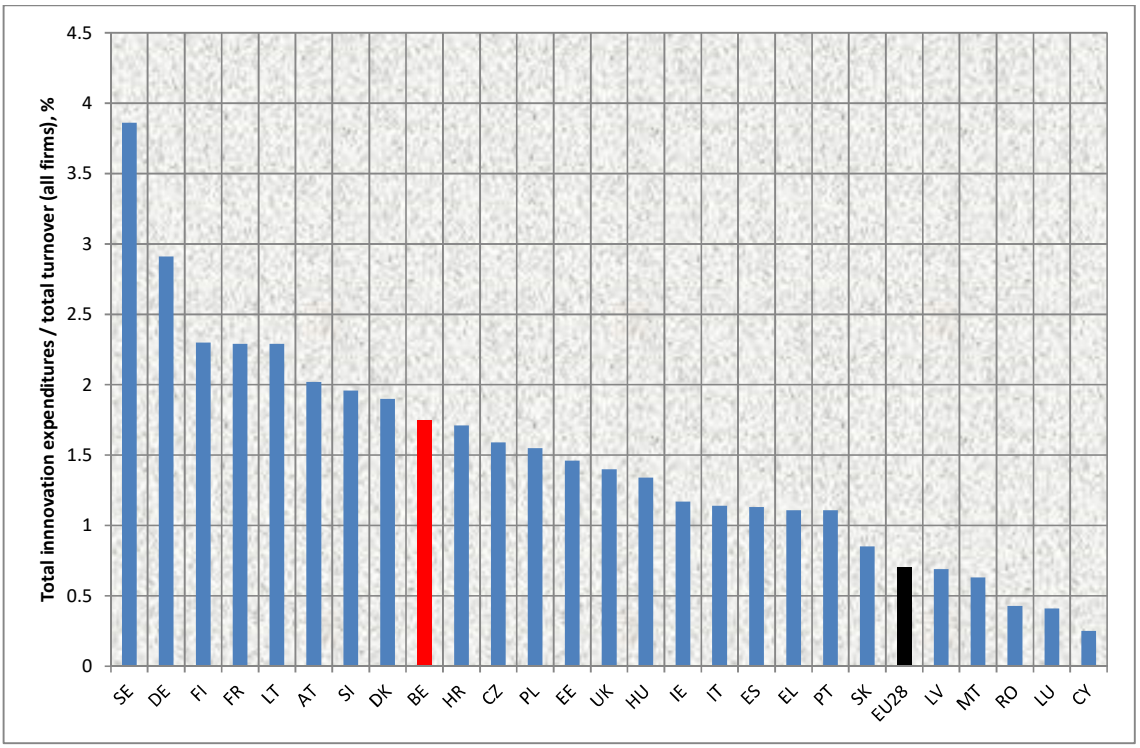


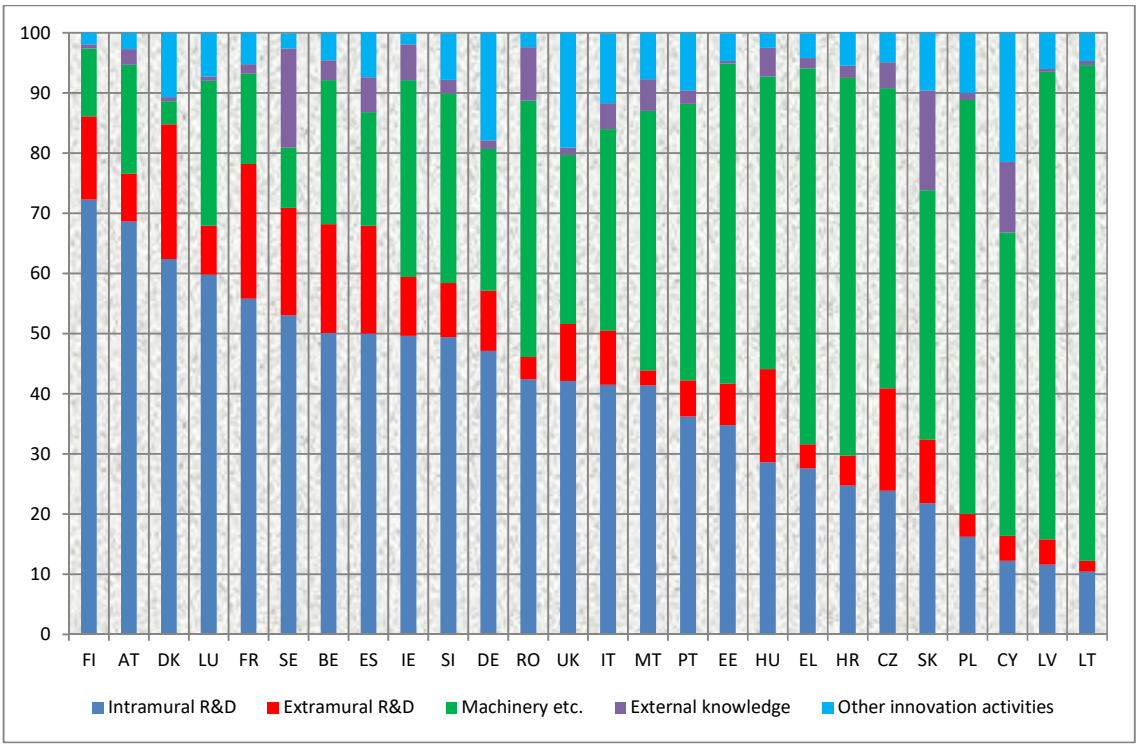
Figure 15 and Figure 16 put these results in an international perspective, the former in terms of gross intensity and the latter in terms of structure.

