11. Innovation, research and creativity[1]

The indicators related to innovation, research and creativity have different trends (Table 1). For the most recent years, up to 2023, the increase in investments in intellectual property products (IPP; +5.9% compared to 2022) and the incidence of knowledge workers on total employment (18.8% in 2023; 17.8% in 2022) demonstrate the growth in demand for financial resources and qualified human capital to be used in the processes of creating new knowledge. Contrasting with these positive signals we can see the worsening of the emigration flows of young Italian graduates (25-39 years), which in 2022 generate a net loss (-4.5 per 1,000 graduates aged 25-39) greater than in 2021 (-2.7) and slightly lower than in 2019 (-4.9). Difficulties in full recovery also persist for employment in the cultural and creative professions and sectors, severely affected by the pandemic in 2020 and 2021, which remained stable in the last year at lower levels than in 2019, while the general employment grows.
In 2021 the share of Research and Development (R&D) expenditure (as a percentage of total GDP), was lower than in 2019 and 2020. However, the spending in R&D of businesses, public administrations, universities and non-profit organizations, as absolute value, is starting to recover in 2021 compared to the previous year. In 2020, there was also a significant increase in the patent propensity, an indicator that detects some of the results obtained and the outputs generated by investments and research and innovation activities carried out by economic operators in previous years.

Table 1. Innovation, research and creativity indicators: values for the latest available year and percentage changes compared to the previous year and 2019

INDICATORS	Year	Value	Unit of measurement	Polarity	Percentage changes	
					compared with previous year	compared with 2019
R&D intensity	2021	1.43	%	+		
Patent propensity	2020	102.9	Per millions of inhabitants	+	....	
Gross Fixed Capital Formation (GFCF) of intellectual property products	2023	128.0	Chain-linked reference year 2015	+		
Innovation rate of the national productive system	2020	50.9	%	+	....	
Impact of knowledge workers out of employment	2023	18.8	Per 100 employees	+		
Cultural employment (% of total employment)	2023	3.5	Per 100 employees	+	0	
Brain circulation (Italians, 25-39 years old) (c)	2022	-4.6	Per 1,000 resident graduates	-		
Regular internet users	2023	77.7	%	+		
Availability of at least one computer and Internet connection in the household	2023	67.2	%	+		
Municipalities with online services for families (b)	2022	53.6	%	+	....	
Enterprises with at least 10 persons employed with web sales to end customers	2023	14.0	%	+		

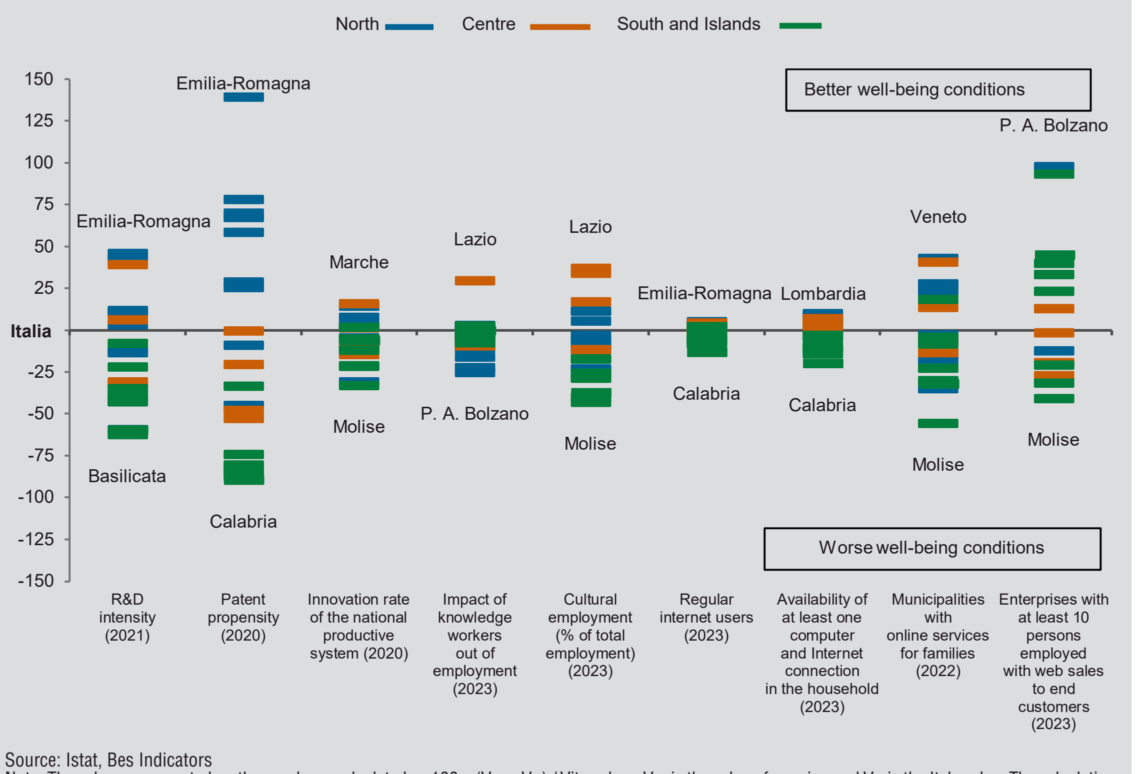
Source: Istat, Bes Indicators
Note: The green colour indicates improvement, red worsening and grey stability, taking into account the polarity of the indicator. The indicators have positive polarity if the increase in their value shows an improvement in well-being, negative polarity if the increase in their value shows a deterioration in well-being. For variations within ±1% the indicators are considered stable in the reference period.
(a) The longest-term comparison is with the year 2018.

The digital transition indicators for individuals and households, public administration and businesses continue to make progress. The only partial exception, in the last year, is

1 This Chapter was edited by Stefania Taralli, with contributions from Angela Forte, Francesca Licari, Valeria Mastrostefano, Alessandra Nurra and Laura Zannella.

represented by the availability in the family of at least one computer and the Internet connection, an indicator that is decreasing, following the technological evolution and the consequent lower availability of PCs in the households, while the availability of Internet connections at home continues to grow. Regular use of the Internet has increased in the last years rising to 77.7% in 2023 (it was 66.7% in 2019): the growth is higher for those aged 55 and over, with a consequent reduction of the gaps between young people and adults; gaps instead persist for the elderly.
The provision of fully online procedures to access local public services for households made a significant progress, as the percentage of Municipalities managing fully online all the phases for accessing at least one service doubled between 2018 and 2022 while the range of services increased.
The share of companies active in web sales to end customers is growing steadily, even if at a much more moderate pace (the indicator is equal to 14.0% in 2023).
Among the regions, the smallest differences are for the indicators related to regular Internet use and families with an Internet connection and a PC (Figure 1). For both these measures, the minimum value is in Calabria, where in 2023 just over two out of three residents aged 11 and over use the Internet regularly (67.6%), and just over half of the families have a PC and an Internet connection at home (53.9%). On the other side, regular Internet use reach 81.8% in Emilia-Romagna, and in Lombardia the availability of a connection and PC rises to 73.9% of families. In both cases, there is a clear division between the central and northern regions, which are generally higher than the Italian average value, while the southern ones always lie below.

Figure 1. Innovation, research and creativity indicators: percentage differences between regional values and the Italian value. Last available year. Italy = 0



Source: Istat, Bes Indicators
Note: The values represented on the graph are calculated as 100 × (V_{reg} – V_{ita}) / Vita, where V_{reg} is the value of a region and V_{ita} is the Italy value. The calculation shall takeinto account the polarity of the indicator. Values greater than zero indicate a better state of well-being than the average Italy; on the other side, values less than zero indicate a worse condition. For greater usability of the Figure, please visit https://www.istat.it/it/archivio/296050.

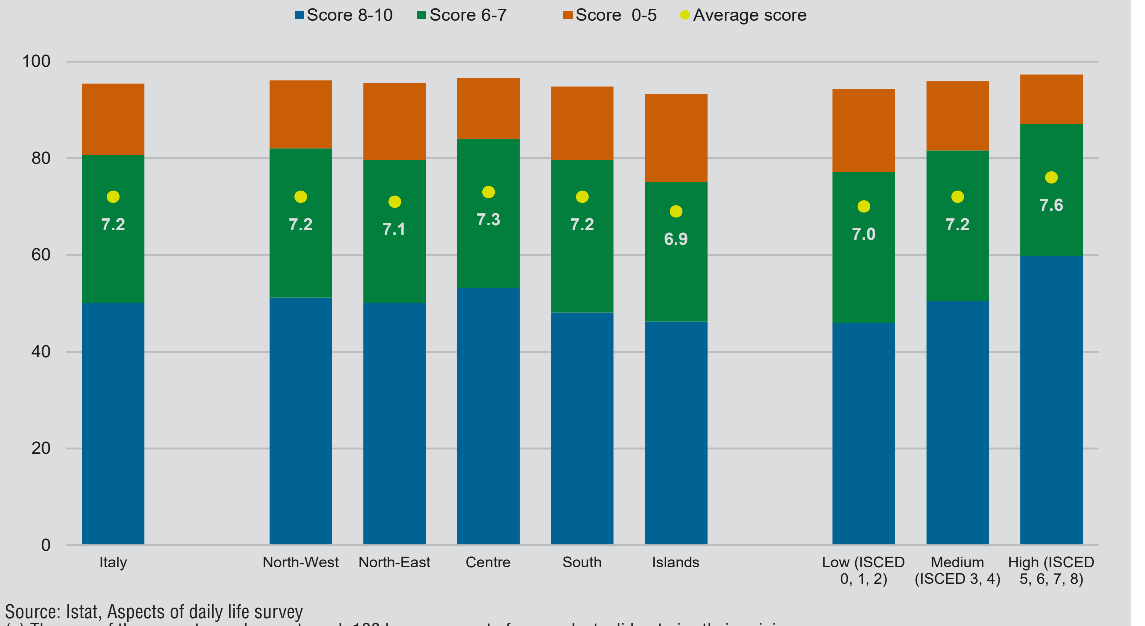
The other two indicators regarding the diffusion of information and communication technologies (ICT) describe much wider differences among regions. In 2022, the Municipalities who manage entirely online the procedure to access at least one service for families are more than three out of four in Veneto (76.7%) and less than one out of four in Molise (23.9%), where in 2023 there was also the lowest percentage of companies selling via the web to end customers (8.3%). The last indicator reaches more than triple levels in Bolzano and Sardegna (27.7% and 27.1%). Both indicators do not show a real gap between the north-central and the southern regions.
The regional distributions of research intensity and patent propensity, however, highlight gaps that are more marked. The first indicator reaches its maximum in Emilia-Romagna, Piemonte and Lazio, with values that, in 2021, exceed the Italian average by more than 40% (respectively 2.09%, 2.04% and 1.99% of regional GDP), clearly higher than the values of the other northern and central regions. The same indicator is at its lowest levels in Basilicata and Calabria, where it is about two thirds lower than the Italian average (0.54% and 0.58% of GDP). However, not all regions of the Centre and North exceed the national figure (1.42%), but all southern regions have smaller results. Only for Campania, the gap is reduced (1.32%). Calabria and Emilia-Romagna also represent the limits of the regional range described by the patent rate, with respectively 10.8 and 246.2 patents per million inhabitants in 2020. The innovation of the production system in 2020 describes a less clear separation between the areas of the country and a smaller regional dispersion, between the highest value of the Marche region, where more than half of the companies carried out innovative activities (59.0%), and Molise, where the rate is just over one in three companies (34.2%). Finally, for both indicators related to human capital, i.e. knowledge workers and cultural and creative workers, Lazio has a separate position, with higher values than other regions (24.4% and 4.8%). Cultural and creative employment reaches similar levels also in Toscana (4.7%), with a greater variability among regions, without a marked North-South divide.

