

## Product and process innovation

A product innovation is the introduction of a good or service that is new or has significantly improved characteristics or intended uses; a process innovation refers to the implementation of a new or significantly improved production or delivery method. Evidence from firm innovation surveys suggests that the share of firms with a product or process innovation varies significantly across countries and that firms often adopt mixed modes of innovation, meaning that they combine product and process innovations.

### What are product and process innovations?

**A product innovation** is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. These include significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics. Product innovations include both new products and new uses for existing products:

- **New products.** These are goods and services that differ significantly in their characteristics or intended uses from products previously produced by the firm. The first microprocessors and digital cameras are examples of new products using new technologies. The first portable MP3 player, which combined existing software standards with miniaturised hard-drive technology, was a new product combining existing technologies.
- **New uses for products.** The development of a new use for a product with only minor changes to its technical specifications is a product innovation. An example is the introduction of a new detergent using an existing chemical composition that was previously used as an intermediary for coating production only.

**A process innovation** is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software. Process innovations can be intended to decrease unit costs of production or delivery, to increase quality or to produce or deliver new or significantly improved products. Process innovations can be distinguished by production methods or delivery methods, or both:

- **Production methods.** These methods involve the techniques, equipment and software used to produce goods or services. Examples of new production methods are the implementation of new automation equipment on a production line or the implementation of computer-assisted design for product development.
- **Delivery methods.** These concern the logistics of the firm and encompass equipment, software and techniques to source inputs, allocate supplies within the firm or deliver final products. An example of a new delivery method is the introduction of a bar-coded or active RFID (radio frequency identification) goods tracking system.

### Additional explanations for product innovation

**Provision of service.** Product innovations in services can include significant improvements in how they are provided (for example, in terms of their efficiency or speed), the addition of new functions or characteristics to existing services, or the introduction of entirely new services. Examples are significant improvements in Internet banking services, such as greatly improved speed and ease of use, or the addition of home pick-up and drop-off services that improve customer access for rental

cars. Providing on-site rather than remote management contact points for outsourced services is an example of an improvement in service quality.

**Design.** Design is an integral part of the development and implementation of product innovations. However, design changes that do not involve a significant change in a product's functional characteristics or intended uses are not product innovations, although they can be marketing innovations. Routine upgrades or regular seasonal changes are also not product innovations.

**New knowledge or technologies or new uses.** Product innovations can utilise new knowledge or technologies, or can be based on new uses or combinations of existing knowledge or technologies. Significant improvements to existing products can occur through changes in materials, components and other characteristics that enhance performance. The introduction of ABS braking, GPS (global positioning system) navigational systems, or other subsystem improvements in vehicles is an example of a product innovation consisting of partial changes or additions to one of a number of integrated technical subsystems.

#### **Additional explanations for process innovation**

**Equipment and software changes.** Process innovations can involve significant changes in the equipment and software used in services-oriented firms or in the procedures or techniques that are employed to deliver services. Examples are the introduction of GPS tracking devices for transport services, the implementation of a new reservation system in a travel agency and the development of new techniques for managing projects in a consultancy firm.

**Innovations in support services.** Process innovations also cover new or significantly improved techniques, equipment and software in ancillary support activities, such as purchasing, accounting, computing and maintenance. The implementation of new or significantly improved information and communication technology (ICT) is a process innovation if it is intended to improve the efficiency or quality of an ancillary support activity.

### **Distinguishing between product and process innovations**

With respect to goods, the distinction between products and processes is clear. With respect to services, however, it may be less clear, as the production, delivery and consumption of many services can occur at the same time. Some distinguishing guidelines are as follows:

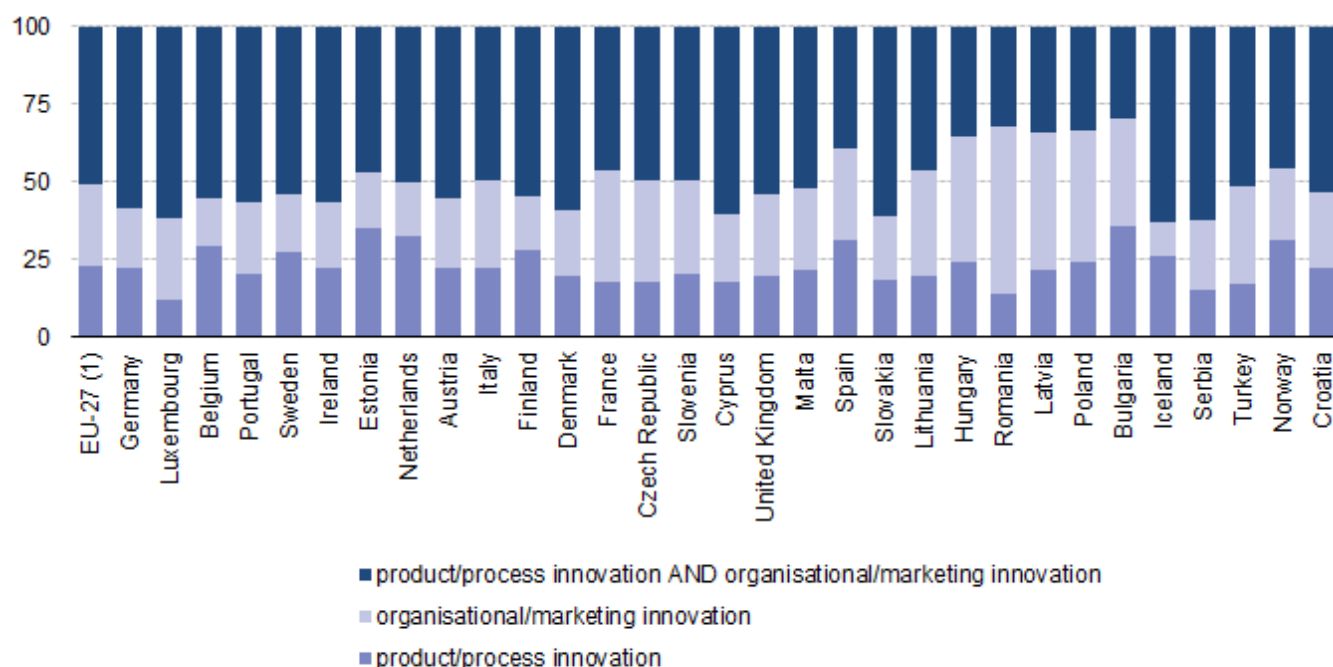
- If the innovation involves new or significantly improved characteristics of the service offered to customers, it is a product innovation.
- If the innovation involves new or significantly improved methods, equipment or skills used to perform the service, it is a process innovation.
- If the innovation involves significant improvements in both the characteristics of the service offered and in the methods, equipment or skills used to perform the service, it is both a product and a process innovation.

In many cases, a service innovation may be only of one type. For example, firms can offer a new service or new characteristics of a service without significantly changing the method of providing the service. Likewise, significant process improvements, for instance to reduce delivery costs, may make no difference to the characteristics of the service that is sold to customers.

### **How extensive is the provision of product and process innovations?**

Evidence from firm innovation surveys suggests that the share of firms with a product or process innovation varies significantly across countries (Figure 1) and depends on firm size (Figure 2) and economic sector. Data on innovations developed mainly within a firm (so-called “in-house innovators”) confirm that small and medium-sized enterprises (SMEs) tend to be “adopters” of technologies more frequently than large firms.

**Figure 1. Proportion of innovative enterprises by type of innovation, 2008-10 (% of all innovative enterprises)**



Source: (1) Excluding Greece.

Eurostat

(inn\_cis7\_type).

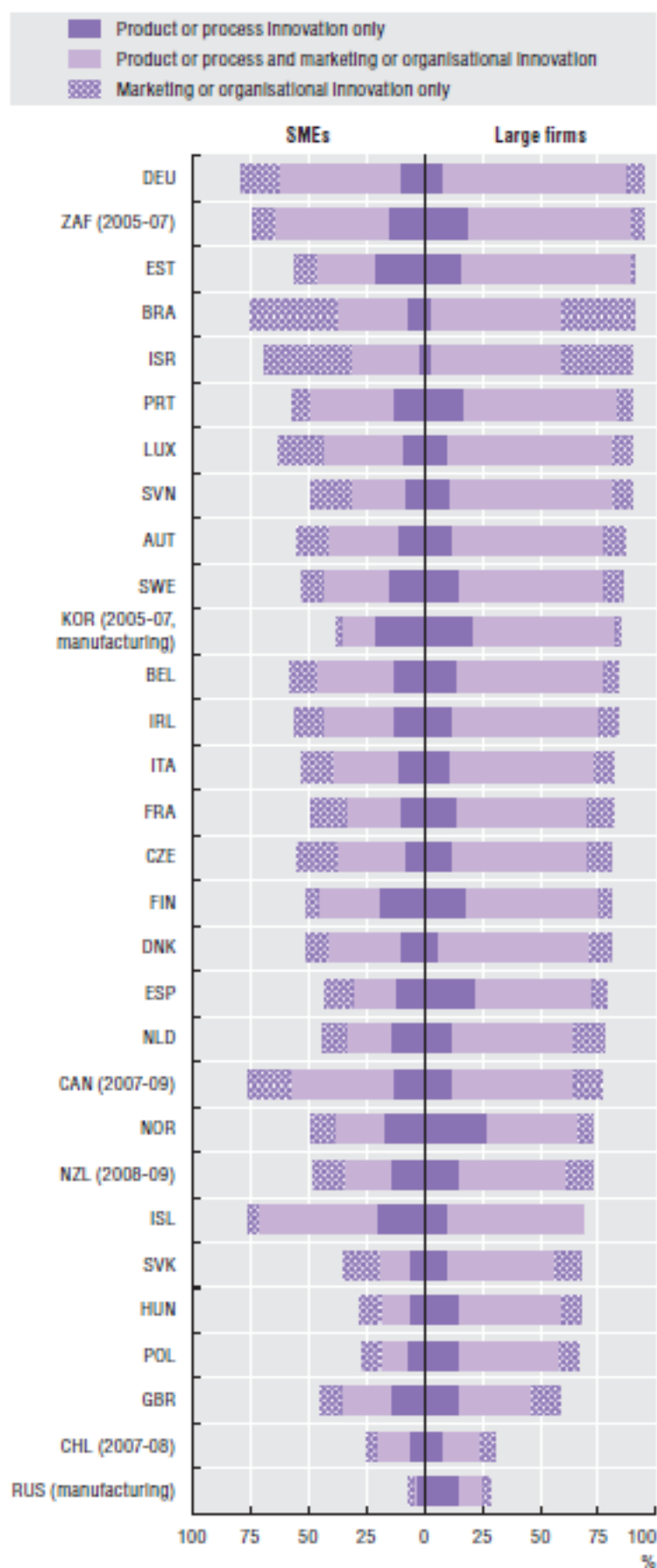
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[1]

