

21. The space industry's R&D intensity

The research and technology (R&D) intensity of higher-technology industries remains strong in developed economies, and the space sector is a good example. R&D intensity is a key indicator for the assessment of innovative activity at the firm and industry level. Although many OECD economies have seen in the past decade the number of enterprises and total employment falling in manufacturing, higher technology sub-sectors have fared relatively well so far. High technology-intensive sectors, like the space sector, tend to benefit from a stock of long-term past R&D investments, not easily and rapidly delocalised. The challenge for these sectors is to constantly prepare the future with new R&D investments.

The space sector has been a leading-edge high technology industry for decades, diffusing innovative applications in different economic sectors (e.g. location-based technologies in cars and smartphones), despite not being a major source of patenting as compared to other sectors. The space industry also increasingly benefits from the effect of spin-in from other domains, as different types of innovation find their way to the space sector (i.e. computing advances and electronics miniaturisation infusing new ideas in space manufacturing).

In this context, the space sector remains a R&D intensive leading-edge sector and a source of innovation, as demonstrated by two recent case studies conducted independently in Canada and Italy, using survey results for the space industry data. In Canada, space manufacturing is close to six times more R&D intensive than total manufacturing in 2012. It also outperforms key sectors such as pharmaceuticals and motor vehicles and parts (space is also included in the aerospace category). In Italy, the same type of case study was conducted on R&D intensity. In 2012 the space sector was found to be more R&D-intensive than the broader aerospace segment, and eight times more than total manufacturing in Italy.

Methodological notes

The *Frascati Manual* provides statistical guidelines used by OECD economies and many partner economies to measure and report R&D efforts. R&D intensity for an industry is defined as the R&D expenditure as a percentage of gross domestic product (GDP). By examining the relative importance of their R&D intensity, industries and firms in the same industry can be compared nationally. The two case studies presented here use data based on international industry classifications and micro-data collected via space industry surveys. For the patents, the data refer to counts of patent applications filed under the Patent Cooperation Treaty (PCT), by priority date. Patents in biotechnologies and nanotechnologies are based on a selection of International Patent Classification (IPC) classes, for space-related patents, specific keywords were used in addition. Patents in environment-related technologies are defined using combinations of IPC classes and codes Y02 of the European Classification (ECLA).

Sources

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OECD (2014), *Frascati Manual: Proposed Standard Practice for Surveys on Research and Experimental Development*, 6th edition and addendum, www.oecd.org/sti/frascatimanual.

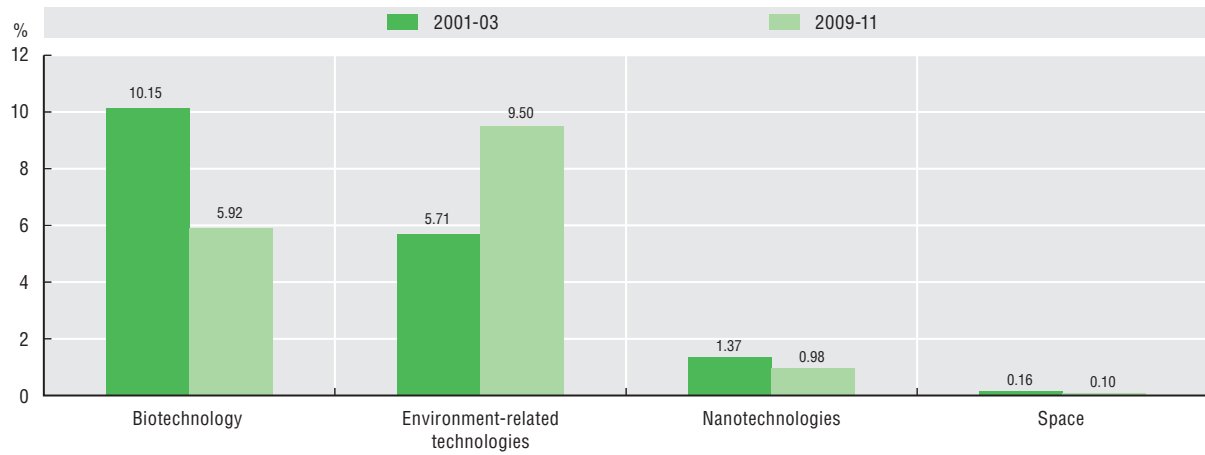
University of Bergamo and Italian Space Agency (2014), *Measuring the Importance of the technological spillovers from high tech sector, with particular attention to the Italian space industry*, Work presented at the OECD Space Forum Workshop on impacts of national space investments, OECD, Paris, June.