Figure 15. Innovation intensity in the EU (2014)



In terms of intensity, as exemplified by Figure 15, Belgium sits in the upper middle, in a sort of "followers" group together with Austria, Slovenia, Denmark and Hungary, behind "top leaders" like Sweden and Germany, and "almost leaders" like Finland, France and Lithuania.

Figure 16. Structure of innovation expenditures in the EU (2014)



In terms of structure, two group of countries emerge: those who invest more intensively in intra- and extra-mural R&D and those who invest more intensively in Machinery, licences, patents, and other innovation activities. Clearly, Belgium belongs to the former group with almost 70% of innovation expenditures in R&D (and about 50% in intra-mural R&D).

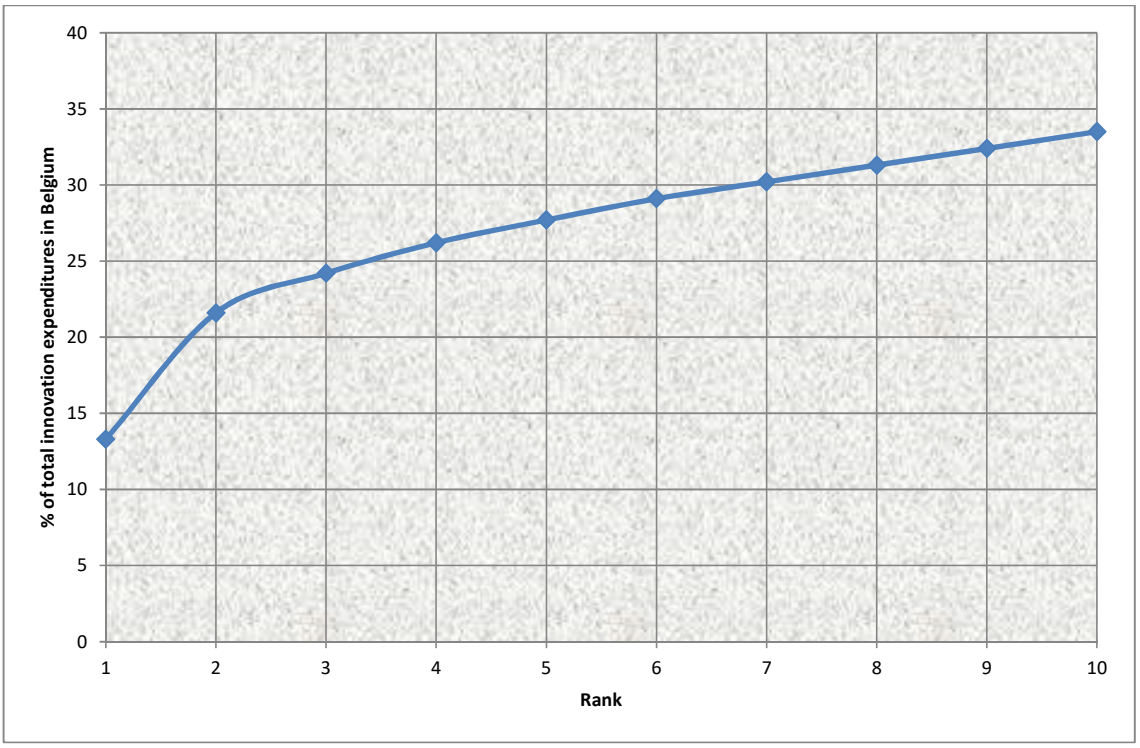
These expenditures are however not homogeneously distributed across firms and sectors. We already noticed in Table 4 that some sectors were more innovative than other ones. Similarly, the distribution of innovation expenditures across sectors does not follow the distribution of the number of firms, as illustrated in Table 7. Remarkably, Chemicals and pharmaceuticals account for about 30% of the total innovation expenditures, though the sector only represents 2.5% of the firms. Conversely, Wholesale trade gathers 25% of the firms but its share in the total innovation expenditures is only 7.7%.

