CDTI MONITORING REPORT

EXECUTIVE SUMMARY

OUTCOMES OF R&D PROJECTS COMPLETED IN 2015-2017

Including the monograph:
Tax Benefits in CDTI R&D Projects

2019

Analysis and Control Department. CDTI E.P.E

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MONITORING PANEL: INDIVIDUAL R&D PROJECTS*

TECHNOLOGICAL DEVELOPMENT COMPLETION STAGE

Indicators	Years 2015	2016	2017
Projects			
Completed	892	522	589
Budget (thousand €)	688,852	359,297	383,841
CDTI funds (thousand €)	531,965	272,555	300,729
Non-refundable tranche (thousand €)	62,869	30,877	47,747
SMEs	53%	53%	59%
High technology	45%	46%	45%
Innovations			
In products or services	45%	48%	41%
In processes	7%	7%	8%
In products or services and processes	47%	44%	42%
Technology leader in its market segment	60%	60%	66%
Job creation			
Create employment (in R&D)	42% (34%)	41% (32%)	43% (35%)
Create 5 jobs or more (in R&D)	4% (2.0%)	4% (1.5%)	6% (2.4%)
Full-time equivalent (FTE) jobs created per project (in R&D)	1.2 (0.8)	1.2 (0.6)	1.4 (0.8)
Forecast of outcomes and investments resulting from projects			
Sales (% total sales)	15%	14%	14%
Exports (% total exports)	18%	16%	16%
New investment in R&D (% project)	83%	80%	82%
New investment in production (% project)	67%	64%	65%
New investment in commercial network (% project)	55%	52%	55%
Patent (% project)	15%	14%	12%
Cooperation			
Only national	59%	57%	55%
Only international	3%	3%	4%
National and international	30%	31%	29%
Facilitate international programmes	29%	28%	23%
Tax benefits			
With a binding reasoned report and tax benefits	57%	67%	69%

* Figures refer to the percentage of projects, save explicit mention to another unit of measurement.
A detailed definition of the monitoring indicators can be consulted in the Appendix.

OUTCOME MONITORING: HOW AND WHY

The monitoring of public activities is essential for learning whether the implementation of a programme or policy is going according to plan and whether expected outcomes are being achieved[1]. To this end, continuous data collection systems have to be designed, tailored to the features, goals and cycles of each instrument and which guarantee efficient use of the information. In this way, monitoring is a tool that can support subsequent evaluation of the impact of the programme in question.

When monitoring focuses on programme implementation, the indicators used appear automatically as a result of government agency processes (number of projects approved, public funding granted, beneficiary companies, etc.). These parameters are usually collected in management reports, as in the case of the CDTI Annual Report [2].

On the other hand, when the aim of monitoring is to learn the impact of these processes on the beneficiaries, these entities have to be approached directly in order to collect the necessary information.

With this objective in mind, in 2011, the CDTI created an outcomes monitoring system based on two surveys completed by the funding recipient companies at two points in the R&D project cycle. The first of them, the Project Closure Survey, is answered at the time of concluding the technological development; while the Ex-Post Survey, which focuses more on the economic outcomes, is sent two years after the estimated date for commercialisation of the innovations achieved (this information is provided by the company in the first questionnaire).

This document summarises the main outcomes of the 2019 CDTI Monitoring Report available on the Internet [2], based on the statistics obtained through the Project Closure Survey for projects that concluded their technological development in the 2015-2017 period. The information from this survey has been merged with that available in the CDTI corporate database and in external databases, so that the final analysis is based on a comprehensive picture of the projects financed and of the developing companies.

After reading or consulting this report, readers will learn which outcomes were obtained by companies upon completion of the technological development of their R&D projects and the impacts they generated in terms of capability building, their position in collaboration networks or their commercial and economic expectations.

To sum up, this report highlights a series of indicators which, above and beyond guaranteeing the implementation of a budget allocated to a public process, help to explain how and to what extent the change for which said budget was allocated has been successfully generated.

1 See, for example, The better regulation guidelines, which set out the principles adopted by the European Commission in the preparation of new initiatives and proposals in the management and evaluation of existing policies.
Better regulation: Guidelines and toolbox (2017)
2 Available at www.cdti.es, Publications section.

1 MAIN OUTCOMES GENERATED BY COMPLETED PROJECTS

Which projects and companies are included in this report?

This report contains the outcomes produced by 2,003 individual R&D projects funded by the CDTI which completed the technological development stage between 2015 and 2017. All in all, the budget for these projects amounted to 1,400 million euros, of which 1,100 million was allocated to funding granted by the CDTI through partially refundable loans.

Altogether, 1,553 companies benefitted from these funds. They employ more than 380,400 people and generate an annual turnover of 153,200 million euros, of which 91,400 comes from exports. They declare expenditure on R&D of 4,800 million.