Note

Information on data for Israel: <http://dx.doi.org/10.1787/888932315602>.

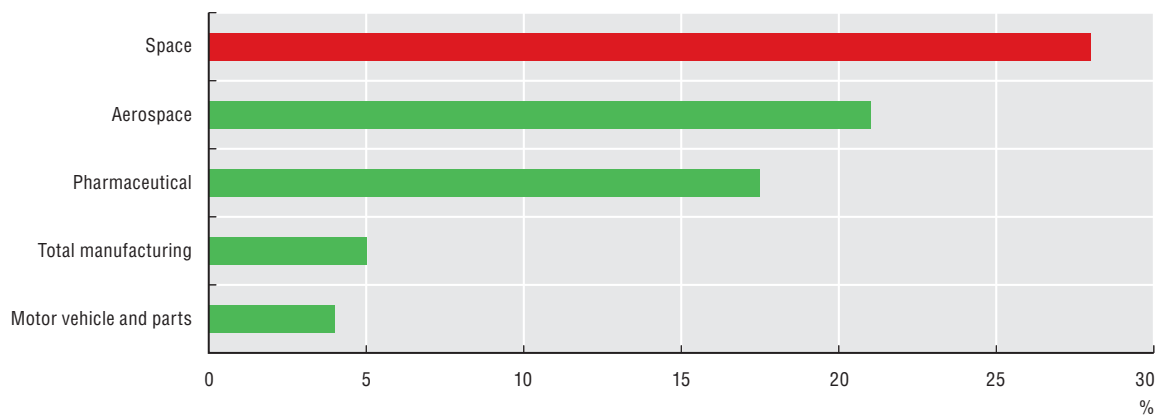
21.1. Patents by technology fields

Share of total patents (%), 2001-03 and 2009-11



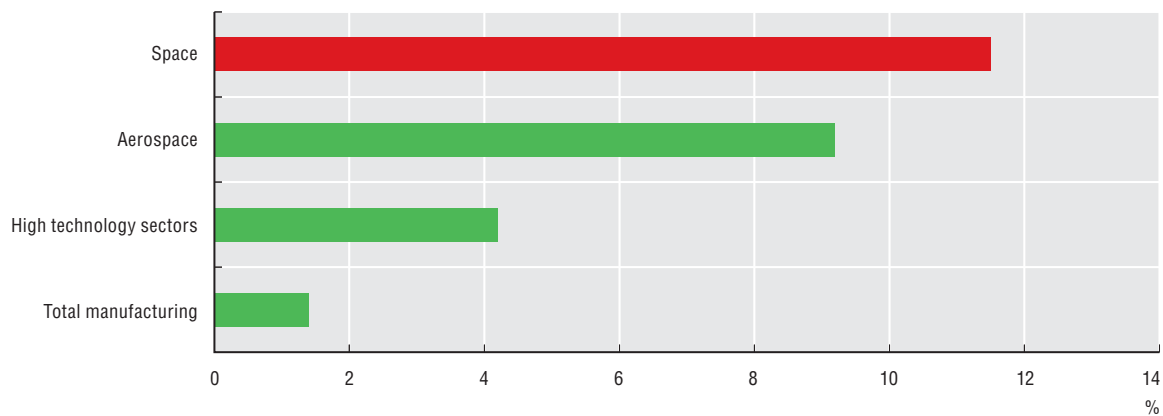
Source: OECD, Patent Database, June 2014.

21.2. Canadian space manufacturing R&D intensity, 2012



Source: Industry Canada, 2014.

21.3. Italian space manufacturing R&D intensity, 2012



Source: University of Bergamo and Italian Space Agency, 2014.



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