



XI Consiliatura 2023-2028



The Italian Tertiary Sector.

Transformations, Productivity and Prospects

Italy – National Productivity Board

Working Paper

No. 5, September 2026



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CONSIGLIO NAZIONALE

DELL'ECONOMIA E DEL LAVORO

CNEL Working Papers

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Managing Director

Renato Brunetta – *President of CNEL*

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Beneath the Surface of a New 'Great
Transformation': The Tertiary Sector
in the 21st century

Paolo Feltrin and Sergio Maset¹

Introduction

This paper examines the transformation of Italy's productive structure through five interrelated dimensions: sectoral composition and enterprise size, human capital, productivity, internationalisation and geographical distribution². The underlying hypothesis is that the growth of the service sector does not, in itself, constitute a sufficient indicator of modernisation. What matters is which services are growing, in what types of firms they are produced, with what skills and technologies, what value added they generate, and in which markets and regions they operate. For this reason, the analysis jointly considers employment in knowledge-intensive services (KIS), technology-intensive manufacturing and the scope of professional and managerial activities (PROM).

The first empirical finding is that employment growth is more complex and cannot be reduced to a simple substitution of manufacturing with services. Between 2015 and 2023, the number of employees in local units increased by around 14 percent overall; growth stood at 6.9 percent in manufacturing and 16.1 percent in services. Within the latter, KIS grew by 25.6 percent, compared with around 11 percent for other services. Furthermore, sector averages mask differing trends: certain professional, scientific, digital and support activities are expanding rapidly, while knowledge-intensive financial services and certain communication activities are experiencing

¹ This report stems from a shared reflection between CNEL President Renato Brunetta and President of Confindustria Professioni & Management Luigi Riva on the role of professional services in the development and future of the country. Building on this reflection, Confindustria Professioni e Management, through its Director General Marco De Amicis, coordinated the project in collaboration with authors Paolo Feltrin and Sergio Maset. We would also like to thank Andrea Passaquieti, Head of the Research Centre of Strategic Management Partners, for his support in the collection, organisation and processing of the data used in the research. Tommaso Barbiero, Luca Garavaglia and Carlotta Giorgis also contributed to this project.

Data analysis and editorial work by IDEA Studi e Ricerche.

² The report was produced using quantitative socio-economic research methods, drawing on national (ISTAT, ICE, MUR-USTAT, etc.) and international (Eurostat, OECD, etc.) data sources. References to sources are clearly indicated in the text and in the tables. Data analysis was carried out in accordance with analytical standards accepted and widely applied by the scientific community.

weaker or negative growth. Even within manufacturing, the distinction based on technological intensity alters the picture presented by traditional aggregates.

The second empirical finding concerns scale and organisation. The Italian business landscape remains characterised by a very high share of micro and small enterprises; within the PROM scope, around seven out of ten employees work in the smallest size classes. KIS growth is observed across a wider range of size classes, but a comparison between enterprises and local units shows that legal and organisational size do not coincide, as a large enterprise may be organised into a number of smaller local units. The analytical focus is not to contrast small and large enterprises in the abstract, but to ascertain whether firms possess the capital, managerial functions, technologies, skills and access to demand necessary to sustain new investment and resulting growth trajectories.

The third finding is a dual bottleneck in the relationship between human capital and productivity. Italy produces few tertiary qualifications compared with the European average and, at the same time, struggles to translate tertiary qualifications into stable employment that is commensurate with those qualifications. A limited supply of skills restricts the adoption of technology; weak demand for such professionals, in turn, reduces the return on investment in training and encourages labour mobility to other countries. Productivity data confirm that employment, hours worked and value added are not equivalent measures: a sector can increase its workforce without increasing value added per hour to the same extent. The size gradient observed in some sectors must therefore be interpreted in conjunction with the composition of the workforce, capital intensity and the presence of self-employed workers.

Internationalisation and regional distribution complete the picture. In advanced sectors, foreign-controlled firms operating in Italy have a significant presence in terms of employment and turnover, while the international presence of Italian service firms appears more limited. In terms of trade, the advanced services sector accounts for substantial trade volumes but records negative balances in many sectors. Geographically, KIS and technology-intensive manufacturing are distributed according to different patterns: large cities, universities and human capital are associated with specialisation in advanced services, while various manufacturing regions maintain a structure more oriented towards industrial technology.

Chapter 1. Size Dynamics of Local Units and Enterprises in Manufacturing and Services

This chapter examines employment trends in local units and enterprises in Italy, highlighting the main changes that took place between 2015 and 2023. The analysis of the productive structure considers sectoral composition, the technological level of manufacturing, the knowledge intensity of services, and the size of enterprises and local units. To this end, various levels of classification are used: the ATECO sections, groupings of divisions according to Eurostat criteria relating to technological and knowledge intensity, and a specific aggregate of divisions attributable to the advanced tertiary sector³. The trends are examined over the period 2015–2023, taking into account both changes in the number of employees and shifts in the composition of employment.

Subsequently, an analysis is carried out by size class at the level of local units and enterprises, integrating sectoral and technology-knowledge classifications. The comparison between local units and enterprises also makes it possible to identify any processes of enterprise restructuring, through a comparative analysis of changes in the production structure at both levels and of the different distribution of local units across sectors of activity. Finally, a comparison with similar data from the main EU countries makes it possible to situate the size structure of Italian enterprises within the broader European context and to identify their distinctive features.

1.1. Composition and trends in employment in local units by ATECO section

Table 1.1 presents the number of employees in local units of enterprises in Italy in the years 2001, 2011, 2015, 2019 and 2023, broken down by ATECO section⁴.

³ This grouping of divisions largely corresponds to the scope of representation of Confindustria Professioni e Management (PROM). See the list of divisions in Appendix A.

⁴ The source for the number of employees in 2001 is the 8th General Census of Industry and Services, which documents the situation of local units and their employees as of 22 October 2001. For 2011, the 9th General Census of Industry and Services was used, which provides a snapshot of the situation as of 31 December 2011. For the years 2015, 2019 and 2023, the source used for the number of employees in local units is the Statistical Register

Overall, the number of employees shows an increase over the period under consideration, rising from approximately 15.6 million in 2001 to 18.6 million in 2023, representing an overall increase of around 19 percent. However, this growth varies across the different ATECO sections, both in terms of absolute and relative changes in the number of employees and in terms of their share of the overall employment structure. Tables 1.1 and 1.2 therefore form the basis for analysing employment trends over the period under consideration, enabling a detailed examination of the development trajectories of individual economic sectors through an analysis of the absolute and relative changes in the number of employees and shifts in sectoral composition.

With regard to the analysis of the composition of the workforce by ATECO section (Table 1.2), two contrasting trends clearly emerge. On the one hand, there is a gradual expansion, in percentage terms, of the tertiary sector, whose share of total employment rose from 57.5 percent in 2001 to 64.7 percent in 2011, before stabilising, from 2015 onwards, at levels close to 68–69 percent in subsequent years (69.2 percent in 2019 and 68.9 percent in 2023). Conversely, there has been a steady decline in the share of manufacturing activities, which fell from 30.8 percent in 2001 to 23.7 percent in 2011, to 22.1 percent in 2015, and further to 21.5 percent in 2019 and 20.7 percent in 2023.

of Active Enterprises (ASIA). In this case, the number of employees is calculated as an average for the year under review. It follows that the data for 2001 and 2011 represent a snapshot of the employment structure on a specific reference date, while those derived from ASIA represent the average number of employees over the year. This difference in measurement methods has been taken into account in the analysis of trends over time: it was therefore deemed appropriate to calculate absolute and relative changes exclusively from 2015 onwards.

Table 1.1. Employees in local units by ATECO section – 2001–2023 period – absolute figures.

EMPLOYEES – ABSOLUTE FIGURES					
ATECO section	2001	2011	2015	2019	2023
B. Extraction of minerals from quarries and mines	36,782	33,123	23,316	22,062	19,884
C. Manufacturing activities	4,813,226	3,881,051	3,608,024	3,751,959	3,858,488
D. Supply of electricity, gas, steam and air conditioning	109,047	85,055	88,150	81,711	84,994
E. Water supply; sewerage networks, waste management and sanitation	118,196	173,888	187,856	207,185	228,386
F. Construction	1,551,395	1,596,322	1,317,012	1,314,571	1,610,949
G. Wholesale and retail trade; repair of motor vehicles and motorcycles	3,093,719	3,448,021	3,318,914	3,456,119	3,486,515
H. Transport and storage	1,044,324	1,094,665	1,087,787	1,138,269	1,192,402
I. Accommodation and food service activities	853,122	1,222,889	1,324,675	1,595,225	1,666,872
J. Information and communication services	556,996	537,156	539,736	580,512	657,028
K. Financial and insurance activities	588,851	597,164	570,617	546,184	537,826
L. Real estate activities	211,291	281,416	298,796	309,181	297,109
M. Professional, scientific and technical activities	946,181	1,184,813	1,224,403	1,313,657	1,575,070
N. Administrative and support service activities	760,554	1,048,165	1,167,223	1,402,663	1,532,051
P. Education	62,042	75,149	98,119	118,895	145,096
Q. Health and social care	370,564	521,342	817,317	930,283	1,059,055

R. Arts, sports, entertainment and recreation	120,746	157,113	165,489	190,423	210,023
S. Other service activities	377,338	422,207	452,440	479,180	482,673
Manufacturing	4,813,226	3,881,051	3,608,024	3,751,959	3,858,488
Services	8,985,728	10,590,100	11,065,518	12,060,590	12,841,722
Total	15,614,374	16,359,539	16,289,875	17,438,078	18,644,422

Source: IDEA analysis based on data from the Industry and Services Censuses (2001, 2011) and Istat ASIA (2015, 2019, 2023).

Table 1.2. Employees in local units by ATECO section – 2001–2023 period – composition.

COMPOSITION (BASE 100 OF TOTAL EMPLOYEES)					
ATECO section	2001	2011	2015	2019	2023
B. Extraction of minerals from quarries and mines	0.2	0.2	0.1	0.1	0.1
C. Manufacturing	30.8	23.7	22.1	21.5	20.7
D. Supply of electricity, gas, steam and air conditioning	0.7	0.5	0.5	0.5	0.5
E. Water supply; sewerage networks, waste management and sanitation	0.8	1.1	1.2	1.2	1.2
F. Construction	9.9	9.8	8.1	7.5	8.6
G. Wholesale and retail trade; repair of motor vehicles and motorcycles	19.8	21.1	20.4	19.8	18.7
H. Transport and storage	6.7	6.7	6.7	6.5	6.4
I. Accommodation and food service activities	5.5	7.5	8.1	9.1	8.9
J. Information and communication services	3.6	3.3	3.3	3.3	3.5
K. Financial and insurance activities	3.8	3.7	3.5	3.1	2.9
L. Real estate activities	1.4	1.7	1.8	1.8	1.6
M. Professional, scientific and technical activities	6.1	7.2	7.5	7.5	8.4

N. Administrative and support service activities	4.9	6.4	7.2	8.0	8.2
P. Education	0.4	0.5	0.6	0.7	0.8
Q. Health and social care	2.4	3.2	5.0	5.3	5.7
R. Arts, sports, entertainment and recreation	0.8	1.0	1.0	1.1	1.1
S. Other service activities	2.4	2.6	2.8	2.7	2.6
Manufacturing	30.8	23.7	22.1	21.5	20.7
Services	57.5	64.7	67.9	69.2	68.9
Mining, Utilities and Construction	11.6	11.5	9.9	9.3	10.4
Total	100.0	100.0	100.0	100.0	100.0

Source: IDEA analysis based on data from the Industry and Services Censuses (2001, 2011) and Istat ASIA (2015, 2019, 2023).

Within the services sector, however, the restructuring of the employment landscape is characterised by varying trends. Between 2001 and 2023, there was a significant increase in the share of professional, scientific and technical activities; Administrative and support service activities; accommodation and food services; and health and social care.

The first two sectors show almost constant growth throughout the entire period under review: professional, scientific and technical activities rose from 6.1 percent to 8.4 percent of the total workforce, while rental services, travel agencies and Administrative and support service activities increased from 4.9 percent to 8.2 percent. Accommodation and food service activities also show strong growth over the period as a whole, rising from 5.5 percent in 2001 to 9.1 percent in 2019. However, a slight decline is observed in the final time period, with the share falling to 8.9 percent in 2023. Healthcare and social care, on the other hand, show particularly marked and essentially continuous growth, rising from 2.4 percent in 2001 to 5.7 percent in 2023.

Other components of the service sector, on the other hand, show greater stability. Information and communication services maintain a share that remains essentially unchanged over the period, fluctuating between 3.3 percent and 3.6 percent, while real estate activities, following an increase from 1.4 percent in 2001 to 1.8 percent in 2015 and 2019, recorded a slight decline in the latter period, standing at 1.6 percent in 2023. The retail sector

shows a different trend: after its share increased between 2001 and 2011, rising from 19.8 percent to 21.1 percent, it has gradually declined to reach 18.7 percent in 2023.

Financial and insurance activities show a clear downward trend, with an almost continuous decline in their share of total employment, from 3.8 percent in 2001 to 2.9 percent in 2023. Overall, the internal restructuring within the tertiary sector thus reveals a shift in the employment balance towards professional and business support activities, as well as towards healthcare, care and hospitality-related services, against a relative decline in trade and, more markedly, in financial and insurance activities.

Turning to the relative percentage changes (Table 1.3), overall, the number of employees in local units increased by 14.5 percent between 2015 and 2023, with a very similar trend in the two sub-periods under consideration: +7.0 percent between 2015 and 2019 and +6.9 percent between 2019 and 2023. Overall, between 2015 and 2023, the number of employees in local manufacturing units increased by 6.9 percent and those in services by 16.1 percent.

Particularly significant increases are evident in certain service sectors. The greatest growth is recorded in Education (P), with an increase in the number of employees of around 48 percent. This is followed by certain activities characterised by a significant knowledge component, such as professional, scientific and technical activities (M) and those relating to health and social care (Q), both of which fall under knowledge-intensive services (KIS⁵), while section N – Administrative and support service activities – also shows growth of around 30 percent. Furthermore, the number of employees in artistic, sporting, entertainment and recreational activities (R) and in accommodation and food service activities (I) has increased by around a quarter. In particular, for the latter, growth was concentrated mainly in the period 2015–2019, prior to the pandemic, while in the following four-year period the sector recorded a more modest increase.

Alongside these positive trends, some contractions are evident. The most pronounced concerns mining and quarrying (B), which recorded a fall in the number of employees of around 15 percent over the period 2015–2023, although the absolute change is modest, as this sector accounts for only

⁵ The activities included in the KIS services are listed in detail in Appendix B.

around 0.1 percent of the workforce in 2023. Financial and insurance activities (K) also show a decline of around 6 percent, in line with the reduction in the sector's share already observed in Table 1.2.

If, on the other hand, we consider the absolute changes (Table 1.4), the picture highlights which sectors have contributed most to the overall growth in the number of employees. The most significant increases are recorded in Section N – Administrative and support service activities, with an increase of around 360,000 employees; in professional, scientific and technical activities (M), with an increase of around 350,000; and in accommodation and food service activities (I), with an increase of around 340,000.

Table 1.3. Employees in local units by ATECO section – 2015–2023 period – relative changes.

RELATIVE PERCENTAGE CHANGES			
ATECO section	2015–2019	2019–2023	2015–2023
B. Extraction of minerals from quarries and mines	-5.4	-9.9	-14.7
C. Manufacturing	4.0	2.8	6.9
D. Supply of electricity, gas, steam and air conditioning	-7.3	4.0	-3.6
E. Water supply; sewerage, waste management and sanitation	10.3	10.2	21.6
F. Construction	-0.2	22.5	22.3
G. Wholesale and retail trade; repair of motor vehicles and motorcycles	4.1	0.9	5.0
H. Transport and storage	4.6	4.8	9.6
I. Accommodation and food service activities	20.4	4.5	25.8
J. Information and communication services	7.6	13.2	21.7
K. Financial and insurance activities	-4.3	-1.5	-5.7
L. Real estate activities	3.5	-3.9	-0.6
M. Professional, scientific and technical activities	7.3	19.9	28.6
N. Administrative and support service activities	20.2	9.2	31.3
P. Education	21.2	22.0	47.9
Q. Health and social care	13.8	13.8	29.6
R. Arts, sport, entertainment and recreation	15.1	10.3	26.9
S. Other service activities	5.9	0.7	6.7
Manufacturing	4.0	2.8	6.9
Services	9.0	6.5	16.1
Italian average	7.0	6.9	14.5

Source: IDEA analysis based on Istat data.

Table 1.4. Employees in local units by ATECO section – 2015–2023 period – absolute changes.

ABSOLUTE CHANGES			
ATECO section	2015–2019	2019–2023	2015–2023
B. Extraction of minerals from quarries and mines	-1,254	-2,178	-3,431
C. Manufacturing	143,935	106,528	250,463
D. Supply of electricity, gas, steam and air conditioning	-6,439	3,283	-3,156
E. Water supply; sewerage, waste management and sanitation	19,329	21,200	40,530
F. Construction	-2,441	296,378	293,937
G. Wholesale and retail trade; repair of motor vehicles and motorcycles	137,205	30,395	167,600
H. Transport and storage	50,481	54,134	104,615
I. Accommodation and food service activities	270,550	71,647	342,197
J. Information and communication services	40,776	76,516	117,291
K. Financial and insurance activities	-24,432	-8,358	-32,790
L. Real estate activities	10,384	-12,071	-1,687
M. Professional, scientific and technical activities	89,253	261,414	350,667
N. Administrative and support service activities	235,440	129,389	364,828
P. Education	20,776	26,201	46,977
Q. Health and social care	112,965	128,772	241,737
R. Arts, sport, entertainment and recreation	24,935	19,600	44,535
S. Other service activities	26,739	3,493	30,233
Manufacturing	143,935	106,528	250,463
Services	995,072	781,131	1,776,204
Total	1,148,203	1,206,344	2,354,547

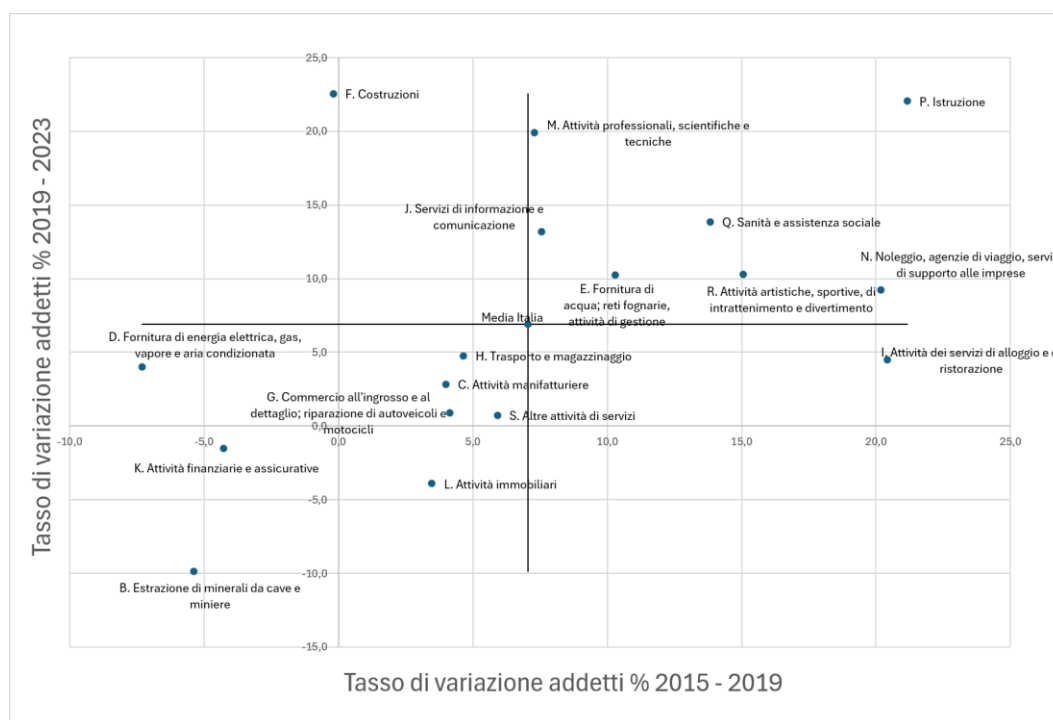
Source: IDEA analysis based on Istat ASIA data.

Significant increases are also being recorded outside the services sector. Over the period 2015–2023, construction (F) increased by around 300,000 employees, while manufacturing (C) recorded an increase of around 250,000 employees. By contrast, the downward trend in financial and

insurance activities (K) continued, as this is one of the few service sectors to record an overall reduction in the number of employees.

A comparison of changes in the number of employees at local units across the two sub-periods, shown in Figure 1.5, highlights further shifts in sectoral trends. Each point on the figure represents a specific ATECO section (letter). The horizontal axis shows the percentage rate of change in the number of employees in local units over the period 2015–2019, while the vertical axis shows the corresponding rate of change over the subsequent period 2019–2023. In general, the changes are consistent across the two periods: in most sections, the number of employees either increased or decreased in both four-year periods. However, there are some significant exceptions, which help to interpret the effects of the pandemic and the subsequent recovery phase.

Figure 1.5. Percentage change in the number of employees in local units, 2015–2019 compared with 2019–2023.



Source: IDEA analysis based on Istat ASIA data.

The case of the construction sector (F) is particularly striking. Following a downward trend in the first period, the sector recorded an increase of over 20 percent in 2019–2023, contributing significantly to the overall growth in

the number of employees. This trend coincided with a period of strong expansion in construction activity and the implementation of incentive measures, including the Superbonus; however, the data used here do not allow us to isolate the causal effect of individual measures. By contrast, the real estate activities (L) followed an opposite trend, growing during the period 2015–2019 before contracting in the four-year period 2019–2023. This highlights how the trend in employment was not uniform even within the sectors linked to the real estate and construction markets.

Finally, the accommodation and food services sector (I) deserves particular attention. The number of employees grew by over 20 percent in the period 2015–2019, while in the four-year period 2019–2023, despite the pandemic crisis, the sector continued to record positive growth, albeit at a lower rate than that of the economy as a whole. The ‘Information and Communication Services’ and ‘Professional, Scientific and Technical Activities’ sections, which include a significant share of PROM activities⁶, both grew significantly in both sub-periods.

1.2. Employees in local units in manufacturing and services by technology and knowledge intensity

To complement and explore in greater depth the trends described using the ATECO classifications, an analysis was carried out of employees in local units of enterprises in Italy, categorised according to the sectoral classifications adopted by Eurostat in relation to different levels of technological and knowledge intensity. To this end, specific analyses were carried out on employees engaged in high-technology (High-End Technology – HET) and low-technology (Low-End Technology – LET) manufacturing activities, categories which encompass a significant share of the activities associated with the so-called ‘Made in Italy’ label. For the services sector, the analysis distinguished between employees engaged in less knowledge-intensive services (Less Knowledge-Intensive Services – L-KIS) and those employed in knowledge-intensive services (Knowledge-Intensive Services – KIS). Within the KIS sector, high-tech knowledge-intensive services (High-Tech Knowledge-Intensive Services – HT-KIS)

⁶ The activities covered by PROM are listed in detail in Appendix A.

were also identified, characterised by a combination of high knowledge content and high technological intensity⁷.

Finally, separate data were compiled on the employees in activities relating to multi-utilities, the extractive industry and the construction sector, grouped under the MUC (Mining, Utilities and Construction) category. This aggregate comprises the main economic activities not included in the previous classifications, with the exception of agriculture.

Using the data on employees in local units available at the ATECO division level (2-digit), and by applying the correspondence tables between ATECO divisions and sections and between the ATECO classification and the Eurostat classification set out in Appendix B, it was possible to assign each economic activity to its relevant reference category and proceed with the subsequent aggregation of employees. The results of these analyses are presented in the following tables (1.6 to 1.9); Table 1.6 shows the absolute figures for employees in local units broken down by Eurostat classifications. Tables 1.7, 1.8 and 1.9 present, respectively, their composition relative to the total number of employees, the absolute changes and the relative changes, with particular reference to the period 2015–2023.

Table 1.6 and the following tables show the composition of the workforce not only according to individual Eurostat classifications, but also by grouping them into macro-categories, distinguishing between technology-intensive manufacturing and other manufacturing, and between knowledge-intensive services and other services. In particular:

- The ‘High-end Technology Manufacturing’ macro-group (also referred to as ‘Technology Manufacturing’) comprises high-technology and medium-high-technology manufacturing;
- the ‘Other Manufacturing’ macro-group comprises medium-low-technology and low-technology manufacturing;
- the ‘Knowledge-Intensive Services (KIS)’ macro-group comprises high-tech knowledge-intensive services, knowledge-intensive

⁷ The individual economic activities included in the categories *High-end Technology* (HET), *Low-end Technology* (LET), *Knowledge-Intensive Services* (KIS), *Less Knowledge-Intensive Services* (L-KIS) and *Mining, Utilities and Construction* (MUC) are set out in detail (with their respective ATECO codes) in the tables in Appendix B.

financial services, knowledge-intensive market services and other knowledge-intensive services;

- the ‘Other services’ macro-group comprises less knowledge-intensive market services and other less knowledge-intensive services.

Table 1.6. Employees in local units by Eurostat classification, 2001–2023.

EMPLOYEES – ABSOLUTE FIGURES					
Eurostat group	2001	2011	2015	2019	2023
high-tech	208,350	175,761	154,499	159,511	166,518
medium-high-technology	1,009,737	980,351	943,046	994,218	1,019,165
medium-low-technology	1,634,244	1,227,365	1,127,429	1,186,771	1,262,467
low-technology	1,960,895	1,497,574	1,383,050	1,411,460	1,410,338
high-tech knowledge-intensive services	533,203	522,189	532,136	580,769	670,546
knowledge-intensive financial services	588,851	597,164	570,617	546,184	537,826
knowledge-intensive market services	1,158,656	1,464,855	1,581,393	1,788,041	2,113,153
other knowledge-intensive services	610,868	805,566	1,128,811	1,289,262	146,8143
less knowledge-intensive market services	5,597,149	6,662,273	6,684,550	7,275,303	7,475,643
other less knowledge-intensive services	497,001	538,053	568,011	581,031	576,410
High-end technology manufacturing	1,218,087	1,156,112	1,097,545	1,153,729	1,185,682
Other Manufacturing	3,595,139	2,724,939	2,510,479	2,598,231	2,672,805
Knowledge-Intensive Services (KIS)	2,891,578	3,389,774	3,812,957	4,204,257	4,789,669
Other Services	6,094,150	7,200,326	7,252,561	7,856,333	8,052,053
Mining, Utilities and Construction	1,815,420	1,888,388	1,616,333	1,625,528	1,944,212
Total	15,614,374	16,359,539	16,289,875	17,438,078	18,644,422

Source: ISTAT (ATECO classification) and Eurostat.

Table 1.7. Employees in local units by Eurostat classification – Composition over the period 2001–2023.

COMPOSITION (BASE 100) OF TOTAL EMPLOYEES					
Eurostat group	2001	2011	2015	2019	2023
high-tech	1.3	1.1	0.9	0.9	0.9
medium-high-technology	6.5	6.0	5.8	5.7	5.5
medium-low-technology	10.5	7.5	6.9	6.8	6.8
low-technology	12.6	9.2	8.5	8.1	7.6
high-tech knowledge-intensive services	3.4	3.2	3.3	3.3	3.6
knowledge-intensive financial services	3.8	3.7	3.5	3.1	2.9
knowledge-intensive market services	7.4	9.0	9.7	10.3	11.3
other knowledge-intensive services	3.9	4.9	6.9	7.4	7.9
less knowledge-intensive market services	35.8	40.7	41.0	41.7	40.1
other less knowledge-intensive services	3.2	3.3	3.5	3.3	3.1
High-end technology manufacturing	7.8	7.1	6.7	6.6	6.4
Other manufacturing	23.0	16.7	15.4	14.9	14.3
Knowledge-Intensive Services (KIS)	18.5	20.7	23.4	24.1	25.7
Other Services	39.0	44.0	44.5	45.1	43.2
Mining, Utilities and Construction	11.6	11.5	9.9	9.3	10.4
Total	100.0	100.0	100.0	100.0	100.0

Source: IDEA analysis based on data from the Industry and Services Censuses (2001, 2011) and Istat ASIA (2015, 2019, 2023).

Table 1.8. Absolute changes in the number of employees in local units by Eurostat classification, 2015–2023.

ABSOLUTE CHANGES			
Eurostat group	2015–2019	2019–2023	2015–2023
high-technology	5,011	7,007	12,018
medium-high-technology	51,173	24,947	76,119
medium-low-technology	59,342	75,696	135,038
low-technology	28,409	-1,122	27,288
high-tech knowledge-intensive services	48,633	89,777	138,410
knowledge-intensive financial services	-24,432	-8,358	-32,790
knowledge-intensive market services	206,648	325,112	531,760
other knowledge-intensive services	160,451	178,880	339,332
less knowledge-intensive market services	590,752	200,340	791,093
other less knowledge-intensive services	13,020	-4,620	8,400
High-end technology manufacturing	56,184	31,953	88,137
Other manufacturing	87,751	74,575	162,326
Knowledge-Intensive Services (KIS)	391,300	585,412	976,712
Other Services	603,772	195,720	799,492
Mining, Utilities and Construction	9,195	318,684	327,880
Total	1,148,203	1,206,344	2,354,547

Source: IDEA analysis based on data from the Industry and Services Censuses (2001, 2011) and Istat ASIA (2015, 2019, 2023).

Table 1.9. Relative percentage changes in the number of employees in local units by Eurostat classification, 2015–2023.

RELATIVE PERCENTAGE CHANGES			
Eurostat group	2015–2019	2019–2023	2015–2023
high-technology	3.2	4.4	7.8
medium-high-technology	5.4	2.5	8.1
medium-low-technology	5.3	6.4	12.0
low-technology	2.1	-0.1	2.0
high-tech knowledge-intensive services	9.1	15.5	26.0
knowledge-intensive financial services	-4.3	-1.5	-5.7
knowledge-intensive market services	13.1	18.2	33.6
other knowledge-intensive services	14.2	13.9	30.1
less knowledge-intensive market services	8.8	2.8	11.8
other less knowledge-intensive services	2.3	-0.8	1.5
High-end technology manufacturing	5.1	2.8	8.0
Other manufacturing	3.5	2.9	6.5
Knowledge-Intensive Services (KIS)	10.3	13.9	25.6
Other Services	8.3	2.5	11.0
Mining, Utilities and Construction	0.6	19.6	20.3
Total	7.0	6.9	14.5

Source: IDEA analysis based on data from the Industry and Services Censuses (2001, 2011) and Istat ASIA (2015, 2019, 2023).