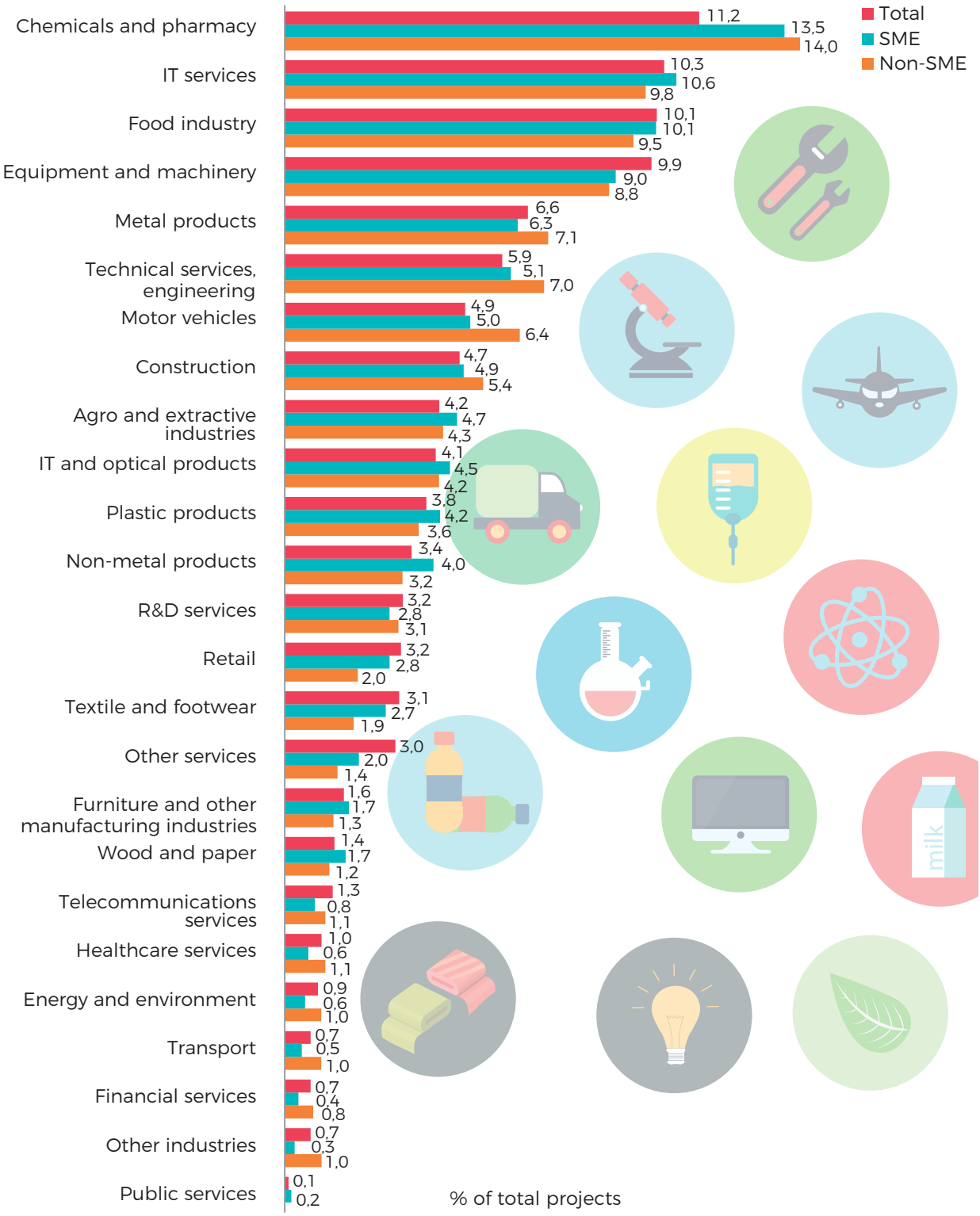
The most common beneficiary profile is similar to that of previous periods: companies that have been in business for more than 20 years; export companies; located mostly in Catalonia, Madrid, the Autonomous Community of Valencia and the Basque Region; with workforces of between 10 and 250 employees and which conduct their business in almost all sectors of the economy, although more frequently in the chemical and pharmacy, IT services, food, and equipment and machinery manufacturing industries. This profile is consistent with the characteristics of the companies that allocate most expenditure to R&D in our country[3].

The industries classified as high and medium-high technology generate 45% of the projects, five percentage points higher than the projects completed between 2012 and 2014[4]. Especially significant in these sectors is the growth of small and medium-sized enterprises that develop programming and communications services, which have come to account for more than 30% of all the projects implemented by the SME group.