Trust in scientists continues to decline

By the third year of the survey, in 2023, the average score of trust in scientists fell to 7.2 on a scale of 0 to 10 (it was 7.3 in 2021 and 2022). Approximately one person in six (14.8%) expresses insufficient trust, assigning a score between 0 and 5 (Figure 2). The share of those who assign a score of at least 6 points decreases further (1.6 percentage points less than in 2021), even if it is still the majority (80.6%). The percentage of those who assign the highest trust scores (8-10) drops to 50.1%, with a more marked decline (2.8 percentage points less than in 2021).
Trust in scientists increases with the level of education, while differences by gender or age group are limited. In 2023, the average score of trust is 7.0 among persons with at most a lower secondary school diploma and 7.6 among those who have a university degree. With the percentage of at least sufficient scores, assigned by 87.1% of those with a high level of education, the gap between the two groups is about 10 percentage points and widens to 14 percentage points if we consider the votes from 8 to 10, assigned by 59.7% of those with a high level of education. Compared to 2021, all the values are decreasing, to a lesser extent among the most educated people.

The regional situations are different. Trust levels remain significantly higher in the Centre: on average, 84.0% of residents assign scores of 6 or higher and 53.2% from 8 to 10. The latter share, however, is significantly lower than in 2021 in all regions of Central Italy (-7.7 percentage points in Umbria; -4.8 p.p. in Toscana; -3.7 p.p. in Lazio) with the exception of Marche, where it has an increase (+4,2 p.p.) bringing the regional value above the national average.
The regional distribution is rather uneven in both northern and southern regions, as average scores of trust in scientists vary between the highest (7.4) mean score of Emilia-Romagna, Lazio and Molise and the lowest one, that also in 2023 is given by the residents in Bolzano and in Valle d'Aosta (6.5 and 6.6 respectively). In these two regions, in the last year, no more than seven out of ten residents give at least a sufficient score, and about four out of ten give a vote equal to or greater than 8 (38.9% in Bolzano and 43.0% in Valle d'Aosta). In Valle d'Aosta, however, the share of scores higher than 5 significantly declines compared to the (yet minimal) levels of 2021, falling by 7.6 percentage points; the share of votes between 8 and 10 loses 5.1 percentage points.
The South and Islands record a significant decline, as the percentages of scores from 6 and above are lower than the Italian average (respectively 79.6% and 75.1% in 2023; they were 82.1% and 78.2% in 2021), and the share of higher votes, falls by about 4 percentage points both in the South (48.0%) and in the Islands (46,2%), in particular in Campania and Sicilia. In these two regions, but also in Calabria and Sardegna, scores of trust from 6 and above are less widespread than in Italy. All the remaining regions of the South are close to the Italian average or exceed it.

Figure 2. People aged 14 and over by vote of trust in scientists and level of education. Year 2023. Percentages and average scores in tenths (a)

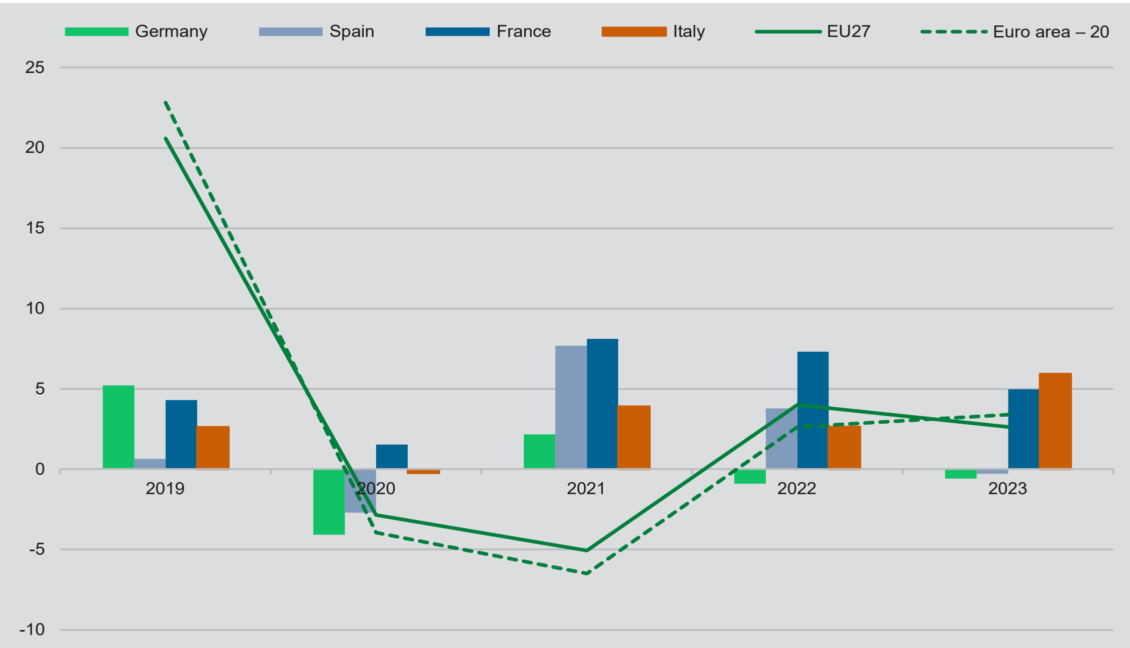


Source: Istat, Aspects of daily life survey
(a) The sum of the percentages does not reach 100 because a part of respondents did not give their opinion.

Investments in intellectual property products continue to grow

In 2023[2], the provisional estimate of investments in intellectual property products (IPP), that include research and development (R&D), software and databases (hereinafter software), mining and original exploration, and evaluation of artistic, literary or entertainment works, shows an acceleration, reaching a level of 62,876 million euros (Chained values, Indexed 2015 = 100), with a variation of +5.9% compared to 2022 (Figure 3).
The positive trend of the last three years (2021-2023) confirms the recovery of investments in IPP after its decline in the first year of the *COVID-19* crisis. The acceleration of the digital transformation process during the pandemic crisis and the incentive policies, strengthened in recent years also through the PNRR, have made a robust contribution to growth. In particular, the greatest growth is due to investments in software, with variations equal to +6.3% (2021), +4.8% (2022) and +6.1% (2023), and a volume of 32,856 million euros in 2023 (chained values, Indexed 2015=100). Research and development show more moderate growth rates in 2021 (+1.9%) and 2022 (+1.2%) while for 2023 the estimated growth is 5.5%. Therefore, for all the three years the weight of software on the total IPP increases exceeding 50%, to the detriment of the investments in R&D, whose shares are instead 46.6% and 48.8% (the remaining 3% or so goes to mineral prospecting and evaluation, originals of artistic, literary or entertainment works). In the same years, investments in ICT equipment also grew significantly (+6.9% in 2021, +14.9% in 2022 and +6.5% in 2023), with an estimated of 16,054 million euros in 2023 (chained values, Indexed 2015=100).

Figure 3. Intellectual property products (as part of gross fixed capital formation) in Italy, the EU27 and the Eurozone, and in selected European countries. Years 2019-2023. Annual percentage changes (a)

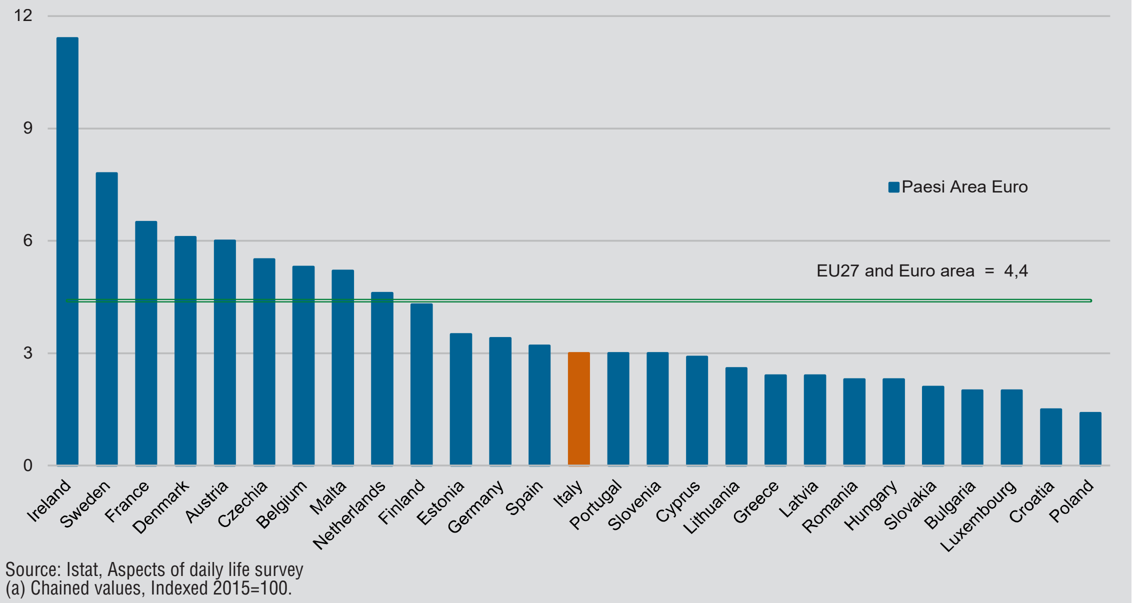


Source: Eurostat
(a) Chained values, Indexed 2015 = 100.

2 For further details on national account review policies, please see: https://ec.europa.eu/eurostat/cache/metadata/en/nama10_esms.htm.