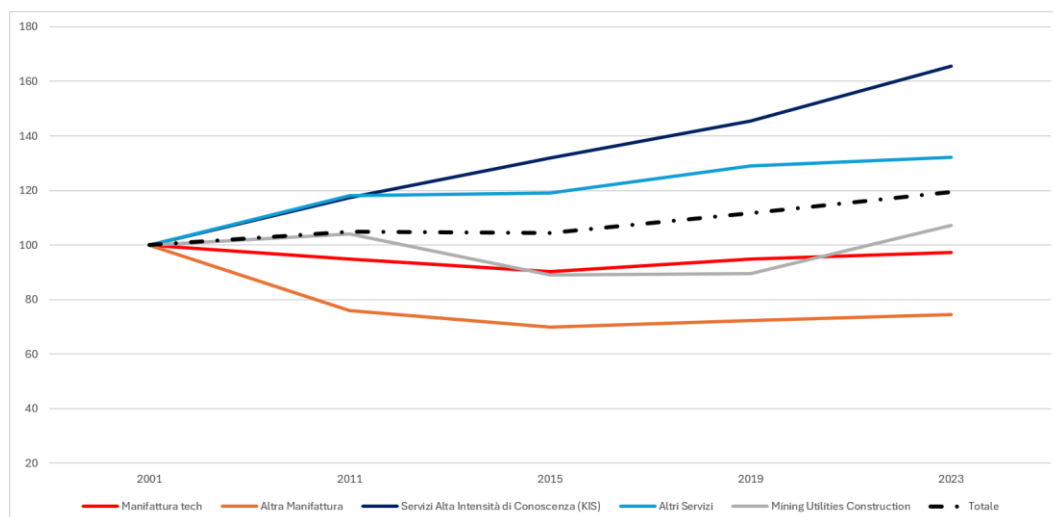
At the level of individual Eurostat classifications, the two that account for more than 10 percent in 2023 both belong to market services (Table 1.7). Less knowledge-intensive market services account for around 40 percent of total employment, while knowledge-intensive market services account for around 11 percent.

As regards manufacturing, the decline is particularly marked in the less technology-intensive manufacturing sectors, falling from 23 percent in 2001 to 14.3 percent in 2023.

Within the services sector, the increase is particularly significant for Knowledge-Intensive Services (KIS), which rise from 18.5 percent to 25.7 percent of the total (Table 1.7), while non-KIS services increase to a more modest extent, from 39.0 percent to 43.2 percent. Significant changes in composition are also observed within KIS: in particular, the share of knowledge-intensive financial services is declining, while the shares of knowledge-intensive market services and other knowledge-intensive services are increasing. Moving from an analysis of composition to one of absolute and relative changes (Tables 1.8 and 1.9), a more nuanced picture emerges. In the 2015–2023 period alone, positive changes were recorded across all sectors, including manufacturing: the number of employees in high-end technology manufacturing increased by around 8 percent, while those in ‘Other manufacturing’ grew by around 6.5 percent, corresponding to absolute changes of approximately +12,000 and +76,000 employees respectively.

At the level of individual Eurostat classifications, the most significant increases are seen within KIS services. Between 2015 and 2023, the number of employees in high-tech knowledge-intensive services increased by around 26 percent, those in knowledge-intensive market services by 34 percent and those in other knowledge-intensive services by 30 percent. The exception is the knowledge-intensive financial services sector, which is instead set to see a decline in the number of employees.

Figure 1.10. Trends in the number of employees in local units over the period 2001–2023. Index figures with 2001 as the base year.



Source: IDEA analysis based on data from the Industry and Services Censuses (2001, 2011) and Istat ASIA (2015, 2019, 2023).

To outline the main long-term trends in the industry and services sectors in Italy, the trend in the number of employees was also analysed according to Eurostat classifications, using index numbers with a base of 100 in 2001. This presentation allows for a direct comparison of the different sectoral trends, distinguishing both the developments recorded over the period 2001–2015 and the changes that have taken place in the more recent period⁸ (see Figure 1.10).

This analysis allows for a clearer understanding of the different trends observed in manufacturing and services during the period under review (Figure 1.10). As regards manufacturing, the sharp contraction observed between 2001 and 2015 was primarily attributable to the non-technological (*non-tech*) segment of the sector. From 2015 onwards, there was a partial recovery in both sub-sectors, although neither has yet returned to the 2001 level of employment.

⁸ For the purposes of this section, it should be noted that the data on employees are drawn from two different sources: the Industry and Services Censuses for 2001 and 2011, and ASIA from 2015 onwards. When comparing years, it should be borne in mind that the census data refer to specific points in time during the reference year, while the ASIA employee figures are annual averages.

As regards the service sector, the growth in the number of employees was particularly marked in KIS services (up by over 60 percent compared with 2001), and, to a lesser extent, in less knowledge-intensive services. If we examine the period 2019–2023 alone, KIS services experienced much stronger growth than less knowledge-intensive services.

Looking at the individual Eurostat groupings (Table 1.11), the most substantial growth over the period under consideration was in ‘other knowledge-intensive services’, where the number of employees reached an index of 240 in 2023, corresponding to a 140 percent increase compared with 2001. Knowledge-intensive market services also show particularly significant growth, reaching an index of 182.

In the case of manufacturing, the decline affects all manufacturing sectors, albeit to varying degrees. The number of employees in the non-technological manufacturing sector fell sharply by 26 percent, from 3,595,139 in 2001 to 2,672,805 in 2023. In the High-end Technology segment, the decline in the number of employees is much more modest, at -3 percent, falling from 1,218,087 in 2001 to 1,185,682 in 2023. The trends in both sectors are partly similar: both recorded a significant initial contraction in 2011, reached their lowest levels in 2015 and rose slightly in subsequent observations.

Table 1.11. Employees in local units by Eurostat classification, 2001–2023 – index figures with 2001 as the base year.

EMPLOYEES – INDEX NUMBERS COMPARED TO 2001					
Eurostat group	2001	2011	2015	2019	2023
high-tech	100	100	74	77	80
medium-high-technology	100	97	93	98	101
medium-low-technology	100	75	69	73	77
low-tech	100	76	71	72	72
high-tech knowledge-intensive services	100	98	100	109	126
knowledge-intensive financial services	100	101	97	93	91
knowledge-intensive market services	100	126	136	154	182
other knowledge-intensive services	100	132	185	211	240
less knowledge-intensive market services	100	119	119	130	134
other less knowledge-intensive services	100	108	114	117	116
High-end technology manufacturing	100	95	90	95	97
Other Manufacturing	100	76	70	72	74
Knowledge-Intensive Services (KIS)	100	117	132	145	166
Other Services	100	118	119	129	132
Mining, Utilities and Construction	100	104	89	90	107
Total	100	105	104	112	119

Source: IDEA analysis based on data from the Industry and Services Censuses (2001, 2011) and Istat ASIA (2015, 2019, 2023).

As regards services, however, there has been widespread growth throughout the entire 2001–2023 period. With the exception of knowledge-intensive financial services, where the number of employees has seen a moderate decline over the long term, reaching an index of 91 in 2023, all the main service sectors show positive growth trends. Growth is particularly strong in knowledge-intensive sectors, especially in ‘other knowledge-intensive services’ and ‘knowledge-intensive market services’.

In the period 2015–2023, there is a marked increase in the number of employees in KIS, amounting to approximately 26 percent. However, non-KIS services also continue to grow: ‘less knowledge-intensive market services’, for example, increase by around 20 percent between 2001 and 2015 and by a further 11 percent between 2015 and 2023.

Overall, the picture therefore highlights a gradual transformation of Italy’s employment structure. The growth in the number of employees is accompanied by a reduction in the relative share of manufacturing and, in parallel, a growing importance of services, particularly those characterised by greater knowledge intensity. This trend is particularly evident in the most recent period, during which employment growth has been concentrated mainly in the KIS sectors, contributing to the progressive shift towards the service sector in Italy’s productive structure.

1.3. Employees in local units and enterprises by size class

The aim of the analysis in this section is to understand and describe the Italian productive structure. Alongside the analysis of local units, an analysis of enterprises⁹ is therefore also presented, both broken down by size class, in order to compare the distribution of employees and the related dynamics across different organisational sizes. The enterprise perspective also allows for an analysis of the business landscape as a set of organisational entities and decision-making centres across the various productive sectors, with particular attention paid to the composition of employees by enterprise size class. The comparison between the two

⁹ According to the definition adopted by Istat in its Glossary, an enterprise corresponds to the ‘smallest combination of legal entities that constitutes an organisational unit for the production of goods and services and enjoys a certain degree of decision-making autonomy’.

perspectives ultimately highlights any differences between the overall size of enterprises and that of the individual local units that comprise them.

Table 1.12 shows the trend, over the period 2001–2023, in the number of employees in local units, broken down by size class; Table 1.13, on the other hand, shows the trend in the number of employees at enterprises over the period 2015–2024, also broken down by size class. It is important to emphasise that, in the case of local units, the size classification adopted in the analysis does not refer to the overall size of the enterprise to which they belong, but rather to the number of employees at the individual local unit. An enterprise may, in fact, consist of several local units, even of different sizes, which are considered separately. The size classification of enterprises, by contrast, takes into account the total number of employees in the enterprise.

The data form the basis for analysing the composition of the workforce in relation to the size of local units and enterprises, and for the subsequent calculation of absolute and relative changes over the periods 2015–2019, 2019–2023 and 2015–2023.

Table 1.12. Employees in local units by size class of local units, 2001–2023 – absolute figures.

EMPLOYEES – ABSOLUTE FIGURES					
Local unit size	2001	2011	2015	2019	2023
Up to 9 employees	7,770,174	8,332,566	8,186,243	8,198,880	8,630,808
10 to 49 employees	3,725,679	3,923,799	3,742,367	4,246,525	4,769,425
50 to 249 employees	2,491,820	2,449,199	2,634,784	3,034,417	3,322,352
250 employees and over	1,626,701	1,653,975	1,726,481	1,958,256	1,921,837
Total	15,614,374	16,359,539	16,289,875	17,438,078	18,644,422

Source: IDEA analysis based on Istat ASIA data.

Table 1.13. Employees by enterprise size class, 2015–2024 – absolute figures.

EMPLOYEES – ABSOLUTE FIGURES				
Enterprise size	2015	2019	2023	2024
Up to 9 employees	7,493,481	7,506,860	7,717,413	7,635,509
10 to 49 employees	3,145,030	3,573,390	3,874,240	3,946,180
50 to 249 employees	2,068,243	2,361,035	2,650,694	2,714,075
250 employees and over	3,583,121	3,996,793	4,402,074	4,550,060
Total	16,289,875	17,438,078	18,644,421	18,845,824

Source: IDEA analysis based on Istat ASIA data.

The distribution of employees (Table 1.12) shows a significant concentration in small and small-to-medium-sized local units. In 2023, around 72 percent of employees worked in local units with fewer than 50 employees, while only around 10 percent worked in local units with more than 250 employees.

Overall, the share of employees by local unit size class remains fairly stable over the long term (Table 1.14). Between 2001 and 2023, no radical changes were observed in the size structure of the workforce, but rather a slight shift in favour of medium-sized local units: the share of the 10–49 and 50–249 employee size classes increased, while the relative share of the smallest local units, with fewer than 10 employees, decreased.

An analysis of the productive structure based on local units also finds parallels when examining enterprises. The breakdown of employees by enterprise size class (Table 1.15) reveals a business structure still strongly characterised by small enterprises. In 2023, in fact, 62 percent of employees were employed in enterprises with fewer than 50 employees, while the remaining 38 percent were concentrated in medium-to-large and large enterprises. However, the distribution shows a gradual shift towards larger size categories: between 2015 and 2023, the share of employees in enterprises with 0–9 employees fell from 46.0% to 41.4%, while that of enterprises with 50–249 employees rose from 12.7% to 14.2%, and, above all, in enterprises with at least 250 employees, from 22.0% to 23.6%.

Consequently, between 2015 and 2023, there was a reduction in the share of the smallest size class (1 to 9 employees), both in terms of local units and

enterprises, and a strengthening of the intermediate size classes. By contrast, the share of large enterprises increased, while the share of local units remained largely unchanged.

Table 1.14. Employees in local units by size class of local units, 2001–2023 – composition.

COMPOSITION (BASE 100) OF THE TOTAL NUMBER OF EMPLOYEES					
Local unit size	2001	2011	2015	2019	2023
Up to 9 employees	49.8	50.9	50.3	47.0	46.3
10 to 49 employees	23.9	24.0	23.0	24.4	25.6
50 to 249 employees	16.0	15.0	16.2	17.4	17.8
250 employees and over	10.4	10.1	10.6	11.2	10.3
Total	100.0	100.0	100.0	100.0	100.0

Source: IDEA analysis based on Istat ASIA data.

Table 1.15. Employees by enterprise size class, 2015–2024 – composition.

COMPOSITION (BASE 100) OF TOTAL EMPLOYEES				
Enterprise size	2015	2019	2023	2024
Up to 9 employees	46.0	43.0	41.4	40.5
10 to 49 employees	19.3	20.5	20.8	20.9
50 to 249 employees	12.7	13.5	14.2	14.4
250 employees and over	22.0	22.9	23.6	24.1
Total	100.0	100.0	100.0	100.0

Source: IDEA analysis based on Istat ASIA data.

An analysis of changes over the most recent period (Table 1.16) reveals differing trends across the size classes of local units, with particularly strong growth among medium-sized local units. Between 2015 and 2023, the number of employees increased across all size classes, but at different rates. The most modest growth was recorded in local units with 0–9 employees (+5.4 percent), while increases were much more substantial in local units with 10–49 employees (+27.4 percent) and 50–249 employees (+26.1

percent). Large local units, with over 250 employees, also recorded an overall increase, albeit a more modest one, of 11.3 percent. This class nevertheless followed a distinctive pattern: while employment increased by 11.3 percent over the period as a whole, the 2019–2023 sub-period recorded a decline of approximately 2 percent, corresponding to a reduction of around 36,000 employees. This trend runs counter to that observed in the other size classes.

Even when focusing the analysis on enterprises, similar trends can be observed between 2015 and 2023. In fact, the number of employees increased predominantly in medium-sized enterprises (+23.2 percent in enterprises with 10–49 employees, +28.2 percent in enterprises with 50–249 employees) and also in those with at least 250 employees (+22.9 percent), compared with much more modest growth of 3.0 percent in enterprises with fewer than 10 employees (Table 1.17). This therefore results in a strengthening of the medium-to-large and large segments of the productive structure, which reduces – though without radically altering – the weight of micro-enterprises. A comparison of the two perspectives, however, reveals a significant difference: the increase in the number of employees in large enterprises (+22.9 percent) is not accompanied by growth of a similar magnitude in local units with over 250 employees (+11.3 percent). This suggests that part of the employment growth in large enterprises has also been distributed across smaller local units, highlighting a greater organisational complexity within these enterprises.

Table 1.16. Employees in local units by size class of local units, 2001–2023 – relative changes.

RELATIVE PERCENTAGE CHANGES			
Local unit size	2015–2019	2019–2023	2015–2023
Up to 9 employees	0.2	5.3	5.4
10 to 49 employees	13.5	12.3	27.4
50 to 249 employees	15.2	9.5	26.1
250 employees and over	13.4	-1.9	11.3
Total	7.0	6.9	14.5

Source: IDEA analysis based on Istat ASIA data.

Table 1.17. Employees by enterprise size class, 2015–2024 – relative changes.

RELATIVE PERCENTAGE CHANGES			
Enterprise size	2015–2019	2019–2023	2015–2023
Up to 9 employees	0.2	2.8	3.0
10 to 49 employees	13.6	8.4	23.2
50 to 249 employees	14.2	12.3	28.2
250 employees and over	11.5	10.1	22.9
Total	7.0	6.9	14.5

Source: IDEA analysis based on Istat ASIA data.

In absolute terms (Table 1.18), growth is particularly significant in medium-sized local units. The 10–49 employees category recorded an increase of around 1 million employees, while the 50–249 employees category increased by around 690,000 employees. The smallest local units, on the other hand, recorded an increase of just under 450,000 employees, largely concentrated in the period 2019–2023. The size class of enterprises that grew the most in absolute terms is the largest one (250 employees and over), confirming that there is not necessarily a correlation between enterprise size and local unit size, particularly in the case of larger enterprises (Table 1.19).

Table 1.18. Employees in local units by size class of local units, 2001–2023 – absolute changes.

ABSOLUTE CHANGES			
Local unit size	2015–2019	2019–2023	2015–2023
Up to 9 employees	12,637	431,927	444,565
10 to 49 employees	504,158	522,901	1,027,059
50 to 249 employees	399,633	287,935	687,568
250 employees and over	231,775	-36,419	195,355
Total	1,148,203	1,206,344	2,354,547

Source: IDEA analysis based on Istat ASIA data.

Table 1.19. Employees by enterprise size class, 2015–2024 – absolute changes.

ABSOLUTE CHANGES			
Enterprise size	2015–2019	2019–2023	2015–2023
Up to 9 employees	13,380	210,553	223,933
10 to 49 employees	428,359	300,850	729,210
50 to 249 employees	292,792	289,659	582,451
250 employees and over	413,673	405,281	818,953
Total	1,148,203	1,206,343	2,354,546

Source: IDEA analysis based on Istat ASIA data.

This initial analysis therefore reveals that the structure of Italian enterprises is still characterised by small and medium-sized enterprises, although large enterprises are gaining ground, albeit to a limited extent.

1.4. Employees by enterprise size class: European comparisons

Table 1.20 reveals a clear difference in the productive structure, in terms of enterprise size, between Italy and the main economies of the European Union. The divergence is particularly marked in comparison with France and Germany, especially with regard to the presence of small enterprises: in Italy, those with fewer than 10 employees account for 41 percent of the total, compared with 28 percent in France and 19 percent in Germany.

Conversely, the share of employees working in large enterprises (over 250 employees) stands at around 24 percent in Italy, while in France and Germany it is almost double that figure. Spain, on the other hand, presents an intermediate situation: the share of employees in small enterprises, with fewer than 10 employees, is essentially similar to that in large enterprises, placing it midway between the Italian model – characterised by a higher share of small enterprises – and the French and German models, which are more concentrated in large enterprises.

Table 1.20. International comparison of the composition of the workforce by enterprise size class.

COMPARISON OF EMPLOYEE DISTRIBUTIONS BY SIZE CLASS – 2024							
Enterprise size	Italy		France		Germany		Spain
Up to 9 employees	41		28		19		34
10 to 49 employees	21		14		20		18
50 to 249 employees	14		12		16		14
250 employees and over	24		46		45		35
Total	100		100		100		100

Source: IDEA analysis based on Eurostat data.

1.5. Employees in local units and enterprises by size class and sector

The following sections present the composition of employees in local units and enterprises by size of the unit of analysis and by distinct levels of technological and knowledge intensity. The data are based on the tables in Appendix C and Appendix D, which show the number and composition of employees in local units and enterprises, broken down by size class and Eurostat sector.

An analysis of the workforce composition reveals a fairly clear relationship between technological intensity and the size of local units in the manufacturing sector. In local units belonging to the high- and medium-high-technology manufacturing sectors, the share of workers employed in large local units – with over 250 employees – stands at approximately 40 percent and 31 percent respectively (Table C.2), figures significantly higher than those observed in the medium-low and low-technology sectors, with percentages rising as technological intensity increases. In the latter sectors, in fact, large local units account for only around 10 percent of the workforce. A similar trend emerges when considering firm size (Table D.2): in the high- and medium-high-tech sectors, approximately 50 percent and 42 percent of employees, respectively, work in firms with over 250 employees, compared with 16 percent in the medium-low-tech sector and 19 percent in the low-tech sector. A clear association therefore emerges between technological intensity and the size of local units: as the technological content of manufacturing increases, so too does the concentration of employees in large local units and enterprises. This phenomenon suggests a greater presence of large production units and enterprises in the most technologically advanced manufacturing sectors.

A similar relationship, albeit less pronounced, also emerges in the services sector. Sectors characterised by higher knowledge intensity do, in fact, have a higher average share of employees working in large local units compared with non-KIS services. Overall, around 13.5 percent of employees in knowledge-intensive services work in local units with over 250 employees, compared with just 6.6 percent in non-KIS services. The difference is also evident when considering firm size: 32.2 percent of KIS employees work in firms with over 250 employees, compared with 21.2 percent in non-KIS services. Within these sectors, however, knowledge-intensive services exhibit varied size structures, both at the level of local units and at the firm level. There is therefore no single size model applicable to KIS as a whole, but rather different configurations depending on the sector.

In the case of financial services, large enterprises predominate: 58.5 percent of employees work in enterprises with over 250 employees. At the local unit level, however, this share falls to around 19 percent, highlighting a marked tendency towards organising work in smaller units. In knowledge-intensive market services, micro-enterprises predominate, accounting for 51.7 percent of employees, but the share of large enterprises is also significant, at 33.0 percent. At the local unit level, micro-enterprises account for around 55 percent of employees, while those with over 250 employees represent around 13 percent. High-tech knowledge-intensive services exhibit a relatively polarised structure. In 2024, 34.9 percent of employees work in large enterprises, while 29.3 percent are employed in micro-enterprises; the intermediate size categories of 10–49 and 50–249 employees account for 18.4 percent and 18.0 percent respectively. This sector is therefore characterised both by the presence of numerous micro-enterprises and by the significant weight of large enterprises. At the local unit level, 22 percent of employees work in large local units, while around 32 percent are employed in small local units. Other knowledge-intensive services, by contrast, have a structure that is more oriented towards small-scale operations. In ‘other knowledge-intensive services’, almost half of the workforce (48.0 percent) is employed in micro-enterprises, while large enterprises account for 21.2 percent. In terms of local units, the respective shares are approximately 53 percent and 8 percent.

In less knowledge-intensive services (L-KIS), the structure is generally fragmented, with a strong presence of micro-enterprises. In less knowledge-intensive market services, these account for 45.3 percent of employees, while in other less knowledge-intensive services the figure rises to as much as 63.5 percent. The same trend is observed for employees in local units, with figures of 52 percent and 68 percent respectively. When considering large enterprises, both groups account for between 21 percent and 24 percent; for local units, however, the shares stand at around 6 percent. Overall, a comparison between manufacturing and services reveals a greater concentration of employees in large enterprises and large local units within the sectors characterised by higher technology or knowledge intensity. The divergence between the percentages of employees in large enterprises and large local units highlights distinct aspects of the productive structure between manufacturing and services. In manufacturing, the share of employees in large enterprises is relatively close to that in large local units (high technology: 50 percent and 40 percent;

medium-high technology: 42 percent and 31 percent). In the services sector, however, the divergence is more pronounced: in KIS, 32 percent of employees work in large enterprises, but only 13.5 percent in large local units, while in non-KIS services the corresponding figures are 20 percent and 6.6 percent respectively. The greater disparity between the two dimensions in the services sector suggests that large enterprises in this sector are more frequently organized into a multitude of relatively small local units.

Cross-referencing the Eurostat group with the size class of local units and enterprises (Tables C.3 and D.3) allows for a further qualification of the trends observed at the aggregate level, highlighting how the growth in the number of employees over the period 2015–2023 varied not only across different economic sectors but also in relation to the size of individual local units. As regards manufacturing, growth appears to be concentrated primarily in medium-sized local units and enterprises. In the high-technology, medium-high-technology and medium-low-technology sectors, the most substantial increases over the period 2015–2023 were in fact recorded in local units with 50–249 employees, amounting to +18.9 percent, +19.7 percent and +24.9 percent respectively. For the number of employees in enterprises, the corresponding increases were +17.1 percent, +20.5 percent and +28.4 percent, highlighting a substantial correspondence between the trends observed in local units and those in enterprises in the 50–249-employee size class.

A notable example is the low-technology manufacturing sector, where the main growth has been in the category with over 250 employees (+26.8 percent for local units and +25.5 percent for enterprises). Across the manufacturing sector as a whole, the period 2015–2023 is also characterised by a decline in the number of employees in micro-enterprises (0–9 employees), both at the local unit level and at the enterprise level, largely irrespective of technological level. In the medium-high-technology and low-technology sectors, for example, the number of employees in micro-enterprises fell by 20.8 percent and 16.2 percent respectively. Growth in manufacturing employment therefore appears to be predominantly associated with medium-to-large enterprises, against a backdrop of general weakness in smaller units.

The trend is different in the services sector, where growth more frequently extends to the smaller size categories as well. In knowledge-intensive

services (KIS), all size categories recorded increases, with particularly marked rises in enterprises and local units with 50–249 employees. The category of over 250 employees shows a significant divergence between enterprises and local units: employment growth reached +32 percent in large enterprises, compared with +14 percent in large local units.

High-tech knowledge-intensive services are experiencing strong growth (+25 percent in the number of employees in enterprises and +26 percent in local units between 2015 and 2023), driven primarily by medium-to-large enterprises (50–249 employees: +58 percent, compared with a 47 percent increase in the number of employees in local units of the same size).

This broad-based growth in KIS is also evident in knowledge-intensive market services, where the increase in the number of employees in enterprises ranges from +18.0 percent in micro-enterprises to +64.4 percent in large enterprises, while in local units it ranges from +23.1 percent in micro-local units to +25.5 percent in large local units. The comparison highlights how, in the services sector, growth in employment affects all size categories across the board and does not depend exclusively on the expansion of larger enterprises. Overall, KIS therefore show more widespread growth across the various size categories than in manufacturing, extending to small and medium-small enterprises as well. Furthermore, in some sectors, the highest increases are concentrated precisely in the intermediate size classes, highlighting a more widespread employment trend compared with that observed in the manufacturing sector.

Non-KIS services also show a positive trend, albeit a more modest one. The number of employees in local units in less knowledge-intensive market services rose by 11.8 percent, with particularly high increases in those with 10–49 (+36.8 percent) and 50–249 employees (+27.2 percent). In the same sector, looking instead at enterprises, growth was recorded in the 10–49 (+30 percent) and 50–249 employees (+32 percent) categories. Other less knowledge-intensive services, by contrast, showed substantial stability (local units +1.5 percent and enterprises +1.1 percent), driven by growth in the 0–9 employee category in both local units and enterprises, against declines in the larger size categories. For the sake of completeness, Tables C.4 and D.4 also show the absolute changes.

Overall, between 2015 and 2023, there is a trend towards a restructuring of the employment structure towards larger enterprises, accompanied by a

reduction in the share of micro-enterprises. This phenomenon is particularly evident in the more technology-intensive manufacturing sectors and in market services, especially those that are highly knowledge-intensive. However, the trend is not uniform: some sectors, in particular other, less knowledge-intensive services, show instead an increase in the concentration of employees in micro-enterprises.

1.6. Production structure in KIS and PROM activities

The analysis of the workforce in knowledge-intensive services is further explored by examining the internal composition of the KIS and the dynamics of the individual activities that make them up. Here too, the distribution of the workforce is analysed with reference to both individual local units and the overall size of enterprises. This section also provides an in-depth analysis of activities within the PROM scope¹⁰, based on the absolute figures for 2023, as well as the absolute and relative changes over the period 2015–2023, which are set out in full in Appendix E. The main results are presented below.

A breakdown of changes in the number of employees by individual ATECO division allows for a more detailed analysis of the trends observed at the level of the macro-groups of knowledge-intensive services. The overall figure, which stands at +25.6 percent between 2015 and 2023, in fact masks very different patterns across individual activities and across the various size classes of local units. Looking in more detail at the KIS divisions, a number of activities stand out first and foremost, characterised by particularly strong growth in the number of employees at both local units and enterprises (Tables E.3 and E.7). These include business management and management consultancy (+94.1 percent in local units and +86.6 percent at enterprises), research and development (+80.7 percent in local units and +76.4 percent at enterprises) and personnel recruitment, selection and supply (+75.8 percent in local units and +75.9 percent at enterprises). These are followed by creative, artistic and entertainment activities (+57.0% in terms of local units and +56.9% in terms of enterprises), software production, IT consultancy and related activities (+48.5% in terms of local units and +46.4% in terms of enterprises), education (+47.9 percent for local units and +48 percent for enterprises), library, archive, museum and other

¹⁰ For a list of PROM activities, please refer to Appendix A.

cultural activities (+47.3 percent for local units and +34 percent for enterprises), veterinary services (+45.9 percent for local units and +46.1 percent for enterprises), non-residential social care (+43.7 percent for local units and +29 percent for enterprises) and film, video, music and sound activities (+42.7 percent for local units and enterprises).

Against the backdrop of this expansion, some sectors, however, are showing a significant reduction in the number of employees. In particular, programming and broadcasting (-49.5 percent) have recorded the sharpest decline, followed by telecommunications (-14.9 percent). The 'knowledge-intensive financial services' group is also the only macro-group to show an overall negative change (-5.7% for local units and -5.8% for enterprises), driven primarily by the performance of financial services (-12.6% for local units and enterprises).

As regards activities falling within the PROM scope, the tables below show their composition by local-unit size (Table 1.21) and enterprise size (Table 1.22). These tables also show the composition of the KIS (knowledge-intensive services) group, of which PROM services are a subset: a comparison of the two sets of data highlights a greater tendency for PROM activities to be concentrated in very small local units.

Table 1.21. Employees in local units within the PROM and KIS scopes, 2023 – absolute figures and composition by local unit size class.

	SIZE CLASS OF LOCAL UNITS				
	0 to 9	10 to 49	50 to 249	250 and over	Total
Employees in PROM division	1,261,578	260,229	178,617	120,538	1,820,961
Employees in KIS division	2,373,398	886,368	884,047	645,855	4,789,669
% of employees in PROM divisions	69.3	14.3	9.8	6.6	100.0
% of employees in KIS divisions	49.6	18.5	18.5	13.5	100.0

Source: IDEA analysis based on Istat ASIA data.

Table 1.22. Employees in enterprises within the PROM and KIS scopes, 2023 – absolute figures and composition by enterprise size class.

ENTERPRISE SIZE CLASS					
	0 to 9	10 to 49	50 to 249	250 and over	Total
Employees in PROM division	1,231,950	230,626	161,166	160,243	1,783,985
Employees in KIS division	2,136,209	550,112	549,235	1,539,206	4,774,763
% of employees in PROM divisions	69.1	12.9	9.0	9.0	100.0
% of employees in KIS divisions	49.6	11.5	11.5	32.5	100.0

Source: IDEA analysis based on Istat ASIA data.