3 Survey on Innovation in Companies, INE (National Statistics Institute)

4 CDTI Notebook on Technological Innovation No. 13: Analysis of outcomes and impact of CDTI projects completed between 2012 and 2014

Graph 1: Project distribution by economic sector

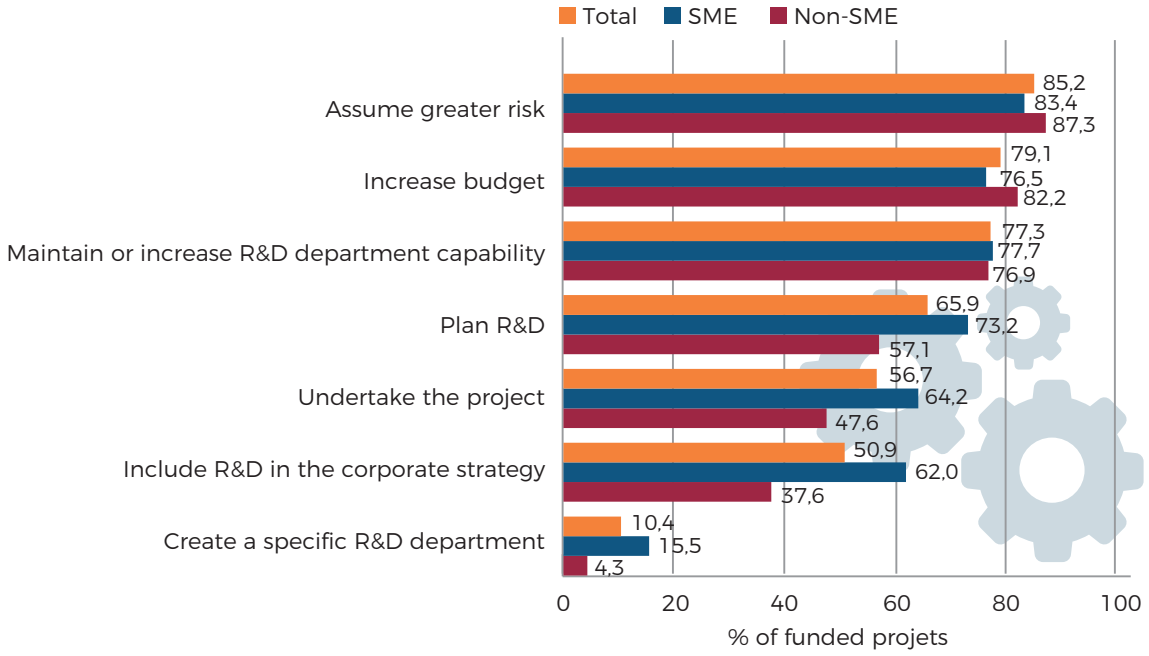


What impact has CDTI funding had on the development of the project?

CDTI funding has, in 80% of cases, allowed greater technological risks to be taken and project budgets to be increased. Moreover, more than half of them could not have been pursued without this funding, with this impact being greater in SMEs (64%).

The innovation capability of companies has been strengthened through an increase in tangible assets that have led to improvements in the capability of the R&D department (77% of cases) or even the creation of a new department (10% of cases). SMEs have improved planning in 73% of cases and have strengthened the strategic nature of R&D in 62%, percentages significantly higher than in large corporations (57% and 38%, respectively).

Graph 2: Effects of CDTI support (distribution by company size)



What innovations have been achieved? How frequently have they been patented?

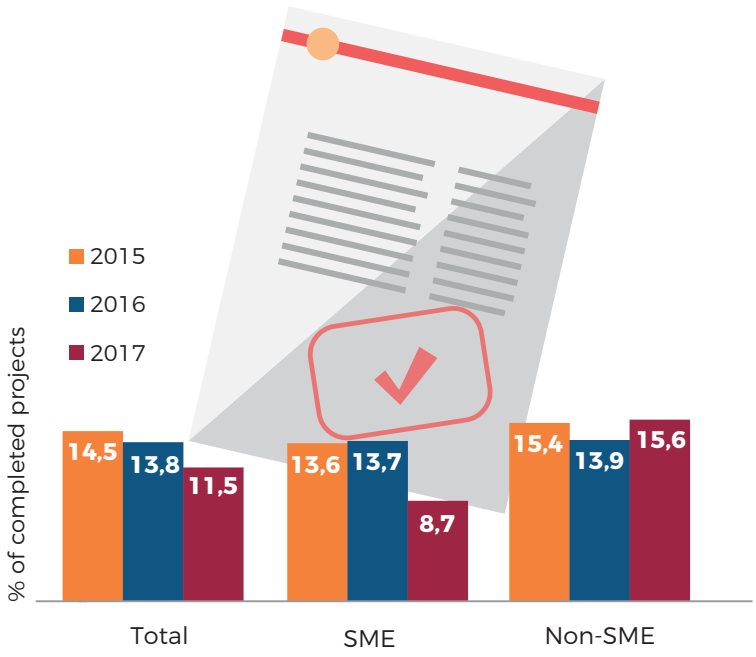
Of all the projects, 90% generate product or service innovations, supported, on half the occasions, by innovations in processes. When innovation is introduced into products or services, companies manage to get ahead of their competitors in approximately 66% of cases. Process innovations focus mainly on improving or updating manufacturing methods.