Compared to the European one, in 2023 the Italian performance of growth is significantly better than both the EU27 (+2.6%) and the Eurozone (+3.4%). Even in comparison with the main European partners – Germany, Spain and France – Italy's performance is better. Preliminary estimates show a slight decrease compared to 2022 for the first two countries mentioned (-0.6% and -0.3% respectively), while France continues with an important positive trend (+4.9%).
This important positive signals bode well for the future trends, nevertheless Italy's IPP volume exceeds just that of Spain (42,895 million euros), and it is far from the levels of Germany and France (equal to 124,615 and 169,834 million euros respectively in chained values, indexed 2015=100)[3].
The ratio between investments in IPP and total Italian investments is also lower than the European average: in 2023, it stands at 14.1%, with a gap of about 6 percentage points from the EU27 (19.7%) and the Eurozone (20.1%), and lower than Germany and Spain (15.7% and 16.7%). In France, however, in 2023 IPP reach 26.4% of total investments (+0.9 percentage points more than in 2022), reflecting the effect of the French incentive policies in recent years to demand for IPP.
The ratio between IPP investments and GDP in 2023 in Italy stands at 3%, 1.4 percentage points less than the EU27 and the Eurozone values (both equal to 4.4%) (Figure 4).
Germany and Spain are at slightly higher levels than Italy (3.4% and 3.2%), while France, whose levels always passed the European average over the years, in 2023 stands at 6.5%, a value more than double that of Italy. Also for 2023, Ireland confirms the highest ratio between IPP and GDP, mainly due to the investments of foreign multinational companies.

Figure 4. Investments in intellectual property products (IPP) in the countries of the European Union. Year 2023. Values as a percentage of GDP (a)



Source: Istat, Aspects of daily life survey
(a) Chained values, Indexed 2015=100.

3 Based on the National account revision policies, the provisional years, or those that could undergo estimate revisions, are: Germany, years 2019-2023; Spain, years 2021-2023; France, years 2021-2023; Italy, years 2021-2023.

Start of recovery in R&D spending mainly due to the public sector and universities

In 2021, the last available results on research and development (R&D) in Italy[4], after the slowdown triggered by the pandemic and health containment measures, record an overall recovery in R&D spending, which increases by 3.8% compared to the previous year, reaching nearly 26 billion euros. With the recovery of GDP, which grows more than R&D spending, the research intensity indicator (i.e. R&D spending as a percentage of GDP), is equal to 1.43%, declining from the previous year (1.51%)[5], and Italy moves away from the European average (2.27% of GDP in 2021). In the Member States ranking our country is 15th, overtaken both by the most recent entry countries (such as Slovenia and Estonia) and by countries such as Portugal and Greece, that were once low-growth but now have strong positive dynamics. In 2021, the R&D intensity of Italian companies is equal to 0.86% of GDP. Companies still are the main investors (60.2% of total expenditure) and funders (53.9% of total funding). Universities are the most important players after companies, participating in the total expenditure of 2021 with a 24.0% share, slightly increasing compared to 2020(+0.9 percentage points). The public sector share is also slightly increasing, getting to 14.0% of total expenditure (+0.8 percentage points), while the non-profit sector share stands marginal (1.9%). With reference to R&D funding, the second most important source, after businesses, is the public institutions sector, with a 35.1% of total expenditure. Compared to 2020, public sector, non-profits and businesses funding increased (respectively +8.3%, +6.5% and +5.9%), while universities funding share decreased (-6.8%).

In 2021, there were still important signs of difficulty among businesses: spending stood at 15.6 billion compared to 16.6 in 2019; annual growth (+1.1%) is far from the pace of the pre-pandemic period (+7.4% in 2018; +4.1% in 2019). The increase in the last year, with overall modest values, is mainly due to the good resilience of large businesses (+3.8%), while small and medium-sized businesses had a marked decline (-4.5%). The situation does not seem to improve in 2022 according to preliminary data, which show a further reduction in businesses spending (-2.9% compared to 2021). In 2023 a recovery is estimated and spending values higher than those of 2021 (around 16 billion euros; +5.2% compared to 2022)[6]. However, this recovery only affects large companies and the industrial sector while the service sector and small companies (less than 50 employees) are expected to recede.

At a regional level, in 2021 there is a generalized trend towards the recovery of R&D spending, with a full recovery of activities in the central regions (+5.3%), significant growth in the southern regions (+8.4%) and positive results in the Islands (+5.8%) and in the North-East (+4.7%). R&D expenditure in the North-West remains stable (+0.7%), with a 4.2% drop in Piemonte. This region nevertheless remains in a leading position.

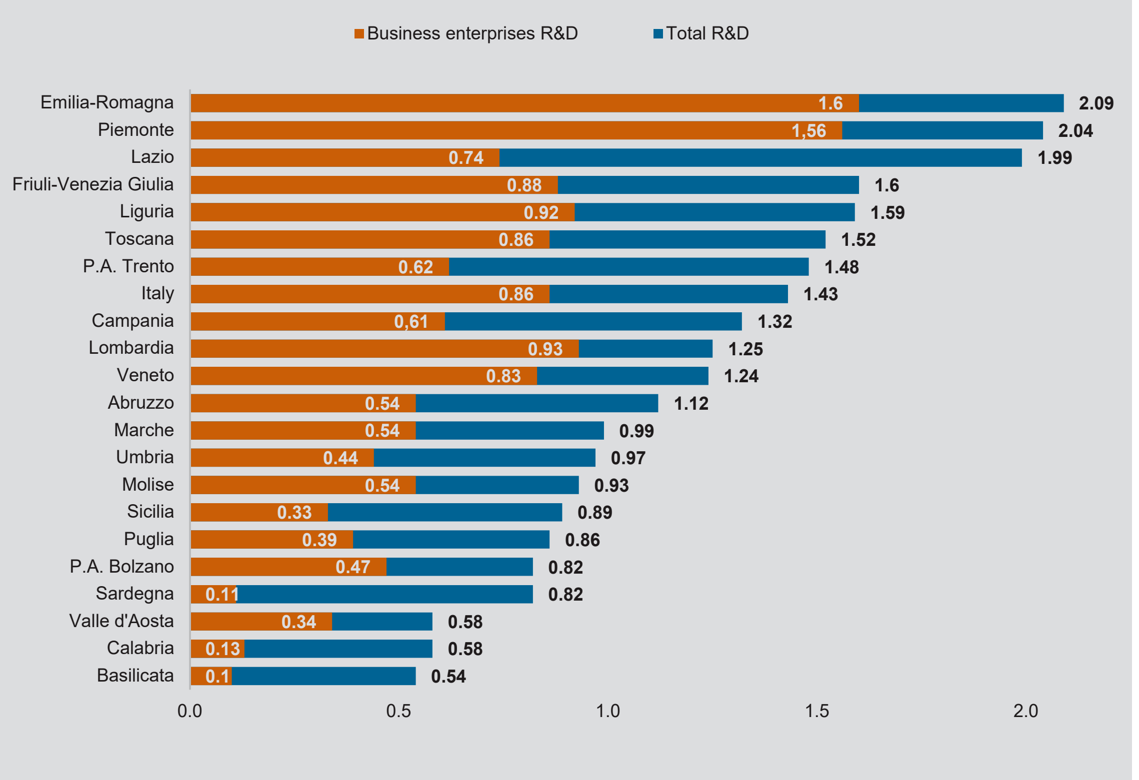
4 The data refer to expenditure actually incurred to carry out research and development activities with its own personnel and equipment (so-called intra-muros R&D activities) detected through three coordinated surveys, carried out by Istat, on R&D in companies, non-profit organizations and public bodies.

5 For GDP data, we used the historical series of national economic accounts updated to September 2023.

6 The preliminary and forecast data relating to businesses and institutions are an estimate based on the information provided by the units that were active in R&D during 2021. They therefore do not consider the information provided by those businesses and institutions that could start R&D activities during the following years, 2022 or 2023.

Large regional differences arise when referring to the share of businesses expenditure (Figure 5).

Figure 5. Total and business expenditure on intra-muros R&D by region. Year 2021. Values as a percentage of GDP



Source: Istat, Survey on R&D in companies, Survey on R&D in non-profit organizations, Survey on R&D in public bodies and Territorial economic accounts

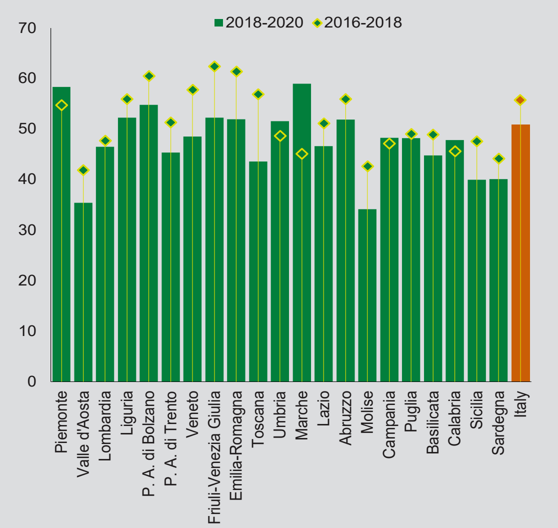
In terms of R&D expenditure as a percentage of GDP, good performances are recorded in Emilia-Romagna (2.09%), Piemonte (2.04%) and Lazio (1.99%)[7]. Two important regions in the North, that were leaders in R&D, such as Lombardia (1.25%) and Veneto (1.24%), in 2021 fall below the national average. The lowest values are in Valle d'Aosta (0.58%), Calabria (0.58%) and Basilicata (0.54%). Also in terms of the companies R&D intensity Emilia-Romagna and Piemonte are leading, followed by Lombardia, while Lazio is below the national average. Another important historical leader in private R&D such as Veneto also falls below the national average of private R&D intensity in 2021, since the private investors in R&D in this region (that are mainly SMEs) have been most impacted by the COVID-19 crisis. The regions of southern Italy are far behind, with Calabria, Sardegna and Basilicata remaining at the bottom of the list.