Table 7. Innovation expenditures in Belgium by sector (2014)

Sector	Innovation expenditures (mln EUR)	Sector share in the total	Nb. Firms	Sector share in the total
Mining and quarrying	17	0.2	56	0.4
Food, drinks, tobacco	670	7.2	1090	8
Textiles	122	1.3	347	2.6
Paper, wood, furniture	183	2.0	814	6
Petroleum, plastics, minerals	298	3.2	648	4.8
Chemicals and pharmaceuticals	2748	29.5	341	2.5
Metals, repair and installation of machinery	465	5.0	1157	8.5
ICT, electronics	571	6.1.	273	2
Transport equipment	390	4.2	139	1
Other machinery, repair and installation	335	3.6	491	3.6
Other industries	186	2.0	363	2.7
Wholesale trade	717	7.7	3417	25.2
Transportation, storage	331	3.6	2050	15.1
Publishing, audio-visual, broadcasting, market studies	97	1.0	431	3.2
Telecoms, IT, information services	530	5.7	819	6
Financial services	647	6.9	532	3.9
Architecture, engineering, technical testing, RD	998	10.7	576	4.3
All	**9306**	**100.0**	**13543**	**100**

Innovation expenditures are also heavily concentrated across firms. Figure 17 gives the proportion of the total innovation expenditures accounted for by the 10 most important firms. The largest firm alone already accounts for 13% of the expenditures. The two largest firms represent 22% of the expenditures. The 4 largest firms make up for more than one-fourth of the expenditures, and the 10 largest firms altogether represent more than one-third of the expenditures.

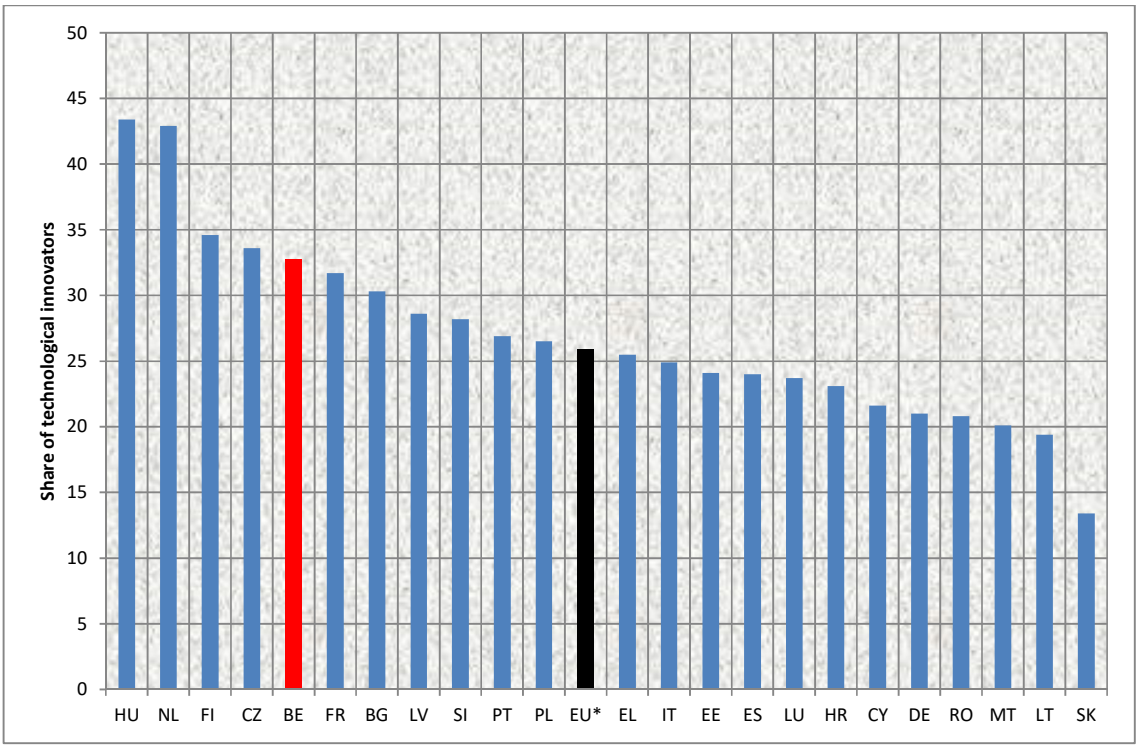
Figure 17. Concentration of innovation expenditures in Belgium (2014)