Thanks to these innovations, companies have been able to expand their range of products and improve their quality, increase the capacity and flexibility of their production systems and move forward in improving their environmental impact.

Between 2015 and 2017, the percentage of projects generating patents dropped from 14.5 to 11.5, dragged downwards by the performance of SMEs, which only do so in 8.7% of projects. This decision seems

to be related to strategy factors or to the type of innovation developed rather than to costs resulting from the registration and defence of the patent. At any event, it is not a decision taken immediately, as in 25% of projects the option to register a patent is still in the study stage.

Graph 3: Projects for which patent applications filed



What impact do the projects have on job creation?

Four out of every ten projects give rise to new hires. In most cases (38%), the increases are modest, between 1 and 5 jobs. The area that is most strengthened is that of R&D, to which more than half of the new jobs are allocated. Altogether, the projects completed between 2015 and 2017 created 2,536 direct jobs, of which 1,479 relate to staff engaged in R&D and 714 are women (28% of the total).

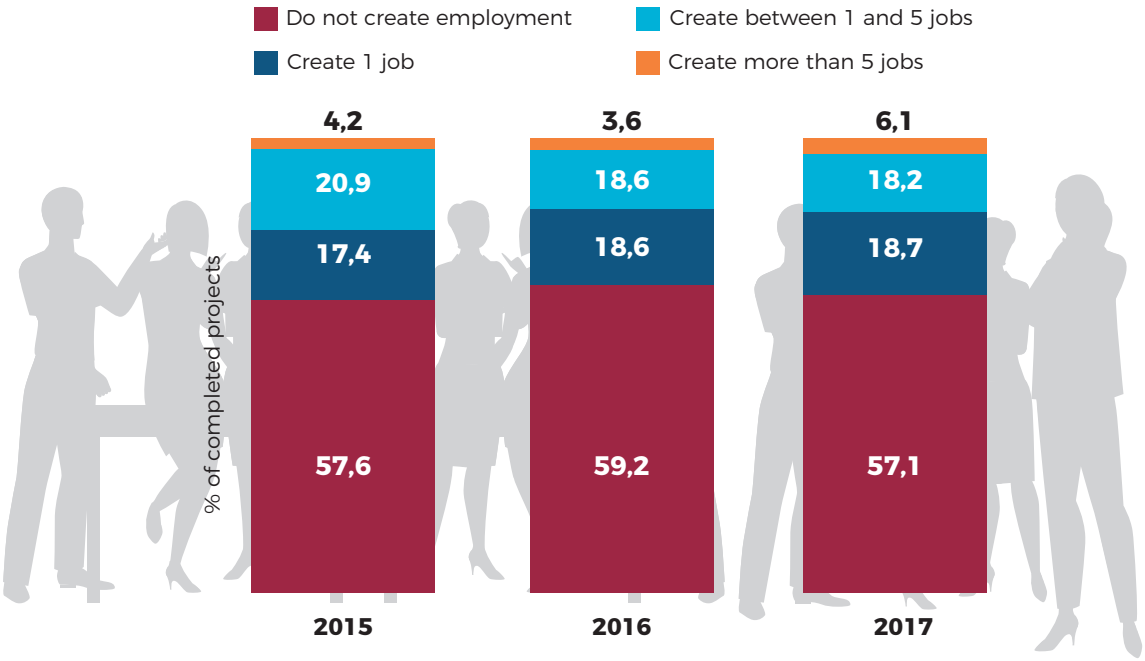
SMEs generate 60% of total hires and 65% of female hires; hence, as in previous years, they are still the driving force behind new job creation.

On average, each project generates 1.3 jobs, a ratio that drops to 0.8 if only employment in R&D is taken into consideration. These figures remain quite steady throughout the whole period analysed.

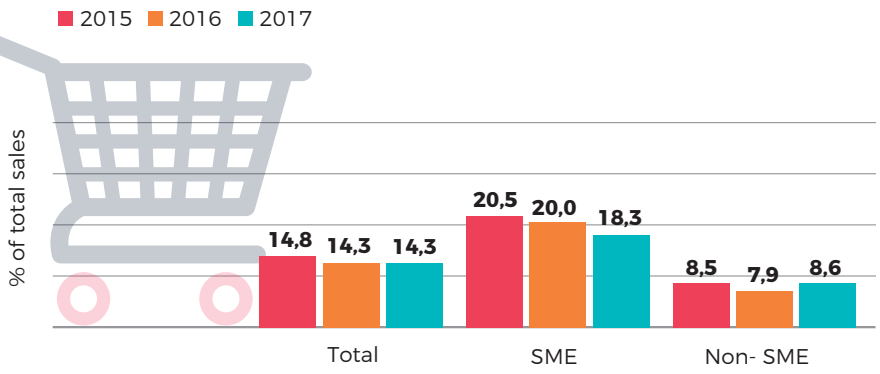
Is there an improvement in sales, exports and company investments?