7 The regional GDP data refer to the Istat December 2023 edition of regional economic accounts.

More innovative companies in the North. Greater propensity for product innovation in the South of Italy

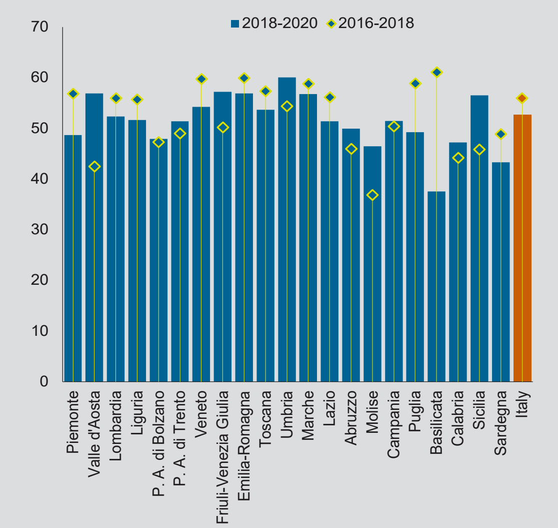
In the three-year period 2018-2020, the crisis associated with the pandemic emergency significantly reduced the propensity of companies to innovate. It is estimated that only 50.9% of companies with at least 10 employees carried out activities directed to introducing innovations, with a fall of about 5 percentage points compared to the previous three-year period (2016-2018)[8].
To better assess the relevance of the innovations introduced it is useful to look at the process-related rather than the product-related ones[9]. The latter are a more appropriate measure for evaluating innovation from a qualitative point of view because investments in new products or services can lead to a significant competitive advantage in the current market, that is characterized by international competition and a large offer of similar products. The prevailing trend among Italian companies to innovate business processes remains confirmed: in the last three years, only 26.8% of total companies have developed new products and services compared to 43.6% of companies that have introduced process innovations. Compared to the previous three-year period (2016-2018), the share of companies that implement product innovations decreases more (-4.3 points) than the percentage of companies that invest in new processes (-3.8 points).
In only two regions (Marche and Piemonte), more than half of companies have carried out innovative activities in the last three years (Figure 6a).

Figure 6a. Companies with at least 10 employees with innovative activities by region. Years 2016-2018 and 2018- 2020. Percentage values



Source: ISTAT, Community Innovation Survey

Figure 6b. Companies with at least 10 employees that have introduced product innovations by region. Years 2016- 2018 and 2018- 2020. Values per 100 companies with innovative activities



Source: ISTAT, Community Innovation Survey

8 The health emergency caused the suspension or the reduction of innovation activities in the 64.8% of companies with innovative activities, in particular the smallest ones (66.7% versus 50.2% for large companies).

9 Product innovation consists in the introduction on the market of a new or significantly improved product or service compared to the range of products and services previously sold on the market by the company. Product innovations also include significant changes in the design of a product and new (or significantly improved) digital products and services. Innovations of a purely aesthetic nature and trade (intended as simple resale) of new products and new services purchased from other companies are excluded.

In general, the North confirm its primacy, with a good number of regions placed above the national average. Among the central regions, Lazio and Toscana (despite the most active regions in R&D spending) report a low share of innovative companies. The innovation rate is lower than the national average in almost all the southern regions, with the exception of Abruzzo, and the gap reaches its maximum peaks in Molise (34.1%).
With a few exceptions, the health emergency weakened all the regions and led to a general reduction in innovators with a worsening of about 10 percentage points (compared to the three-year period 2016-2018) in Toscana, as well as in other leading regions such as Veneto, Emilia-Romagna and Trento. The crisis, although pervasive, had uneven effects on innovation: in the Centre-North, Marche, Piemonte and Umbria recorded an increase in the share of innovators. For the South, an improvement (albeit more limited) was also recorded in Campania and Calabria.
Overall, the crisis affected the propensity to innovate more in the central and northern regions (-5.5 percentage points compared to the three-year period 2016-2018) than the southern ones, where it was already lower (-2 percentage points). The result is a convergence at lower levels. Regional distribution in our country remains characterized by a clear divide, but positive signs come from product innovators in the South and Islands, with a reduced gap from the Centre-North (from -6 percentage points recorded in 2018-2020 for the total number of innovators to -3 percentage points for product innovators) (Figure 6b).
Although the trend to innovate products and services is more widespread in the North, Umbria, Marche and Sicilia too stands above the national average, among the regions with the greatest presence of these innovators.
Moreover, product innovators in the southern regions compared to the three-year period 2016-2018 show signs of positive dynamism, despite the pandemic crisis. In particular, Molise and Calabria, that were in a backward position, have a good increase in product innovators (+9.6 and +3.0 p.p. respectively), which also increased in Sicilia, a region that is historically weaker in innovation (+10.6 p.p.).

The growing trend of patent propensity is being consolidated

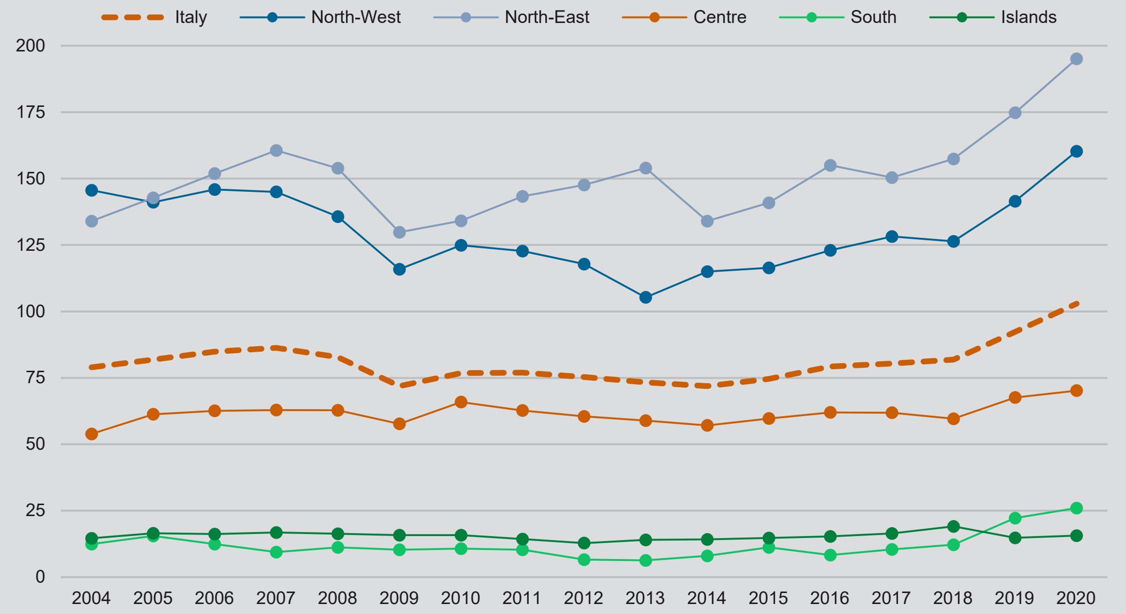
The indicators on patent applications provide a measure of the results of the inventive activity and the ability of operators to turn the products of research and innovation into potential economic gains. The statistics on patents allow measuring some outputs created by the research and development activity (with a variable extent according to the scientific disciplinary field and the focus on applied research rather than basic one).
The patent propensity, measured on the basis of the participation in the European patenting process of inventors[10] resident in Italy, after a decade of stable trends, starting from 2014 shows a constant growth, which becomes sharper from 2019 when the indicator raises up to 92.3 patent applications per million inhabitants (it was 81.9 in 2018).

10 The Bes indicator on “patent propensity” takes into account the contribution of several inventors to the same patent application, applying a fractional count (pro-quota). The regional allocation follows the inventors addresses indicated in the patent application filed.

In 2020 (last update available) the growth trend is consolidated with 102.9 applications per million inhabitants. Overall growth for Italy between 2014 and 2020 was 43.1%, with an average annual rate of +7.2% (Figure 7). There are clear differences in levels and dynamics among macro-areas reflecting the R&D activity and the different degree of innovation of the local productive systems.

The North drives the Italian average, with a noticeable difference between the North-East and the North-West (195.1 and 160.3 patents per million inhabitants) which in 2020 is wider compared to 2014. The North-East grew at a faster average annual rate (+7.6%) than the North-West (+6.6%). In the South, the patent propensity more than tripled its 2014 value (+225.0%). Nonetheless, the gap between the North and the South and Islands increased (in 2020, 26.0 patents per million inhabitants in the South and 15.6 in the Islands).

Figure 7. Patent applications submitted to the European Patent Office (EPO) by inventor's residence. Years 2004-2020. Values per million inhabitants



Source: OECD – Regpat database, January 2024 edition

The patent applications submitted to the EPO by applicants resident in Italy[11] confirm the same trends. These data (which refer to the ownership of the rights of patents economic exploitation) recorded a similar and constant growth between 2014 and 2020, which continues in 2021 (+6.5% compared to 2020) and does not stop in 2022. In 2022, based on preliminary data released by Eurostat[12], the European Patent Office recorded 4,864 European patent applications submitted by applicants with their residence in Italy, an average of 82.4 applications per million inhabitants[13] compared to 151.1 per million inhabitants of the EU27.

11 The applicant is the organization or person (the original inventor or an assignee) who files the patent application, starting the patenting process.

12 Source: Eurostat. Data updated to 31/03/2023; provisional year 2022.

13 This indicator considers in the numerator the applications registered by the EPO whose first applicant is resident in a country of the European Union. The country or region is defined on the basis of the first applicant residence (in the case of multiple applicants no fractional counting is applied).

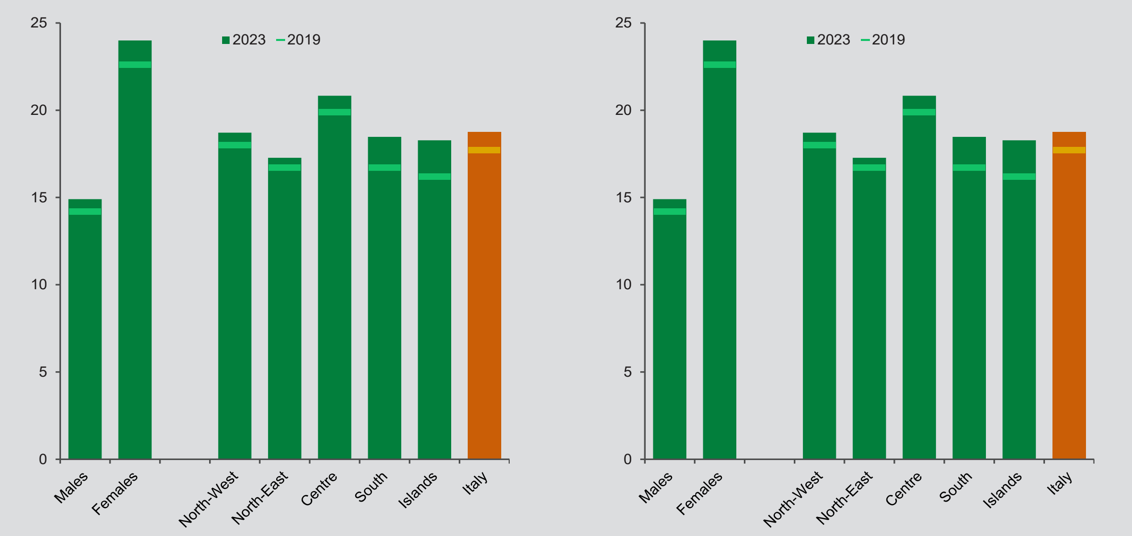
Almost 80% of Italian patent applicants in 2022 are resident in the North (about 44% in the North-West), less than 15% in the Centre[14].