VI.5. Public support to technological innovation

Figure 18 shows the share of technological innovators having received public support for their innovation endeavours. Public support includes financial support via tax credits or deductions, grants, subsidised loans, and loan guarantees. It however excludes R&D and other innovation activities conducted entirely for the public sector under contract. About one-third of Belgian technological innovators have received such support, which makes Belgium a "good pupil" (the EU-wide share is 26%

Figure 18. Public support to technological innovation in the EU (2012-2014)

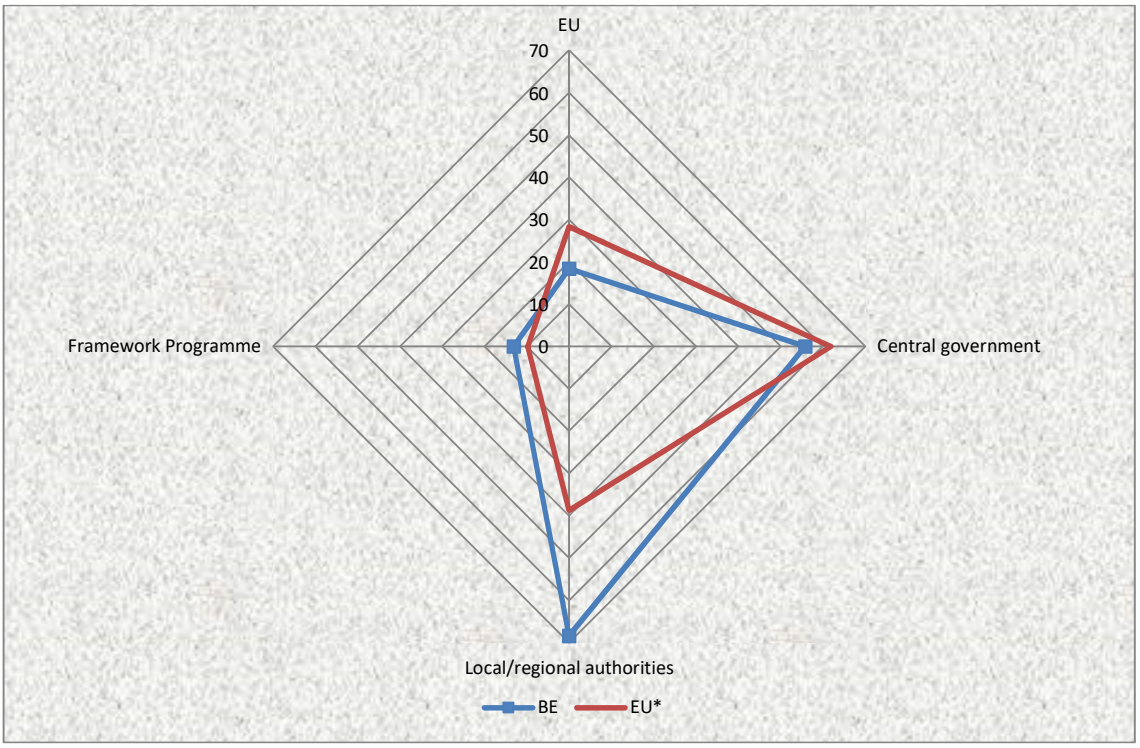


*: Without DK, UK, SE, PL

It is also interesting to investigate from which authority the support comes. We distinguish between 4 types of authorities: local/regional level (Communities and Regions in the case of Belgium), central government (the Federal authority in Belgium), the EU in general, and the 7th Framework Program (FP7). This FP7 is a subset of EU support, so any respondent claiming to have been granted support through FP7 must also claim to received EU support in general.