(%25\_of\_all\_innovative\_enterprises)\_yb2.png&filetimestamp=20130301133405

**Figure 2. Types of innovation by firm size, 2006-08**

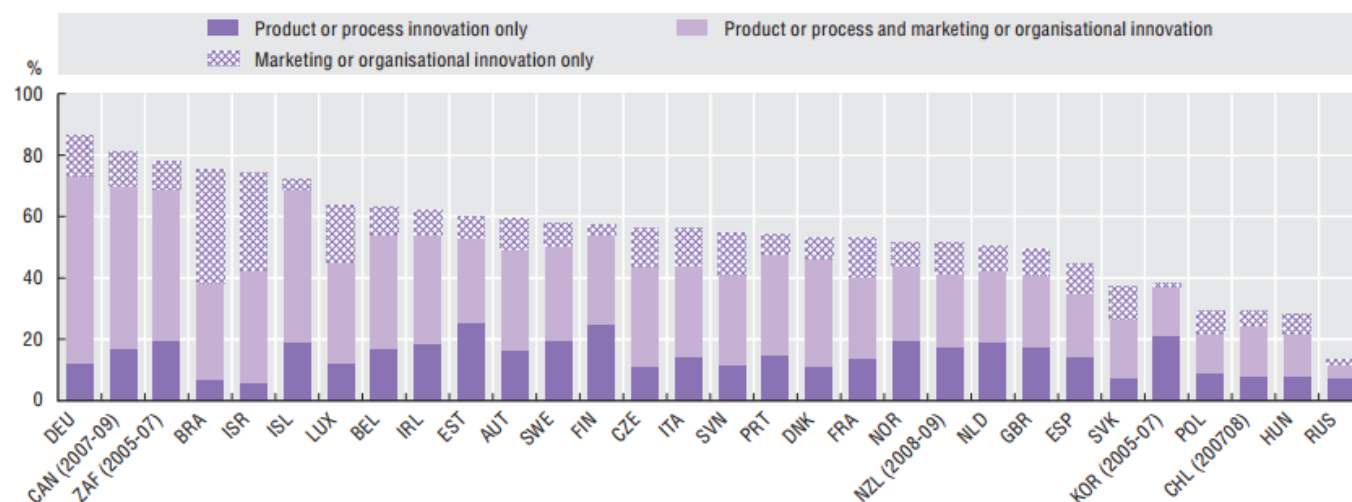
(% all SMEs and large firms)



OECD (2011), "Mixed modes of innovation", in OECD Science, Technology and Industry Scoreboard 2011, OECD Publishing. Source: OECD, based on Eurostat (CIS-2008) and national data sources, June 2011. See chapter notes StatLink: <http://dx.doi.org/10.1787/888932487058> [2]