Compared with other EU countries, Italy's patent activity is still lower, also because of its productive structure features. The data describe a livelier dynamic for our country than in the past, with a growth of 33.3% between 2014 and 2022 and an average annual rate of +4.2% (the average annual rate for the EU27 is 1.1%). Consequently the gap between our country and the European Union average has narrowed. The percentage of Italian patent applicants on the total number of European applicants has grown (from 5.8% in 2014 to 7.2% in 2022) and Italy gained one position – from 13th place in 2014 to 12th in 2022 – in the ranking of the 27 countries of the Union according to the number of patent applications per million inhabitants registered at the EPO.

Knowledge workers share is growing. The Centre has the greatest share of cultural and creative employment

In 2023, the share of knowledge workers on total employment, reaches 18.8%, approximately one percentage point more than both 2022 and 2019 (Figure 8).

Figure 8. Employees with tertiary education in scientific-technological occupations (left) and employees in cultural and creative professions or sectors of activity (right) by gender and geographic area. Years 2019 and 2023. Values per 100 employees with the same characteristics



Source: ISTAT, Labour force survey

The increase in the last year (+5.4%) is stronger than is stronger than that in overall employement (+2.1%), indicating that the positive dynamic is supported by the more pronounced growth in skilled employment in the scientific and technological professions. The gap between men and women remains at 9 percentage points in favor of the latter: in 2023, about one in four employed women is a knowledge worker (24.0%), while the ratio for employed men is approximately one in six (14.9%). Among the areas, the highest values for women are confirmed in the South and the Centre (26.3% and 25.8% respectively), for men in the Centre and the North-West (16.9% and 15.5%).

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14 Source: EPO, as at 31/03/2023. See EPO Patent Index 2022. Italy's country profile. https://report-archive.epo.org/about-us/annual-reports-statistics/statistics/2022.html.

The North-East has still the lowest share of knowledge workers both men (13.8%) and women (21.6%), and has one of the lowest growth in the last year. Instead, the North-West has the greatest increases for both men and women (+1.0 p.p.; +1.5 p.p.), together with the South, where the growth in the last year is concentrated on the male component (rising from 12.8% to 13.7%). Regardless of the area of residence, the indicator reaches the highest levels among the youngest employed, and in particular in the 25-34 and 35-44 age groups (24.5% and 22.8%) especially women (33.0% and 29.6%), and among older male workers (65+; 24.1%). These three age groups have also the greatest increases in the last year (between +1.2 p.p. and +1.4 p.p.).
In 2023, the cultural and creative employment share is unchanged at 3.5% of total employment. This stability is the result of a weaker growth than general employment, with a modest increase in the number of employed people in cultural and creative sectors or professions, which in 2023 reached 825.1 thousand units (+0.7% in the last year) approaching the values of 2019 (826.3 thousand employed people). In the last year the recovery achieved after the drastic employment during the pandemic is consolidated in absolute terms, but not the share on total employment and the indicator is still far from the pre-pandemic level (it was equal to 3.6% in 2019). In particular, the male component remains at lower levels, stopping at 3.3% also in 2023, compared to 3.5% in 2019. For women, however, the indicator records a slight decline in the last year turning back in line with the 2019 value (3.7%). The Centre still has the highest values, reaching 4.5% in 2023, with a substantial growth compared to 2019 (it was 4.2%), in particular for women who rise to 4.6% (from 4.1% in 2019). The lowest levels are in the South and the Islands, where 2023 values are 2.6% and 2.5% respectively, in clear growth compared to 2019 (they were 2.4% and 2.3%), both for men and women. Similarly to knowledge workers, the higher share of cultural and creative workers is among 25-34-year-old people (4.2%), especially women (4.9%), and among those over 64 (4.7%), especially men (5.0%).

Emigrations abroad of young Italian graduates rise back to pre-pandemic levels

After a decade characterized by an increasing trend in emigration, slowed during the pandemic[15], in 2022 the expatriation flows of young Italian graduates aged 25-39 intensified and reached the pre-pandemic levels (21,607 expatriations, +20% on 2021 and +2.6% on 2019), while returns from abroad decreased significantly (9,119 returns, -13.5% on 2021). So, the negative migration balance (i.e. the loss) of young graduates abroad comes back to grow again (-12,488 people)[16].

15 In 2020, despite the restrictive measures that limited the normal migration trend, an unexpected growth in expatriations was observed, probably due to the exit of the United Kingdom from the European Union that have accelerated the registration procedures in the Registry of Italians Resident Abroad of those Italians who were already living in the UK.

16 The indicator is given by the sum of the internal migration rate and the foreign migration rate. At a national level, the internal migration rate is zero.

In 2022, the migration rate of Italians holders of a tertiary degree (25-39 years)[17], after having improved in 2021 (-2.7 per thousand; with a significant contribution of repatriations), was -4.5 per thousand, with a wide gap between young males (-5.6 per thousand) and females (-3.7 per thousand).
There are significant differences among the areas of the country as the intensity and sign of the indicator summarize the results of two different flows, national and international mobility, which in the central-northern areas have opposing trends (Figure 9).

Figure 9. Net migration rate of Italian graduates (aged 25-39 years) by origin/destination and geographic area. Years 2019-2022. Values per 1,000 residents with the same characteristics

Source: Istat, Registrations and cancellations from the registry office due to transfer of residence and Permanent population census

In 2022, the foreign migration rates of young graduates are negative and worsening in all the areas of the country. Rates remain lower than the Italian average in the Centre (-3.4 per thousand against -2.1 per thousand in 2021) and South and Islands (respectively -3.9 and -4.0, against -2.8 and -3.2 of 2021), while the North has higher values than the national figure (-4.9 North-West and -5.8 North-East, against -2.7 and -3.1 of 2021).
Those flows of young graduates abroad combines with various internal migration flows. These latter are positive in the central and northern Italy and manage to invert the sign of the indicator, transforming the loss into gain.

17 The indicator is limited to young Italian graduates because for the transfers of residence of foreign citizens. It is not yet possible to correctly estimate the level of education.

In 2022, in fact, the overall balance is largely positive for the North (+10.7 per thousand, about +14 thousand young graduates) and, to a lesser extent, for the Centre (+4.3 per thousand). In southern Italy, however, the losses of young qualified resources due to emigration abroad (-3,906) add up to internal migrations towards the Centre-North (-25,319). The result is a negative total migration balance, with higher losses than the previous year (-32.5 per thousand in the South and -29.3 per thousand in the Islands, while in 2021 the indicator was -23.5 and -20.8 per thousand respectively).
The flows on the traditional route from the South and Islands towards the Centre-North, is high and increasing after the pandemic crisis, exacerbating the gap of the southern regions that are less and less attractive for the younger and most qualified human resources.
Migratory choices and opportunities have a clear geographical pattern. In 2022, the total loss of young Italian graduates is mainly due to migrations from the northern Italy abroad (about 12 thousand expatriations and 5 thousand returns), and – to a lesser extent – from the South and Islands (6 thousand expatriations and 2 thousand returns), while flows from the Centre play a residual role (4 thousand expatriations and 1.9 thousand returns).

The number of Municipalities managing online families services has doubled. The range of offering has expanded

The data referring to 2022 year, compared to the 2018 survey, show a significant increase in the share of Municipalities that manage entirely online the formal procedure for accessing services dedicated to families and individuals. This was possible thanks to the strong acceleration brought about by the health emergency in the digital transformation of services, procedures and work organization[18]. while greater financial resources were made available already in 2020[19], thus providing to match the growing citizen's demand for online public services[20].
In 2022, more than one in two Italian municipalities (53.6%) declared that they could manage entirely online at least one service for families, the share drops to 36% if we consider the Municipalities that manage online at least two services and to 24% if the services are three at least.

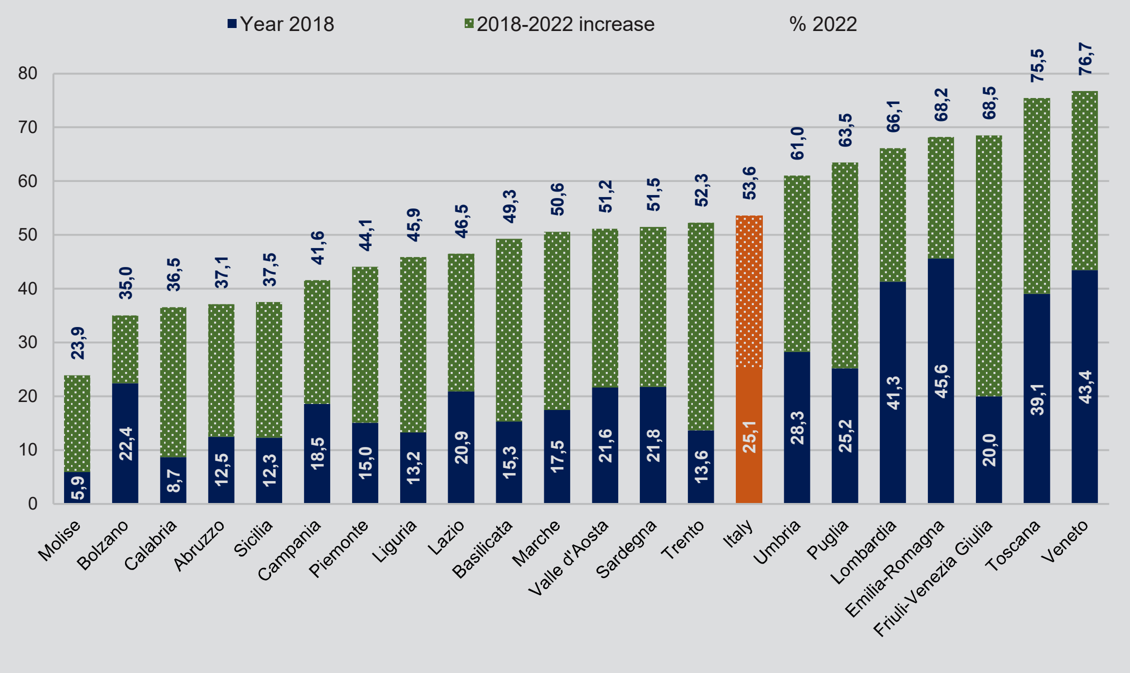
18 Trend already highlighted in the 2021 Bes Report. Please see in details *The technological evolution of municipal administrations between 2017 and 2020*, Chapter 11.