Figure 19 shows how innovators break down according to the level of power they received support from. The figures are defined as proportions of technologically innovative firms that received public support in general, to control for overall differences of public support intensity across countries

Figure 19. Structure of public support to technological innovation, BE vs. EU (2012-2014)

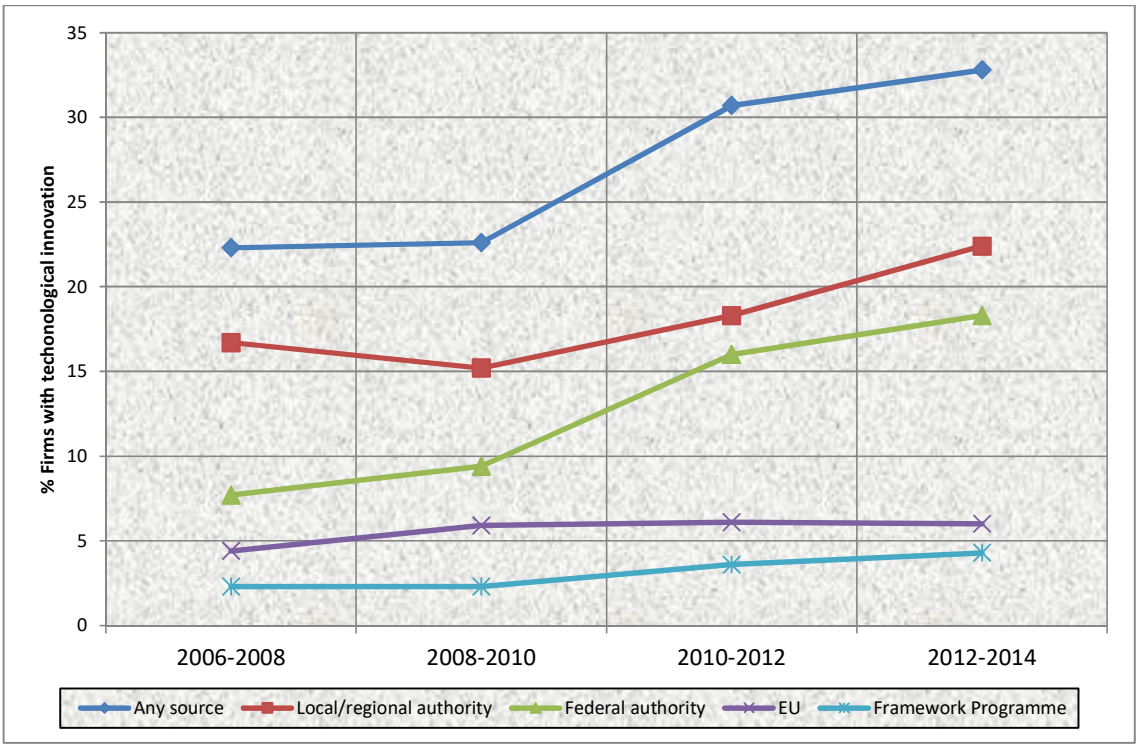


*: Without DK, UK, SE, PL

The peculiar characteristics of Belgium appear clearly. Though the central government (federal authority) is an important actor, local and regional authorities (Communities and Regions) are even more important. This is not the case in the EU at large, as the central government is the main source of support there, and the local level is much less important. This reflects the highly decentralized nature of the Belgian institutional system. The high importance of Communities and Regions in the funding system should not mask that a great proportion of firms also received support from the federal authority, probably mainly through tax cuts. Finally the proportion of Belgian firm that received support from the EU is lower than the proportion of European firms in general, but the converse is true when only FP7 is considered. This reflects the very high success rate of the Belgian actors in the Framework Programme, and maybe an under-utilisation of other European public support schemes.