The forecasts of companies upon completion of their projects are quite optimistic: more than 80% believe they will enter the market in the first year and 94% of them will generate an increase in sales, although modest in most cases (under 5% of the total company sales). Better forecasts, higher than 25%, are more frequent among SMEs operating in the equipment and machinery sectors, IT services and IT and optical products. On average, two years after entry into the market, innovations are forecast to generate 14.3% of total company sales.

Graph 4: Job creation. Distribution according to number of direct jobs created

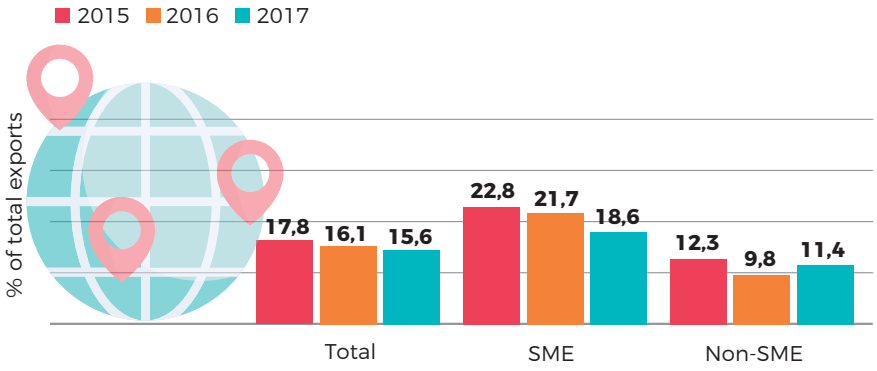


Graph 5: Forecast for sales resulting from project outcomes (% of overall company sales)



A large share of this activity increase is targeted at overseas markets. In more than 70% of cases, a growth in exports is expected, mostly by an amount lower than 5% of total company turnover. The average value of the increase in exports has dropped from 18% (2015) to 15% (2017), a trend that has been more pronounced in SMEs.

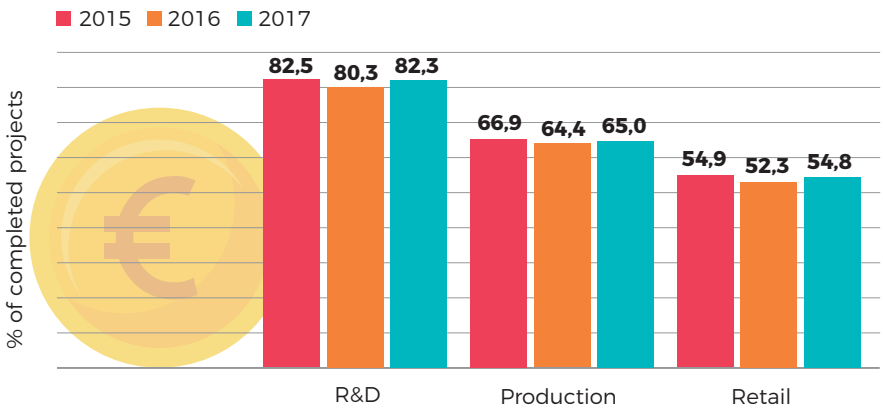
Graph 6: Forecast for exports resulting from project outcomes (average % of overall company exports)



These figures are consistent with the assessment made by companies of the impact of the project on increases in domestic market share and entry into new overseas markets (2.9 and 2.8 out of 4, respectively). Although these effects are very frequent, their amount is not very high.

Most projects bring about new investments in R&D (82% of cases), in production capacity (65%) and in company sales networks (55%). They are usually allocated to national territory, although in the retail sphere movements targeted at overseas countries are very frequent: more than 30% of projects will have a positive impact on the international network.

Graph 7: Projects giving rise to new investments (by investment area)



What significance does technological cooperation have in the projects?

Is there a surge in participation in international programmes?

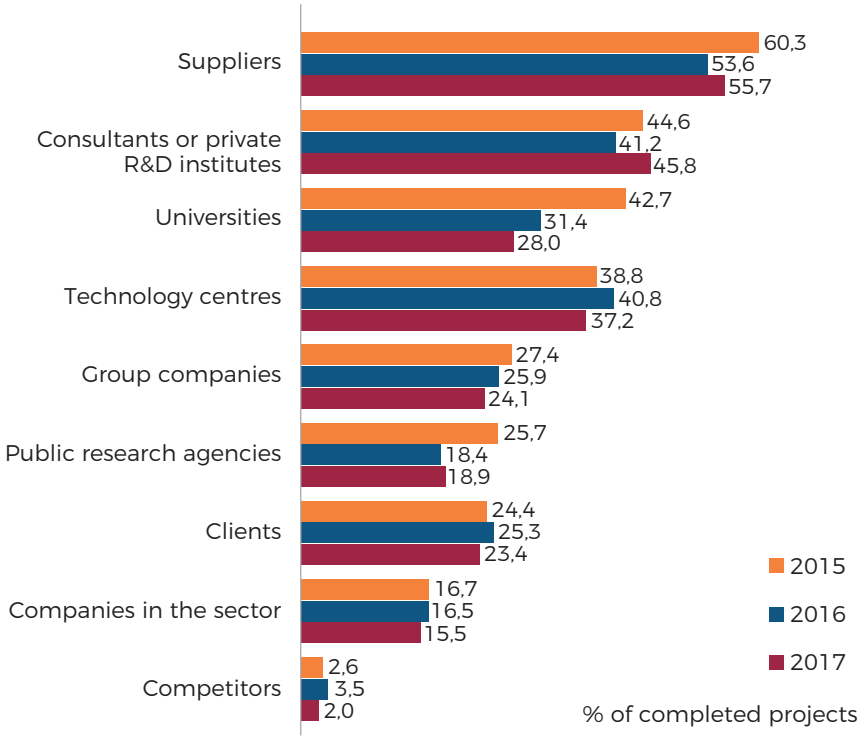
In this instrument, cooperation with another entity (company, research agency, etc.) is not a requirement for obtaining CDTI funding. Nevertheless, in most projects (90%) companies say there was collaboration with some kind of partner, echoing the need to supplement internal capabilities with external capabilities in innovation processes.