There is clearly a greater tendency for PROM activities to concentrate on very small local units and enterprises. Indeed, only 6.6 percent of employees in local units within the PROM scope in 2023 work in local units with 250 or more employees, while the corresponding share for employees in enterprises is 9 percent. As noted, there is a marked divergence between the share of employees in local units and that relating to enterprises within the KIS grouping as a whole; however, this divergence is less pronounced for the PROM divisions, due to the small size of the enterprises.

1.7. Concluding remarks

The analysis carried out in this chapter, which aims to illustrate the structure and trends of the technology- and knowledge-intensive activities within the productive structure, has yielded the following main findings:

Over the period 2015–2023, the number of employees in local units increased from around 16.3 to 18.6 million (+14.1 percent). Growth was stronger in services (+16.1 percent) than in manufacturing (+6.9 percent), with particularly significant increases in knowledge-intensive services (KIS), which recorded growth of 25.6 percent, and more modest increases in other services (+11 percent).

At sectoral level, the largest relative increases are observed in Education and in professional, scientific and technical activities, while in absolute terms, business support activities, professional, scientific and technical activities, and accommodation and food service activities contribute most to growth.

In terms of size, employment growth is predominantly associated with local units and medium-sized and medium-to-large enterprises, while smaller

local units generally show weaker growth trends. In the KIS sectors, however, growth appears to be more widespread across size classes than in manufacturing, also affecting small and medium small enterprises. Overall, therefore, there is more pronounced growth in sectors characterised by greater knowledge and technology intensity, accompanied by a strengthening of the medium-sized and medium-to-large segments of the productive structure. Indeed, the number of employees in high-end technology manufacturing increased by around 8 percent, while those in the 'Other manufacturing' aggregate grew by around 6.5 percent. Over the same period, knowledge-intensive services increased by 25.6 percent, while other services recorded more modest growth of around 11 percent.

Within the KIS sector, services falling within the remit of the *Confindustria Professioni e Management* (PROM services), which include professional and legal practices, represent a very significant share (around 70 per cent) of employees working in small local units and enterprises.

Chapter 2. Human Capital

This chapter presents an analysis of the composition of the workforce and human capital intensity in the national context, focusing in particular on levels of educational attainment (according to the ISCED classification shown in Table 2.1 below) and the incorporation of knowledge within enterprises.¹¹

Table 2.1. ISCED classification of educational qualifications

ISCED CLASSIFICATION		
Level	Educational qualifications	ISCED classification
Low	No qualifications, primary school certificate, lower secondary school certificate	ISCED 0–2
Intermediate	Vocational qualification, vocational diploma, upper secondary school diploma	ISCED 3–4
High	Bachelor's degree, Master's degree, PhD, postgraduate master's programmes and other tertiary qualifications	ISCED 5–8

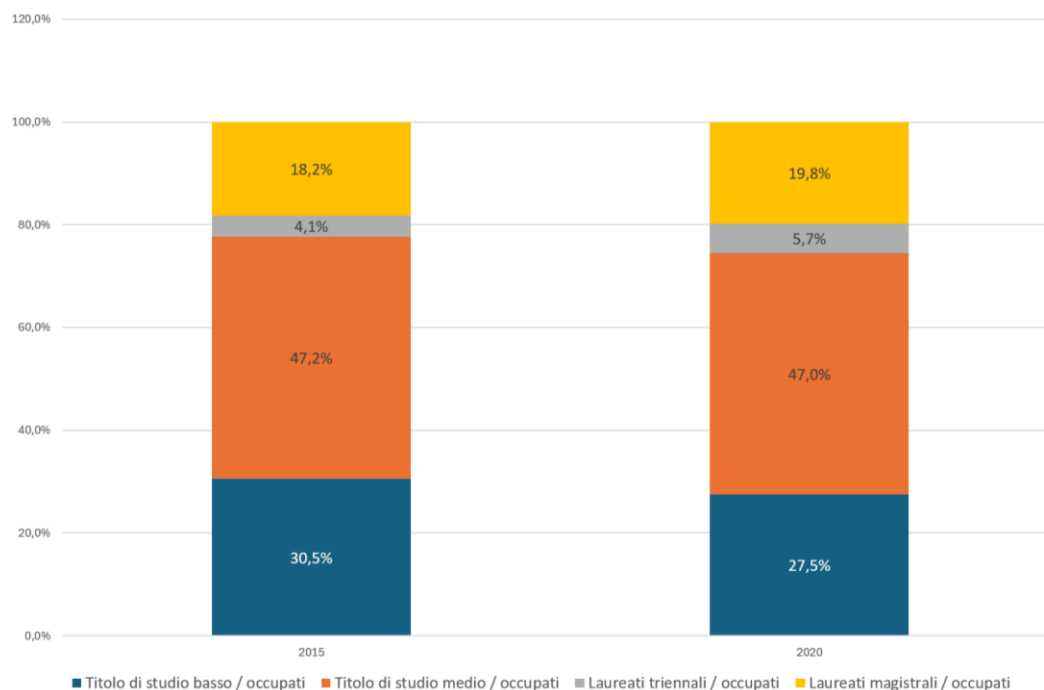
Source: International Standard Classification of Education, UNESCO Institute for Statistics

2.1. The rise in the educational attainment of the workforce

Between 2014 and 2020, the share of the workforce with a low level of educational attainment (Fig. 2.2) fell from 30.8 percent to 27.5 percent, while the share with a medium level of educational attainment fell from 47.7 percent to 47.0 percent. Both tertiary-education categories increased: the share with a bachelor's degree rose from 3.9 per cent to 5.7 per cent, while the share with a master's degree or a PhD rose from 17.6 per cent to 19.8 per cent. Overall, the share of employed people with a degree increased by approximately 4.0 percentage points, from 21.5 percent to 25.5 percent.

¹¹ The indicators measure shares of the workforce rather than absolute levels of employment. Changes are expressed in percentage points.

Figure 2.2 – Composition of the employed population by level of education, 2015–2020.



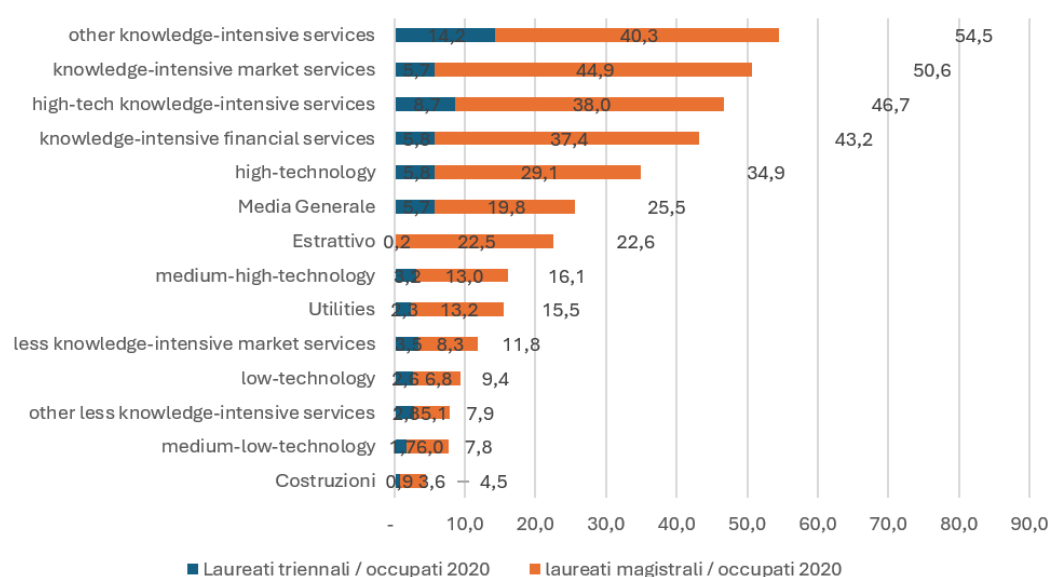
Source: ISTAT, Labour Force Survey, quarterly cross-sectional data.

The change is gradual and does not alter the prevalence of intermediate-level qualifications, which continue to account for almost half of the workforce. The increase in the number of graduates stems from growth in both bachelor's degrees and master's degrees. However, the internal composition of graduates remains skewed towards longer-duration qualifications: overall, the share of master's graduates and PhD holders among all graduates falls from 81.5 percent to 77.7 percent but remains very high.

2.2. Graduates and Eurostat groupings

Overall, the share of graduates among the workforce rose from 22.3 percent in 2015 to 25.5 percent in 2020. However, there are significant variations in these levels. In 2020, the highest figures were observed in other knowledge-intensive services, knowledge-intensive market services, high-tech knowledge-intensive services and knowledge-intensive financial services. Less knowledge-intensive market services and other non-KIS services lagged considerably behind in terms of the share of graduates among the workforce.

Figure 2.3 – Share of graduates in the workforce by technology and knowledge intensity groupings, 2020.



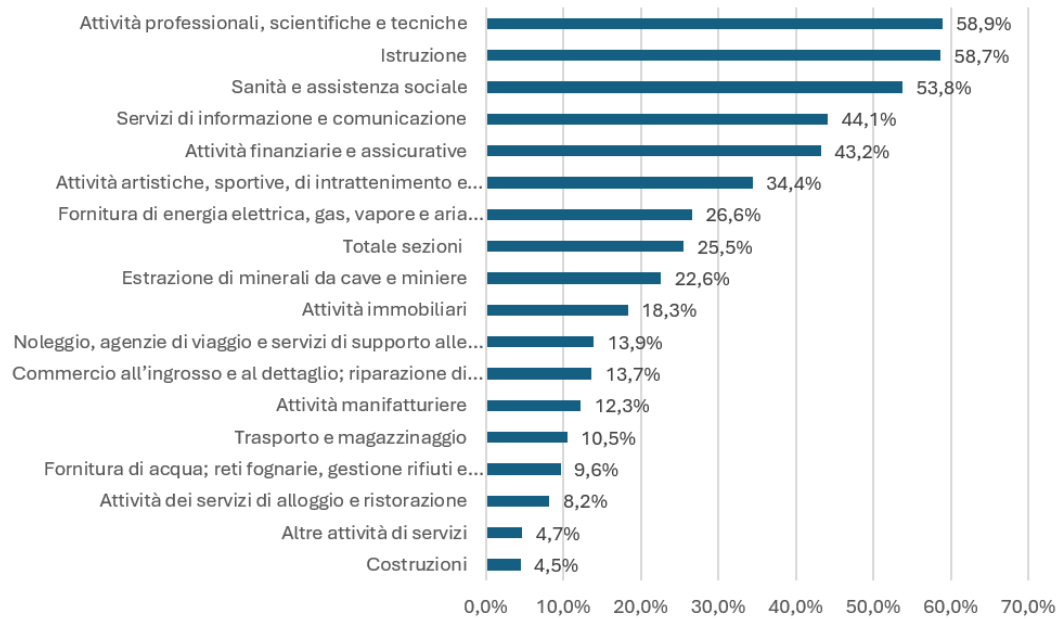
Source: ISTAT, Labour Force Survey, quarterly cross-sectional data.

In 2020, graduates accounted for 50.6 percent of the workforce in knowledge-intensive market services (Figure 2.3), 46.7 percent in high-tech knowledge-intensive services, 43.2 percent in knowledge-intensive financial services and 54.5 percent in other knowledge-intensive services. In less knowledge-intensive market services, the share was 11.8 percent; in other less knowledge-intensive services, it was 7.9 percent.

2.3. The presence of graduates in sectors/divisions

Among the ATECO sections (Fig. 2.4), in 2020 professional, scientific and technical activities accounted for 58.9 percent of graduates among employees, education 58.7 percent, health and social care 53.8 percent, information and communication 44.1 percent, and financial and insurance activities 43.2 percent. At the opposite end of the spectrum are construction, other service activities, accommodation and food service activities, and water and waste management.

Figure 2.4 – Share of graduates among employees by ATECO section, 2020.

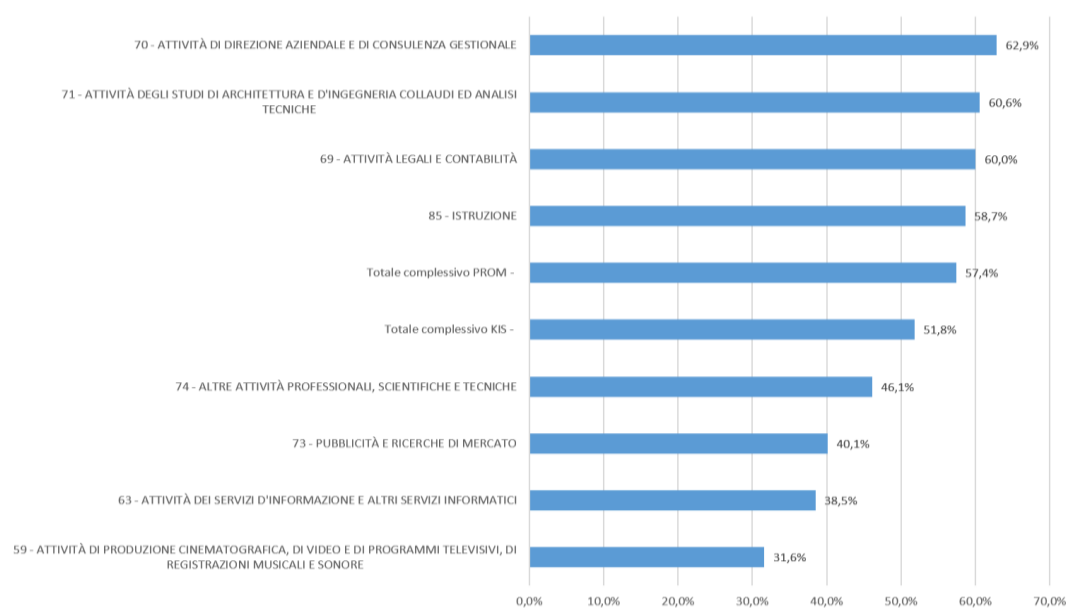


Source: ISTAT, Labour Force Survey, quarterly cross-sectional data.

2.4. The PROM divisions as a lens on knowledge-based professions

The highest shares of graduates in 2020 (Figure 2.5) were found in business management and management consultancy (62.9 percent), in architectural and engineering practices, testing and technical analysis (60.6 percent), in legal and accounting services (60.0 percent) and in education (58.7 percent). Information services account for 38.5 percent; audiovisual production stands at 31.6 percent; advertising and market research stand at around 40 percent. The comparison therefore highlights significant heterogeneity even within the PROM sector; the lowest share is recorded in activities relating to the production of films, videos, television programmes and music recordings.

Figure 2.5 – Share of graduates amongst employees in PROM divisions, 2020.



Source: ISTAT, Labour Force Survey, quarterly cross-sectional data.

Chapter 3. In-depth Analysis: Italy's Lag in Tertiary Education

3.1. A preliminary remark and summary: few graduates and too few jobs for graduates

For at least twenty years, the Italian debate on higher education has been shaped by two empirical observations which, taken separately, are both true but both incomplete. The first notes that Italy has few graduates. The second counters that many graduates hold jobs that do not require a degree, earn modest wages, or leave the country in search of higher pay. In the first case, the solution seems to lie in widening access to university; in the second, in realigning degree programmes with the demands of enterprises, limiting enrolment in fields considered to offer fewer employment prospects, or, alternatively, resigning oneself to the idea that the Italian economy does not need a greater number of highly educated people. However, there may also be another explanation: a country may produce few graduates and, at the same time, make poor use of them.

A European comparison highlights the extent of the lag. In 2025, the share of people aged between 25 and 34 with a tertiary qualification (ISCED levels 5–8) stood at 44.8 percent in the European Union and only 31.1 percent in Italy, which ranked second-last out of the 28 countries considered (including the United Kingdom).¹² Compared with the 24.2 percent recorded in 2014, Italy's progress has been substantial (+6.9 percentage points), but it has not closed the gap because, in the meantime, the number of graduates has increased everywhere¹³. In 2025, 37.8 percent of young Italian women held a tertiary qualification, compared with 24.7 percent of men, while in the EU the figures were 50.5 percent and 39.3 percent respectively. The gender gap is therefore common across Europe, but in Italy it is compounded by a lower starting point for both sexes and a proportionally wider gap.

¹² Eurostat, dataset 'Population by educational attainment level, sex and age' (EDAT_LFSE_03), 2025 data.

¹³ European Commission, (2025), Education and Training Monitor 2025. Italy, Luxembourg, Publications Office of the European Union, section 5.

These figures should be considered alongside employment outcomes. The employment rate for 20–34-year-olds with a tertiary qualification who had left education one to three years previously stood at 78.7 percent in Italy and 87 percent in the EU in 2025. Germany, the Netherlands and Sweden exceeded 91 percent; France stood at 82 percent. Italy's lag therefore concerns not only the number of people obtaining a qualification, but also the ability to integrate them swiftly into the labour market.¹⁴ Nevertheless, the incidence of *overqualification* amongst those in employment with tertiary education (defined by Eurostat as employment in the major ISCO occupational groups 4–9) stood at 21.1 percent, almost identical to the European average of 21.4 percent. Spain, with far more graduates, reached 34 percent, while the Netherlands and Sweden remained below 15 percent.¹⁵ The indicator relates to those who have already found a job and does not take into account the quality of pay or employment contracts; it shows that just over a fifth of employed graduates perform tasks for which a degree is not required, but it does not allow the inference to be extended to the entire population of graduates.

Another issue is whether the most developed sectors and regions correspond to a greater presence of highly educated workers and growth in high-skill activities.¹⁶ The empirical evidence supports this, showing that education, the productive structure and the region move in tandem; however, even here, the supply of graduates may exceed the number of roles in which organisations are able to place them. This, in turn, inevitably leads to mobility to other countries. If a highly educated young person finds an organisation abroad that recognises their expertise, grants them autonomy and offers credible career prospects, including in terms of pay, leaving is a rational choice. However, there is a collective cost, given that the education system has financed a substantial share of their education but is then unable to retain the human capital it has developed – that is, to

¹⁴ Eurostat, dataset 'Employment rates of recent graduates' (EDAT_LFSE_24), 2025 data. The population comprises 20–34-year-olds who completed their highest level of education between one and three years ago, are no longer in education or training, and are in employment.

¹⁵ Eurostat, dataset 'Over-qualification rate by sex, age and citizenship' (LFSA_EOQGAN), 2025 data. For France and Spain, Eurostat notes a difference in definition.

¹⁶ See Fabbris L. and Feltrin P., (2021), 'Education, development and territories: what are the relationships?', in Observatory on the Liberal Professions (ed.), *VI Report on the Liberal Professions in Italy. Year 2021*, pp. 169–178, Milan: Confprofessioni.

generate returns or attract highly qualified foreign nationals capable of offsetting the outflow.

The chapter therefore proceeds on three levels. The first clarifies what is included under the heading of ‘tertiary education’ and why the breakdown by level is crucial. The second extends the quantitative comparison to all EU-27 Member States and the United Kingdom, while retaining a smaller group of national cases for the analysis of institutional frameworks. The third explores the link between education, advanced services, professions and the demand for talent, drawing some policy implications from this. It should also be noted that statistics on tertiary education require at least four caveats. The first is to distinguish between stocks and flows. The share of 25–34-year-olds measures the cumulative outcome of recent cohorts, not the current capacity of universities. The number of annual graduates may increase even as the youth population declines; conversely, a fall in enrolment may reflect demographic contraction rather than a reduced propensity to enrol. The second is to distinguish between qualification attainment and skills. A qualification certifies a course of study, but does not guarantee equivalent levels of *literacy*, *numeracy* or digital skills across countries and institutions. The third is not to confuse field-of-study mismatch, overqualification and low-wage returns: these are distinct phenomena and require different data. The fourth is to consider non-tertiary alternatives. Germany, for example, has a lower tertiary education rate than France, Spain, the Netherlands and Sweden, but has a dual system and higher vocational qualifications that foster robust skills even outside the university system. The ISCED 5–8 rate alone therefore underestimates the overall density of skills in systems where higher vocational education is classified outside the tertiary sector; in other systems, it is not sufficient, on its own, to measure the quality of employment.

3.2. What matters when measuring tertiary education

In everyday language, ‘tertiary education’ and ‘university’ are often used as synonyms. In international statistics, the former term is broader. The ISCED 2011 classification includes short-cycle programmes (level 5), bachelor’s degrees or equivalent qualifications (level 6), master’s degrees or equivalent qualifications (level 7) and doctoral degrees (level 8). The attainment rate used by the European Union combines all four. This is a reasonable approach for comparing the share of the population that has attained a qualification beyond upper-secondary education, even though

the underlying national systems vary considerably.¹⁷ Comparing Italian graduates with their French, German or British counterparts risks lumping together qualifications that differ in duration, selectivity and the institutions awarding them. In particular, it is not possible to distinguish the so-called vocational pathway – which, by definition, is of short duration – from the rest of higher-level tertiary education. In countries where Level 5 (short cycle) is widespread, a substantial share of young people obtains a vocational tertiary qualification in two or, at most, three years. Elsewhere, vocational higher education is classified at Level 6 and is provided by universities of applied sciences or equivalent institutions. In Italy, by contrast, tertiary education has long been almost entirely equated with university, while the ITS – now known as ITS Academy – have only gained institutional and numerical significance in recent years. The result is a system that is overly skewed towards the higher levels: weak in short-cycle and intermediate qualifications, but comparatively less so at master's and doctoral levels.

This is not merely a matter of nomenclature. A system with a robust short-cycle tertiary level offers a less costly entry point in terms of time and resources, lends credibility to higher technical training and terminal qualifications, and enables young people from weaker educational backgrounds to avoid having to choose between leaving school after their diploma and embarking on a lengthy university pathway. The solid presence and legitimacy of these short-cycle tertiary programmes also alter the incentives for enterprises, making it easier to create intermediate technical roles, integrate production and services, and disseminate technical knowledge within small and medium-sized enterprises. Conversely, when the first university qualification (a bachelor's degree) is perceived primarily as a stage of little value, serving only as a stepping stone to a master's degree, this creates the conditions for high drop-out rates and for short-duration university qualifications to have little market value. The bachelor's degree remains nominally valid but is regarded as incomplete in the labour market, including the public sector, where a five-year degree is almost always required. Consequently, students and

¹⁷ UNESCO Institute for Statistics (2012), *International Standard Classification of Education: ISCED 2011*, Montréal; Eurostat, (2026), *Educational attainment statistics*, paper, April 2026.

employers coordinate their expectations around the next qualification (a master's degree) or settle for the lowest level (a secondary school diploma).

It has already been noted that the increase in the number of young Italians has not closed the European gap and that the disparity depends mainly on the distribution across qualification levels. The most anomalous feature is the near-absence of short-cycle programmes and the reduced weight of first-level qualifications compared with the EU average. The problem lies not so much in 'useless degrees' as in the structure of the provision itself. In the absence of a clear, recognisable short-cycle pathway, universities end up absorbing a wide variety of demands: from academic training to access to regulated professions; from the training of mid-level technicians to highly specialised professionals. But when an institution is expected to do everything, it tends to select and certify educational profiles poorly.

Indicators of early school leavers confirm that the problem is not limited to entry alone. According to *Education at a Glance 2025*, in Italy 37 percent of new bachelor's students complete their degree within the standard duration, compared with an OECD average of 43 percent. This figure rises to 51 percent with an additional year and to 56 percent with three additional years; the OECD averages are 59 percent and 70 percent respectively. The drop-out rate after the first year, at 13 percent, is, on the other hand, in line with the OECD average.¹⁸ This suggests that the Italian drop-out problem is not concentrated solely in the initial selection phase. It is a long, drawn-out process. It begins as early as upper secondary school, continues with weak foundational skills, exams taken late, the difficulty of combining work and study, housing costs, educational deficits and poorly organised tutoring. The poor integration between study and work is in itself a significant institutional difference. In 2025, only 5.4 percent of young Italians aged 18–24 were both in employment and engaged in education or training, compared with 21.4 percent in the EU, 35.7 percent in Germany and 55 percent in the Netherlands.¹⁹ This indicator does not correspond

¹⁸ OECD, (2025), *Education at a Glance 2025: OECD Indicators*, Paris, OECD Publishing, country note on Italy, see Figure 3 and Table B5.1. The data refer to the cohort whose theoretical duration ended in 2020 and are affected by the measures adopted during the pandemic.

¹⁹ Eurostat, dataset 'Young people by educational and labour status' (EDAT_LFSE_18), 2025 data. The proportion is calculated based on the entire population aged 18–24 and records participation in formal and non-formal activities in the preceding four weeks.

exactly to the administrative definition of ‘working students’, but the discrepancy is too great to be ignored. In Italy, work tends to interrupt or slow down studies; in dual systems, it can become a recognised component of the training pathway.

A European comparison reveals different models of integration between education and the world of work. Spain demonstrates that a high share of qualifications can coexist with very high levels of overqualification. The Netherlands and Sweden, by contrast, combine high levels of education, rapid entry into the labour market, low levels of overqualification and substantial adult participation in training. Germany combines a more modest share of tertiary education with excellent employment outcomes. France produces many qualifications but exhibits a less seamless transition than the three countries mentioned above. Italy ranks lowest because it combines a low level of qualification attainment with weak initial employment. The breakdown shown in Table 3.1 quantifies what can be described as an ‘upward imbalance’. In 2024, Italy combined an almost non-existent short-cycle programme and a very limited bachelor’s programme with a share of master’s degrees not far removed from that of the other countries. France, Spain and Sweden, on the other hand, built a substantial part of their tertiary base through level 5; Germany and the Netherlands mainly through level 6²⁰.

Broadening the scope reinforces, rather than mitigates, Italy’s distinctiveness. Within the total ISCED 5–8 category, only Romania has a lower share; at the same time, amongst the countries for which a breakdown is available, Italy combines one of the lowest levels 5 with a very low share at level 6. The lag is therefore not caused by a selective comparison with only the strongest systems, but by a structural problem within the national education system.

3.3. A diverse European landscape

Table 3.2 presents four indicators for each country. The first is the total share of young people with a tertiary qualification; the second and third show the

²⁰ OECD, (2025), *op. cit.*, Table A1.2, dataset DSD_EAG_LSO_EA@DF_LSO_NEAC_DISTR_EA, 2024 data. ISCED 5–8 indicates the highest qualification attained. For Cyprus and Malta, which are not included in the OECD breakdown, the total is taken from Eurostat, EDAT_LFSE_03, 2024 data.

gender distribution; the fourth records the employment rate of recent graduates²¹.

The Italian exception takes three forms. The first is quantitative: almost 14 percentage points below the EU average, and amongst the twenty-seven Member States, only Romania has a lower rate. The second relates to gender. Italian women have a 13-point advantage over men, but their level remains lower even than that of men in the European Union. The third concerns the transition: between Italy and Germany, the employment gap for recent graduates is almost 14 points, even wider than the gap in qualifications. The overall picture also shows that high educational attainment and a smooth transition into the labour market do not automatically go hand in hand: Ireland has over 66 percent of young people with tertiary qualifications and a recent employment rate of 92 percent, while Greece has a higher level of educational attainment than Italy but a lower employment rate. It is therefore not enough to look at how many complete their studies; we must ask how quickly and under what conditions the qualification is converted into professional experience.

Table 3.3 adds three indicators that help to interpret the results²² and allow us to distinguish at least four models. The Netherlands and Sweden are

²¹ Eurostat, EDAT_LFSE_03 and EDAT_LFSE_24, 2025 data, extracted on 28 August 2026. EDAT_LFSE_03 covers 25–34-year-olds with an ISCED level of 5–8; EDAT_LFSE_24 covers 20–34-year-olds who left education one to three years ago and are no longer in education or training. Regarding employment, Denmark has a break in the time series, while France and Spain have a difference in definition. For the United Kingdom: OECD Data Explorer, dataset DSD_EAG_LSO_EA@DF_LSO_NEAC_DISTR_EA, age 25–34, ISCED levels 5–8, 2025 data; the UK’s national employment indicator was not used as it relates to a different population. For the United Kingdom, which is no longer covered by the updated Eurostat series, the attainment data are drawn from the harmonised OECD database, while employment outcomes remain unavailable in strictly comparable terms.

²² Overqualification refers to tertiary-educated workers aged 20–64 employed in ISCO groups 4–9. Adult learning measures participation, in the four weeks prior to the interview, in education or training activities. International mobility indicates the proportion of *degree-seeking* tertiary students, i.e. those who have come from abroad to obtain a degree. For this latter indicator, the reference year is 2024. The UK data for 2023, by contrast, uses the OECD category of international or foreign students and should be interpreted as a measure that is similar to, but not identical to, the Eurostat measure. See Eurostat, LFSA_EOQGAN; *Participation rate in education and training (last 4 weeks)* (TRNG_LFSE_01); *Mobile students from abroad enrolled by education level, sex and country of origin* (EDUC_UOE_MOBS03), data for 2024–2025, retrieved on 28 August 2026. For the United Kingdom: OECD, (2025), *op. cit.*: see *United Kingdom*, Table B4.3, data for 2023. The OECD category ‘international or foreign

close to a high-skill equilibrium: many qualifications, high employment, low underutilisation and strong adult learning. Germany achieves an equally high level of employment with a lower tertiary education rate and lower participation in training measured over a four-week period; however, its dual vocational system and non-university higher education mean that a comparison based solely on tertiary qualifications is incomplete. Spain represents a balance of high supply and weaker qualitative absorption: it has many graduates and a recent-graduate employment rate close to the average, but over a third of those with tertiary qualifications are classified in jobs that do not require a degree. France combines a very high level of attainment, international attractiveness and a less favourable transition into employment compared with Northern Europe. Finally, Italy combines low qualification attainment, low employment and reduced attractiveness, while not showing an exceptional rate of overqualification amongst the employed. Wage returns are also more modest. Among those in full-time employment for the whole year, the OECD estimates that in Italy the tertiary qualification premium is 33 percent compared with upper secondary qualifications, compared with an average of 54 percent across member countries, 50 percent in Germany, 49 percent in Spain and 60 percent in France.²³ This is consistent with the incentive to seek a return on investment in education elsewhere.

Table 3.4 compares three indicators that are often used separately: tertiary students as a share of the population aged 20–24, tertiary graduates per thousand inhabitants aged 20–29, and STEM graduates as a share of the same population. The first figure is not an enrolment rate for the 20–24 age group alone: it places all tertiary students in the numerator and the population of that age group in the denominator. It is therefore a summary indicator of the size of the system relative to the potential cohort, also influenced by the duration of studies and the presence of older students. Precisely for this reason, it should be interpreted alongside the output indicators.

students does not correspond exactly to Eurostat's '*degree-mobile*' students; the figure is retained to illustrate the order of magnitude and is reported separately.