Figure 20 shows the dynamics of public support in Belgium, by type of authority. Clearly public support is on the rise, and clearly, both the federal level and the federated entities have intensified their support in the recent years.

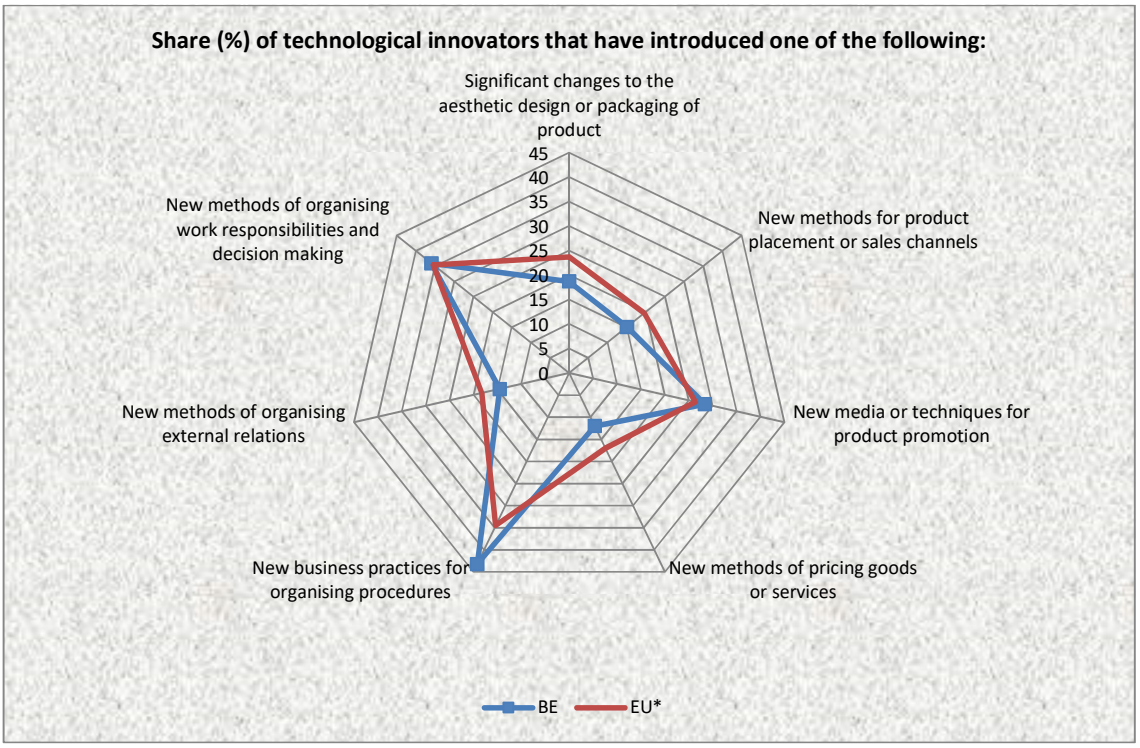
Figure 20. Dynamics of public support to technological innovation in Belgium (2006-2014)



VI.6. Links with non-technological innovation

The high complementarity between technological and non-technological innovation has already been underlined in Section V. In order to get a more detailed picture of the complementarities that may exist between technological innovation and the various types of non-technological innovations, hence to better figure out the strategies pursued by technological innovators, Figure 21 shows the shares of technological innovators that have introduced each type of non-technological innovation. It also compares Belgium with the available EU countries.

Figure 21. Non-technological innovations introduced by technological innovators, BE vs. EU (2012-2014)



Belgian technological innovators are more geared towards organisational innovation than towards marketing organisation to complement their technological innovations. In particular almost 45% of them also introduced new business practices for organising procedures (i.e. first time use of supply chain management, business re-engineering, knowledge management, lean production, quality management, etc.), which much higher than the overall EU proportion. More than 35% of them also introduced new methods of organising work responsibilities and decision making (i.e. first time use of a new system of employee responsibilities, team work, decentralisation, integration or de-integration of departments, education/training systems, etc.). This share is however comparable to EU standards. As noticed in Section V.2. above, Belgium has an absolutely remarkable share of process innovators (the highest in the EU), but a lower share of product innovators. We conjecture that the introduction of these types of organisational innovation complements the implementation of process innovations. As regards marketing innovation, their prevalence among Belgian technological innovators is systematically lower than among other European innovators, except for product promotion technique. We believe this might partially explain the poor commercial results of Belgian product innovators