The cooperation profile remains steady in the period analysed, as both other companies and research agencies participate in more than half the projects; in other words, public-private and private-private partnerships occur in tandem.

The most habitual partners are suppliers (present in approximately 60% of projects); private consulting agencies (45%), technology centres (40%) and universities (between 42% and 28% in the period). The presence of the latter is the most erratic whereas, with respect to other entities, it remains steady in similar percentages. The participation of foreign partners, mostly European, takes place in 33% of projects.

In approximately 50% of cases, companies take part or are planning on taking part in international technology cooperation programmes. In this respect, CDTI's support is key for the SME group: 66% of companies that decide to take part would not have done so without this support.

Graph 8: Projects involving technology cooperation by collaborating agent



2 TAX BENEFITS FOR R&D IN CDTI PROJECTS

The Spanish R&D tax benefits system is acknowledged as one of the most advantageous in the OECD, as up to 42% of direct expenditure incurred can be deducted in a fiscal year [5].

The CDTI was empowered in 2007 (Royal Decree 2/2007) as a competent body to issue reasoned reports on the R&D projects it finances. The reasoned report mechanism was created to improve the legal certainty of deductions before the tax authorities, as it serves to classify, in a binding way, R&D and technological innovation activities by an expert public entity in the field. Therefore, the CDTI's processes serve to supplement the funding it grants with access to tax benefits.

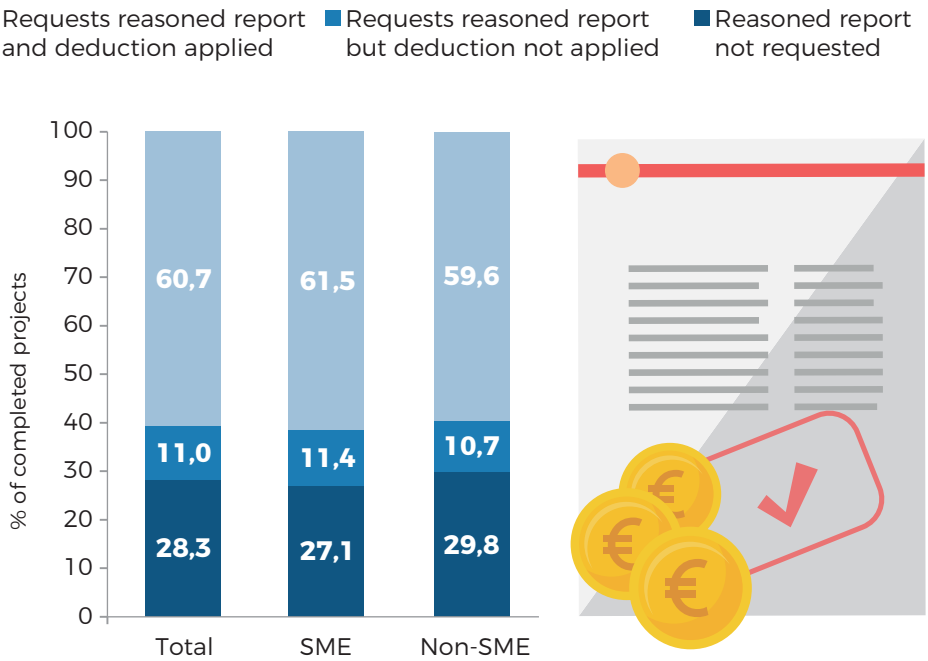
This section analyses the performance of companies that completed their R&D projects in the 2015-2017 period in relation to the application of tax deductions and to the use of the reasoned report issued by the CDTI. Given that the autonomous communities of the Basque Region and Navarre are governed by their own tax regulations, they are excluded from this reasoned report and, therefore, have not been taken into account.