²³ OECD, (2025), *op. cit.*, cited Table A4.1. The report compares the earnings from employment of 25–64-year-olds in full-time employment for the whole year, setting upper secondary or post-secondary non-tertiary education at 100.

Italy has 36.6 percent of its residents aged 20–24 enrolled in higher education. This figure places it in the middle of the rankings, close to Denmark, Portugal and France, and does not paint a picture of a system simply lacking in demand. The picture changes when graduates are considered: 60.1 per thousand inhabitants aged 20–29, compared with 97.7 in France, 97.2 in Ireland, 84.3 in Denmark and 79.4 in Spain. The gap between the number of enrolled students and the number of degrees awarded raises issues regarding completion rates, duration of study, drop-out rates during the course and the structure of study programmes. The same problem is evident among STEM graduates. Italy stands at 20.1 per thousand young people aged 20–29: roughly half of Ireland and well below Finland, France and Denmark. Two factors come into play here: the overall size of the graduate cohort and the share of science and technology degrees. The problem in Italy lies not only in persuading more young people to choose STEM subjects, but also in increasing the system’s overall capacity to guide them to a degree. Once again, the issue concerns supply – that is, how tertiary education provision is structured in our country: a policy focused on enrolment figures, without tutoring, support services, financial assistance or effective teaching organisation, risks missing the mark and failing to tackle early school leaving.

Table 3.5 corrects a recurring oversimplification. Italy’s share of STEM graduates, at 23.4 percent, is not exceptionally low: while it lags behind Germany, Austria and the leading Nordic countries, it ranks above Spain, the Netherlands, Belgium and Poland. Italy’s weakness in terms of STEM graduates therefore stems partly from the low overall number of graduates and partly from an unusual disciplinary composition. The end result is that, while the share of STEM graduates out of the total number of graduates is, all things considered, not that low, when applied to a small pool of graduates, it still yields few science and technology graduates. The real anomaly lies in ICT. With 1.6 percent of graduates, Italy ranks last in the table, far behind Luxembourg, Estonia, Finland and Ireland. This figure is more serious than the general rhetoric about the STEM shortage, because it identifies a specific segment: computer science, software, data, networks and communication technologies. These are cross-cutting skills, necessary not only in digital enterprises but also in manufacturing, professional services, healthcare and public administration. The scarcity of ICT graduates reflects a national demand that is not robust enough to make

these careers widespread and attractive. Furthermore, educational provision and the structure of the labour market influence one another.

Economics, business administration and law account for 19.5 percent of degrees in Italy, a lower share than in many countries in Central and Eastern Europe, France and Luxembourg. Healthcare and social care account for 12.6 percent, well below the figures for Belgium, Malta, Finland, Lithuania and the Nordic countries – a fact that should give pause for thought, as the ageing population makes it difficult to imagine that demand for healthcare and social care skills could decline. University planning will therefore have to address two distinct shortages: digital skills, necessary for industrial transformation, and care skills, necessary for public health.

Table 3.6 compares three input indicators: public expenditure on tertiary education as a share of GDP, expenditure per student in purchasing power standards, and research carried out in the university sector as a share of GDP. Italy allocates 0.9 percent of its gross domestic product to tertiary education, compared with 2.2 percent in Denmark, 1.8 percent in Austria and Sweden, 1.6 percent in Belgium and the Netherlands, and 1.5 percent in Finland. Expenditure per student, at 8,321.5 PPS, remains far below the figures for the Nordic countries, Austria, Germany and the Netherlands. In terms of university research, Italy stands at 0.3 percent of GDP, around a third of the Danish level and less than half that of Austria. The point is not to argue that every additional euro automatically produces more graduates or more innovation. It is to recognise that universities are called upon to engage simultaneously on seven fronts: reducing drop-out rates, becoming more international, expanding English-taught courses, strengthening ICT, supporting the right to education, conducting research and collaborating with enterprises. All this is taking place against a comparatively weak financial backdrop due to the well-known problems of public debt. In the future, the demographic downturn could lead to a reduction in funding in line with the decline in student numbers. This would be a short-sighted choice: the shrinking student cohorts can become an opportunity to increase spending per student and improve quality, not a pretext for further squeezing the system.

Table 3.7 is the key element of the entire comparison. The employment rate for 25–29-year-olds with a tertiary qualification in Italy stands at 62.4 percent, the lowest figure among the twenty-eight countries considered. Malta and the Netherlands exceed 91 percent; Poland and Lithuania are just

below that; the United Kingdom reaches 90.2 percent. This gap cannot be explained by the quality of universities alone. It reflects the weakness of the graduate labour market, which depends on the geographical distribution of opportunities, starting salaries and the structure of enterprises. If one looks at the unemployment rate among Italian graduates aged between 25 and 39, which stands at 5 percent, it is not the worst in Europe, given that Greece, Spain, Denmark, Sweden and France have higher figures. The combination of very low employment and unemployment that is not exceptionally high suggests that part of the problem lies outside unemployment in the strict sense and relates to prolonged transitions, discouragement or withdrawal from the national labour market.

A further point of analysis helps to shed light on the issue. The share of graduates in temporary employment, at 19.8 percent, places Italy amongst the highest, close to Finland, Spain and Portugal, and behind the Netherlands. Contractual precariousness is compounded by an even more telling figure: 21.9 percent of those employed in the tertiary sector aged 25–64 is self-employed or freelancer, the highest share in the entire European ranking. This reflects a fragmented productive structure, where high-paying salaried careers are largely out of reach, leading to a shift from business risk to individual risk. The distinction between ‘self-employment by choice’ and ‘self-employment by necessity’ remains one that the data do not allow us to assess, but which should always be borne in mind because, without larger companies, the high share of self-employed graduates risks going hand in hand with low productivity and low incomes.

Demographic projections show a decline in the potential university-age population. Between 2025 and 2035, the population aged 18–24 will increase in Slovenia, Sweden, Malta, Slovakia, the Czech Republic and numerous Eastern European countries; conversely, it will decrease by 4.1 percent in Italy, by 8.9 percent in Denmark, by 10.7 percent in the Netherlands and by 14.8 percent in Portugal. By 2050, Italy’s figure will have fallen by 21.4 percent, in line with Greece and Croatia and slightly less than Lithuania and Latvia. In Italy, the impact of the demographic decline appears more moderate by 2035 but becomes very severe in the long term. Without new students from abroad and without an increase in domestic enrolment, the potential student base for universities will shrink structurally. The solution cannot lie in indiscriminately increasing the number of courses taught in English.

A comparison of demographic scenarios makes it possible to isolate the effect of migration. In the baseline scenario, the Italian population falls by 2.4 percent between 2025 and 2050; in the no-migration scenario, the decline reaches 15.5 percent. However, these figures lead to a second consideration. Migration can sustain the population and university enrolment, but its contribution to human capital depends on the composition and length of stay of the new arrivals. Attracting foreign students amounts to selecting a young population that has already chosen to invest in education and which, while studying, acquires language skills, builds relationships and gains an understanding of institutions. It is one of the most effective channels for skilled immigration. However, the public return on investment in higher education is reduced if, upon graduation, those graduates move to economies offering higher wages, faster career progression and more technologically advanced companies. The same problem applies to Italian graduates. Italy suffers not only from the relatively low number of graduates; it suffers because a share of its qualified young people chooses to work elsewhere. The net balance of human capital therefore depends on four flows: how many Italians graduate; how many Italian graduates leave; how many foreign students arrive; and how many foreign graduates remain.

3.4. The Italian architecture: a system with a narrow base and lengthy pathways

Italy's lag appears to be the cumulative result of a system that progressively narrows the pool of candidates: early inequalities in skills, rigorous selection in secondary education, a transition to university that is socially dependent, weak alternative tertiary provision, late completion of studies and uncertain entry into the labour market. Secondary school plays a particularly strong sorting role: over 70 percent of students graduating from academic secondary schools go on to higher education, while the figure falls below 15 percent for vocational pathways.²⁴ The difference does not merely reflect individual preferences, given that these pathways are linked to social background and the quality of the skills acquired. The choice made at the age of fourteen therefore significantly influences the likelihood of obtaining

²⁴ European Commission, (2026), *Education and Training Monitor 2025. Italy*, op. cit., section 5.

a tertiary qualification ten years later. The influence of family background remains high even when the type of qualification is the same. The European Commission reports a 77 percent gap in higher education enrolment in Italy between young people from families where both parents hold a degree and those whose parents have at most a secondary school qualification²⁵.

Against this backdrop, the growth of the ITS Academies represents an important step in the right direction but is not yet sufficient to alter the overall structure. The limitation lies in the still far too small number of graduates: a pathway currently serving only a few tens of thousands of students cannot yet fulfil the systemic role that short-cycle programmes and applied universities play in other countries.

The weakness of the short-cycle programmes is compounded by the ambiguity of the bachelor's degree. In many courses, the curriculum has been created by compressing the old four- or five-year programmes, without redesigning them around a distinct professional profile. Enterprises have continued to favour master's graduates for positions that, in other systems, are filled by bachelor's graduates. Consequently, students have responded either by continuing their studies or by dropping out from the outset. Finally, the architecture of the system must be assessed in the light of demographic trends. Italy's working-age population is projected to fall from 37.4 million in 2024 to 31.6 million in 2050.²⁶ A smaller cohort of young people makes it both easier and more urgent to raise the share of graduates: easier because the absolute number of places required is growing at a slower rate; more urgent because every instance of a student failing to complete their degree weighs more heavily on the skills base. However, demographic trends also reduce the potential demand at certain institutions, particularly in inland and southern areas, and may trigger a vicious circle of reduced provision, student migration and further regional decline.

3.5. From the supply of education to the organised demand for talent

The time has come to examine the relationship between human capital and the productive structure, based on a dataset that cross-references 78 ATECO

²⁵ Ibid., based on data from the UniCredit Foundation (2025), **Smoothing the Path from Compulsory to Tertiary Education in Europe**.

²⁶ Ibid., section 5, based on Eurostat, PROJ_23NP.

categories and ten indicators, and a second regional dataset comprising twenty territorial units and thirteen indicators. The hypotheses concern the level of skills in developed and growing sectors, the prevalence of self-employment, the relationship between human capital and regional income, territorial differences and the role of metropolitan areas²⁷. Between the two-year periods 2011–2012 and 2018–2019, the share of workers with a tertiary qualification in the sectors under consideration rose from 18 percent to 23.3 percent, representing a 29.5 percent increase. The share of workers in higher-level occupations rose to 17.4 percent, while the number of self-employed workers fell. Among the latter, however, the share with a university education reached 26.6 percent and grew by a third; the presence of self-employed workers in high-skill sectors also increased.²⁸ Self-employment was shrinking in quantitative terms, but the average level of education amongst the self-employed was rising. This is the same transformation that, in subsequent years, would increasingly distinguish qualified professional self-employment from residual self-employment.

In the sectoral dataset considered, the correlation between the presence of higher qualifications and high-level occupations was very high, at 0.89. The figure shows that occupational classification and human capital tend to move in tandem, but it describes a bivariate relationship and does not identify a causal link. However, the share of educated workers exceeded that of jobs classified as higher-level: a portion of the labour supply was absorbed into lower-level roles.²⁹ This discrepancy does not undermine the value of education but clearly illustrates how the organisation of production does not automatically adapt to the availability of skills. This finding is consistent with the literature on the relationship between education and technology but emphasises its institutional and territorial dimensions. The ‘race’ between education and technological change described by Goldin and Katz implies that the supply of skills must keep pace with innovation; the task-based analysis by Autor and by Acemoglu and Restrepo shows that automation replaces some activities while creating others; Moretti’s geography of work highlights the cumulative effects of

²⁷ Fabbris L. and Feltrin P., (2021), *op. cit.*

²⁸ *Ibid.*, p. 172. The changes are calculated between the two-year periods 2011–2012 and 2018–2019.

²⁹ *Ibid.*, pp. 172–173.

concentrations of human capital³⁰. The available data reveal a recurring complementarity: sectors with the most human capital are also those in which research, technology, professional responsibility and business services carry the greatest weight. It is not any single variable that explains productivity, but their combined effect. A shortage of specialists reduces the capacity to adopt technology; low adoption reduces the demand for specialists; organisations with little delegated decision-making make both less viable. This creates an equilibrium characterised by low demand for knowledge, which is associated with lower average levels of productivity.

As is well known, the causes of Italian stagnation are low labour productivity in increasingly service-based economies, the belated adoption of information technologies, a traditional specialisation based on small-scale operations, and the persistent 'southern divide'. The problem is not small enterprises as such, but the transformation of a historically successful phase into a permanent model. 'Flexible specialisation' and the 'Third Italy' were an effective response during the transition away from Fordism; on their own, however, they do not guarantee competitiveness in an economy where data, research and platforms generate high fixed costs and economies of scale. A historical breakdown is useful. In the second half of the twentieth century, the spread of secondary education accompanied industrialisation and the growth of traditional services. In the transition to the twenty-first century, the focus of transformation shifted towards advanced services, highly skilled professions and digital technologies. Tertiary education is no longer merely the channel for producing administrative elites and members of the regulated professions; it has become an integral part of productive capacity. Given that 70–80 percent of gross domestic product and employment is accounted for by the tertiary sector, the issue of national productivity is increasingly played out within the services sector and in the links between services and manufacturing.

³⁰ Goldin, C. and Katz, L. F., (2008), *The Race between Education and Technology*, Cambridge, Mass., Harvard University Press; Autor, D. H., (2015) "Why Are There Still So Many Jobs? The History and Future of Workplace Automation", *Journal of Economic Perspectives*, 29(3), pp. 3–30; Acemoglu, D. and Restrepo, P., (2019) "Automation and New Tasks: How Technology Displaces and Reinstates Labour", *Journal of Economic Perspectives*, 33(2), pp. 3–30; Moretti, E., (2012), *The New Geography of Jobs*, Boston–New York, Houghton Mifflin Harcourt.

There is also an issue regarding the collective return on investment. Italian higher education is predominantly funded by public resources: in 2022, these accounted for 73.6 percent of funding, and in 2024/25, the average contribution at state universities stood at 959 euros per enrolled student, albeit with significant differences between fee-paying and fee-exempt students.³¹ It does not follow that graduates owe a debt of loyalty to the country; freedom of movement remains a benefit of European integration. However, if an international student studies in Italy and immediately relocates their work elsewhere, the university may have achieved a positive financial result and advanced its internationalisation, while the economy has not permanently expanded its skills base.

3.6. Online universities: the Italian route to degrees

As we have seen, Italy's lag is not solely due to the insufficient number of young people entering university but depends on the structure of the tertiary education system: very weak at the short and intermediate levels, relatively less problematic at the higher levels, and built around a stark choice between a school-leaving certificate and a degree lasting at least three years. Within this gap, a solution has emerged that was not specifically planned as such: online universities. They award the same three-year and master's degrees as other universities but lower certain access costs that, in other European systems, are reduced at the undergraduate level through institutional arrangements. For example, online universities reduce constraints relating to location and timetable, make it possible to combine study with work, and enable adults to return to education. Online universities have become, without this having been envisaged by the legislator, the Italian route to expanding access to degree programmes.

Table 3.8 shows a level of growth that now makes it impossible to regard the phenomenon as marginal. Enrolment at the eleven online universities increased from 54,415 in 2014/15 to 309,368 in 2024/25, with their share of

³¹ OECD (2025), *op. cit.*, section 'Financial resources invested in education': 73.6 percent of tertiary funding came from public sources before transfers. Ministry of Universities and Research (2026), *Student fees at universities and AFAM institutions in the 2024/2025 academic year*, Rome, 27 August 2026, pp. 4–7: at state universities, the average fee was 959 euros for all enrolled students and 1,550 euros for fee-paying students only; 38.1 percent were fully exempt. These figures are not directly comparable with OECD expenditure per student, which uses purchasing power parity, full-time equivalent students and includes research.

the total university student population rising from 3.2 percent to 15.3 percent. Over the same decade, the total number of university students increased by 324,595; of these, 254,953 – accounting for 78.5 percent of the increase – were enrolled in online programmes. The contribution to the number of degrees awarded is even more pronounced. The number of distance-learning graduates rose from 7,770 in 2014 to 74,882 in 2024, increasing from 2.5 percent to 18.0 percent of the national total. Of the 107,780 additional graduates recorded over the decade, 67,112 – 62.3 percent – came from distance-learning universities. Without this expansion, Italy's recovery in terms of the number of graduates would have been considerably weaker. Table 3.9 shows that this growth does not affect all subject groups equally. Economics accounts for 16.0 percent of online students; however, the share within the respective national group reaches its highest levels in sports and physical education (52.8 percent), psychology (36.2 percent) and education and training (27.7 percent), while in industrial and information engineering it stands at 12.0 percent. The profile of the students clarifies which demand has been met. In the MUR's Focus on students enrolled on fully distance-learning courses, for the 2021/22 academic year, only 19.2 percent are aged 22 or under; 49.4 percent are aged 30 or over, and 34.1 percent are aged 40 or over. Almost three out of four students are enrolled on a bachelor's degree programme. We are therefore not seeing a simple online replication of the university experience followed immediately after leaving school; on the contrary, online learning reopens interrupted educational pathways, offers a second chance to technical and vocational school leavers, and enables employed and self-employed people to convert their work experience into formal qualifications. It is precisely this function that explains why the share of graduates is higher than that of enrolled students: the student body comprises more mature individuals, often already in employment and focused on obtaining a degree.

The policy issue is therefore not whether to endorse or dismiss the model. We must recognise the democratising role played by online learning. Its growth, however, must not become an excuse for postponing the development of a genuine short-cycle, vocationally-oriented tertiary system. Online learning is successful in increasing the number of graduates, but a human capital policy must also determine what skills a tertiary education system produces and how they are utilised.

3.7. What the European comparison teaches us and what public policies are needed

European examples reveal different combinations of schools, universities, vocational training, industrial relations, welfare and the productive structure. An institution that functions within such a combination may produce different outcomes if taken in isolation. It is therefore useful to draw some lessons from the variety of ways in which the supply and demand for skills are coordinated.

France illustrates the impact of a well-structured tertiary education system. The *'brevets de technicien supérieur'* and university institutes of technology, now organised around the *'bachelor universitaire de technologie'*, offer short or applied courses with a level of recognition that the Italian first-level degree struggles to match. Alongside these operate universities and *grandes écoles*, within a highly stratified system. France's high qualification attainment rate (55.8 percent among 25–34-year-olds in 2025) also depends on this diversity.

Germany, with 40.9 percent of young people holding tertiary qualifications, lies below the EU average, but 92.6 percent of recent tertiary graduates are in employment, and the dual system provides solid qualifications to a wide audience. Some of the technical and managerial skills that elsewhere are developed through tertiary education are acquired via apprenticeships, advanced vocational training and certifications recognised by the social partners. The lesson to be drawn is that the quality of non-academic pathways depends on their links with enterprises, rather than on the label of being an 'alternative to university'.

Spain is another case worth considering: in 2025, over half of young people held a tertiary qualification and the employment rate for recent graduates was 86.2 percent, but 34 percent of those with tertiary qualifications were in jobs classified as non-tertiary. The 2025 *Monitor* identifies it as the country with the highest level of overqualification in the EU.³² The Netherlands and Sweden offer, through different institutions, examples of stronger complementarity. In the Netherlands, the distinction between research universities and *hogescholen* (universities of applied sciences) highlights the diversity of their missions; employment among recent graduates exceeds 92 percent and *overqualification* stands at 13.7 percent. This high level of

³² European Commission (2025), *Education and Training Monitor 2025. Spain*, Luxembourg, Publications Office of the European Union.

attractiveness must be managed in relation to the costs of education, professional needs and retention rates. In Sweden, in addition to high graduation rates and a smooth transition into employment, adult participation in education is striking: 38.2 percent over four weeks and 61.2 percent over twelve months in 2024.³³ Initial education is embedded in a society where it is normal to return to learning periodically.

These comparative cases allow us to formulate four policy recommendations. Firstly, short-cycle qualifications gain value if they lead to recognisable occupations and leave the door open for further study, without becoming a dead end. Secondly, a non-university vocational system can support high-level skills, but only if enterprises and representative bodies guarantee standards and career progression. Thirdly, the increase in qualifications must go hand in hand with growth in skilled employment; otherwise, the cost of adjustment falls on graduates. Fourthly, adult learning is not a separate sector and must be linked to tertiary education.

Let us now turn to the policy recommendations. The first priority is to increase the volume of short-cycle tertiary education. ITS Academies must be able to grow without losing the characteristics that underpin their success. This growth also requires credible pathways to higher education: recognition of credits, access to further study, and the opportunity for an ITS graduate to return to further education after a few years.

The second priority is to ensure that a bachelor's degree is a qualification that can be put to practical use where appropriate. This does not mean making every course vocationally oriented, nor does it mean subordinating universities to short-term forecasts of labour market needs. The reform agenda should be complemented by the recognition of apprenticeships, grants and loans, a reduction in early school leaving, and a clearer differentiation between qualifications.

The third priority concerns tackling early school leaving. OECD data shows that delays accumulate over the course of a student's education. Dedicated tutors are needed in the first two years, catch-up courses before and during enrolment, monitoring of missed exams, genuine part-time options for

³³ Eurostat, TRNG_LFSE_01 and *Participation rate in education and training (last 12 months)* (TRNG_LFS_17), data for 2024–2025, retrieved on 28 August 2026.

those in work, compatible timetables and psychological support services. Scholarships and tuition-fee exemptions must be accompanied by adequate student accommodation. In university towns with severe housing shortages, rent has now become part of the cost of education and can negate the benefit of a grant. Measures relating to student accommodation, transport and rents are not merely ancillary policies, as they influence who can choose a place to study and how much time they can devote to their studies.

The fourth priority is to address the digital bottleneck without reducing the entire policy to a simple count of STEM graduates. In 2024, ICT qualifications accounted for 1.6 percent of Italian tertiary qualifications, compared with 5 percent in the EU; engineering, on the other hand, was broadly in line with the EU average, while the natural sciences were above average.³⁴ The shortfall is specific. We need to strengthen computer science and data science, but also to embed digital skills across economics, law, healthcare, design and the social sciences.

The fifth priority is internationalisation. Accessible courses – including bachelor's programmes in English where the institution's mission and demand justify it – administrative services in multiple languages, fast-track procedures for visas and the recognition of qualifications, accommodation, Italian language tuition, work placements and pathways to employment can transform international students into a structural component of the skills base.

The observations made so far lead to a simple yet demanding conclusion. Italy's lag does not have a single cause and cannot be addressed by a single measure. It is necessary to increase the number of qualifications awarded, address the ICT deficit, strengthen sectors linked to health and care, bring resources into line with the most robust European systems, bridge the gap between university and first employment, and transform the high prevalence of skilled self-employment into a driver of productivity. These policies must be complemented by a demographic and migration strategy capable of attracting students and, above all, retaining them.

³⁴ Eurostat, *Graduates by education level, programme orientation, sex and field of education* (EDUC_UOE_GRAD02), 2024 data, updated 26 August 2026. The shares are calculated on the basis of absolute values.

Table 3.1. Composition of tertiary qualifications among 25–34-year-olds in the 27 EU Member States and the United Kingdom, 2024. Countries ranked in descending order according to the total ISCED 5–8*.

Country	ISCED 5, short-cycle (%)	ISCED 6, bachelor's degree (%)	ISCED 7, Master's degree (%)	ISCED 8, doctoral degree (%)	Total ISCED 5–8 (%)
Ireland	1.7	41.7	21.4	1.4	66.2
Luxembourg	3.6	20.5	38.7	n.a.	64.8
Cyprus	n.a.	n.a.	n.a.	n.a.	60.3
United Kingdom	6.6	35.0	17.4	1.3	60.3
Lithuania	n.a.	41.4	16.5	0.4	58.3
Sweden	11.3	25.6	18.0	1.1	56.0
Netherlands	1.5	30.8	22.4	1.0	55.6
France	12.0	14.8	25.8	0.7	53.4
Spain	15.5	18.5	18.4	0.6	53.0
Denmark	5.2	24.9	20.5	0.7	51.2
Belgium	0.7	27.8	21.5	0.7	50.7
Malta	n.a.	n.a.	n.a.	n.a.	47.1
Poland	n.a.	13.7	31.4	0.4	45.7
Latvia	8.4	24.5	12.3	0.2	45.4
Greece	n.a.	31.2	13.0	0.4	44.5
Austria	15.1	13.6	15.0	0.7	44.4
Estonia	n.a.	22.7	20.3	0.2	43.2

Portugal	1.0	25.1	16.7	0.4	43.2
Slovenia	n.a.	n.a.	n.a.	n.a.	43.1
Bulgaria	n.a.	18.3	21.9	0.3	40.5
Germany	0.3	23.0	15.2	1.1	39.6
Croatia	0.8	11.4	26.8	n.a.	39.4
Finland	n.a.	24.0	14.5	0.4	39.0
Slovakia	0.4	6.9	29.2	0.8	37.2
Czech Republic	0.1	12.8	20.2	0.3	33.5
Hungary	2.5	8.8	20.6	0.4	32.3
Italy	0.3	13.5	17.4	0.4	31.6
Romania	n.a.	23.2	n.a.	n.a.	23.2

Source: OECD, Table A1.2; for Cyprus and Malta, only the total is taken from Eurostat; for Romania, the figure for level 6 includes categories that the OECD does not distinguish.

Table 3.2. Tertiary qualifications and transition to work in the EU-27 and the UK, 2025.

Country	25–34-year-olds with a tertiary qualification (%)	Men (%)	Women (%)	Employment rate of recent tertiary graduates (%)
Ireland	66.8	63.3	70.2	92.7
Luxembourg	65.0	62.3	67.7	92.4
United Kingdom	61.2	57.5	64.7	n.a.
Lithuania	60.8	52.8	69.9	93.2
Cyprus	60.0	51.8	69.1	84.3
Netherlands	56.1	51.6	60.8	92.1
France	55.8	52.3	59.2	82.0 (d)
Sweden	53.6	46.4	61.3	91.1
Belgium	52.7	45.2	60.3	87.8
Denmark	52.5	44.1	61.3	86.4 (b)
Spain	52.5	46.6	58.7	86.2 (d)
Malta	47.7	41.5	56.2	94.1
Poland	45.2	36.3	54.5	92.4
European Union	44.8	39.3	50.5	87.0
Latvia	44.7	35.2	54.7	92.1
Estonia	44.3	33.2	56.2	95.9
Austria	43.7	38.0	49.7	90.8
Greece	42.8	35.4	50.9	66.9

Slovenia	42.8	31.6	55.4	90.9
Portugal	42.5	34.6	50.7	88.0
Croatia	42.0	34.3	50.5	81.8
Bulgaria	41.2	34.6	48.1	90.0
Germany	40.9	38.0	44.1	92.6
Finland	38.2	30.7	46.2	86.5
Slovakia	36.3	27.7	45.3	88.6
Czech Republic	36.0	28.9	43.5	87.1
Hungary	32.6	27.9	37.6	93.2
Italy	31.1	24.7	37.8	78.7
Romania	23.0	21.1	25.2	84.3

Sources: compiled from Eurostat data.

Table 3.3. Skills utilisation, adult learning and international attractiveness in the EU-27 and the United Kingdom. Year 2025, except for international mobility: Eurostat (2024).

Country	Overqualification of employed graduates (%)	Adults aged 25–64 in education/training (%)	Tertiary students from abroad pursuing a degree (%)
Spain	34.0 (d)	15.8	4.6
Greece	31.4	5.2	2.6
Cyprus	27.5	12.0	21.6
Ireland	27.0	14.6	12.2 (d)
Austria	25.8	16.1	20.8
Estonia	23.2	23.8	9.8
European Union	21.4	13.7	9.1
Lithuania	21.4	10.4	11.4
Malta	21.4	19.7	35.6
Italy	21.1	10.8	5.3
Slovakia	20.9	11.9	15.6
Bulgaria	20.7	6.1	7.9 (n/a)
France	20.4 (d)	15.5	9.9
Poland	20.3	8.8	6.8
Latvia	20.2	11.4	14.1
Slovenia	20.0	22.8	11.8
Germany	19.9	9.3	13.4
Belgium	19.7	18.0	8.8
Finland	16.4	28.1	10.5
Portugal	16.4	16.9	12.9
Denmark	16.1	31.0 (b)	9.9
Romania	15.6	10.2	7.0
Sweden	14.6	38.2	7.2
Hungary	14.1	10.6	13.9
Netherlands	13.7	25.9	n.a.

Czech Republic	13.2	11.1	16.7
Croatia	13.0	6.5	3.5
Luxembourg	6.5	17.4	51.5 (d)
United Kingdom	n.a.	n.a.	23.4 (2023)

Sources: compiled from Eurostat data.

Table 3.4. Participation in tertiary education and number of graduates, total and STEM, 2023; United Kingdom, 2019.

Country	Tertiary students / population aged 20– 24 (%)	Tertiary graduates per 1,000 inhabitants aged 20–29	STEM graduates per 1,000 inhabitants aged 20–29
Greece	51.4	59.0	23.1
Slovenia	46.8	63.5	23.3
Croatia	44.1	64.9	22.1
Belgium	41.2	77.5	17.2
Bulgaria	41.2	50.0	16.4
Netherlands	41.2	71.0	16.1
Poland	40.9 (de)	67.9	19.5 (de)
Latvia	40.3	50.4	15.6
Spain	39.9	79.4	23.5
Finland	39.7	59.7	28.8
Lithuania	39.5	60.6	18.1
Czech Republic	39.0	52.7	16.1
Ireland	37.2	97.2 (d)	39.7 (d)

Italy	36.6	60.1	20.1
Denmark	36.1	84.3	26.9
Portugal	36.1	72.2	23.4
France	36.0 (bd)	97.7	27.6
Cyprus	34.4	62.6	12.0
Germany	32.9	53.3	24.2
Slovakia	31.0	51.7	13.0
Austria	30.9	49.9	24.6
Romania	30.6	51.0	19.0
Sweden	30.1	44.5	20.5
Estonia	29.5	42.6	17.2
Hungary	29.2	50.8	15.9
United Kingdom	26.5 (d)	75.9 (d)	26.2 (d)
Malta	25.3	51.1	10.7
Luxembourg	9.0	19.1	6.1

Source: Eurostat.

