

RESEARCH AND INNOVATION

1. Base concepts

Research and innovation are an indirect determinant of well-being and the base of social and economic progress. In the identification of the suitable indicators have been privileged those that best capture the use of research, innovation and high level skills in relation to the well-being objectives outlined by the other domains.

2. Evaluated dimensions to the domain representation

Among the indicators that are considered most important and representative to the evaluation of research and innovation were selected those which are able to provide a measurement of the processes of creation, application and diffusion of knowledge. In order to obtain a consistent overview on these aspects, the indicators of research and innovation were grouped into two macro categories that refer to two distinct dimensions

1. Creation of knowledge.
2. Application and diffusion of knowledge.

3. Chosen Indicators

1. Intensity of research: *Percentage of R&D expenditure on GDP.*
This indicator underlines the will of the country to invest its resources in the creation of new knowledge. It assumes that R&D is a prerequisite for cultural, civil and economic progress of a country to which is linked moral, civic and economic well-being.
2. Propensity to patent: *Number of patent applications filed to the European Patent Office (EPO) per million of inhabitants.*
Patents are the typical output of the innovativeness of firms that use the intellectual property right to ensure an adequate return on investment in R&D. It is traditionally used to measure the technological ability of a country (or industrial sector) . The EPO “channel” allows to obtain a patent valid throughout the EU with a single deposit: this represents an indirect indicator of a greater economic value attributed by the applicants with respect to patents filed at National offices and allows to overcome the *home bias* characteristic of patent statistics.
3. Impact of knowledge workers on employment: *Percentage of persons employed with university education (ISCED 5-6) in scientific-technological occupations (ISCO 2-3) on total persons employed.*
The indicator measures the innovation effects on the structure and the composition of employment (*skill based technical change*) and of the economic contribution of knowledge work. and it is related to the economic well-being. From an individual point of view, the cognitive work is less arduous and, generally, characterized by a better quality. It is potentially an instrument of personal achievement and it has positive effects on individual well-being.

4. Innovation rate of the productive system: Percentage of firms that have introduced technological (product or process), organizational or marketing innovation in a three-year period on total number of firms with at least 10 number of persons employed.
It measures the propensity of business innovation. The indicator allows to evaluate and compare the relative positioning of a national (or regional) economy in terms of innovative capacity.
5. Innovation rate of product/service of the national productive system: Percentage of firms that have introduced innovations of product/service in a three-years period on total number of firms with at least 10 number of persons employed .
The definition of product innovation comes from the Oslo Manual, 3rd edition. The indicator aims at measuring the ability of the productive system to meet the changing needs and to create new jobs.
6. Productive specialization in knowledge-intensive sectors: Percentage of persons employed in high-tech manufacturing sectors and those in knowledge-intensive services on total of persons employed.
It measures the economic weight of knowledge-based activities in terms of employment.
7. Intensity of Internet use: Percentage of people aged 16-74 years who have used internet at least once a week during the 12 months before the interview on total people aged 16-74 years.
It reflects the importance of ICT in the processes of social inclusion. The ICT are an important tool for the dissemination of information and the construction of a shared wealth of knowledge: the more the ICT affects the communications and the opportunities of participation, the more digital illiteracy is the cause of social marginalization. The proposed indicator therefore reflects the degree of digital inclusion and its complement is an index of *digital divide*.

4. Indicators that are being studied

1. Highly qualified human resources working abroad: Percentage of graduates and PhD graduates (ISCED 5 -6) working abroad on total labor force with university education.
The studied indicator shows, rather than an aspect of wellness, an aspect of malaise: in this era a lot of skilled young people do not find adequate employment in Italy and are forced to emigrate. At the same time staying abroad has different grounds and, in the medium to long term, it may represent an investment in experience.