19 Legislative Decree n. 34/2020, converted with amendments in Law n. 77/2020, containing "Urgent measures in the field of health, support for work and the economy, as well as social policies, connected to the *COVID-19* epidemiological emergency"; Legislative Decree n. 76 of 16 July 2020, containing urgent measures for simplification and digital innovation, converted by Law n. 120/2020; Legislative Decree n. 18/2020, converted with amendments by Law n. 27/2020, containing "Measures to strengthen the national health service and economic support for families, workers and businesses connected to the *COVID-19* epidemiological emergency".

20 Between 2019 and 2021, data on the demand for e-government highlighted, for the first time since 2015, a strong growth in the share of individuals aged 16-74 who used the Internet to interact with the Public Administration in the last 12 months, which increased from 23.4% to 33.9%. Source: Eurostat, Survey on the use of Information and Communication Technologies (ICT) in households and by individuals (dataset isoc_ciegi_ac variable I_IUGOV12: Use of the Internet to interact with the PA in the previous 12 months). The indicator takes into account a subset of 11 services that: a) are intended exclusively or mainly for families; b) are connected to the fundamental functions of the Municipalities; c) theoretically, are deliverable by all the Municipalities. On the basis of these criteria, the following services were selected: Registry certificates; Identity card; Disabled badge; Catalogue consultation and library loan; Kindergarten registration; School canteen services; Public competitions; Parking payment service; Fines; Municipal property tax (ICI/IMU); Tax for the disposal of solid urban waste (Ta.Ri/Tarsu).

Compared to 2018, the percentage of Municipalities that manage online the entire process for accessing at least one service for families has more than doubled (it was 25.1%); going up to at least two services the percentage has more than tripled (it was 10%) and if the threshold is set at three services the share has quintupled (it was 5%). These are mainly registry services (which go from 65.5% to 83.9%), related to identity card (from 58.8% to 70.8%) and the request for a disabled person badge (from 46.1% to 60.0%), school refectory services (from 55.1% to 66.0%) and the payment of fines (from 30.8% to 45.5%).
Growth is widespread across regions, but, despite their positive dynamics, the South and Islands have a slight worsening of their gap with the North (from 14.8 percentage points in 2018 to 16.4): the North goes from 30.4% in 2018 to 59.1%, the South and Islands from 15.6% to 42.7%. Among the regions, the indicator is the highest in Veneto and Toscana, where in 2022 more than three out of four Municipalities (76.7% and 75.5% respectively) manage online at least one service for families and individuals. Friuli-Venezia Giulia (68.5%) and Emilia-Romagna (68.2%) follow. The most significant increases from 2018 are in Friuli-Venezia Giulia (+48.5 percentage points) and in Trento (+38.6 p.p.). Important progresses are also made by many southern regions, which however remain at the bottom: in Molise and Calabria, the 2022 value triples that of 2018, in Basilicata and Sicilia has doubled (Figure 10).

Figure 10. Municipalities that manage online at least one service for families or individuals at a level that allows the online start and conclusion of the entire procedure by region. Years 2018 and 2022. Percentage values

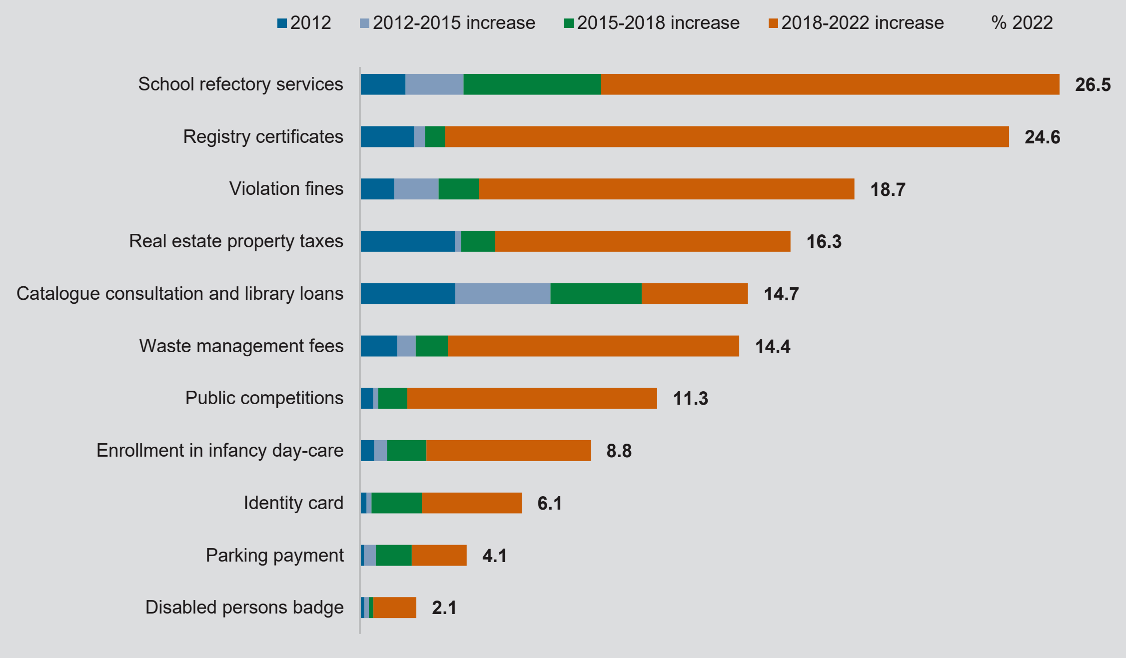


Source: Istat, Survey on information and communication technologies in public administrations

The size of the Municipality still plays a role in growth: in small Municipalities with up to 5,000 inhabitants the indicator improves, but are far away from the growing values recorded by the larger ones.

In 2022, Municipalities with at least 60 thousand inhabitants managing entirely online one or more services are 97.4% (77.1% in 2018) those with up to 5 thousand inhabitants are the 43.6% (16.5% in 2018).
At the end of 2022, 26.5% of Italian Municipalities make it possible for users to manage entirely online the procedure for accessing the school refectory service (including any payment). The most widespread services are then the payment of fines (18.7%) and property taxes (16.3%). The complete digitalization of these three services had an important increase from 2018, boosted by some regulatory measures aimed to generalize the online payment platform for the Public Administration[21]. Online managing of registry certificates is also growing significantly (24.6%) thanks to the progress of the National Registry of Resident Population (ANPR) which from November 2021 onwards allows citizens' digital apply for some services (Figure 11).

Figure 11. Municipalities that manage online at least one service for families or individuals by type of service. Years 2012, 2015, 2018 and 2022. Values per 100 Municipalities



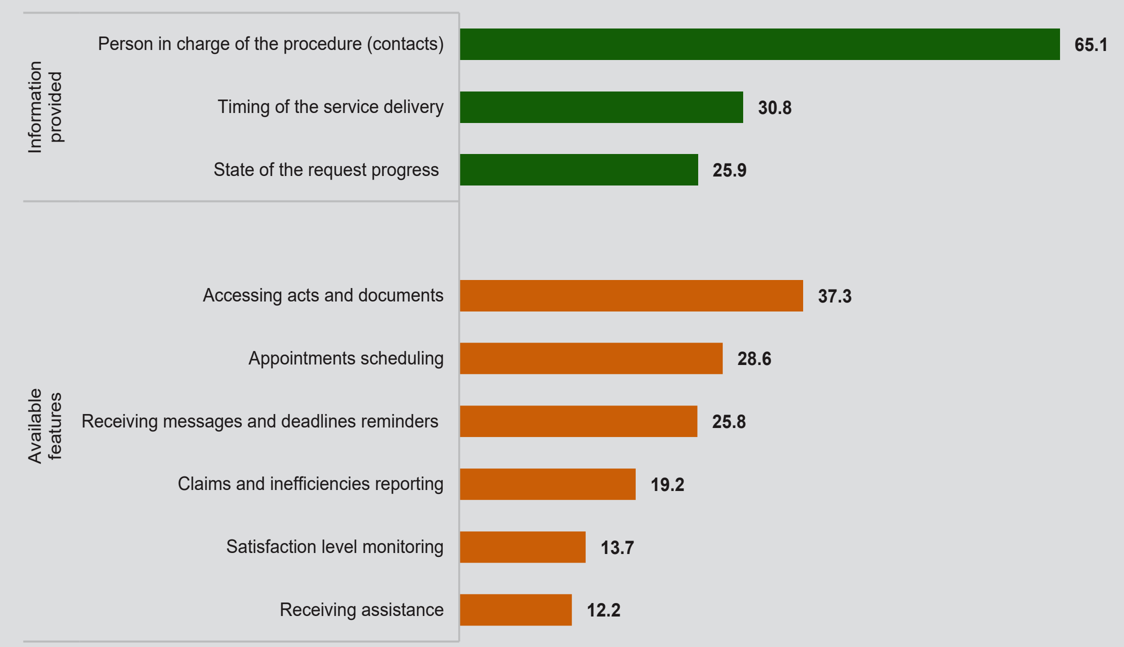
Source: Istat, Survey on information and communication technologies in public administrations

The users experience in online public services improves when providing some information services or support functions, such as, for example, the possibility of requesting assistance or knowing the delivery time of the service. From this point of view, 2022 data indicate a strong need for improvement especially for Municipal administrations: only 19.2% of Municipalities activated the possibility of reporting an inefficiency for the digital service and only 12.2% allow users to request and receive assistance for the digital service. Only 13.7% of Municipalities survey the customers' satisfaction with the online services.

21 The Law 11/11/2020, n.120 has established that Public Administrations, Public Bodies and Payment Service Providers (PSP) must integrate the pagoPA platform, with the aim of standardizing payment at a national level.

One in four Municipalities (25.8%) is able to send notifications concerning deadlines related to services; 28.6% of Municipalities offer the possibility of booking appointments with the Administration offices; 30.8% of Municipalities (58.2% among Municipalities with over 60 thousand inhabitants) provides information to online users on the service delivery times, and 25.9% on the progress of their requests; 37.3% of Municipalities allows online requests for access to the documents and 65.1% provides the contact information about the responsible officer (Figure 12).