In order to determine which projects have given rise to deductions, the following has been taken into account: on the one hand, administrative register of mailing of the report by the CDTI and, on the other, the information provided by the company in the Project Closure Survey. Altogether, 1,005 projects have brought about effective deductions for R&D expenditure, which means that 6 out of every 10 projects benefit from these incentives.

The characteristics of the companies that use these tax deductions are not significantly different from

5 OECD Science, Technology and Industry Scoreboard 2017

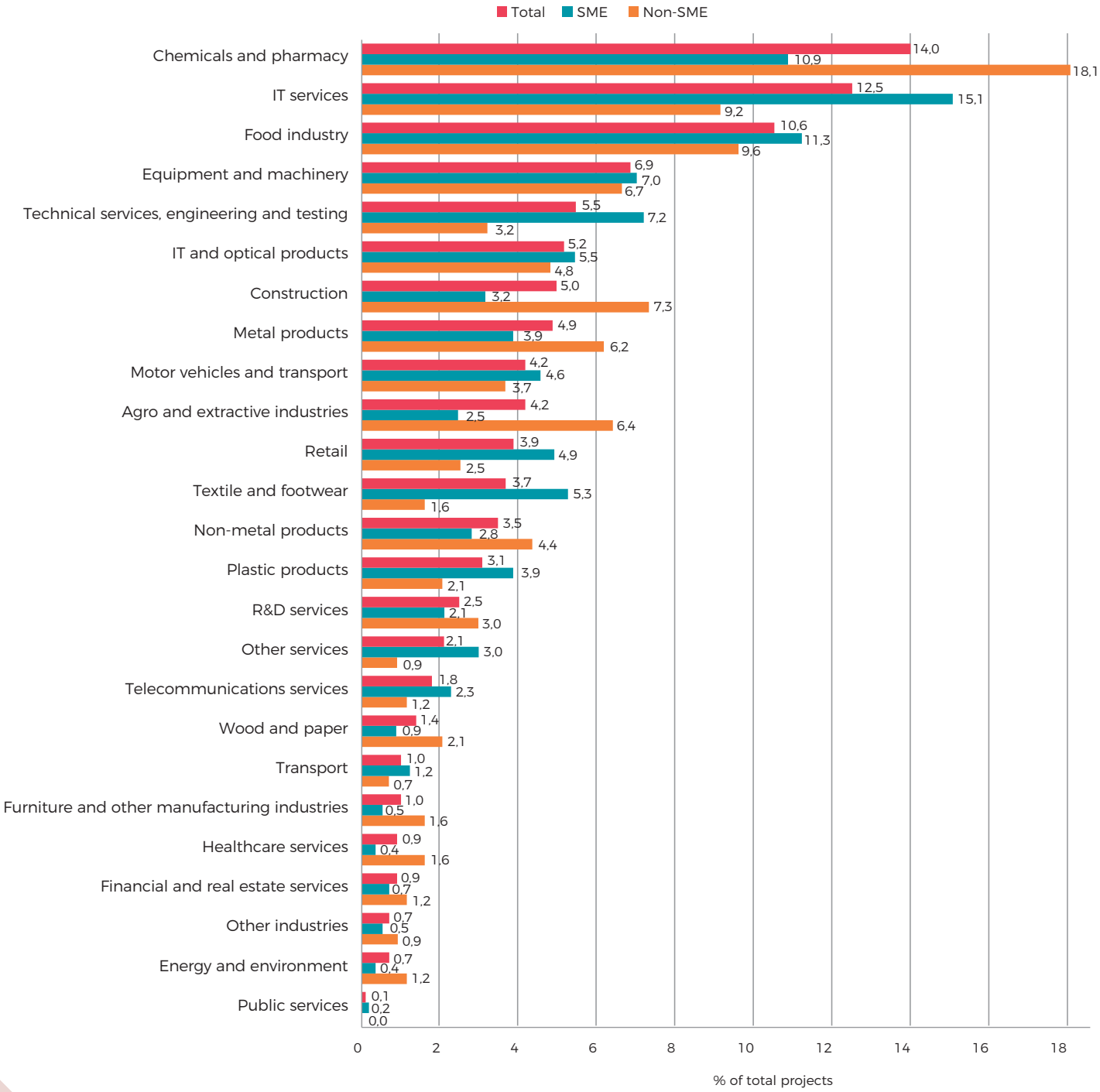
Graph 9: Reasoned report issued by the CDTI. Projects completed in 2015-2017



the rest of the sample. By size, age, geographical location and business sector, the distribution pattern is very similar to average distribution.

In terms of distribution by branch of activity, the chemical and pharmacy and IT services sectors are seen to be more inclined to apply tax deductions, closely followed by the food industry. Especially significant among large corporations is the behaviour of chemical and pharmaceutical firms, which account for 18% of projects with deductions. As regards SMEs, IT services have a prominent position, accounting for 15% of projects.