Table 3.5. *Distribution of tertiary graduates by field of study, 2023; United Kingdom, 2019.*

Country	STEM graduates (%)	ICT graduates (%)	Economics, business and law (%)	Health and social care (%)
Germany	35.5	5.6	24.4	8.0
Austria	30.5	5.6	24.5	10.6
Slovenia	29.9	5.2	19.0	13.8
Finland	29.2	8.3	20.0	21.4
Romania	29.0	7.3	26.8	12.0
Sweden	28.7	7.0	15.6	20.4
Croatia	28.4	5.5	20.9	14.8
Greece	27.5	3.7	19.8	13.1
Portugal	27.4	2.9	22.0	16.9
Estonia	26.5	9.0	22.3	13.9
United Kingdom	26.3 (d)	4.0 (d)	24.1 (d)	13.6 (d)
Ireland	25.5 (d)	8.1 (d)	26.2 (d)	16.2 (d)
Denmark	25.4	6.1	25.2	20.7
France	24.5	3.8	35.7	14.0
Czech Republic	24.4	5.6	18.7	13.4
Luxembourg	24.2	9.7	41.5	5.9
Lithuania	23.7	5.0	25.7	21.4
Italy	23.4	1.6	19.5	12.6

Hungary	21.8	6.2	25.9	8.2
Spain	21.3	5.7	19.3	18.9
Slovakia	20.5	4.8	20.2	18.0
Netherlands	20.2	4.6	27.4	15.3
Bulgaria	20.1	4.9	23.1	12.1
Belgium	19.4	3.0	22.1	26.1
Latvia	19.4	5.9	26.9	19.8
Poland	19.2 (de)	4.8 (de)	26.9 (de)	15.6 (de)
Malta	14.2	5.2	29.7	23.2
Cyprus	11.3	2.8	34.2	8.2

Source: compiled from Eurostat data.

Table 3.6. Public expenditure on tertiary education, expenditure per student and university research. Expenditure: 2022; research: 2023; United Kingdom, 2019.

Country	Public expenditure on tertiary education / GDP (%)	PPS per full-time equivalent student	University R&D expenditure / GDP (%)
Denmark	2.2	21,478.9	1.1
Austria	1.8	16,280.9	0.7
Sweden	1.8	21,014.1	0.8
Belgium	1.6	16,103.7	0.6
Netherlands	1.6	15,237.5	0.6
Finland	1.5	12,540.3	0.8
United Kingdom	1.4	14,471.7	0.4 (p)
Germany	1.3 (p)	14,954.2	0.6
France	1.2	9,738.7	0.5
Malta	1.2	14,641.7	0.2
Estonia	1.1	9,867.5	0.6
Slovenia	1.1	12,263.6	0.3
Spain	1.1 (p)	8,468.1	0.4
Greece	1.0 (p)	2,843.3	0.4
Slovakia	1.0	10,644.0	0.3
Italy	0.9	8,321.5	0.3 (e)
Poland	0.9	8,583.3	0.5
Czech Republic	0.8	8,149.4	0.3

Cyprus	0.8	5,171.1	0.2
Croatia	0.8	5,522.1	0.4
Lithuania	0.8	7,621.3	0.5
Portugal	0.8	5,738.1	0.5
Hungary	0.8	8,924.6	0.2
Bulgaria	0.7	2,866.7	0.1
Ireland	0.7	14,064.0 (d)	0.2 (e)
Latvia	0.7	4,721.9	0.4
Romania	0.7	6,730.6	0.1
Luxembourg	0.4	36,385.5	0.3

Sources: Eurostat.

Table 3.7. Employment, unemployment, temporary work and self-employment amongst the population with a tertiary qualification, 2025; United Kingdom, 2019.

Country	Employment among those aged 25–29 with a tertiary qualification (%)	Unemployment amongst those aged 25–39 with a tertiary qualification (%)	Temporary employment amongst those aged 25–34 with a tertiary qualification (%)	Self-employment amongst those with tertiary qualifications, aged 25–64 (%)
Malta	92.8	2.6	10.1	10.8
Netherlands	91.5	2.9	27.1	17.2
Poland	91.1	1.7	15.7	16.9
Lithuania	90.7	4.2	1.1 (u)	9.0
United Kingdom	90.2	2.2	5.5	13.8
Estonia	89.8	5.8	n.a.	11.4
Hungary	89.3	2.5	1.6	11.8
Ireland	88.1	3.7	8.4	10.3
Romania	88.0	2.2	n.a.	5.9
Latvia	86.7	4.1	n.a.	14.0
Germany	86.6	3.9	17.8	10.6
Cyprus	86.3	4.4	15.7	8.9
Portugal	86.2	5.1	21.7	13.0
Austria	85.2	4.4	11.3	15.0

Bulgaria	85.1	1.8	n.a.	13.7
Slovenia	85.1	3.2 (u)	14.4	12.0
Finland	85.0	5.5	20.0	8.5
France	84.4 (d)	5.9 (d)	13.9 (d)	14.8 (d)
Denmark	84.1	6.7	16.9	5.9
Belgium	83.4	4.4	11.8	15.4
Sweden	83.1	6.1	14.0	6.7
Luxembourg	81.2	5.3 (u)	12.1	8.2
Slovakia	81.2	3.0	3.5	13.4
Czech Republic	79.7	2.0	11.1	14.8
Spain	79.6 (d)	7.0 (d)	20.6 (d)	12.9 (d)
Croatia	77.0	4.0	11.5	9.6
Greece	75.1	9.3	11.1	19.8
Italy	62.4	5.0	19.8	21.9

Sources: analysis based on Eurostat data.

Table 3.8. Enrolments and graduates at online universities: absolute figures and share of the national higher education system.

Academic year: Enrolments / Year of graduation	Online enrolments	Share of students (%)	Online graduates	Share of graduates (%)
2010/11 – 2010	38,352	2.0	3,348	1.2
2014/15 – 2014	54,415	3.2	7,770	2.5
2019/20 – 2019	140,321	7.9	208.84	6.1
2021/22 – 2021	203,201	10.8	40,651	10.9
2024/25 – 2024	309,368	15.3	74,882	18.0

Source: analysis of MUR-USTAT data, National Student Register.

Table 3.9. Enrolments at online universities by subject group, academic year 2024/25.

Subject group	Online enrolments	Share (%)	Share of the national total (%)
Economics	49,558	16.0	18.3
Physical Education and Sports Science	38,953	12.6	52.8
Education and training	38,872	12.6	27.7
Psychology	37,636	12.2	36.2
Legal	36,848	11.9	23.1
Industrial and Information Engineering	29,398	9.5	12.0
Political and Social Sciences and Communication	21,035	6.8	13.0
Linguistics	12,084	3.9	12.7
Literature and Humanities	9,408	3.0	9.4
Other groups	35,576	11.5	5.3

Source: analysis based on MUR-USTAT data, National Student Register.

Chapter 4. Productivity and Structural Change in the Italian Tertiary Sector

This chapter analyses three distinct but interrelated dimensions of economic activity over the period from 2008 to 2023: total hours worked, employment and value added. The combined analysis of these variables – in particular hours worked and value added – allows us to examine economic sectors, at the section level and, with some caveats, at the division level, from a perspective that enables us to compare labour intensity with the overall economic output generated. This type of analysis makes it possible to identify differences between sectors in productivity per hour worked – defined precisely as the ratio of value added to hours worked – to observe how this has varied over time, and how it is distributed across different sectors according to the size class of the enterprise.

It is obvious, but it is nonetheless important to make this clear, that this definition of productivity should not be interpreted as establishing a strict causal relationship between labour and the value generated. In other words, it is incorrect to interpret productivity calculated in this way as the ability of labour to generate value added. This is because, across sectors, not only do the quantity and composition of labour vary, but so do other factors, such as the intensity and quality of capital, the structure of demand, skills, organisation and firm size. Nevertheless, this type of analysis makes it possible to identify processes of decoupling between value added and hours worked, and thus to highlight the significance of other factors not attributable to labour intensity. In the current economic, social and technological climate, which is strongly characterised by tensions on the labour supply side and by the rapidly accelerating diffusion of automation based on generative artificial intelligence, observing these decoupling processes and seeking to understand their determinants is of the utmost importance.

That said, this chapter analyses the dynamics relating to productivity³⁵, adopting three time periods in all time-series analyses: 2008–2015, 2015–

³⁵ Within this chapter, changes in sectoral productivity are analysed in real terms, using chained values, at the section level and for certain divisions. The analysis carried out on

2019 and 2019–2023. This choice distinguishes the long phase of crisis and stabilisation, the pre-pandemic recovery and the transformation following 2019, without attributing an automatic causal significance to these events.

4.1. Changes in employment and value added over time

This section compares the trends over time of the three dimensions (hours worked, number of employees and value added at chained values) and the derived indicator of hourly productivity, at the level of ISTAT economic activity sections³⁶. The aim is to highlight the different trajectories followed by the various sectors in relation to the dimensions considered across the three periods under review. Across all eleven sections (Fig. 4.1), between 2008 and 2015, real value added fell by 10.5 percent, the number of employees by 6.0 percent and hours worked by 11.0 percent. Hourly productivity rose by 0.6 percent. During this period, only the Wholesale and Retail Trade sector saw an increase in value added (+11.4 percent). The sharpest declines were seen in Construction (-36.8 percent) and Transport

groupings of divisions defined according to the Eurostat classification by technological level is, however, based on current prices, as chained value added is not additive.

The chapter also analyses changes in productivity across different size classes. These values are not directly comparable at the same level as real productivity because, in the analysis by section and size class, value added is expressed at factor cost and at current prices, and is related solely to employees' hours worked. This is because value added at factor cost by size class is a statistical estimate of firms' economic performance obtained by integrating tax, administrative and survey data, and does not reflect the full adjustment for under-reporting, irregular employment, illegal activities and other components of the unobserved economy being attributed to individual size classes.

By contrast, the series on value added, employment and hours worked used for the analysis of sections and divisions (but not size classes) are drawn from ISTAT's National Accounts and, for the labour input, refer to the 'Total' employment category – encompassing both regular and irregular employment – in terms of both the number of employees and the number of hours worked. The aggregates therefore include estimates relating to the unobserved economy. Value added in the national accounts inherently incorporates the following adjustments for under-reporting: the use of undeclared labour, undeclared rents, tips, the reconciliation of supply and demand and, in accordance with the conventions of the ESA 2010, illegal activities included within the scope of the National Accounts. Hourly productivity, calculated as the ratio of chained value added to hours worked, is therefore consistent in terms of its coverage of both the observed and unobserved economy.

³⁶ All calculations exclude Section A (Agriculture, forestry and fishing), Sections K and L (Real estate and financial activities) and Sections O to U (Public administration), which are typically excluded from productivity calculations.

(-16.8 percent). Productivity rose most significantly in Retail trade (+22.2 percent) and Manufacturing (+11.4 percent); it fell most notably in Construction (-13.9 percent) and Professional services (-13.2 percent). In 2015–2019, as the economy emerged from the crisis, across all eleven sectors, real value added varied by 8.8 percent, the number of people in employment by 5.9 percent and hours worked by 5.3 percent. Hourly productivity rose by 3.3 percent. The sectors showing the strongest growth in value added were Administrative and support service activities (+17.6 percent), Transport (+13.7 percent), Retail (+9.5 percent), Accommodation and Food Services (+8.2 percent) and Manufacturing (+7.0 percent). Productivity rose most significantly in Retail (+8.2 percent), Transport (+6.4 percent) and Professional services (+4.2 percent), while the decline continued in the Accommodation and food services sector (-3.6 percent) and in support services. Over the period 2019–2023, across all eleven sectors, real value added varied by 9.5 percent, the number of people in employment by 4.1 percent and hours worked by 6.5 percent. Hourly productivity increased by 2.8 percent. In terms of value added, the sectors that stand out are Construction (+48.6 percent), Professional services (+33.0 percent) and Information and communication services (+19.4 percent). Declines were seen in Transport (-1.8 percent) and Accommodation and food services (-1.1 percent). Productivity rose most significantly in Construction (+17.5 percent), Professional services (+14.8 percent) and Information and communication (+6.8 percent). It fell in Accommodation and food services (-7.5 percent), Transport (-3.2 percent) and Manufacturing (-1.2 percent).

Figure 4.1.a. Change in hourly productivity by sector over the period 2008–2015.

Section	Relative rate of change (%)			
	Value added	Employed	Hours worked	Productivity per hour
B – Mining and quarrying	1.9	-15.4	-20.1	27.5
C – Manufacturing	-11.6	-15.8	-20.7	11.4
D – Electricity and gas supply	-28.5	-2.4	-6.8	-23.3
E – Water, sewerage, waste and sanitation	-24.7	4.5	0.1	-24.8
F – Construction	-36.8	-21.3	-26.6	-13.9
G – Wholesale and retail trade	11.4	-4.1	-8.8	22.2
H – Transport and storage	-16.8	-4.8	-6.4	-11.1
I – Accommodation and food service activities	-3.1	10.6	2.3	-5.3
J – Information and communication services	-5.2	-4.1	-7.0	1.9

M – Professional, scientific and technical activities	-11.5	7.2	1.9	-13.2
N – Administrative and support service activities	-3.6	9.7	6.5	-9.5
Total	-10.5	-6.0	-11.0	0.6

Source: Regional Economic Accounts; value added at chained prices.

Note: negative values are shown in red.

Figure 4.1.b. Change in hourly productivity across sectors over the period 2015–2019.

Relative rate of change %				
Sector	2015–2019			
	Value Added	Employed	Hours worked	Productivity per hour
B – Mining and quarrying	35.4	-4.5	-4.6	41.9
C – Manufacturing industry	7.0	3.2	4.1	2.8
D – Electricity and gas supply	14.4	-4.8	-2.2	17.0
E – Water, sewerage, waste and sanitation	4.6	9.1	11.2	-6.0
F – Construction	5.6	-0.9	1.9	3.6
G – Wholesale and retail trade	9.5	3.8	1.2	8.2
H – Transport and storage	13.7	6.0	6.9	6.4
I – Accommodation and food service activities	8.2	16.9	12.3	-3.6
J – Information and communication services	7.1	7.1	7.5	-0.3
M – Professional, scientific and technical activities	6.1	3.0	1.8	4.2
N – Administrative and support service activities	17.6	18.2	21.0	-2.8
Total	8.8	5.9	5.3	3.3

Source: Regional Economic Accounts; value added at chained prices.

Note: negative values are shown in red.

Figure 4.1.c. Change in hourly productivity across sectors over the period 2019–2023.

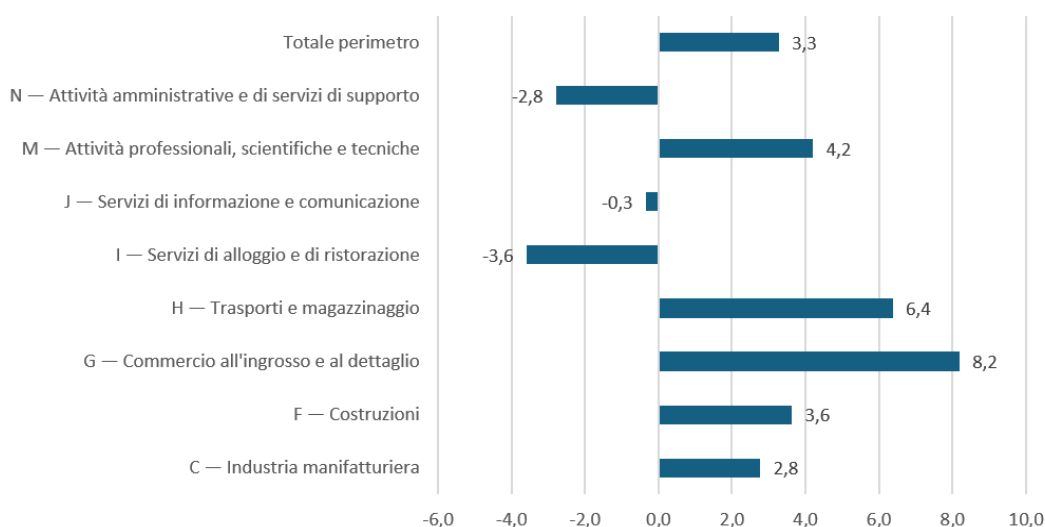
Relative rate of change %				
Sector	2019–2023			
	Value Added	Employed	Hours worked	Productivity per hour
B – Mining and quarrying	-36.8	-14.3	-15.5	-25.2
C – Manufacturing	1.4	0.9	2.6	-1.2
D – Electricity and gas supply	-23.4	3.8	5.2	-27.2
E – Water, sewerage, waste and sanitation	11.0	8.3	10.4	0.6
F – Construction	48.6	17.2	26.4	17.5
G – Wholesale and retail trade	4.8	-1.5	-1.3	6.2
H – Transport and storage	-1.8	2.8	1.4	-3.2
I – Accommodation and food service activities	-1.1	2.9	6.9	-7.5

J – Information and communication services	19.4	8.1	11.8	6.8
M – Professional, scientific and technical activities	33.0	12.3	15.9	14.8
N – Administrative and support service activities	9.0	4.2	7.8	1.1
Total	9.5	4.1	6.5	2.8

Source: Regional Economic Accounts; value added at chained prices.

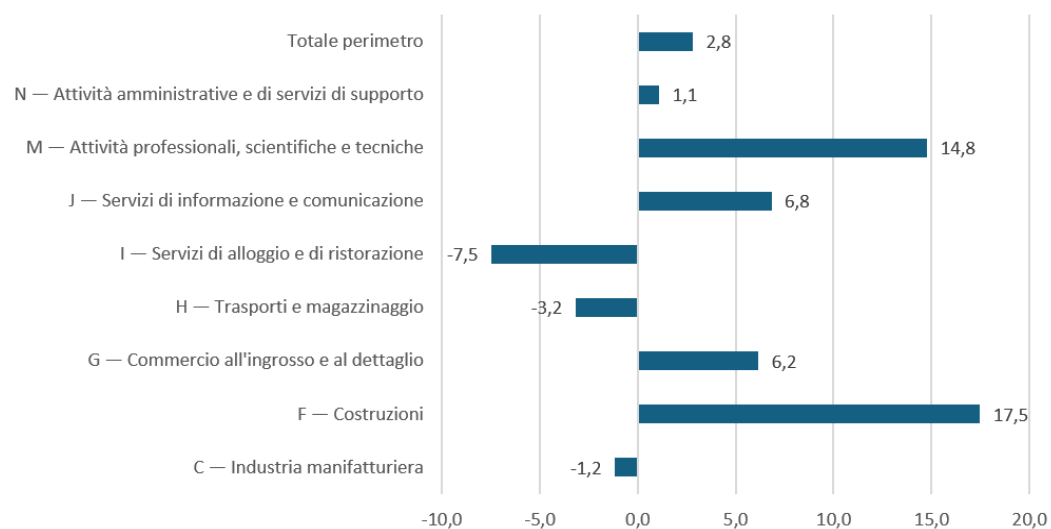
Note: negative values are shown in red.

Figure 4.2. Productivity: relative percentage rate of change 2015–2019



Source: Regional Economic Accounts; value added at chained prices.

Figure 4.3. Productivity: relative percentage rate of change 2019–2023



Source: Regional Economic Accounts; value added at chained values.

A detailed analysis of the ‘PROM’ advanced services divisions³⁷, in relation to the 2008–2015 crisis period, reveals real growth in the Software and IT infrastructure sector (+6.5 percent), the only one to show an upward trend in terms of productivity as well (+4.4 percent).

Table 4.4. Changes in value added, employment, hours worked and hourly productivity in the PROM divisions over the period 2008–2015.

Section	Relative rate of change (%)			
	2008–2015			
	Value Added	Employed	Hours worked	Productivity per hour
Audiovisual production (59_60)	-16.9	-19.0	-14.0	-3.4
Software and IT infrastructure (62–63)	6.5	6.4	2.0	4.4
Legal services, accounting, head offices (69_70)	-10.5	8.0	3.1	-13.2
Architecture and engineering (71)	-11.1	3.8	0.3	-11.4
Advertising and market research (73)	-28.0	1.3	-9.8	-20.2
Other professional activities (74–75)	-19.4	12.2	3.4	-22.1

Source: Regional Economic Accounts; value added at chained prices.

Note: negative values are shown in red.

Table 4.4. Changes in value added, employment, hours worked and hourly productivity in the PROM divisions over the period 2015–2019.

Section	Relative rate of change %			
	2015–2019			
	Value Added	Employed	Hours worked	Productivity per hour
Audiovisual production (59_60)	-9.3	14.9	7.4	-15.6
Software and IT infrastructure (62–63)	7.1	8.9	10.6	-3.2
Legal services, accounting, head offices (69_70)	6.2	1.6	0.3	5.9
Architecture and engineering (71)	-9.6	1.7	-1.3	-8.4
Advertising and market research (73)	74.1	5.0	3.7	67.8
Other professional activities (74–75)	7.0	7.4	7.3	-0.3

Source: Regional Economic Accounts; value added at chained prices.

Note: negative values are shown in red.

³⁷ For a list of PROM activities, please refer to Appendix A.

Table 4.4. Changes in value added, employment, hours worked and hourly productivity in the PROM divisions over the period 2019–2023.

Section	Relative rate of change %			
	2019–2023			
	Value Added	Employed	Hours worked	Productivity per hour
Audiovisual production (59_60)	22.8	13.0	8.8	12.9
Software and IT infrastructure (62–63)	21.7	12.1	16.9	4.1
Legal services, accounting, head offices (69_70)	32.9	17.0	20.9	9.9
Architecture and engineering (71)	56.3	5.9	10.1	42.0
Advertising and market research (73)	99.1	13.1	18.0	68.6
Other professional activities (74–75)	7.2	8.5	9.2	-1.9

Source: Regional Economic Accounts; value added at chained prices.

Note: negative values are shown in red.

In the period 2015–2019, the sectors with the highest real growth were Advertising (+74.1 percent), Software and IT infrastructure (+7.1 percent), and other professional services (+7.0 percent). In terms of productivity, the strongest positive changes were seen in Advertising (+67.8 percent) and legal and accounting services (+5.9 percent); the most significant negative changes were in audiovisual production (-15.6 percent) and architecture and engineering (-8.4 percent).

In the post-pandemic period (2019–2023), the sectors with the highest real growth are Advertising (+99.1 percent), Architecture and Engineering (+56.3 percent), and Legal and Accounting Services (+32.9 percent). In terms of productivity, against a backdrop of almost entirely positive results, Advertising (+68.6 percent) and Architecture and Engineering (+42.0 percent) stand out in particular.

4.2. Productivity by enterprise size class

The analysis by size class (Table 4.5) complements the sectoral results by examining the ratio of value added at factor cost to the hours worked by employees in 2023. The indicator is expressed in current euros per hour and allows for a cross-sectional comparison between size classes in the same year. To make the size gradient more immediately apparent, the table shows, in addition to the absolute values, the indices obtained by setting the class with 10–19 employees to 100.

Table 4.5. Productivity per hour worked by employees, by ATECO section and size class, 2023.

Value added at factor cost per hour worked by employees									
Section	Euro per hour					Index (100= 10–19 employees)			
	0–9	10–19	20–49	50–249	>249	10–19	20–49	50–249	>249
C – Manufacturing	44.2	38.7	44.2	54.2	73.1	100	114	140	189
F – Construction	63.6	44.2	45.7	47.6	53.9	100	103	108	122
G – Wholesale and retail trade;	61.1	42.1	44.4	49.9	50.3	100	105	119	119
H – Transport and warehousing	49.9	37.0	35.2	34.0	50.5	100	95	92	137
I – Accommodation and catering	30.0	26.2	28.3	32.1	29.4	100	108	123	112
J – Information and communication	58.2	39.7	44.7	49.8	74.5	100	113	126	188
M – Professional, scientific and technical activities	168.4	50.9	46.0	47.9	56.4	100	90	94	111
N – Administrative and support service activities	60.3	34.6	31.8	32.6	25.0	100	92	94	72

Source: Structural Business Statistics, ISTAT.

Apparent productivity is calculated as value added at factor cost divided by the number of hours worked by employees. The indices are based on a reference value of 100 for the 10–19 employees category.

Productivity in the 0–9 class is higher³⁸ than that in the 10–19 class across all sectors considered, and reaches a particularly high level in professional, scientific and technical activities. This figure should be interpreted with caution, and is essentially attributable to the fact that the numerator

³⁸ This depends on the very nature of the data contained in the national accounts. In micro-enterprises, characterised by a higher proportion of owners, working partners and other self-employed individuals, a portion of the labour contributing to the production of value added is therefore not represented in the denominator. This may result in an overestimation of apparent productivity per employee hour. For this reason, the assessment of the relationship between size and productivity takes the 10–19 class as its reference.

comprises the total value added produced by the enterprise, while the denominator includes only the hours worked by employees. That said, the results show a particularly clear relationship between size and productivity in manufacturing and in information and communication services. In manufacturing, productivity rises from 38.7 euros per hour in the 10–19 class to 73.1 euros in enterprises with at least 250 employees; in information and communication, it increases from 39.7 to 74.5 euros. In both sectors, the gradient is progressive across all classes following the first, and the productivity of the largest enterprises is nearly double that of the 10–19 class³⁹. In other sectors, the relationship with size appears less uniform. Construction and wholesale and retail trade show a positive but more modest gradient; in transport, the advantage is particularly evident in the largest class; in accommodation and food services, the trend is not monotonic. Professional services show limited differences between size classes, while in Administrative and support service activities, productivity decreases as size increases⁴⁰. The analysis clearly reveals a size-related gradient in productivity: this is not an automatic phenomenon of economies of scale, but it is reasonable to attribute it also to factors such as capital intensity, organisation, innovation and internationalisation.

4.3. Composition of labour and value added by technological and knowledge intensity

The use of Eurostat classifications allows us to examine the composition of the workforce across different sectors, distinguishing activities according to their technological and knowledge intensity. The data have already been presented in Chapter 1 but are reproduced here with some differences⁴¹ in the classifications.

³⁹ The same relationship is also evident in 2019 – a figure not shown here for the sake of brevity – where the index for the largest size class reaches 175.3 in manufacturing and 240.3 in information and communication.

⁴⁰ This figure calls for a degree of caution, as it also includes temporary work agencies, which are typically large firms that account for enormous volumes of hours worked. In other words, the downward trend observed may not reflect lower technical efficiency in large firms, but rather a sectoral composition effect within Section N, strongly influenced by the presence of temporary work agencies.

⁴¹ The sectoral classification adopted here presents value added at current prices, employment and hours for nine non-overlapping components: four Eurostat groupings, sections B, D, E and F separately, and divisions 80–82 grouped under the heading ‘Other

Between 2008 and 2015, the number of *people* employed in *high-end* and *low-end technology* manufacturing fell by 11.4 percent and 17.6 percent respectively; employment in construction fell by 21.3 percent (Table 4.6). KIS, on the other hand, grew by 4.0 percent, increasing its share from 15.1 percent to 16.7 percent. Energy and water/waste management showed more modest trends. In 2015–2019, the recovery in employment was driven by services: KIS +8.1 percent, L-KIS +7.5 percent. *High-end* and *low-end manufacturing* grew by 4.9 percent and 2.6 percent respectively. Construction, mining and energy continued to decline. In 2019–2023, KIS accelerated to +11.8 percent and construction grew by 17.2 percent. *High-end* and *low-end* manufacturing grew by only 1.3 percent and 0.7 percent respectively. L-KIS remained almost stable, at +0.6 percent.

services’. The value added to hours ratio is calculated only for 2023 as a nominal value-added intensity measure: it is not interpreted as real productivity over time, as chained value added data are not available for these groupings.

Table 4.6. Composition and relative change in the workforce.

Group	Employed						
	Composition %				Relative rate of change %		
	2008	2015	2019	2023	2008–2015	2015–2019	2019–2023
High-end technology	7.8%	7.4%	7.3%	7.1%	-11.4%	4.9%	1.3%
Low-end technology	19.6%	17.2%	16.6%	16.1%	-17.6%	2.6%	0.7%
KIS	15.1%	16.7%	17.0%	18.3%	4.0%	8.1%	11.8%
Less-KIS	38.8%	40.9%	41.5%	40.1%	-0.9%	7.5%	0.6%
F Construction	11.9%	9.9%	9.3%	10.5%	-21.3%	-0.9%	17.2%
B Mining	0.2%	0.1%	0.1%	0.1%	-15.4%	-4.5%	-14.3%
D Energy	0.5%	0.5%	0.5%	0.5%	-2.4%	-4.8%	3.8%
E Water and waste	1.2%	1.4%	1.4%	1.5%	4.5%	9.1%	8.3%
Other services	5.0%	6.0%	6.3%	5.9%	11.0%	11.4%	-1.4%
Total	100.0%	100.0%	100.0%	100.0%	-6.0%	5.9%	4.1%
Total number of employees, thousands	16,376	15,386	16,291	16,956			

Source: Regional Economic Accounts.

Note: In all cases, Section A (Agriculture, forestry and fishing), Sections K and L (Financial and insurance activities and Real estate activities) and Sections O to U are excluded from the productivity calculations presented here.

Between 2008 and 2015, the total number of hours worked fell by 11.0 percent (Table 4.7). The decline was particularly sharp in construction (-26.6 percent), in the low-end sector (-22.7 percent) and in the high-end sector (-15.6 percent). KIS hours increased by 1.5 percent, while those for less knowledge-intensive services (L-KIS) fell by 6 percent. Between 2015 and 2019, hours increased by 5.3 percent. KIS, L-KIS and Other services increased by 7.8 percent, 4.8 percent and 13.1 percent respectively. Manufacturing also recovered, particularly *high-end tech* manufacturing. In 2019–2023, total hours worked increased by 6.5 per cent, with construction (+26.4 per cent) and KIS (+14.8 per cent) as the main drivers.

Table 4.7. Composition and relative change in hours worked.

Group	Hours worked						
	Composition %				Relative rate of change %		
	2008	2015	2019	2023	2008–2015	2015–2019	2019–2023
High-end technology	7.8%	7.4%	7.4%	7.2%	-15.6%	5.4%	3.6%
Low-end technology	19.7%	17.1%	16.9%	16.2%	-22.7%	3.6%	2.1%
KIS	14.6%	16.6%	17.0%	18.4%	1.5%	7.8%	14.8%
Less-KIS	40.0%	42.3%	42.1%	40.1%	-6.0%	4.8%	1.4%
F Construction	11.7%	9.6%	9.3%	11.1%	-26.6%	1.9%	26.4%
B Mining	0.2%	0.2%	0.1%	0.1%	-20.1%	-4.6%	-15.5%
D Energy	0.5%	0.5%	0.5%	0.5%	-6.8%	-2.2%	5.2%
E Water and waste	1.2%	1.3%	1.4%	1.4%	0.1%	11.2%	10.4%
Other services	4.3%	4.9%	5.3%	5.1%	1.6%	13.1%	2.4%
Total	100.0%	100.0%	100.0%	100.0%	-11.0%	5.3%	6.5%
Total hours worked, millions	30,417	27,074	28,512	30,361			

Source: Regional Economic Accounts.