Figure 12. Available functions and accessible information for users of online municipal services. Year 2022. Values per hundred Municipalities



Source: Istat, Survey on information and communication technologies in public administrations

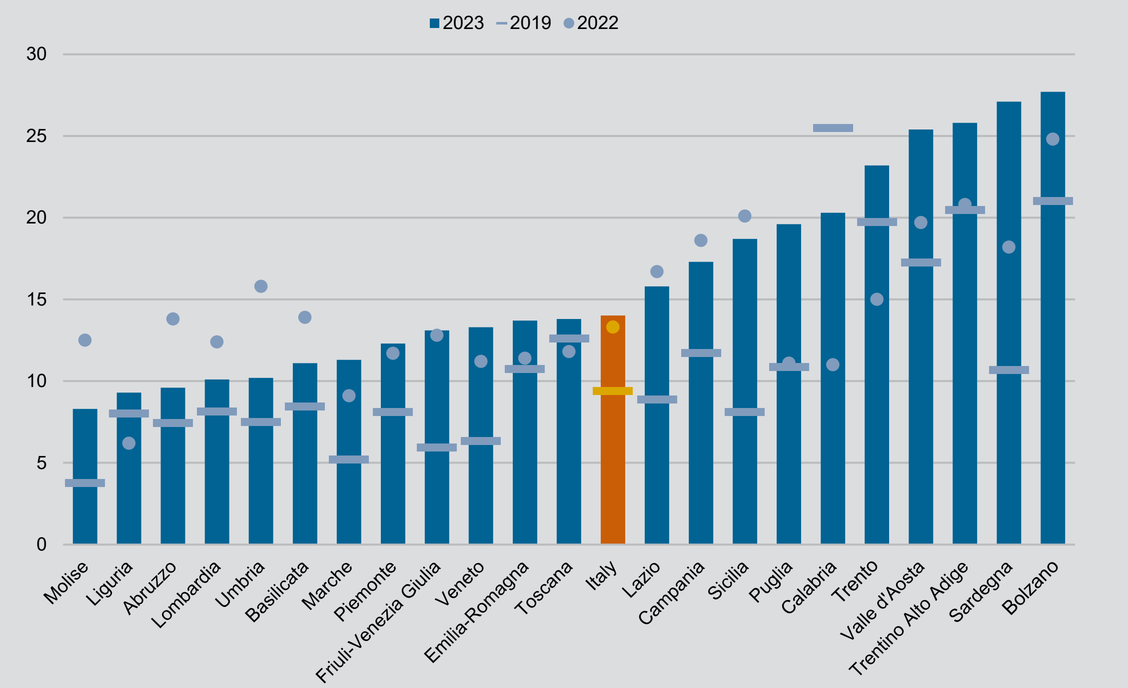
The National Recovery and Resilience Plan (PNRR) has not yet been able to influence the indicators measured by the survey. In the next edition of the survey, referring to 2025, it will be possible to observe the effects produced by the Plan's measures, such as projects related to migration to the Cloud, those directed to improve the citizen's experience in public online services, those to boost platforms such as pagoPA and the IO app or the SPID/CIE digital identity

Tourism and trade continue to drive web sales to final consumers

In 2023, the share of Italian companies with at least 10 employees that in the previous year sold goods and services via the web to final consumers (B2C) through their own channels, digital platforms or *e-commerce* intermediaries is 14.0%, recovering the slight decline of the previous year (it was 13.3% in 2022).

The distance from the European average (16.2%) remains around two percentage points (it was one point in 2021).
Compared to 2019, the trend remains positive but slow, with an overall growth of 4.6 percentage points (Figure 13).
At a territorial level, the growth of the South (from 11.1% in 2019 to 18.0% in 2023) is most concentrated in Sardegna (+16.4 percentage points) and Sicilia (+10.6 p.p.) and in Puglia (+8.7 p.p.), while in the North, the companies of the Valle d'Aosta stand out at 25.4% (+8.1 p.p.), reaching those of Trentino-Alto Adige (25,8%), that place first since 2019.

Figure 13. Enterprises with 10 or more persons employed that during the previous year sold via web to end customers (B2C) by region. Years 2019, 2022 and 2023. Percentage values



Source: Istat, Survey on information and communication technologies in companies

Considering the nature of the indicator, it is interesting to carry out a detailed analysis also at sector level and compare the trends recorded for economic activities that offer the goods and services most in demand in online purchases made by individuals[22]. Between 2019 and 2023, the activities that recorded the greatest increases were those related to retail trade (+12.5 percentage points), accommodation and catering services (+11 p.p.), telecommunications (+10.2 p.p.) and the food industry (+9.5 p.p.). Even in 2023, the share of Italian companies that sell via the web to final consumer on the total of those that sell via the web[23] is growing (from 78.6% in 2019 to 88.9% in 2023), coming in line with France and Greece (around 90%) and exceeding the EU27 average (82.1%) and also the percentage of Germany (81.7%) and Spain (72.4%).

22 According to data from the module on the use of ICT by families and individuals of the Aspects of Daily Life) survey, the most common online purchase in the previous 12 months by individuals aged 14 and over concerned clothing, shoes or accessories (21.7%), followed by household items, furniture or gardening products (11.9%) and films and TV series in streaming or download (9.8%) (see National Institute of Statistics - Istat. 2023. "Cittadini e ICT. Anno 2023". *Statistiche Report*. https://www.istat.it/it/archivio/292410).

23 The indicator does not take into account companies that made online sales to companies and Public Administration. If this amount is taken into account the percentage reached is 15.7% in 2023 (it was 11.9% in 2019).

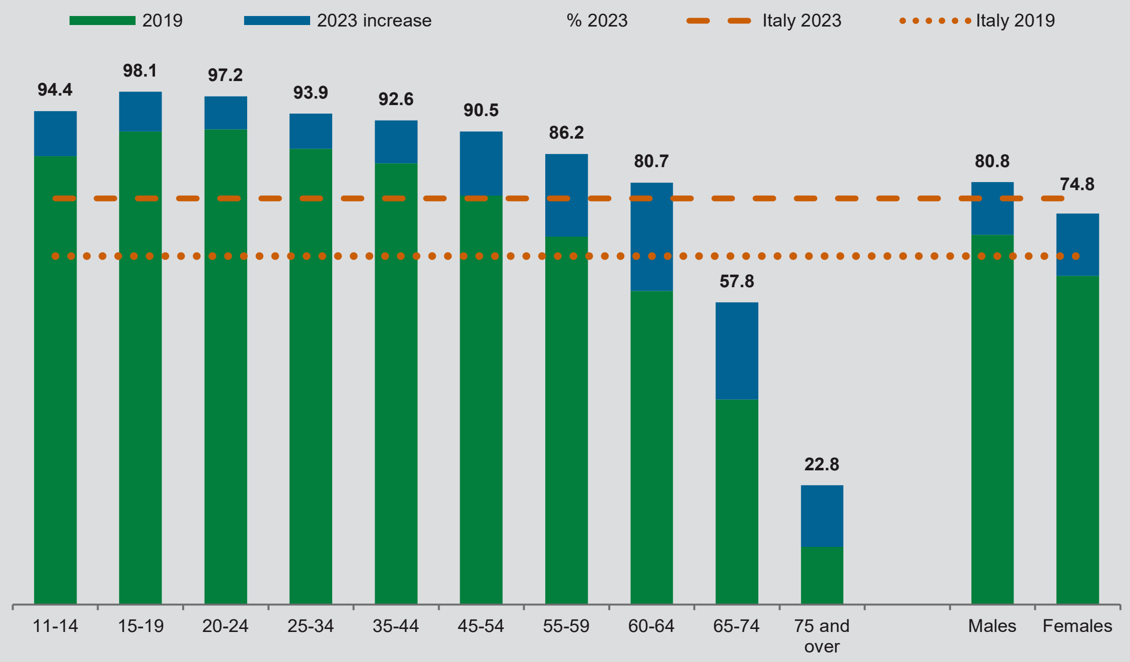
Furthermore, in 2023, the share of Italian companies that sold to end consumer for at least 10% of the overall value of on-line sales was confirmed at 84.2% (the European average is 75.6%)[24].

Digital gaps continue to narrow, while age gaps remain wide

In 2023, 77.7% of the population aged 11 and over used the Internet regularly, at least once a week in the last three months (over 41 million people). This percentage continues to grow, with a significant increase compared to 2019 (+11 percentage points) and reaching levels close to 100% for a large part of the population. Over 90% of people aged 11-54 browse the Internet regularly, this amount remains above 80% among people aged 55-64, and drops sharply among people aged 65-74 (57.8%) falling to 22.8% of people aged 75 and over (Figure 14). Between 2022 and 2023, Internet use increased overall by 2.1 percentage points and the age group of 55 years and over has the most significant growth, above 3 percentage points.
Gender differences in the use of ICT relate only to the older age groups, with a gap of almost 8 percentage points in favor of men.
Over the last five years (2019-2023), age-related digital gaps have narrowed, also due to the acceleration in the use of ICT during the health emergency. In fact, Internet use has consolidated in the younger age groups (11-34 years), while adults aged 60-64 have recorded a growth higher than the average (+20.7 p.p.), as well as the 65-74 age group (+18.6 p.p.). For those aged 75 and over, the increase is in line with the average trend (+11.8 p.p.). For the two older age groups, despite the increase, the gaps remain wide.
Regional differences are not decreasing. The highest values of the indicator are in Emilia-Romagna (81.8%), Lombardia (81.4%), Lazio (81.2%) and Bolzano (81%). In general, all the central and northern regions have higher values than the national average, except for Liguria, Marche and Umbria. The South (72.9%) stands well below the Italy figure, with a gap of 7.5 percentage points compared to the North (80.4%) and 6.6 percentage points compared to the Centre (79.5%). There are also wide differences among the southern regions, ranging from 79.4% in Abruzzo and 67.6% in Calabria. Between 2019 and 2023, the South and Islands improved, in line with the national average, but this positive trend was not enough to bridge the gap. Among residents in the South, regular internet users increased by 13.0 percentage points, while a smaller increases was recorded in the Islands (+9.4 p.p.). In the other Italian macroregions the increases in the last year runs from 2.5 percentage points in the Centre to 1.6 points in the North-East.

24 For further information, see Istituto Nazionale di Statistica - Istat. 2023. "Imprese e ICT. Anno 2023". *Statistiche Report*. https://www.istat.it/it/archivio/292463.