VII. Conclusion

Belgian firms are very innovative, though they are more geared towards technological - product or process - innovation, and in particular process innovation. They however fail to fully reap the returns from their product innovations. As a corollary; marketing innovations - that should arise as a complement to sell new goods and services - are also slightly less present in Belgium. One possible explanation could be that Belgian firms, who very often belong to international groups, are used to develop new goods and services here in Belgium, but that these goods and services are then sold by other firms from the group on other markets.

Coherent with this explanation is the fact that Belgian firms mostly develop their innovations internally or in cooperation, in particular with other firms within the group or suppliers. International cooperation ties are very strong in Belgium, in particular with other European countries. Innovation activities are mostly of technical nature (intra- or extra-mural activities and training), and 70% of innovation expenditures relate to R&D. Conversely, market-related activities, such as market introduction of innovations, design, etc. are relatively less frequent in Belgium. Also, Belgian technological innovators implement much more often organisational innovations than marketing innovations. All in all, this is coherent with the idea that, possibly, a great deal of the very many innovations developed in Belgium is not necessarily meant to be sold on the Belgian market. We have also noticed that innovation expenditures are highly concentrated in the hands of a few large players, is some specific sectors.

Belgian firms benefit from a good level of support from public authorities. The structure of this support reflects the particular institutional structure in Belgium, as local and regional authorities play a much larger role than in Europe in general.

Finally, the innovation rates in Belgium, after some contraction in 2010-2012, are on the rise again. This goes hand in hand with continued and ever increasing public support.

ANNEX: "CORE NACE" SECTORS

The CIS survey only investigates firms with market activities belonging to one of the following sectors, as defined at the 2-digit level.

NACE SECTION	NACE 2-DIGITS	LABEL
B. MINING AND QUARRYING	8	Other mining and quarrying
	9	Mining support service activities
C. MANUFACTURING	10	Manufacture of food products
	11	Manufacture of beverages
	12	Manufacture of tobacco products
	13	Manufacture of textiles
	14	Manufacture of wearing apparel
	15	Manufacture of leather and related products
	16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
	17	Manufacture of paper and paper products
	18	Printing and reproduction of recorded media
	19	Manufacture of coke and refined petroleum products
	20	Manufacture of chemicals and chemical products
	21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
	22	Manufacture of rubber and plastic products
	23	Manufacture of other non-metallic mineral products
	24	Manufacture of basic metals
	25	Manufacture of fabricated metal products, except machinery and equipment
	26	Manufacture of computer, electronic and optical products
	27	Manufacture of electrical equipment
	28	Manufacture of machinery and equipment n.e.c.
	29	Manufacture of motor vehicles, trailers and semi-trailers
	30	Manufacture of other transport equipment
	31	Manufacture of furniture
	32	Other manufacturing
	33	Repair and installation of machinery and equipment
D. ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY	35	Electricity, gas, steam and air conditioning supply
E. WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES	36	Water collection, treatment and supply
	37	Sewerage
	38	Waste collection, treatment and disposal activities; materials recovery
	39	Remediation activities and other waste management services

G. WHOLESALE AND RETAIL TRADE	46	Wholesale trade, except of motor vehicles and motorcycles
H. TRANSPORTATION AND STORAGE	49	Land transport and transport via pipelines
	50	Water transport
	51	Air transport
	52	Warehousing and support activities for transportation
	53	Postal and courier activities
J. INFORMATION AND COMMUNICATION	58	Publishing activities
	59	Motion picture, video and television programme production, sound recording and music publishing activities
	60	Programming and broadcasting activities
	61	Telecommunications
	62	Computer programming, consultancy and related activities
	63	Information service activities
K FINANCIAL AND INSURANCE ACTIVITIES	64	Financial service activities, except insurance and pension funding
	65	Insurance, reinsurance and pension funding, except compulsory social security
	66	Activities auxiliary to financial services and insurance activities
M PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES	71	Architectural and engineering activities; technical testing and analysis
	72	Scientific research and development
	73	Advertising and market research