Note: In all cases, Section A (Agriculture, forestry and fishing), Sections K and L (Financial and insurance activities and Real estate activities) and Sections O to U are excluded from the productivity calculations presented here.

The composition of current value added (Table 4.8) shows a more stable structure over time than that of labour. In 2023, *high-end* manufacturing accounts for 10.9 percent, *low-end* manufacturing for 17.3 percent, KIS for 19.2 percent and L-KIS for 34.4 percent. In 2023, current value added per hour 58.5 euros in *high-end* manufacturing, 41.4 in *low-end* manufacturing, 40.5 in KIS, 33.3 in L-KIS and 34.8 in construction. The comparison is cross-sectional and nominal; it is not a measure of real dynamics.

Table 4.8. Composition of value added at current prices and value added per hour worked.

Group	Current value added				Current value added per hour
Composition %					
	2008	2015	2019	2023	2023
High-end technology	10.5%	11.0%	11.1%	10.9%	58.5
Low-end technology	18.4%	17.3%	17.2%	17.3%	41.4
KIS	19.6%	19.5%	19.1%	19.2%	40.5
Less-KIS	34.1%	36.6%	37.0%	34.4%	33.3
F Construction	10.1%	7.6%	7.3%	9.9%	34.8
B Mining	0.7%	0.5%	0.4%	0.3%	99.0
D Energy	2.4%	2.1%	2.3%	3.1%	243.9
E Water and waste	1.3%	1.8%	1.8%	1.6%	44.6
Other services	3.0%	3.7%	3.7%	3.3%	25.3
Total	100.00%	100.00%	100.00%	100.00%	38.8

Source: Regional Economic Accounts.

Note: In all cases, Section A (Agriculture, forestry and fishing), Sections K and L (Financial and insurance activities and Real estate activities) and Sections O to U are excluded from the productivity calculations presented here.

4.4. Concluding remarks

The division into three periods confirms that the shift towards the service sector is not uniform. In the first period (2008–2015), the relative growth of KIS took place within a contracting economy; in the second (2015–2019), the recovery mainly involved services; in the third (2019–2023), KIS sectors accelerated while construction recovered strongly in tandem with incentives for the building sector. KIS sectors are the main driver of the restructuring of employment across all phases. The focus on PROM divisions confirms that growth in employment, growth in hours worked and growth in value added are not equivalent. In the period 2019–2023, productivity rises when real output grows faster than hourly input, as in Architecture and Engineering and in Advertising and Market Research; it remains almost stable when the two variables grow at the same rate, as in Software and IT Infrastructure and Legal and Accounting Services; it falls when labour input grows faster than output, as in Other Professional Activities.⁴²

⁴² ‘Other professional activities’ include ATECO codes 74 (‘Other professional, scientific and technical activities: specialised professional services not classified elsewhere, such as design, photography, translation and interpreting, specialist technical consultancy and other professional activities’) and 75 (‘Veterinary services: veterinary activities for domestic and farm animals, including diagnosis, treatment, healthcare and related activities’).

Chapter 5. The internationalisation of enterprises

The aim of this line of inquiry is to assess the expansion of Italian service firms beyond national borders and, conversely, the development of foreign service firms in Italy. The study is conducted from three perspectives. Firstly, it examines trends in terms of the number of firms, average number of employees and turnover of Italian multinationals and foreign-controlled multinationals. In this case, the analysis focuses on the information and communication sector and the professional, scientific and technical services sector as areas of the advanced tertiary sector. Secondly, the volumes of direct investment from abroad into Italy (*inward*) and from Italy abroad (*outward*) are assessed, by branch of economic activity, along with their ratio – the ‘attraction index’ – which allows for a comparison of the relative weight of the two investment directions within each sector. Finally, with regard to trade in services with other countries, debits from imports and credits from exports are analysed, broken down by broad service categories, in order to reconstruct the actual degree of interdependence between Italy and other countries in the advanced tertiary services sector.

5.1. Multinational Enterprises

Table 5.1 presents the number of enterprises, the number of employees and the turnover of foreign-controlled enterprises resident in Italy and of Italian-controlled enterprises resident abroad, with reference to the industrial and services sectors and, in particular, to the information and communication (J) and professional, scientific and technical activities (M) sectors. Both the data relating to foreign-controlled enterprises resident in Italy and those relating to Italian-controlled enterprises resident abroad are expressed not only in absolute terms but also as a share of the total number of enterprises resident in Italy, thus allowing a comparison of the weight of the two groups against the same national benchmark.

Tables 5.1.a. – 5.1.b. Comparison between foreign-controlled multinationals resident in Italy and Italian multinationals resident abroad by number of enterprises, average annual number of employees and turnover in absolute figures and as a percentage of the total number of enterprises resident in Italy – year 2023.

FOCUS 2023 – ABSOLUTE VALUES AND % INDICATORS PUBLISHED				
Population	Variable	Industry	Services	Non-financial services
Foreign-controlled enterprises resident in Italy	Enterprises	5,332 0.60%	13,493 0.40%	12,385 n/a
Foreign-controlled enterprises resident in Italy	Employees	618,801 10.60%	1,216,064 9.50%	1,142,087 n/a
Foreign-controlled enterprises resident in Italy	Turnover	366,337 18.90%	520,621 22.90%	520,621 22.90%
Italian-controlled enterprises resident abroad	Enterprises	10,144 1.10%	15,129 0.40%	14,175 0.40%
Italian-controlled enterprises resident abroad	Employees	914,340 15.70%	801,821 6.40%	663,193 5.40%
Italian-controlled enterprises resident abroad	Turnover	285,036 14.70%	274,502	184,088 8.10%

FOCUS 2023 – ABSOLUTE FIGURES AND PUBLISHED PERCENTAGE INDICATORS				
Population	Advanced service sector (J+M)	J %	M %	Measure %
Foreign-controlled enterprises resident in Italy	3,744	1.20%	0.30%	Composition
Foreign-controlled enterprises resident in Italy	259,653	23.00%	7.00%	Composition
Foreign-controlled enterprises resident in Italy	78,001	37.00%	16.90%	Composition
Italian-controlled enterprises resident abroad	2,059	0.80%	0.10%	Share
Italian-controlled enterprises resident abroad	76,240	7.50%	1.70%	Share
Italian-controlled enterprises resident abroad	19,366	10.10%	3.60%	Share

Source: Istat-ICE, Foreign Trade and International Business Activities.

The comparison highlights a gap between foreign-controlled and Italian-controlled enterprises in the advanced service sector. In the information and communication sector, foreign-controlled enterprises resident in Italy account for 1.2 percent of enterprises, 23.0 percent of employees and 37.0 percent of turnover, while Italian-controlled enterprises resident abroad account for 0.8 percent of the total number of enterprises, 7.5 percent of employees and 10.1 percent of turnover, compared with the national figures. In the professional, scientific and technical services sector, a similar trend emerges: foreign-controlled enterprises based in Italy account for 0.3 percent of enterprises, 7.0 percent of employees and 16.9 percent of turnover, compared with 0.1 percent, 1.7 percent and 3.6 percent respectively for Italian-controlled enterprises based abroad.

In other words, for the highlighted advanced service sectors, it is evident that foreign-controlled enterprises are, in terms of the number of enterprises, employees and turnover, more significant than Italian-controlled enterprises resident abroad, when compared with the national economy as a whole. Furthermore, for foreign-controlled enterprises resident in Italy, the gap between their share in terms of the number of enterprises and their shares in terms of employees and turnover indicates, above all, a larger average size. The table alone does not allow us to attribute this difference to higher productivity or greater capacity for value creation. While in the case of services, foreign-controlled enterprises outnumber domestically controlled enterprises resident abroad across the three key dimensions (number of enterprises, employees and turnover) – both in absolute terms and relative to the national economy as a whole – the situation is different in the industrial sector. In this sector, Italian-controlled enterprises outnumber foreign-controlled ones in terms of the number of firms and the average number of employees, both in absolute terms and relative to the total number of enterprises resident in Italy. However, foreign-controlled enterprises retain an advantage in terms of turnover.

In conclusion, what emerges from the comparison between foreign-controlled and domestically controlled enterprises in 2023 is a greater presence of foreign-controlled multinational enterprises in the advanced service sector than is observed in the industrial sector.

5.2. Foreign Direct Investment

Table 5.2 shows the stock, expressed in millions of euros, of foreign direct investment into Italy (*inward*) and from Italy abroad (*outward*), by sector of economic activity. In absolute terms, the largest stocks of *inward* investment are found in financial and insurance activities, at 120.9 billion euros (18.9 percent of total *inward* investment), in professional, scientific and technical activities, at 86.4 billion euros (13.5 percent of total *inward* investment), and in the transport and communications sector, at 70.4 billion (11 percent of total *inward* investment). The first two sectors also rank highest in terms of outward investment from Italy, while the transport and communications sector slips to ninth place in terms of outward investment (28.4 billion), with the third place instead occupied by the metallurgical sector (75.1 billion). Knowledge-intensive activities therefore rank among the top sectors in terms of the volume of foreign investment, both inward and outward; however, their significance is more limited when considered in relation to the share of value added they generate out of the national total. In terms of its share of total value added at current prices, the transport and communications sector ranks fourth, with a share of 8.3 percent, followed by professional, scientific and technical activities, which account for 7.3 percent and rank fifth. Financial and insurance activities, on the other hand, rank eighth, accounting for 5.4 percent. In particular, the professional, scientific and technical services sector exhibits an imbalance between its significance in terms of foreign investment (13.5 percent of the national total) and its weight in terms of value added (7 percent of the national total): this imbalance is shared with the manufacture of refined petroleum products and chemicals, the metallurgy sector, the automotive sector and other manufacturing activities.

A comparison of *inward investment* figures alone does not allow for an assessment of the different propensity of sectors to attract foreign capital compared with their propensity to invest abroad. To this end, the attraction index compares the volume of *inward* investment with the sum of *inward* and *outward* investment, thereby enabling a comparison, for each sector, of the relative weight of the two investment directions. A value of 50 percent indicates a substantial balance between foreign investment in Italy and Italian investment abroad; higher values indicate a prevalence of foreign investment in Italy, while lower values indicate a prevalence of Italian investment abroad. In the financial and insurance sector, although the volume of *inward* investment is the highest, the attractiveness index stands

at 34.8 percent, compared with 226.9 billion in *outward* investment. The sector therefore shows a prevalence of Italian investment abroad over foreign investment in Italy. In the professional, scientific and technical services sector, the two components balance each other out: *inward* investment of 86.4 billion is matched by 80.4 billion of the economy as a whole (46.3 percent). The figure of 51.8 percent therefore indicates a slight prevalence of foreign investment in Italy compared with Italian investment abroad, although the two components are, all things considered, broadly balanced. The picture of sectors comprising knowledge-intensive activities is completed by transport and communications, where *inward* investment accounts for 71.2 percent of the total, highlighting a prevalence of inward foreign investment over outward investment.

Table 5.2.a. Inward and Outward Investment (millions of euros), share of inward investment in the national total, Attraction Index – 2023.

SECTORAL RANKING						
Rank	ATECO	Economic sector	Inward 2023	National share	Outward 2023	Attractiveness index
17	A	Agriculture and fisheries	1,694	0.30%	924	64.70%
14	B	Mining and quarrying	6,203	1.00%	2,595	70.50%
12	10–12	Food, beverages and tobacco industries	18,851	3.00%	12,982	59.20%
10	13–18	Textiles, clothing, leather goods, wood and paper	23,338	3.70%	11,401	67.20%
6	19–23	Manufacture of refined petroleum products and chemicals	49,010	7.70%	44,806	52.20%
9	24–28	Metallurgy, metal products and machinery	31,666	5.00%	75,147	29.60%
8	29–30	Manufacture of motor vehicles and other transport equipment	34,995	5.50%	27,542	56.00%
7	31-32-33	Other manufacturing activities	35,014	5.50%	47,698	42.30%
13	35–39	Electricity, gas, water supply	8,383	1.30%	15,392	35.30%
15	F	Construction	5,857	0.90%	39,966	12.80%
4	G	Trade and repairs activities	69,244	10.90%	72,285	48.90%
3	49–53 58–63	Transport and communications	70,386	11.00%	28,406	71.20%

16	I	Accommodation and food service activities	3,498	0.50%	4,336	44.70%
1	K	Financial and insurance activities	120,896	18.90%	226,907	34.80%
11	L	Real estate activities	20,874	3.30%	7,721	73.00%
2	M	Professional, scientific and technical activities	86,440	13.50%	80,360	51.80%
5	77–82 84–99	Other services	51,678	8.10%	40,282	56.20%

Source: Istat-Ice Foreign trade and international business activities.

Table 5.2.b. Value added at current prices in absolute terms (millions of euros) and as a percentage of the national total – 2023.

SECTORAL RANKING				
Rank	ATECO	Economic sector	Value added in 2023 at current prices	Sector's value added as a share of total value added
17	A	Agriculture and fisheries	39,847	2%
14	B	Mining and quarrying	3,339	0%
12	10–12	Food, beverages and tobacco industries	36,708	2%
10	13–18	Textiles, clothing, leather goods, wood and paper	47,570	2%
6	19–23	Manufacture of refined petroleum products and chemicals	59,050	3%
9	24–28	Metallurgy, metal products and machinery	127,985	7%
8	29–30	Manufacture of motor vehicles and other transport equipment	31,369	2%
7	31-32-33	Other manufacturing activities	28,748	2%
13	35–39	Electricity, gas, water supply	55,691	3%
15	F	Construction	116,676	6%
4	G	Trade and repairs activities	227,030	12%
3	49–53 58–63	Transport and communications	157,708	8%
16	I	Accommodation and food service activities	76,923	4%
1	K	Financial and insurance activities	102,572	5%
11	L	Real estate activities	240,660	13%
2	M	Professional, scientific and technical activities	138,650	7%
5	77–82 84–99	Other services	417,728	22%

Source: Istat-ICE Foreign Trade and International Business Activities.

Table 5.3. *Inward and Outward Investment, share of Inward Investment in the national total, Attractiveness Index – 2023.*

REFERENCE COMPARISON					
Scope	Description	Inward 2023	Share of the economy	Outward 2023	Attraction Index
M	Advanced professional and business services	86,440	13.50%	80,360	51.80%
SERV	Total services	423,016	66.30%	460,297	47.90%
TOT	Total economy	638,027	100.00%	738,750	46.30%

Source: Istat-Ice Foreign trade and international business activities.

5.3. International trade in services

In the case of trade, it is important to note that the definition of sectors does not refer to the ATECO classification, but rather to *the 2010 Extended Balance of Payments Services Classification (EBOPS 2010)*, set out in Appendix F. With regard to international trade in services, credits represent exports of services, while debits represent imports⁴³. Across the services sector as a whole, the deficit increased over the period 2017–2024. The year 2020 saw an exceptional disruption, followed by an incomplete reopening in 2021 and a strong rebound in 2022. The two-year period 2023–2024 represents the normalised period: in 2024, growth slows to 5.7 percent for credits and 5.0 percent for debits, while the deficit narrows slightly compared with 2023. The 2019–2024 comparison should therefore be interpreted by

⁴³ International flows of goods and services are recorded in the balance of payments on the basis of the economic residence of the units involved, not the nationality of the controlling group. The balance of payments records transactions between residents and non-residents: for goods, the change in economic ownership is relevant, while for services, the provision of a service by a resident to a non-resident or vice versa is relevant.

Consequently, sales made by an Italian subsidiary resident abroad to customers resident in the same country do not constitute Italian exports, whether of goods or services. Such activities are recorded in the *Outward* FATS statistics on foreign affiliates and in the accounts of the host country. By contrast, sales made by units resident in Italy to non-residents, including intra-group transactions with foreign affiliates, contribute to Italy's credits.

For services, as there is generally no customs clearance, flows are reconstructed primarily through direct surveys of enterprises and other specific sources of the balance of payments. For goods, foreign trade statistics also draw on customs and European surveys on physical trade, while the balance of payments reclassifies them according to the criterion of change of ownership between residents and non-residents.

distinguishing between structural growth and post-pandemic recovery effects (Table 5.4).

Table 5.4. Credits from exports of services, debits from imports of services, balances and annual changes in credits and debits – 2017–2024.

TIME SERIES 2017–2024 AND COVID-19 IMPACT					
Year	Credits	Debits	Balance	Change in receivables	Change in payables
2017	99,025	102,738	-3,713		
2018	103,633	106,362	-2,729	4.70%	3.50%
2019	108,768	110,572	-1,805	5.00%	4.00%
2020	75,754	82,551	-6,797	-30.40%	-25.30%
2021	86,724	98,108	-11,384	14.50%	18.80%
2022	121,565	131,129	-9,564	40.20%	33.70%
2023	135,593	143,208	-7,615	11.50%	9.20%
2024	143,386	150,432	-7,046	5.70%	5.00%

Source: Istat-Ice Foreign trade and international business activities.

An examination of the trends in receivables and payables over the last two years (2023–2024: Table 5.5) reveals an increase in the volume of both credits and debits. The increase in credits is greater than that in debits, resulting in a reduction in the deficit of 0.5 billion.

Table 5.5 provides an overall picture of the position of the various service sectors in foreign trade in 2024, highlighting those in which Italy has a surplus – that is, export credits exceeding import debits – and those characterised, conversely, by a deficit.

In 2024, the highest surpluses are recorded in travel, services involving the processing of goods owned by third parties, and personal, cultural and recreational services. Travel, attributable to tourism, therefore represents one of the main strengths of Italy’s trade in services. Processing services on goods owned by third parties, while classified as services in the balance of payments, include activities such as processing, transformation, assembly and packaging carried out on goods owned by the foreign client. This is therefore an item which, due to the nature of the activities included, has a

strong link to the manufacturing sector. Personal, cultural and recreational services, on the other hand, constitute a further significant component of the surplus; like the travel sector, this too is largely attributable to tourism and *leisure* activities.

The importance of travel is particularly evident when considering the composition of export credits: in 2024, this item accounts for around 38 percent of total credits, while other sectors generally account for less than 10 percent. Exceptions are other business services, with a share of 25 percent, and transport, at 11 percent; in both cases, however, the balance is negative. It follows that Italy's position in the trade in services is supported predominantly by the travel sector and, therefore, by tourism.

Tables 5.5.a. – 5.5.b. Credits from exports of services, debits from imports of services and balances – 2023 and 2024.

TOTAL SERVICES				
Flow	2023	2024	Difference	Change
Credits	135,593	143,386	7,793	5.70%
Debits	143,208	150,432	7,224	5.00%

TOTAL SERVICES					
Flow	Balance 2023	Balance 2024	Change in balance	Result	Note
Credits	-7,615	-7,046	569	Steady	Moderate growth
Debits	-7,615	-7,046	569	Steady	Moderate growth

Source: Istat-Ice Foreign trade and international business activities.

Table 5.6.a. Credits from exports of services by type of service – 2023 and 2024.

COMPARISON BY SERVICE				
Service	Receivables 2023	Receivables 2024	% of 2024 receivables as a share of total receivables	Change in credits
Travel	51,688	54,214	38%	4.90%
Processing services on goods owned by third parties	7,485	8,351	6%	11.60%
Personal, cultural and recreational services	466	1,386	1%	197.50%
Construction	270	232	0%	-14.00%
Maintenance and repair services	1,051	1,666	1%	58.60%
Goods and services for public administrations	948	896	1%	-5.40%
Insurance and pension services	1,770	964	1%	-45.50%
Financial services	9,868	10,726	7%	8.70%
Royalties for the use of intellectual property	5,762	4,927	3%	-14.50%
Other business services	32,176	35,805	25%	11.30%
IT, information and telecommunications services	9,681	8,860	6%	-8.50%
Transport	14,428	15,358	11%	6.40%

Source: Istat-Ice Foreign trade and international business activities.

Table 5.6.b. Debits for imports of services and balances, by type of service – 2023 and 2024.

COMPARISON BY SERVICE						
Service	Liabilities 2023	Liabilities 2024	Change in liabilities	Balance 2023	Balance 2024	Change in balance 2024– 2023
Travel	31,585	33,006	4.50%	20,102	21,208	1,106
Processing services on goods owned by third parties	3,980	3,836	-3.60%	3,505	4,515	1,009
Personal, cultural and recreational services	1,407	1,277	-9.20%	-942	108	1,050
Construction	85	145	69.60%	185	88	-97
Maintenance and repair services	1,161	1,651	42.20%	-110	15	125
Goods and services for public administrations	1,076	1,211	12.60%	-128	-315	-187
Insurance and pension services	4,523	1,990	-56.00%	-2,753	-1,026	1,727
Financial services	12,329	12,351	0.20%	-2,461	-1,624	837
Royalties for the use of intellectual property	5,559	7,033	26.50%	203	-2,106	-2,309
Other business services	37,120	40,168	8.20%	-4,945	-4,363	581
IT, information and telecommunications services	15,110	16,109	6.60%	-5,428	-7,249	-1,821
Transport	29,272	31,654	8.10%	-14,844	-16,296	-1,452

Source: Istat-Ice Foreign trade and international business activities.

A different picture emerges when considering the sectors classified as advanced tertiary services, namely insurance and pension services, financial services, royalties for the use of intellectual property, IT, information and telecommunications services, and activities categorised as other business services. In 2024, with the exception of other business services (25 percent) and financial services (7 percent), the share of receivables generated by each of these sectors does not exceed 6 percent of total export receivables and is significantly lower than that of travel. Furthermore, all the sectors considered show a negative balance, with import liabilities exceeding receivables from exports. In 2024, the sector recording the largest deficit is transport, which ranks third in terms of its

share of total credits, accounting for 11 percent. This figure highlights the sector's significance in the composition of foreign trade.

To complete the analysis, we can examine the change in balances between 2023 and 2024. In the travel sector, the surplus is increasing, as it is in services involving the processing of goods owned by third parties and in personal, cultural and recreational services, confirming the strengthening of the net position of these sectors. Conversely, the deficit in the transport sector worsens further. Among the sectors classified as advanced services, however, the trend varies. The deficit narrows in insurance and pension services, financial services and other business services, signalling an improvement in the relative position of these sectors. Conversely, the deficit widened in royalties and licence fees and in IT, information and telecommunications services, highlighting a deterioration in the balance compared with 2023.

Looking at Italy's service trade balances with different geographical areas (Table 5.7), positive balances emerge with the Americas and Oceania, both of which increased in 2024 compared with the previous year. The largest volumes of export credits and import liabilities are recorded in trade with Europe, where the balance remains negative, although the deficit narrowed in 2024. Conversely, Italy's position deteriorated in trade with Africa and Asia, where the deficit widened. The widening is particularly pronounced in trade with Asia, which shows the sharpest increase in the negative balance among the regions considered.

Table 5.7.a. Credits from exports of services, by geographical area – 2023 and 2024.

COMPARISON BY REGION			
Region	Credits 2023	Credits 2024	Change in credits
Europe	97,928	103,929	6.10%
Africa	2,474	1,880	-24.00%
America	18,457	21,250	15.10%
Asia	10,146	10,337	1.90%
Oceania	1,905	1,993	4.60%
International organisations	923	1,018	10.30%

Source: Istat-ICE Foreign trade and international business activities.

Table 5.7.b. Debits for imports of services and balances, by geographical area – 2023 and 2024.

COMPARISON BY AREA					
Area	Debits 2023	Debits 2024	Change in credits	Balance 2023	Balance 2024
Europe	109,590	114,550	4.50%	-11,663	-10,621
Africa	4,540	4,251	-6.40%	-2,066	-2,371
America	14,903	16,649	11.70%	3,554	4,602
Asia	10,806	12,479	15.50%	-660	-2,143
Oceania	532	602	13.20%	1,373	1,391
International organisations	239	189	-21.10%	684	829

Source: Istat-Ice: Foreign Trade and International Business Activities.

Tables 5.8, 5.9 and 5.10 show Italy's position in relation to the various geographical areas. In trade with Europe, the main surpluses are recorded in travel, processing services on goods owned by third parties and construction. With the exception of the latter item, this breakdown is consistent with what is observed at an overall level for the international trade in services. Even when considering the composition of export receivables, travel represents the most significant component, accounting for 36 percent of total receivables from Europe. As regards sectors attributable to the advanced service sector, negative balances were observed in 2024 for all components considered. In line with the findings at the national level, the deficit is increasing in the ' ' IT, information and telecommunications services, and in royalties and licence fees. Conversely, the deficit is narrowing in insurance and pension services, financial services and other business services, highlighting an improvement in the relative

position of these sectors. In 2024, the largest deficit with Europe is recorded in the transport sector, which therefore represents the main component of the deficit in trade in services with that region.

With regard to Asia, the largest surplus in 2024 is recorded in royalties for the use of intellectual property. The structure of trade also shows some differences compared with that observed with Europe and, more generally, compared with the national picture. In particular, travel does not represent the component with the largest surplus: in 2023, the balance for this item was negative, while in 2024 it becomes positive. Despite this, travel constitutes a significant component on the export side, accounting for around 40 percent of total credits vis-à-vis Asia. A different situation from that with Europe emerges for sectors attributable to the advanced service sector. In 2024, in fact, Italy's position vis-à-vis Asia is characterised overall by positive balances. The largest surplus is recorded in royalties and licence fees, followed by IT, information and telecommunications services, and financial services. Insurance and pension services, and other business services, on the other hand, are the components of the advanced service sector that show a negative balance. In trade with Asia in 2024, the largest deficit is recorded in the transport sector, which accounts for 14 percent of total receivables from the region.

In trade with Africa, most sectors show a positive balance in 2024. The exceptions are insurance and pension services, other business services, transport and travel, which instead show a negative balance. The component with the greatest impact on the overall position vis-à-vis Africa is travel, which shows a deficit and accounts for around 38 percent of total credits with the region. A significant share is also attributable to other business services, which account for around 26 percent of credits. The combination of these components contributes to the overall deficit in the trade in services with Africa.

As regards the Americas, the largest surplus in 2024 is recorded in travel, which is the main component of exports, accounting for around 47 percent of total credits to the region. Within the advanced services sector, financial services and other business services show a positive balance; by contrast, the balances for insurance and pension services, IT, information and telecommunications services, and, above all, royalties for the use of intellectual property – which constitute the main component of the deficit in trade in services with the region – are negative.

Finally, in trade with Oceania, travel represents the component with the largest surplus and accounts for around 77 percent of total credits with the region. Sectors within the advanced services sector also show positive balances, but with generally modest volumes: other business services account for 14 percent of credits in 2024, while each of the other advanced sectors does not exceed 1 percent.

Table 5.8.a. credits from service exports – 2023 and 2024 – Europe and Asia.

REGIONAL COMPARISON				
Region	Service	credits 2023	credits 2024	Share of total 2024 service exports (%)
Europe	Travel	36,470	37,837	36%
	Processing services on third-party assets	7,002	7,193	7%
	Construction	183	162	0%
	Maintenance and repair services	790	1,129	1%
	Personal, cultural and recreational services	306	922	1%
	Goods and services for public administrations	43	44	0%
	Insurance and pension services	1,488	807	1%
	Royalties for the use of intellectual property	3,451	3,180	3%
	Financial services	8,976	9,765	9%
	Other business services	24,586	27,884	27%
	IT, information and telecommunications services	6,282	6,211	6%
	Transport	8,350	8,795	8%
Asia	Royalties for the use of intellectual property	1,162	863	8%
	IT, information and telecommunications services	1,165	804	8%
	Financial services	235	216	2%
	Personal, cultural and recreational services	68	116	1%
	Construction	32	20	0%
	Goods and services for public administrations	8	11	0%
	Travel	3,602	4,178	40%
	Insurance and pension services	103	67	1%
	Maintenance and repair services	126	97	1%
	Processing services on third-party assets	87	115	1%
	Other business services	2,406	2,444	24%
	Transport	1,151	1,407	14%

Source: Istat-ICE Foreign Trade and International Business Activities.

Table 5.8.b. *debts for imports of services and balances, by type of service and geographical area – 2023 and 2024 – Europe and Asia.*

COMPARISON BY REGION						
Area	Service	debts 2023	debts 2024	Balance 2023	Balance 2024	Change in balance 2024–2023
Europe	Travel	19,458	20,646	17,012	17,191	179
	Processing services on third-party assets	2,926	2,801	4,076	4,391	316
	Construction	47	129	135	33	-102
	Maintenance and repair services	985	1,310	-195	-181	14
	Personal, cultural and recreational services	1,301	1,140	-995	-218	777
	Goods and services for public administrations	619	628	-577	-584	-7
	Insurance and pension services	3,835	1,513	-2,347	-706	1,641
	Royalties for the use of intellectual property	4,396	4,734	-944	-1,555	-610
	Financial services	11,840	11,838	-2,864	-2,072	791
	Other business services	28,796	31,970	-4,210	-4,086	124
	IT, information and telecommunications services	12,718	13,676	-6,437	-7,465	-1,028
	Transport	22,668	24,165	-14,318	-15,370	-1,052
Asia	Royalties for the use of intellectual property	94	143	1,068	720	-348
	IT, information and telecommunications services	572	500	593	304	-288
	Financial services	58	26	177	190	13
	Personal, cultural and recreational services	24	33	44	83	39
	Construction	7	1	26	19	-7
	Goods and services for public administrations	8	6	0	5	6
	Travel	3,831	4,174	-228	4	232
	Insurance and pension services	190	89	-87	-22	64
	Maintenance and repair services	63	139	63	-42	-105
	Processing services on third-party assets	175	173	-88	-58	30
	Other business services	2,145	2,560	261	-116	-377
	Transport	3,639	4,635	-2,487	-3,228	-741

Source: Istat-Ice Foreign trade and international business activities.

Table 5.9.a. credits from exports of services by type of service and geographical area – 2023 and 2024 – Africa and the Americas.