Figure 14. People aged 11 and over who used the Internet at least once a week in the 3 months prior to the interview by age group, by gender. Years 2019 and 2023. Percentage values

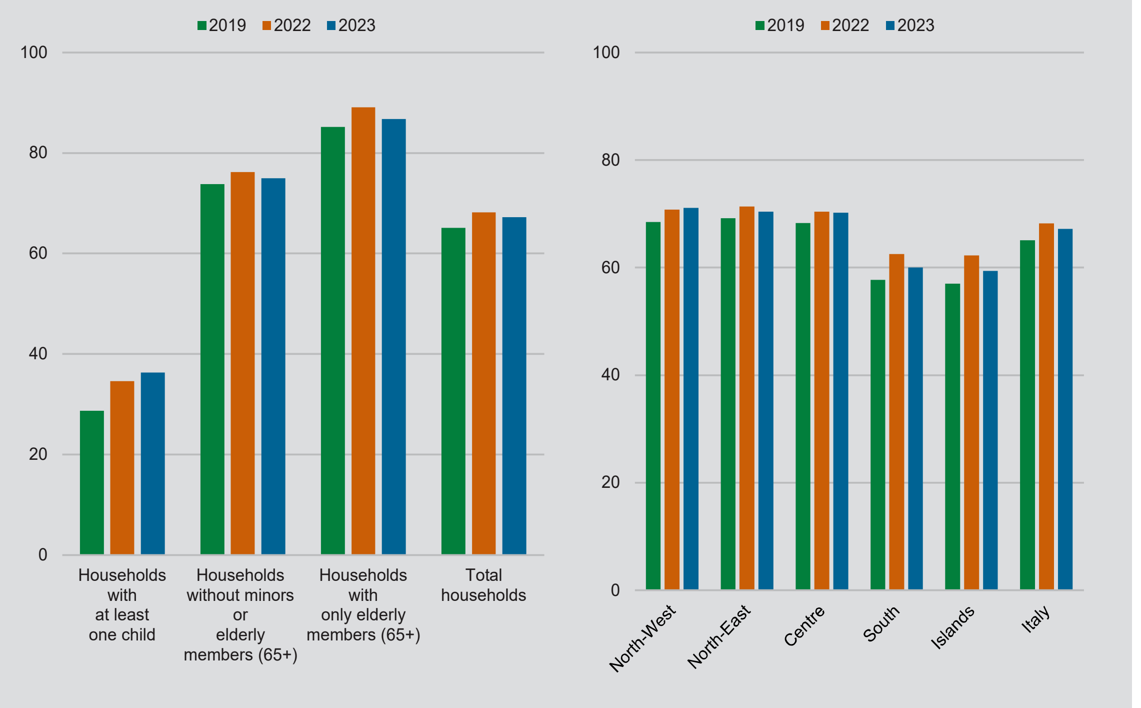


Source: Istat, Aspects of daily life survey

The digital divide interacts with sociocultural and economic inequalities, further exacerbating. The level of instruction continues to be a discriminating factor, partly because it is positively associated with age: in 2023 regular Internet use concerns 94.5 percent of people with a high qualification, it drops to 89.0 percent among those with a medium educational level and to 62.0% among those with a low one. These differences remain unchanged compared to the previous year.

In 2023, 83.7% of household have a connection to the Internet from home. The qualification of family members remains positively correlated with the availability of Internet access at home: 97.7 percent of households with at least one member with a university degree access the Internet from home; households whose members have at most lower secondary education stop at 59.4 percent. The percentage among households with only elderly members (65+) is much lower – just over a half (52.9 percent) – compared with 98.6 percent of households with at least one minor member, and with 93.4 percent of households without minors and whose members are not only elderly. Considering jointly the availability of Internet connection from home and of a personal computer the overall percentage falls to 67.2%, ranging from 36.3% of elderly-only households to 86.8% of households with at least one minor (Figure 15). The distance between the North (70.8 percent) and the South (59.8 percent) in 2023 is 11 percentage points.

Figure 15. Households with Internet connection and at least one personal computer by family type (left), by geographic area (right). Years 2019, 2022 and 2023. Percentage values



Source: Istat, Aspects of daily life survey

Indicators

1. **R&D intensity:** Percentage of expenditure for intramural research and development activities performed by business enterprise, government, higher education (public and private) and non-profit sector on GDP. Expenditure and GDP are considered in current prices, million euro.
   Source: Istat, Survey on R&D in companies, Survey on R&D in non-profit organizations, Survey on R&D in public bodies
2. **Patent propensity:** Number of patent applications filed to the European Patent Office (EPO) per million of inhabitants.
   Source: OCSE, Regpat Database
3. **Gross Fixed Capital Formation (GFCF) of intellectual property products:** Total GFCF in research and development, mineral exploration and evaluation, entertaiment literary or artistic originals, computer software and database. Chained values, Indexed 2015 = 100.
   Source: Istat, National Accounting
4. **Innovation rate of the national productive system:** Percentage of firms that that carried out product or process innovation activities in the three-year reporting period on total number of firms with at least 10 persons employed.
   Source: Istat, Cis (Community Innovation Survey)
5. **Impact of knowledge workers out of employment:** Percentage of employees with tertiary education (ISCED 6-7-8) in scientific-technological occupations (ISCO 2-3) on total employees.
   Source: ISTAT, Labour force survey
6. **Cultural employment (% of total employment):** Percentage of employees in cultural and creative professions or sectors of activity (ISCO-08, Nace rev.2) out of the total number of employees (15 years and over).
   Source: ISTAT, Labour force survey
7. **Brain circulation (Italians, 25-39 years old):** net migration rate of holders of a tertiary degree: (immigrants-emigrants) / total resident population * 1,000. Both numerator and denominator refer to Italians holders of a tertiary degree, 25-39 years old.
   Source: Istat, Registrations and cancellations from the registry office due to transfer of residence and Permanent population census
8. **Regular internet users:** Percentage of individuals aged 11 and over who used the internet at least once a week in the 3 months prior to the interview.
   Source: Istat, Survey on Aspects of daily life
9. **Availability of at least one computer and Internet connection in the household:** Percentage of households with internet connection and at least one personal computer (including desktop computers, laptops, notebooks, tablets; excluding smartphones, PDAs with phone functions, e-book readers and game consoles).
   Source: Istat, Survey on Aspects of daily life
10. **Municipalities with online services for families:** Percentage of Municipalities that provide online at least one service for families or individuals at a level that allows the electronic start and conclusion of the entire process (including any online payment).
    Source: Istat, Survey on information and communication technologies in public administrations
11. **Enterprises with at least 10 persons employed with web sales to end customers:** Percentage of enterprises with 10 or more persons employed that during the previous year sold via web to end customers (B2C). From the survey year 2021 economic activities from division 10 to 82 are included according to Ateco 2007 nomenclature (excluding section K - Financial and insurance activities). From the same survey year, estimates refer to the unit of analysis "enterprise", i.e. a statistical unit that may consist of one or more legal units.
    Source: Istat - Survey on information and communication technology in enterprises

Indicators by region and geographic area

REGIONS GEOGRAPHIC AREAS	R&D intensity (a)	Patent propensity (b)	Intellectual property products (c)	Innovation rate of the national productive system (d)	Impact of knowledge workers on employment (e)
	2021	2020	2023	2020	2023
Piemonte	2.04	132.6	....	58.3	17.1
Valle d'Aosta/Vallée d'Aoste	0.58	56.8	....	35.3	14.6
Liguria	1.59	93.8	....	54.8	19.2
Lombardia	1.25	183.6	....	46.5	19.4
Trentino-Alto Adige/Südtirol	1.12	150.6	....	46.7	16.1
Bolzano/Bozen	*0.82*	*172.5*	....	*45.3*	*14.1*
Trento	*1.48*	*129.3*	....	*48.6*	*18.1*
Veneto	1.24	163.2	....	52.3	15.8
Friuli-Venezia Giulia	1.60	174.9	....	52.2	16.8
Emilia-Romagna	2.09	246.2	....	52.0	19.3
Toscana	1.52	102.6	....	43.6	17.6
Umbria	0.97	53.6	....	51.6	18.2
Marche	0.99	81.8	....	59.0	17.1
Lazio	1.99	48.8	....	46.6	24.4
Abruzzo	1.12	68.6	....	51.9	17.9
Molise	0.93	18.0	....	34.2	19.3
Campania	1.32	26.6	....	48.3	19.3
Puglia	0.86	20.2	....	48.2	17.4
Basilicata	0.54	18.8	....	44.8	18.5
Calabria	0.58	10.8	....	47.8	18.8
Sicilia	0.89	16.5	....	40.0	18.4
Sardegna	0.82	13.0	....	40.1	18.0
North	1.51	175.0	....	53.5	18.1
North-West	1.45	160.3	....	55.0	18.7
North-East	1.60	195.1	....	51.6	17.3
Centre	1.67	70.2	....	47.9	20.8
South and Islands	0.98	22.7	....	46.1	18.4
South	1.03	26.0	....	48.2	18.5
Islands	0.87	15.6	....	40.0	18.3
Italy	**1.43**	**102.9**	**128.0**	**50.9**	**18.8**

(a) Percentage of R&D expenditure on GDP;
(b) Per million of inhabitants;
(c) Per 100 in employment;
(d) Per 100 enterprises with at least 10 employees;
(e) Chain-linked values Indexed 2015=100;
(f) Per 1,000 inhabitants aged 25-39 with tertiary education (bachelor's degrees, AFAM, PhD);

Cultural employment (e)	Brain circulation (italians, 25-39 years old) (f)	Regular internet users (g)	Availability of at least one computer and Internet connection in the household (h)	Municipalities with online services for families (i)	Enterprises with web sales to end customers (d)
2023	2022	2023	2023	2022	2023
3.4	1.3	78.9	67.6	44.1	12.3
3.1	-7.4	79.5	67.6	51.2	25.4
2.7	-0.4	77.8	64.5	45.9	9.3
3.9	17.5	81.4	73.9	66.1	10.1
3.6	0.8	80.7	72.7	45.2	25.8
3.3	*-6.1*	*81.0*	*73.3*	*35.0*	*27.7*
3.9	*5.6*	*80.4*	*72.1*	*52.3*	*23.2*
3.7	-1.2	79.6	70.9	76.7	13.3
2.7	1.3	79.1	70.6	68.5	13.1
3.2	23.3	81.8	69.4	68.2	13.7
4.7	4.7	78.8	69.5	75.5	13.8
4.1	-12.2	76.3	66.4	61.0	10.2
3.1	-11.4	76.5	71.9	50.6	11.3
4.8	10.3	81.2	70.7	46.5	15.8
2.9	-17.7	79.4	65.3	37.1	9.6
2.0	-36.8	73.7	60.1	23.9	8.3
2.9	-30.9	72.4	60.5	41.6	17.3
2.5	-33.2	73.7	60.7	63.5	19.6
2.1	-44.7	71.4	58.8	49.3	11.1
2.2	-42.5	67.6	53.9	36.5	20.3
2.5	-33.2	72.3	57.7	37.5	18.7
2.6	-16.4	75.4	64.2	51.5	27.1
3.6	10.7	80.4	70.8	59.1	12.5
3.7	11.9	80.4	71.1	55.5	10.6
3.4	9.0	80.5	70.4	67.0	14.7
4.5	4.3	79.5	70.2	57.0	14.0
2.6	-31.6	72.9	59.8	42.7	18.0
2.6	-32.5	72.8	60.0	42.0	16.9
2.5	-29.3	73.1	59.4	44.4	21.0
3.5	**-4.5**	**77.7**	**67.2**	**53.6**	**14.0**

(g) Per 100 persons aged 11 and over;
(h) Per 100 households;
(i) Per 100 Municipalities.