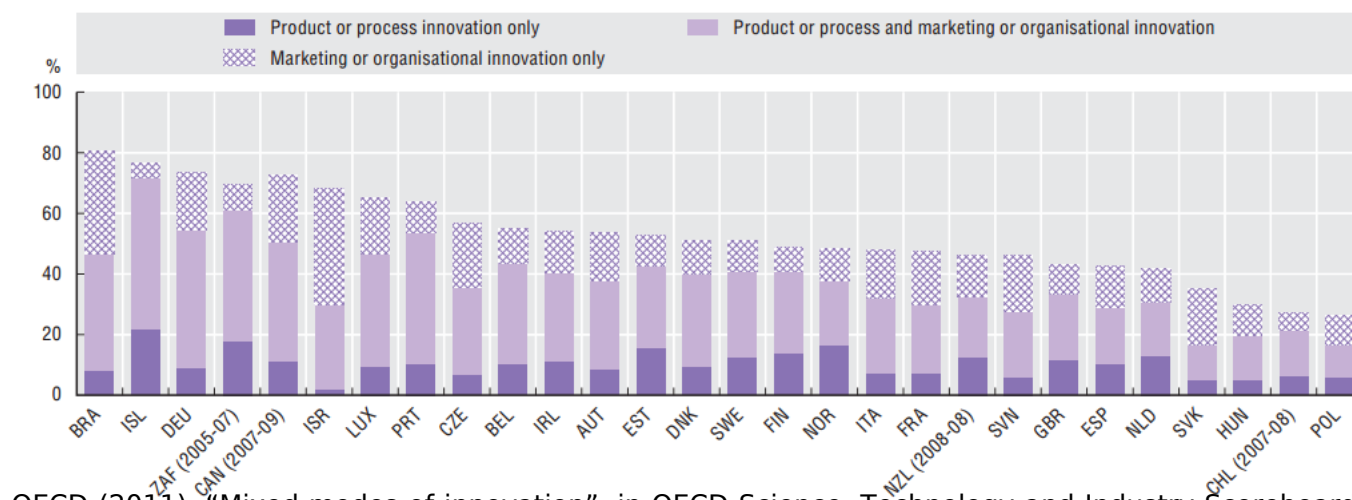
Firm-level innovation data also reveal that the majority of innovative firms (both large firms and SMEs) introduce product or process innovations, as well as marketing/organisational innovations (Figure 1). This is true for firms in manufacturing and services (Figures 3 and 4).

**Figure 3. Types of innovation in the manufacturing sector, 2006-08**  
(% of all manufacturing firms)



OECD (2011). "Mixed modes of innovation", in OECD Science, Technology and Industry Scoreboard 2011, OECD Publishing. Source: OECD, based on Eurostat (CIS-2008) and national data sources, June 2011. See chapter notes. StatLink: <http://dx.doi.org/10.1787/888932487077> [3]

**Figure 4. Types of innovation in the services sector, 2006-08**  
(% of all services firms)



OECD (2011), "Mixed modes of innovation", in OECD Science, Technology and Industry Scoreboard 2011, OECD Publishing. Source: OECD, based on Eurostat (CIS-2008) and national data sources, June 2011. See chapter notes. StatLink: <http://dx.doi.org/10.1787/888932487096> [4]

### What are the implications for policy?

Taking into consideration the different effects of the various types of innovation is important when designing innovation policy. Product and process innovation may differ in their impacts on firm performance (e.g. turnover, cost reduction, and productivity), as well on socioeconomic performance (e.g. contribution to growth and job creation). Recognising this is important for innovation policy agendas, which are often overly focused on product innovation at the expense of process innovation.

Identifying the factors that drive and those that hinder the different types of innovation helps in understanding the innovation process and formulating innovation policy. Indeed, objectives and barriers vary by type of innovation. For example, the objectives of product innovations often relate more to demand (e.g. improving product quality, increasing market share, entering new markets) than do those of process innovations.

The barriers to innovation can also be related to a specific type of innovation or to all types. For example, cost factors can be relevant for all types of innovations, while market factors, such as uncertain demand for innovative goods or services or a potential market dominated by established enterprises, and knowledge factors related to a lack of information on markets and institutional factors, such as the weakness of property rights, can affect product innovation but not process innovation. Barriers to process innovation in developing economies are often associated with weak engineering and technical skills.

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## Links

- [1] [http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php?title=File:proportion\\_of\\_innovative\\_enterprises\\_by\\_type\\_of\\_innovation,\\_2008-010\\_](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php?title=File:proportion_of_innovative_enterprises_by_type_of_innovation,_2008-010_)  
[2] <http://dx.doi.org/10.1787/888932487058>  
[3] <http://dx.doi.org/10.1787/888932487077>  
[4] <http://dx.doi.org/10.1787/888932487096>  
[5] [http://dx.doi.org/10.1787/sti\\_scoreboard-2011-44-en](http://dx.doi.org/10.1787/sti_scoreboard-2011-44-en)  
[6] [http://dx.doi.org/10.1787/sti\\_scoreboard-2009-40-en](http://dx.doi.org/10.1787/sti_scoreboard-2009-40-en)