COMPARISON BY REGION				
Region	Service	credits 2023	credits 2024	Share of total 2024 service exports (%)
Africa	Financial services	62	118	6
	Personal, cultural and recreational services	13	16	1%
	Royalties for the use of intellectual property	37	15	1%
	IT, information and telecommunications services	350	67	4%
	Maintenance and repair services	13	16	1%
	Goods and services for public administrations	9	5	0%
	Processing services on goods owned by third parties	2	5	0%
	Insurance and pension services	42	28	1%
	Other business services	1,096	493	26%
	Transport	335	401	21%
	Travel	514	716	38%
	Construction	1	0	0%
America	Travel	9,692	9,955	47%
	Transport	1,572	2,036	10%
	Other business services	3,464	4,538	21%
	Personal, cultural and recreational services	73	319	1%
	Maintenance and repair services	103	412	2%
	Processing services on goods owned by third parties	379	1,028	5
	Financial services	440	404	2%
	Construction	54	48	0%
	Insurance and pension services	123	55	0%
	IT, information and telecommunications services	1,518	1,580	7%
	Goods and services for public administrations	27	30	0%
	Royalties for the use of intellectual property	1,012	846	4%

Source: Istat-ICE Foreign Trade and International Business Activities

Table 5.9.b. *debits for imports of services and balances, by type of service and geographical area – 2023 and 2024 – Africa and the Americas.*

COMPARISON BY REGION						
Region	Service	debits 2023	debits 2024	Balance 2023	Balance 2024	Change in balance 2024–2023
Africa	Financial services	25	19	38	99	62
	Personal, cultural and recreational services	7	1	5	16	11
	Remuneration for the use of intellectual property	1		36	15	-21
	IT, information and telecommunications services	106	54	244	13	-231
	Maintenance and repair services	11	5	2	11	8
	Goods and services for public administrations	4	2	5	3	-2
	Processing services on goods owned by third parties	1	2	1	3	2
	Insurance and pension services	65	35	-23	-7	16
	Other business services	857	575	239	-82	-321
	Transport	873	872	-538	-471	68
	Travel	2,589	2,686	-2,075	-1,970	105
	Construction	2	1	-1	-1	-1
America	Travel	5,369	5,091	4,323	4,864	541
	Transport	1,603	1,592	-31	443	475
	Other business services	3,668	4,204	-204	334	538
	Personal, cultural and recreational services	50	78	24	240	217
	Maintenance and repair services	91	190	12	221	210
	Processing services on goods owned by third parties	874	856	-495	173	667
	Financial services	302	336	138	67	-70
	Construction	32	15	22	34	11
	Insurance and pension services	141	57	-18	-3	15
	IT, information and telecommunications services	1,573	1,785	-55	-205	-149
	Goods and services for public administrations	148	302	-121	-272	-151
	Remuneration for the use of intellectual property	1,053	2,142	-41	-1,296	-1,256

Table 5.10.a. credits from exports of services, by type of service and geographical area – 2023 and 2024 – Oceania.

COMPARISON BY REGION				
Area	Service	credits 2023	credits 2024	Share of total 2024 service exports (%)
Oceania	Travel	1,409	1,528	77%
	Other business services	214	276	14%
	Royalties for the use of intellectual property	100	25	1%
	Financial services	23	30	1%
	Maintenance and repair services	19	12	1%
	IT, information and telecommunications services	33	30	1%
	Personal, cultural and recreational services	1	9	0%
	Processing services on third- party assets	15	10	1%
	Transport	74	66	3%
	Insurance and pension services	11	6	0%
	Construction	1	2	0%
	Goods and services for public administrations	6		0%

Source: Istat-Ice Foreign Trade and International Business Activities

Table 5.10.b. *debits for imports of services and balances, by type of service and geographical area – 2023 and 2024 – Oceania.*

COMPARISON BY REGION						
Area	Service	debits 2023	debits 2024	Balance 2023	Balance 2024	Change in balance 2024–2023
Oceania	Travel	334	402	1,075	1,126	51
	Other business services	105	93	109	183	74
	Royalties for the use of intellectual property	5	4	94	20	-74
	Financial services	14	10	9	20	11
	Maintenance and repair services	8	3	11	9	-2
	IT, information and telecommunications services	15	21	18	8	-10
	Personal, cultural and recreational services	1	1	0	8	7
	Processing services on third-party assets	4	4	11	6	-5
	Transport	40	61	34	6	-28
	Insurance and pension services	5	2	5	4	-2
	Construction	0	0	1	2	2
	Goods and services for public administrations	0	1	6	-1	-7

Source: Istat-Ice Foreign trade and international business activities.

Chapter 6. Regional patterns of employment in knowledge- and technology-intensive economic activities

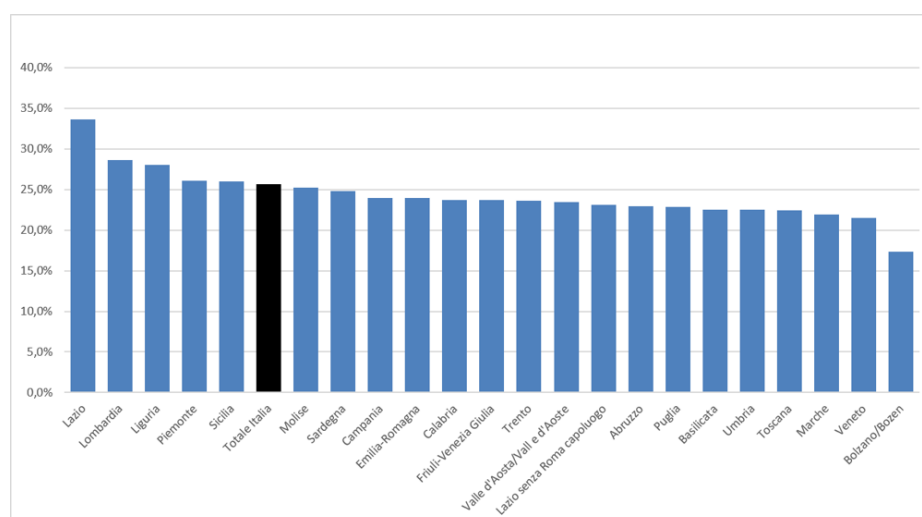
This chapter examines the geographical distribution of employees in local units within the KIS services and technology-intensive manufacturing sectors, broken down by various geographical aggregates: regions, provinces and provincial capitals. The analysis focuses on the share of employees in these sectors, the changes in this share over the period 2015–2023, and the geographical specialisation indices⁴⁴.

6.1. Share of employees and regional specialisations in technology- and knowledge-intensive activities

The shares of employees in KIS activities across Italy show marked differences between the various regions. In 2023, the share of KIS employees out of the total workforce (Figure 6.1) reached 33.7 percent in Lazio, 28.6 percent in Lombardy, 28.0 percent in Liguria and 26.1 percent in Piedmont, compared with a national average of 25.7 percent. These are, in particular, areas characterised by the presence of large urban centres, which are the main hubs for advanced, knowledge-intensive tertiary sector activities (for example, the regional figure for Lazio is strongly influenced by the presence of Rome, where the share of KIS employees exceeds 40 percent; however, if the capital is excluded, the percentage of KIS employees in Lazio falls below the national average). On the other hand, Milan is the main hub for the provision of KIS services for the entire macro-region of Northern Italy. In all other Italian regions, the percentage of employees in local units is below the national average: only slightly so for Emilia-Romagna and Friuli-Venezia Giulia, but more markedly so for Veneto (21.5 percent). Regions such as Calabria, the Province of Bolzano, Sardinia and the Valle D'Aosta have shares of employees in KIS activities that are, in general, significantly lower than the national average, as they have high shares of employees in low-knowledge-intensive tertiary sectors (Figure 6.3).

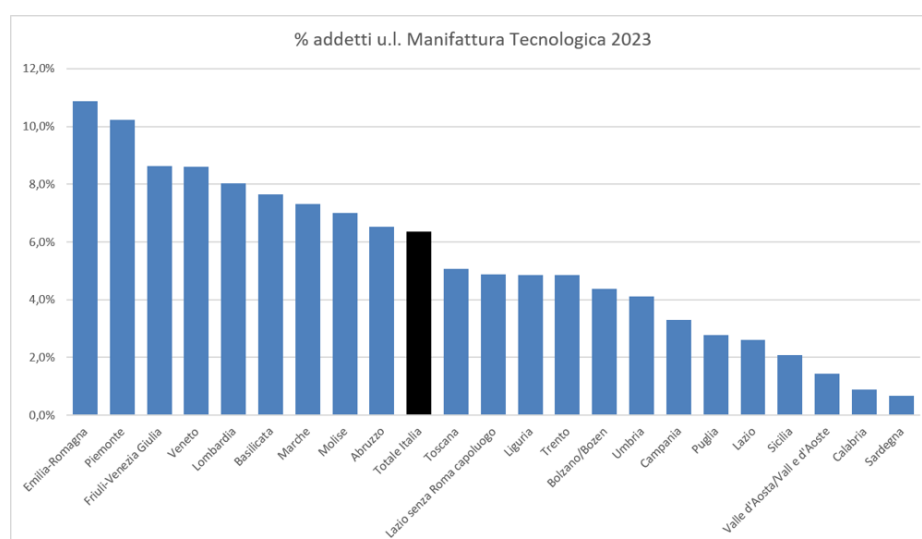
⁴⁴ The activities of the technology manufacturing sector and KIS services are listed in detail in Appendix B.

Figure 6.1. Percentage of employees in local units in KIS services in 2023, by Italian region.



Source: IDEA analysis of Istat ASIA data (2023).

Figure 6.2. Percentage of employees in local units in high-end tech manufacturing in 2023, by Italian region.



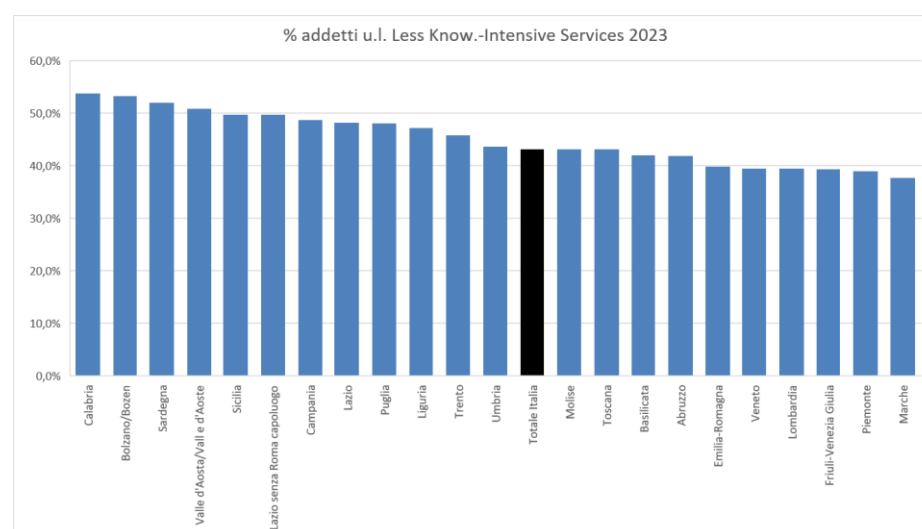
Source: IDEA analysis based on Istat ASIA data (2023).

Turning to the share of employees in technology manufacturing (Figure 6.2), significantly higher figures are observed in the main regions of Northern Italy. Compared with a national average of 6.4 percent, Emilia-Romagna reaches 10.9 percent, followed by Piedmont with 10.2 percent, Friuli-Venezia Giulia and Veneto, both at 8.6 percent, and Lombardy with 8.0 percent. Some regions in the South also record relatively high shares of workers in technology-based manufacturing, exceeding the national average. This is the case, for example, in Abruzzo, Molise and Basilicata

regions. Conversely, areas such as the Autonomous Province of Bolzano and the Valle d'Aosta region show a lower share of workers in technology-based manufacturing. It should be emphasised, however, that a comparison based solely on sectoral shares provides only a partial picture of the regional production structure. As these are composition indicators, an increase in the relative weight of one component necessarily implies a reduction in the weight of at least one of the other components, even in the absence of substantial changes in absolute terms.

A relatively low share of employees in KIS services or technology-intensive manufacturing, therefore, does not necessarily imply a limited presence of such activities in the region, just as a high share is not in itself sufficient to identify genuine regional specialisation. To explore this aspect in greater depth, it is therefore necessary to complement the analysis of shares with the use of a specialisation index, which allows for the assessment of the weight of technology- and knowledge-intensive activities in relation to the national production structure, and to distinguish between a simple high incidence and an actual relative concentration of activities. Analysis of the specialisation index thus enables a better characterisation of the various regional profiles, highlighting those regions in which KIS and technology-intensive manufacturing are indeed over-represented compared with the Italian average. Finally, this static analysis can be complemented by an analysis of changes over time, which is useful for identifying territories characterised not only by a high current level of specialisation, but also by growth or transformation in their productive structure.

Figure 6.3. Percentage of employees in local units within low-knowledge-intensive services in 2023, by Italian region.



Source: IDEA analysis based on Istat ASIA data (2023).

6.2. Regional specialisation indices

Specialisation indices complement the analysis of shares by comparing the weight of a sector in the regional economy with its corresponding national weight; they do not, therefore, measure the absolute size of the sector, but its relative importance within a region compared to its importance at the national level, through a comparison of the respective shares of employees⁴⁵.

The specialisation index values, shown in the following Figures, therefore make it possible to identify the regions in which KIS and technology-based manufacturing account for a higher or lower share than the national average.

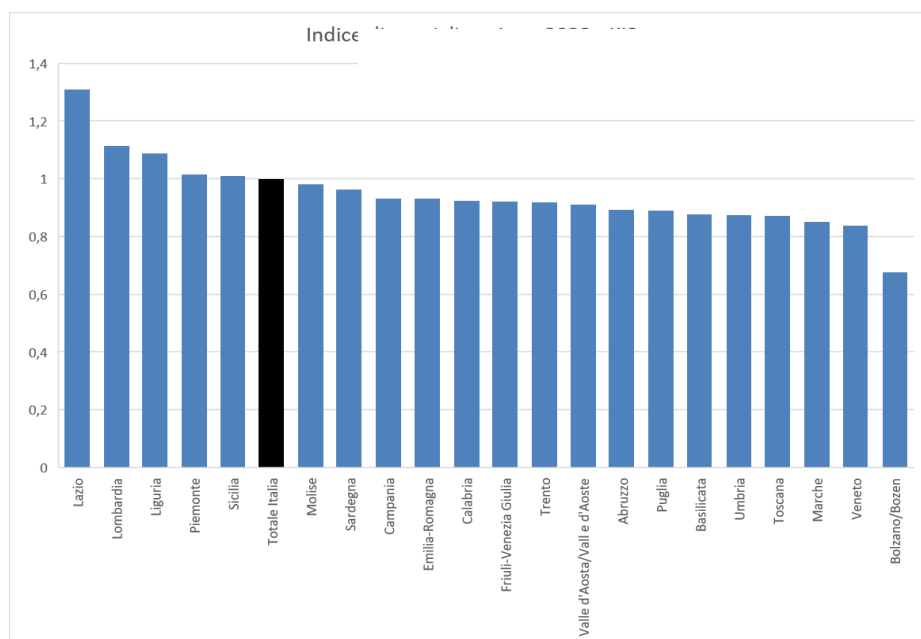
⁴⁵ From an arithmetic perspective, we define the Specialisation Index (also known as the LQ – Location Quotient) as follows:

$$LQ_{ij} = \frac{Add_{ij}/Add_j}{Add_i/TotAdd}$$

Where Add_{ij} is the number of full-time equivalent (FTE) employees in territory i for sector j , Add_j is the total (in this case, the Italian total) number of employees in sector j , Add_i is the total number of employees in territory i , and finally $TotAdd$ is the total number of employees in Italy. In this specific case, the presentation of the specialisation indices is closely linked to that of the shares, as both indicators describe the relative presence of the sectors in the various regions, albeit with reference to different bases for comparison.

Specialisation in KIS reveals an initial regional pattern, attributable above all to regions more strongly oriented towards advanced services (Fig. 6.4): Lazio has a specialisation index of 1.31 (driven by the figure of 1.56 for the city of Rome) and Lombardy an index of 1.12, while Liguria, Piedmont and Sicily also lie around or above the national average.

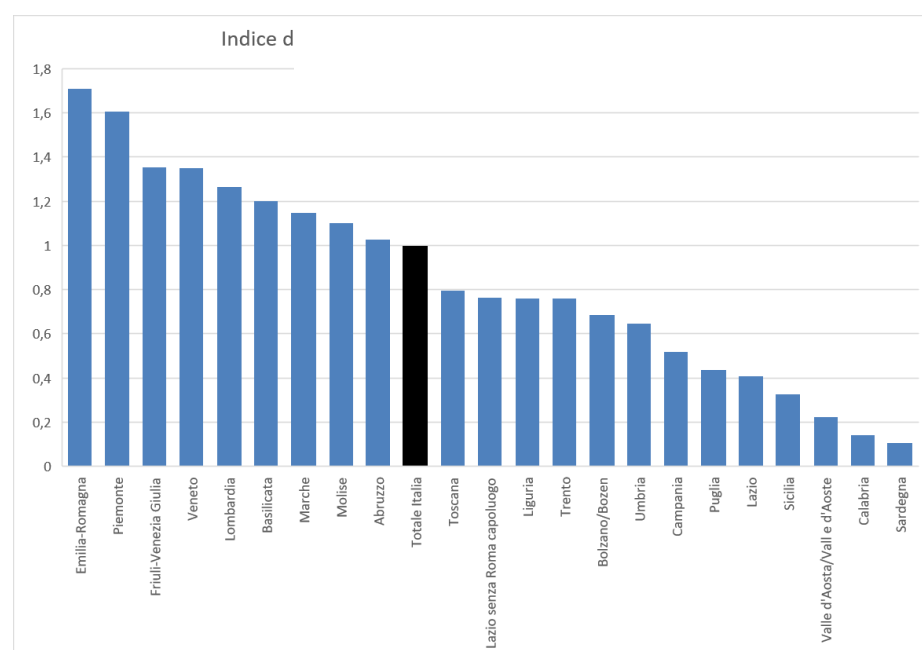
Figure 6.4. Specialisation index based on employees in local units within KIS services in 2023, by Italian region.



Source: IDEA analysis of Istat ASIA data (2023).

Figure 6.5, on the other hand, shows varying degrees of specialisation in technology manufacturing. Several regions have a specialisation index above 1 in *high-end technology* manufacturing and, at the same time, a specialisation in KIS services below the national average. This is particularly the case for numerous regions in the North-East and parts of Central Italy: Veneto, Emilia-Romagna, Friuli-Venezia Giulia and Marche, in fact, show a relatively high share of *high-end technology* manufacturing, with specialisation indices of 1.35, 1.71, 1.36 and 1.15 respectively.

Figure 6.5. Specialisation index based on employees in local units in high-end technology manufacturing in 2023, by Italian region.



Source: IDEA analysis of Istat ASIA data (2023).

Figure 6.6 compares regional specialisation indices in technology-based manufacturing and knowledge-intensive services (KIS), highlighting a marked differentiation in regional profiles:

One distinct group consists of regions characterised by relatively high specialisation in both sectors. This is particularly the case for Lombardy and Piedmont, which have values above the Italian average for both technology-based manufacturing and KIS. These are regions where the coexistence of a technologically advanced manufacturing base and a knowledge-intensive service sector appears to be particularly strong.

A second group, by contrast, exhibits above-average specialisation in manufacturing but a lower relative presence of KIS. This phenomenon is particularly evident in Veneto and Friuli-Venezia Giulia, and to a varying extent in the Marche. This profile suggests an economic structure that is more heavily weighted towards the industrial sector, without a corresponding specialisation in knowledge-intensive services. Veneto represents a particularly significant case in this regard: the LQ (*Location Quotient*: see note 46) for technology-based manufacturing stands at 1.35, while that for KIS is only 0.73. Emilia-Romagna could be classified as occupying an intermediate position between the first and second groups,

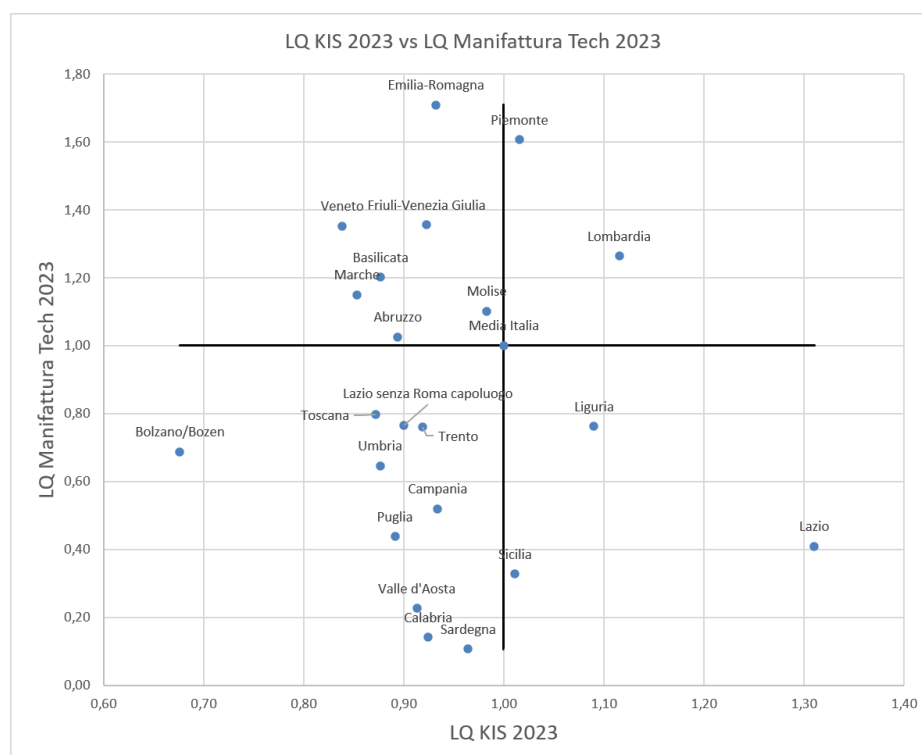
being highly specialised in technology-intensive manufacturing and having a KIS specialisation index of just under 1.

In contrast, Lazio represents the clearest case of specialisation in KIS without a corresponding specialisation in technology-based manufacturing. The KIS index stands at 1.31 – the highest value among the regions considered – while that for technology-based manufacturing stands at 0.41. This figure reflects an economy heavily oriented towards the service sector and focused on knowledge-intensive activities, rather than on the industrial sector. Lazio's figure is likely influenced by the high concentration of activity in the capital, which constitutes a major national hub for advanced services, administrative and institutional functions, and the cultural and creative industries. The marked regional specialisation in KIS can therefore also be interpreted in the light of Rome's particular economic structure.

A group of regions, on the other hand, lies close to the national average for both dimensions, without any particularly marked specialisation in either sector. These include, to varying degrees, Abruzzo, Molise, Basilicata and Sicily.

Finally, some regions show weak specialisation in both sectors: in particular, Calabria, Sardinia and the Autonomous Province of Bolzano – but also Lazio, excluding Rome – are characterised by LQ values well below 1 for both KIS and high-end tech manufacturing. In these cases, the regional economic structure appears to be relatively more oriented towards other sectors, particularly less knowledge-intensive services, such as tourism.

Figure 6.6. Production specialisation index in KIS 2023 vs production specialisation index in High-End Tech Manufacturing 2023.



Source: IDEA analysis based on Istat ASIA data (2023).

Figure 6.7 highlights the regions characterised by the strongest manufacturing focus, where the various Eurostat classifications of technological intensity show specialisation index (LQ) values equal to or greater than 1, or at least close to that threshold⁴⁶. These are predominantly regions historically associated with the 'Third Italy' economic-territorial model, such as Emilia-Romagna, Marche and Friuli-Venezia Giulia, to which Abruzzo is added. Manufacturing specialisation is particularly pronounced in Emilia-Romagna and Marche, albeit with different profiles in terms of technological intensity. In Veneto and the Marche, manufacturing specialisation appears to be predominantly driven by sectors with low and medium-low technological intensity, while in Friuli-

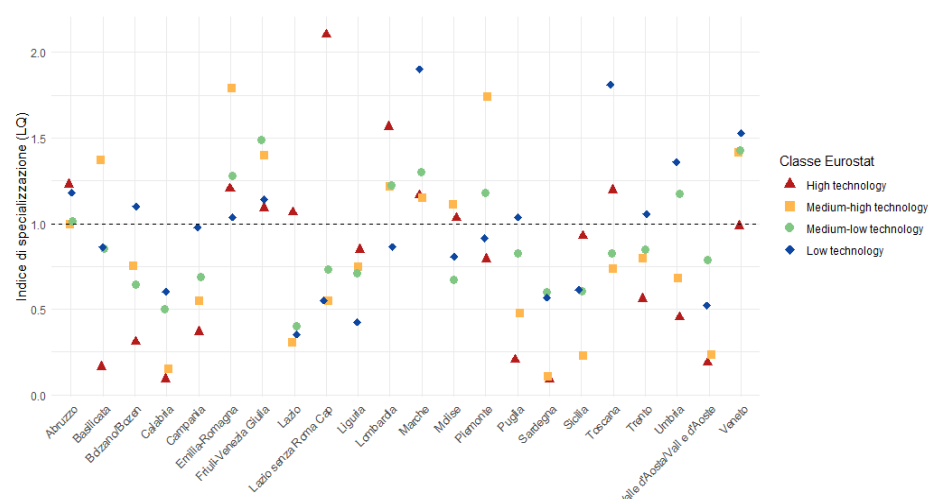
⁴⁶ The tables containing the data used for the regional analysis of the workforce in the various Eurostat groupings, the rates of change and the associated specialisation indices are set out in Appendix G.

Venezia Giulia and Emilia Romagna, medium-intensity manufacturing plays a more prominent role.

Lombardy and Piedmont present a distinct profile, with a more selective specialisation across the manufacturing sectors as a whole. In Lombardy, there is a particular concentration in high-technology-intensive manufacturing activities ($LQ = 1.57$), while Piedmont shows marked specialisation in medium-to-high-technology-intensive manufacturing ($LQ = 1.74$), a category which includes, amongst others, the motor vehicle manufacturing sector. Among the regions that do not have a generalised manufacturing base, the case of Tuscany is particularly significant. The region shows a strong specialisation in low-technology manufacturing activities, which include traditional sectors such as textiles, but also exhibits a certain degree of specialisation in high-technology activities, attributable in particular to the presence of major pharmaceutical companies and manufacturers of medical equipment. A profile that is similar in some respects emerges in Lazio, where specialisation in high-tech manufacturing activities is particularly evident, especially when the contribution of the city of Rome is excluded, thanks in particular to the presence of major players in the pharmaceutical sector.

Finally, in the southern regions, manufacturing sectors are generally less represented than in the national production structure, with LQ values below 1 in most classifications of technological intensity.

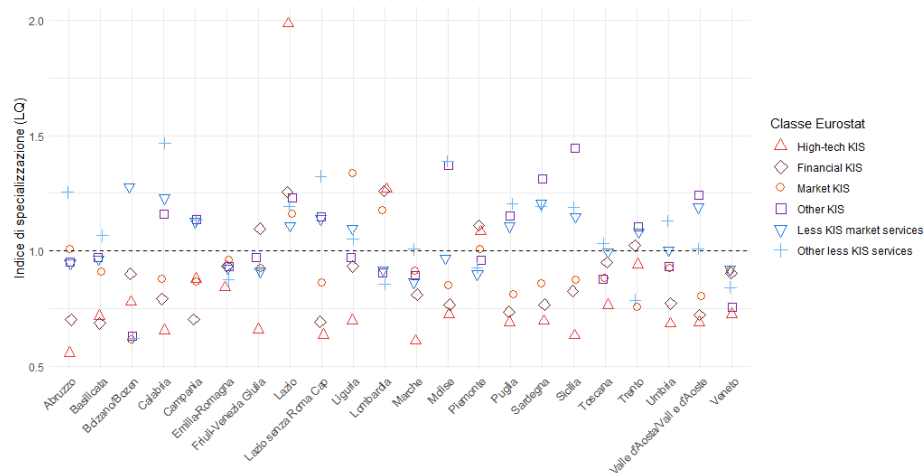
Figure 6.7. Specialisation indices for manufacturing employees in 2023, by Eurostat classification.



Source: IDEA analysis based on Istat ASIA data (2023).

An analysis of the distribution of knowledge intensity across service activities reveals significant differences between Italian regions (Figure 6.8). In many of these regions, high-technology KIS activities have specialisation index values below 1. This group includes scientific research, telecommunications and software production; knowledge-intensive financial services, classified separately from HT-KIS, also tend to be concentrated in areas characterised by the presence of large urban systems and high-level economic and institutional functions. This concentration is particularly evident in Lazio, Lombardy and Piedmont. A similar trend, albeit less pronounced, is observed for market services, which include, amongst other things, legal and accounting activities, management services, professional practices and market research activities. In this case, LQ values above 1 are found in Liguria, Lombardy, Lazio, Piedmont and Abruzzo, confirming a greater concentration of these functions in areas characterised by a higher concentration of urban and managerial functions.

Figure 6.8. Specialisation indices for service sector employees in 2023, by Eurostat classification.



Source: IDEA analysis based on Istat ASIA data (2023)

‘Other KIS’ activities, on the other hand, are more widely distributed across the territory; these include activities such as private education and healthcare, and cultural services. Their distribution therefore appears less polarised compared with more technology-intensive KIS activities and financial and market services.

Conversely, the Figure seems to suggest that regions characterised by LQ values above 1 in low-knowledge-intensity services tend to exhibit lower relative specialisation in high-knowledge-intensity activities, attributable to KIS. This is particularly the case for South Tyrol, Sardinia, Sicily and the Valle D’Aosta, which show high LQ values in low-knowledge-intensive market services, but a more limited specialisation in technology- and knowledge-intensive KIS sectors. This pattern can be attributed, at least in part, to the importance of the tourism economy, which results in a strong presence of service activities geared towards tourist demand and the local population, generally characterised by a relatively lower level of knowledge intensity.