Graph 10: Projects that have given rise to tax deductions based on a reasoned report issued by the CDTI. Projects completed in 2015-2017. Distribution by activity sector



3 CONCLUSIONS

R&D Projects are the instrument used by the CDTI for granting most of its funding. The 2,003 projects completed between 2015 and 2017 received 1,100 million euros, under the partially refundable loan arrangement. Only 13% of this funding is in the form of outright grants; the rest is subject to a repayment schedule depending on the characteristics of the instrument applicable at the time of the approval.

For the private sector, promoting processes of this kind means dedicating resources and assuming commitments, which is directly related to obtaining benefits, not only economic but in terms of innovation capability as well.

The outcomes achieved through the Project Closure Survey reflect this reality: 90% of financed projects generate product or service innovations, and one out of every two of these projects produce process innovations as well. In almost 66% of cases, through these innovations, companies succeed in getting ahead of their competitors and in gaining, therefore, market share.

Without being one of the goals of this instrument, job creation is a fact in 40% of the projects, even though workforce increases are modest: on average, 1.3 jobs are created per project, which would be equivalent to 2.5 direct jobs per million euros granted. These figures do not include indirect jobs, which are sustained by the extensive network of partnerships surrounding R&D projects.

In fact, in 90% of projects, companies say they have collaborated with some kind of entity, whether public or private. The features of this instrument, which are highly flexible in this regard, are adapted to all possible accesses to knowledge: ranging from universities to competitors and including suppliers or customers.

The strategic nature of the projects supported by the CDTI is reflected in several indicators: new investment generation, not only in R&D, but also in production systems and commercial networks; strengthening of the strategic nature of R&D, and the generation of sales and exports.

From 2012, when the first outcome monitoring report (projects completed in 2011) was published, up until 2017, the last year available, the performance pattern in terms of outcome achievement remained steady. It can be concluded, therefore, that there are signs that CDTI processes under the "Individual R&D projects" instrument are achieving their objectives: to drive private investment in R&D in order to develop innovative technologies, targeted clearly at the market.

The high level of adaptability of this instrument allows companies to put their own innovation strategies into practice, without public funding conditions being a hindrance in this regard. Quite the opposite, having CDTI support has enabled them to assume greater risks and to enhance the scope of private R&D initiatives.

Furthermore, tax incentive monitoring indicators ratify the fact that, in many cases (approximately 60%), direct CDTI funding is rounded off with Corporate Income Tax deductions, which is an additional advantage for companies.

In conclusion, it seems advisable to maintain the funding of these types of initiatives through CDTI R&D projects, as the companies achieve planned technological and economic outcomes. It has been verified that the ties these companies establish with other agents in the innovation ecosystem are essential for the success of the projects, and these ties are largely the mechanism through which innovations generate benefits with greater outreach. The extent to which the involvement of the CDTI creates wellbeing and wealth for society as a whole (the ultimate objective of this public process) is a matter to be analysed through a more comprehensive ex-post assessment.

APPENDIX: DEFINITION OF MONITORING PANEL INDICATORS

Indicator	Definition	Unit of measurement
Projects		
Completed	Projects that completed the final milestone and filled out the Project Closure Survey in the respective year	Number of projects
Budget	Total budget of completed projects	Thousand euros
CDTI funds	Total funding provided by the CDTI in completed projects	Thousand euros
Non-refundable tranche	Non-refundable funding	Thousand euros
SMEs	% projects developed by SMEs	% of total
High technology	% projects developed by high and medium-high technology companies	% of total
Innovations		
In products or services	% projects only developing product or service innovations	% of total
In processes	% projects only developing process innovations	% of total
In products or services and processes	% projects developing product or service and process innovations simultaneously	% of total
Market leader	% projects developing product or service innovations not existing in their market segment	% of total projets entailing product/service innovations
Job creation		
Create employment (in R&D)	% projects creating employment (% projects creating employment in R&D)	% of total
Create 5 jobs or more (in R&D)	% projects creating 5 jobs or more (% projects creating 5 jobs or more in R&D)	% of total
Jobs created per project (in R&D)	Average number of jobs created per project in full-time equivalent (FTE) jobs (Average number of jobs created in R&D per project)	No. of FTE jobs
Outcome and investment forecast		
Sales (% total sales)	Forecast of % sales resulting from the project (two years after estimated market entry)	% of total sales
Exports (% total exports)	Forecast of % exports resulting from the project (two years after estimated market entry)	% of total exports
New investment in R&D	% projects resulting in new R&D investments	% of total
New investment in production	% projects resulting in new production investments	% of total
New investment in commercial network	% projects resulting in new commercial network investments	% of total
Patent	% projects resulting in patent applications	% of total
Cooperation		
Only national	% projects with only national partnerships	% of total
Only international	% projects with only international partnerships	% of total
National and international	% projects with national and international partnerships	% of total
Facilitate international programme	% projects facilitating participation in international programmes	% of total
Tax benefits		
With a binding reasoned report and tax benefits	% projects applying tax deductions using a CDTI binding reasoned report	% of total

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