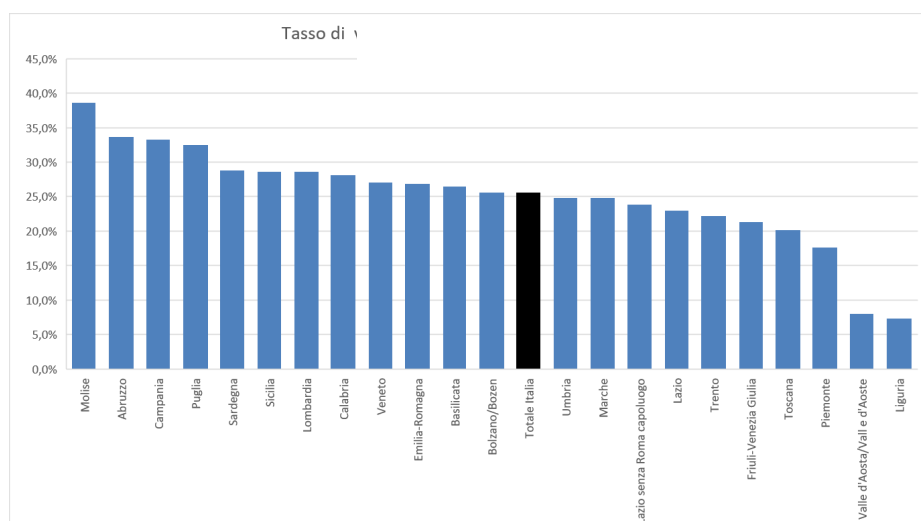
Finally, the comparison between Lazio, Emilia-Romagna and Veneto is particularly significant. In Lazio, all the sectors considered have LQ values above 1, highlighting an overall specialisation of the region in the tertiary sector, spread across different levels of knowledge intensity. By contrast, in Emilia-Romagna and Veneto, all sectors have values below 1. However, this result should not be interpreted as indicative of a weak presence of services in these regions. In fact, these regions host important tertiary sector

functions, such as universities, advanced services and tourism-related activities. Both regions are, however, characterised by a solid and diversified industrial base, which results in a higher relative share of manufacturing employees in the regional total and, consequently, a lower relative specialisation in services.

6.3. Trends in employment in technology-intensive manufacturing and knowledge-intensive services between 2015 and 2023

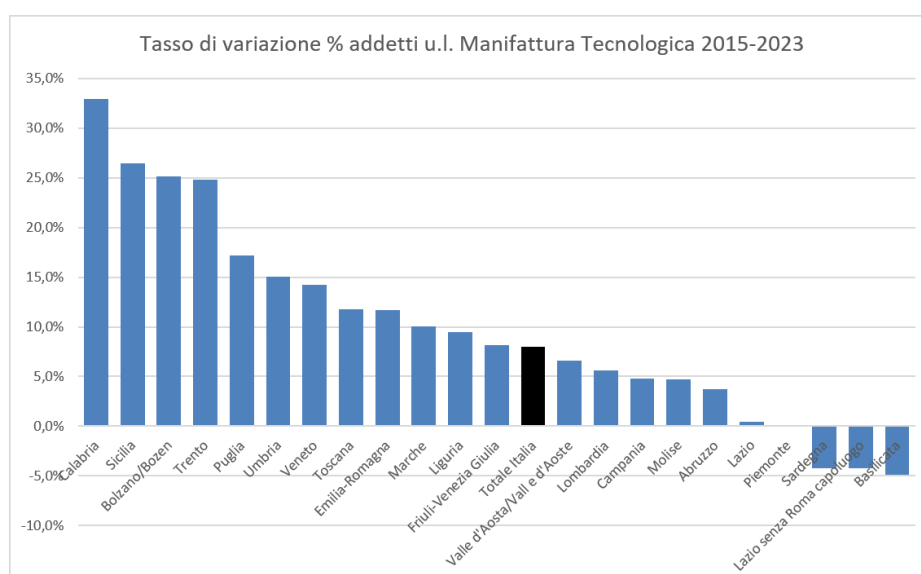
Data on changes in employment (Figure 6.9) show a trend towards a partial territorial rebalancing in the growth of KIS activities. The national increase in KIS employment over the period 2015–2023 stands at 25.6 percent, but several regions in Central and Southern Italy are experiencing above-average growth: Molise (+38.7 percent), Abruzzo (+33.7 percent), Campania (+33.3 percent), Puglia (+32.5 percent), Sicily (+28.7 percent) and Sardinia (+28.9 percent). The growth of KIS is therefore particularly strong in areas that often start from levels of specialisation below the national average. This suggests a process of territorial spread of knowledge-intensive activities, while not eliminating the strong pre-existing concentrations. Conversely, in regions that are already highly specialised, growth is more modest: in Lazio, the number of KIS employees increased by 23.0 percent between 2015 and 2023, while in Liguria the increase was only 7.3 percent. A similar trend, albeit with different characteristics, emerges for technology-based manufacturing (Figure 6.10). The national increase in the workforce over the period 2015–2023 is 8.0 percent, but many regions in the Centre-North, already characterised by a high degree of specialisation, are further strengthening their position: Emilia-Romagna (+11.7 percent), Veneto (+14.2 percent), Marche (+10.1 percent) and Tuscany (+11.8 percent). However, some southern regions are also recording significant increases, in particular Calabria (+32.9 percent), Sicily (+26.5 percent) and Puglia (+17.2 percent).

Figure 6.9. Percentage rate of change in the number of employees in local units in KIS services over the period 2015–2023, by Italian region.



Source: IDEA analysis of Istat ASIA data (2015–2023).

Figure 6.10. Percentage rate of change in the number of employees in local units in high-end tech manufacturing for the period 2015–2023, by Italian region.



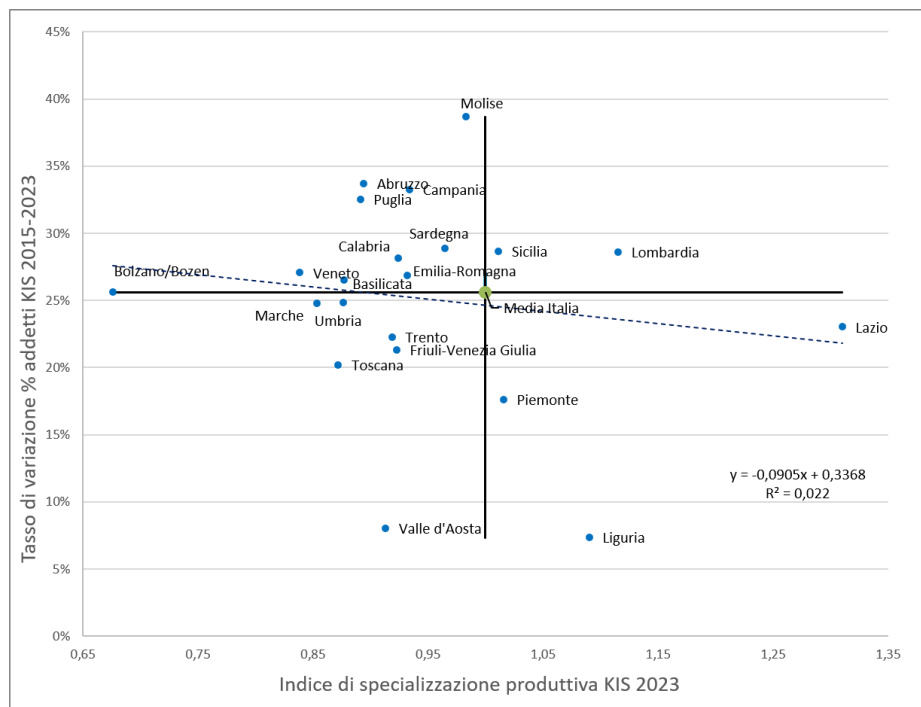
Source: IDEA analysis based on Istat ASIA data (2015–2023).

Finally, a comparison between KIS and technology-intensive manufacturing highlights that the transformation of the regional production structure does not follow a single model. In some regions, such as Veneto and Emilia-Romagna, growth builds on an already well-established manufacturing specialisation; in others, particularly in the

South, the growth in KIS and technology-intensive manufacturing employment is taking place from lower levels of specialisation. Turning instead to Lombardy and Piedmont, different trajectories can be observed in terms of changes in the number of employees in both KIS and high-tech manufacturing, although both regions exhibit high levels of specialisation in both sectors. Lombardy shows stronger growth in KIS employment, at 29 percent, higher than both that recorded in Piedmont (18 percent) and the national average (26 percent). A more favourable trend for Lombardy also emerges in high-tech manufacturing, where employment rose by 6 percent, compared with the substantial stability observed in Piedmont (0 percent). Even in this case, however, both regions recorded growth below the national average of 8 percent. Despite their geographical proximity and shared historical affiliation with the ‘industrial triangle’, the comparison highlights a more dynamic trajectory for Lombardy, where Milan’s role as a hub for advanced services is strengthening, while Piedmont shows more subdued growth trends.

Figure 6.11 does not reveal any particular correlation between the KIS specialisation index and employment trends in the 2015–2023 period; however, the geographical distribution reveals a recurring pattern, characterised by the presence of several regions in Southern Italy and the Islands – including Calabria, Sardinia, Puglia, Campania, Abruzzo and Molise – which, while exhibiting levels of specialisation below the national average, have recorded some of the highest increases in KIS employees. Conversely, regions already characterised by a high level of specialisation, such as Lombardy and Lazio, show increases of moderate magnitude. The relatively stronger growth in the less specialised regions could therefore indicate a trend towards the strengthening of *knowledge-intensive* activities in these contexts.

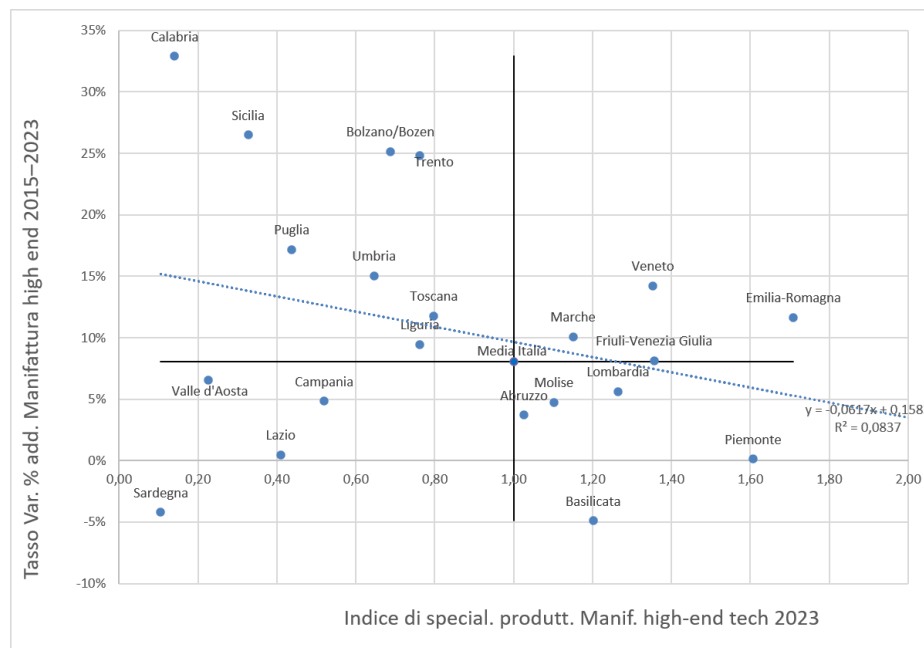
Figure 6.11. KIS Specialisation Index 2023 vs Change in the number of employees in KIS activities 2015–2023.



Source: IDEA analysis of Istat ASIA data (2015–2023).

For technology-based manufacturing, a comparison between the 2023 specialisation index and the change in the number of employees over the period 2015–2023 reveals a negative but weak relationship. The most specialised regions, particularly those in the Centre-North with a strong manufacturing tradition, nevertheless show moderate growth in the number of employees, as in the case of Veneto (+14.2 percent) and Emilia-Romagna (+11.7 percent). Finally, Piedmont represents a distinct case, with a high specialisation index in high-end technology manufacturing, coupled with stagnation in the number of employees in this sector. At the same time, some southern regions, characterised by lower levels of specialisation, are recording much higher increases, such as Calabria (+32.9 percent), Sicily (+26.5 percent) and Puglia (+17.2 percent).

Figure 6.12. LQ of high-end technology manufacturing and percentage rate of change in the number of employees in high-end technology manufacturing for the period 2015–2023.



Source: IDEA analysis based on Istat ASIA data (2015–2023).

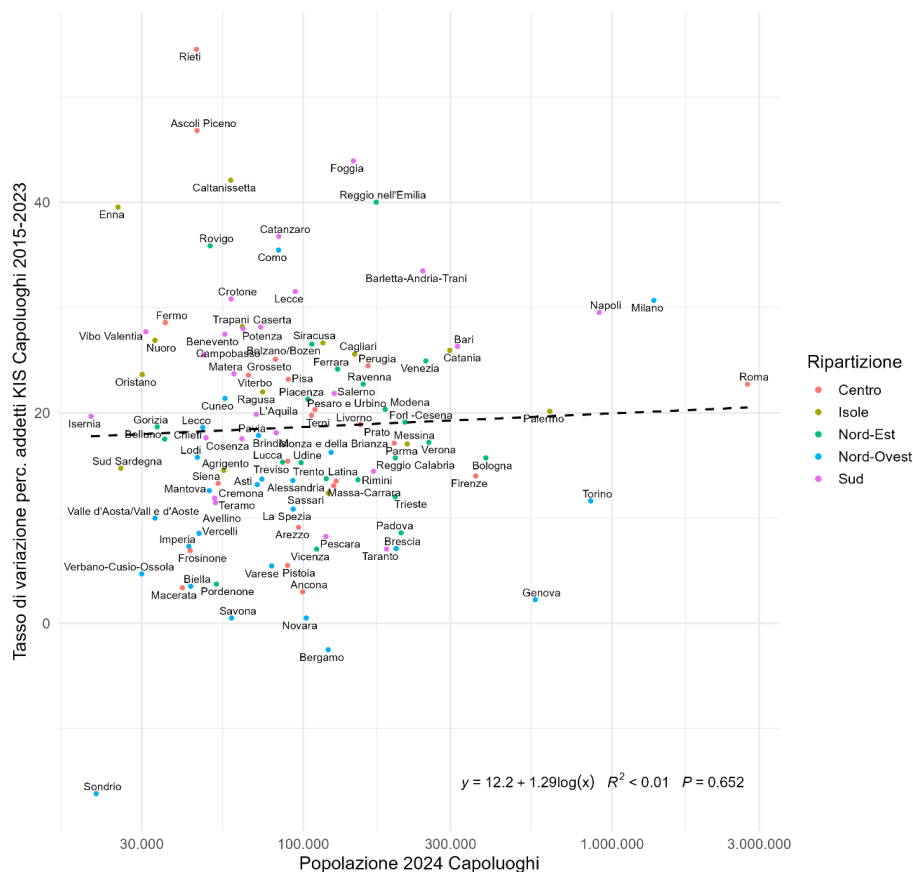
6.4. Factors associated with the presence and dynamics of knowledge- and technology-intensive sectors

The following paragraphs and Figures analyse some of the main factors associated with the presence and dynamics of employees in knowledge- and technology-intensive sectors, with particular reference to *Knowledge-Intensive Services* (KIS). In this case, the territorial units of analysis are the Italian provincial capitals and their corresponding provinces, taking into account both the level of territorial specialisation and the most recent trends, measured by the percentage change in the number of employees over the period 2015–2023. These relationships are analysed by comparing KIS indicators with the demographic size of the territories, the capacity to produce graduates – measured by the ratio of graduates to population – and specialisation in technology-based manufacturing. The relationships between these specialisation indices themselves and their respective changes over the period 2015–2023 are also analysed.

With regard to the relationships in which population is the explanatory variable – both in the analysis at provincial level and in that relating to provincial capitals – in order to reduce the statistical influence exerted by

territories with larger populations, in particular Rome and Milan, the population has been expressed on a logarithmic scale⁴⁷.

Figure 6.13. Population in 2024 in provincial capitals and the percentage rate of change in KIS employees over the period 2015–2023 in provincial capitals.



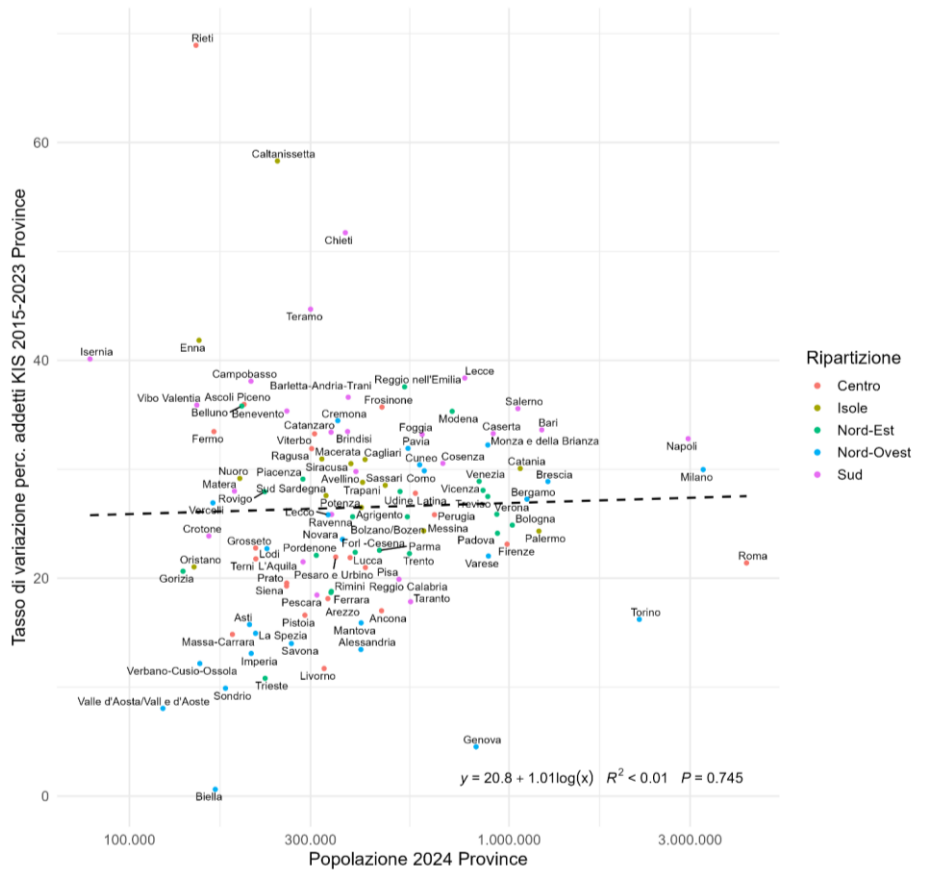
Source: IDEA analysis based on Istat ASIA data (2015–2023) and DemoIstat 2024.

No statistically significant relationship emerges between the population size of provincial capitals and the percentage change in KIS employees over the period 2015–2023 (Figure 6.13). This result holds true even when considering the population at provincial level (Figure 6.14), suggesting that

⁴⁷ The regressions are therefore estimated using a linear specification of the form: $y = \alpha + \beta \ln(Pop. 2024) + \varepsilon$, where y is the dependent variable relative to the natural logarithm of the 2024 population. To facilitate the interpretation of the results, population values are shown on the original scale in the graphs. Consequently, in graphs where population is the X-variable, the scale of the horizontal axis is logarithmic rather than linear.

the growth in KIS employees over the period under consideration is not systematically associated with the population size of the territory.

Figure 6.14. 2024 population of the provinces and percentage rate of change in KIS employees over the period 2015–2023 in the provinces.



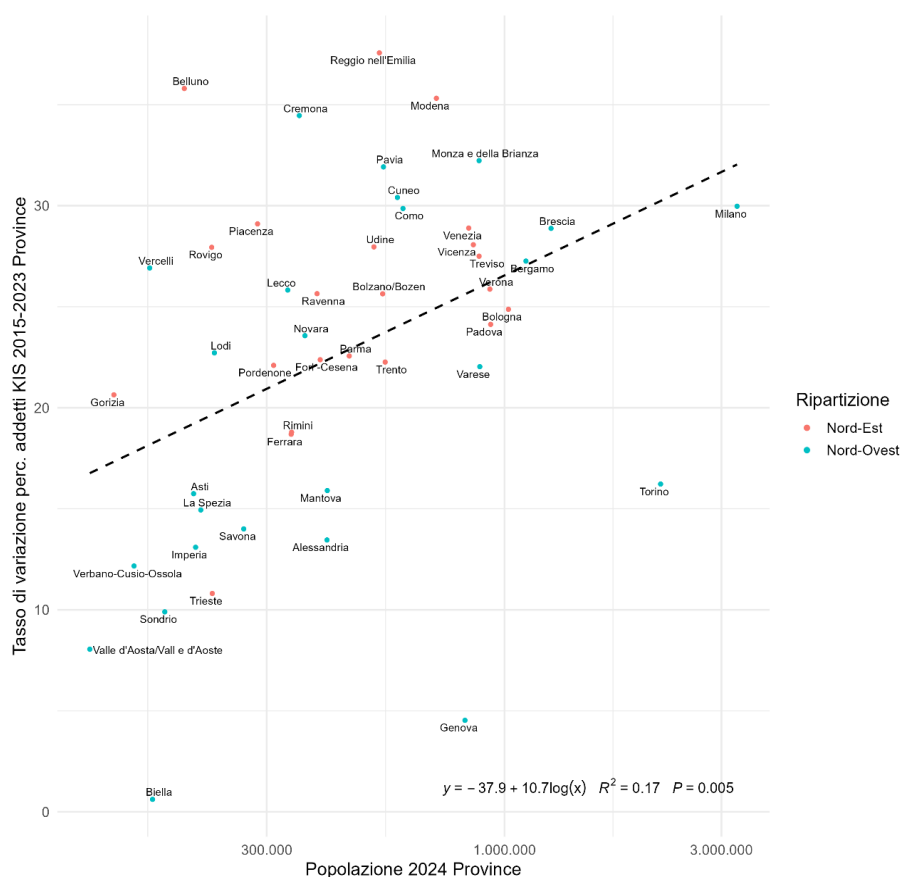
Source: IDEA analysis based on Istat ASIA data (2015–2023) and Demolstat 2024.

6.5. Relationship between the resident population and the percentage change in employees at local KIS service units over the period 2015–2023 in Northern Italy

A particularly interesting finding emerges when the population of the provinces is compared with the rate of change in the number of KIS service employees in Northern Italy: this analysis allows us to explore the structure of advanced services in an area where wide-area relationships between individual territorial systems are particularly strong (as highlighted by the scientific literature, which has described Northern Italy as an integrated

macro-region⁴⁸). When comparing all provinces (Figure 6.14) with the northern provinces alone (Figure 6.15), the association between population size and the growth of KIS services is more evident in the latter group.

Figure 6.15. Population in 2024 of the provinces and percentage change in KIS employees over the period 2015–2023 in the provinces of Northern Italy.



Source: IDEA analysis based on Istat ASIA data (2015–2023) and DemoIstat 2024.

This relationship is particularly evident in the North-West, although there are some exceptions, notably in the provinces of Turin and Genoa, which show growth rates for KIS services lower than might be expected given their population size, while in Belluno, by contrast, they are higher. In the period

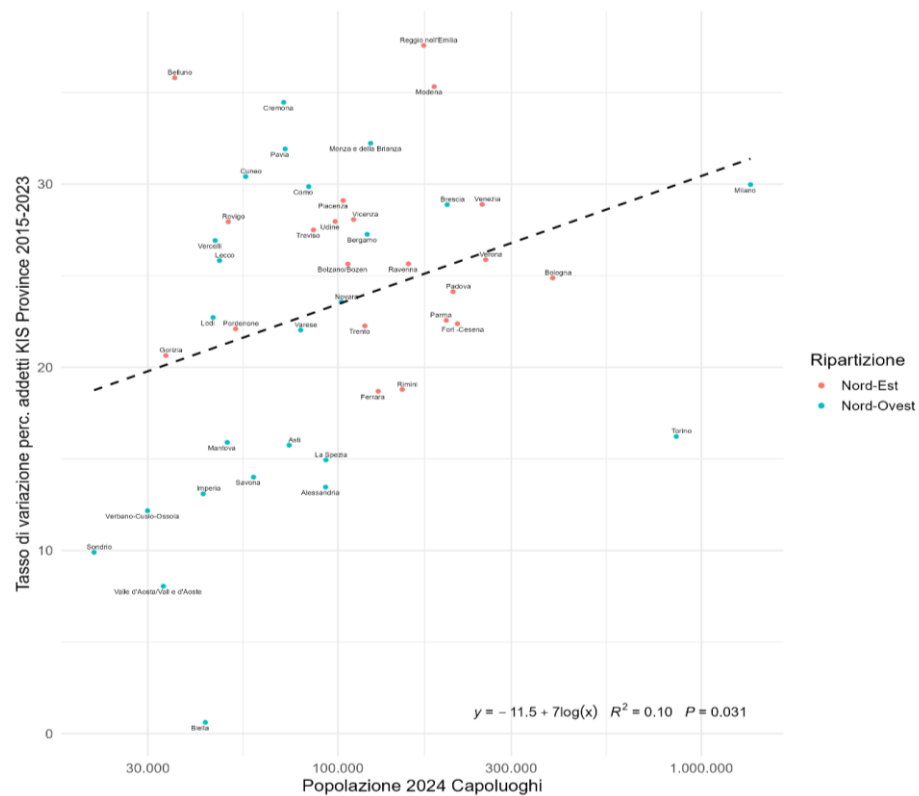
⁴⁸ Turri E. (2000), *The Po Valley Megalopolis*, Marsilio, Venice; Perulli P., Pichierri A. (eds.), (2010), *The Italian Crisis in the Global World. Economy and Society of the North*, Einaudi, Turin; Garavaglia L. (2014), “The distribution of advanced business services in Northern Italy: towards a polycentric metropolis model?”, in *Mètropoles*, 14.

2015–2023, however, there was significant growth in the number of KIS employees in several provinces of Lombardy, including Cremona, Pavia, Como, Brescia and Bergamo. These are areas situated close to Milan and, in several cases, along major infrastructure corridors of national and European significance. The distribution observed therefore suggests that proximity to Milan, the main service sector hub in Northern Italy, and membership of regional networks characterised by high accessibility have favoured the spread and concentration of advanced service sector activities even outside the provincial capital.

The same trend also appears to hold true in the North-East, where particularly high growth rates are recorded along some of the main territorial and infrastructure corridors. This is the case, in particular, for the provinces of Emilia-Romagna along the Via Emilia – including Modena, Reggio Emilia and Piacenza (the latter, however, being close to the Milan area) – and for central Veneto, comprising Venice, Vicenza and Treviso. Overall, the geographical distribution of the results seems to suggest that the growth of KIS services in Northern Italy is not attributable solely to the appeal of the major provincial capitals, but may also be linked to the presence of densely populated territorial systems that are strongly connected and integrated into the main infrastructure and economic networks. Finally, considering the North as a whole, it can be observed that provinces with relatively smaller populations and situated in more peripheral locations compared to the main urban and economic centres are generally associated with lower growth in KIS activities. The association observed in Figure 6.16 suggests that, in Northern Italy, provincial territories associated with provincial capitals with larger populations tend to record higher growth in KIS employees. Since the dependent variable covers the entire provincial territory, this result may be consistent with the hypothesis that the growth of knowledge-intensive activities is not confined to the provincial capital itself but may also extend to surrounding territories and areas functionally integrated with it. However, the result does not allow us to directly attribute the growth to municipalities outside the provincial capital; rather, it highlights a territorial relationship that appears consistent with this dynamic⁴⁹.

⁴⁹ The territories of Trieste and Genoa were excluded from this analysis, as the provincial capital accounts for a particularly high proportion of the provincial population—

Figure 6.16. Population in 2024 in provincial capitals and percentage change in KIS employees over the period 2015–2023 in the provinces of Northern Italy.



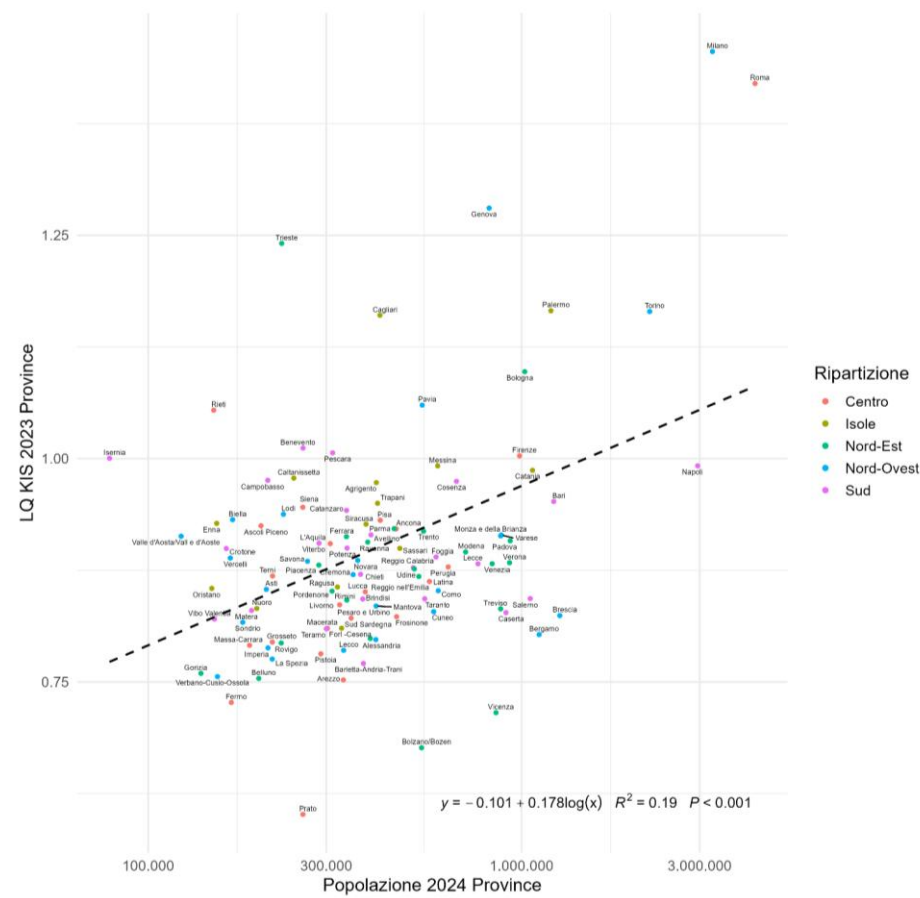
Source: IDEA analysis based on Istat ASIA data (2015–2023) and DemoIstat 2024.

6.6. Relationship between provincial population and the KIS specialisation index

The relationship between provincial population and the KIS specialisation index in services is positive and statistically significant (p-value < 0.05). Provinces with larger populations therefore tend to exhibit higher levels of specialisation in knowledge-intensive activities.

approximately 87 percent and 69 percent, respectively. In these cases, the limited population size of the provincial area outside the capital means that using changes in the number of employees at the provincial level as an indicator of possible processes of tertiarisation in the surrounding territories is less effective.

Figure 6.17. Provincial population in 2024 and the KIS specialisation index in 2023 across the provinces.



Source: IDEA analysis based on Istat ASIA (2023) and DemoIstat 2024 data.

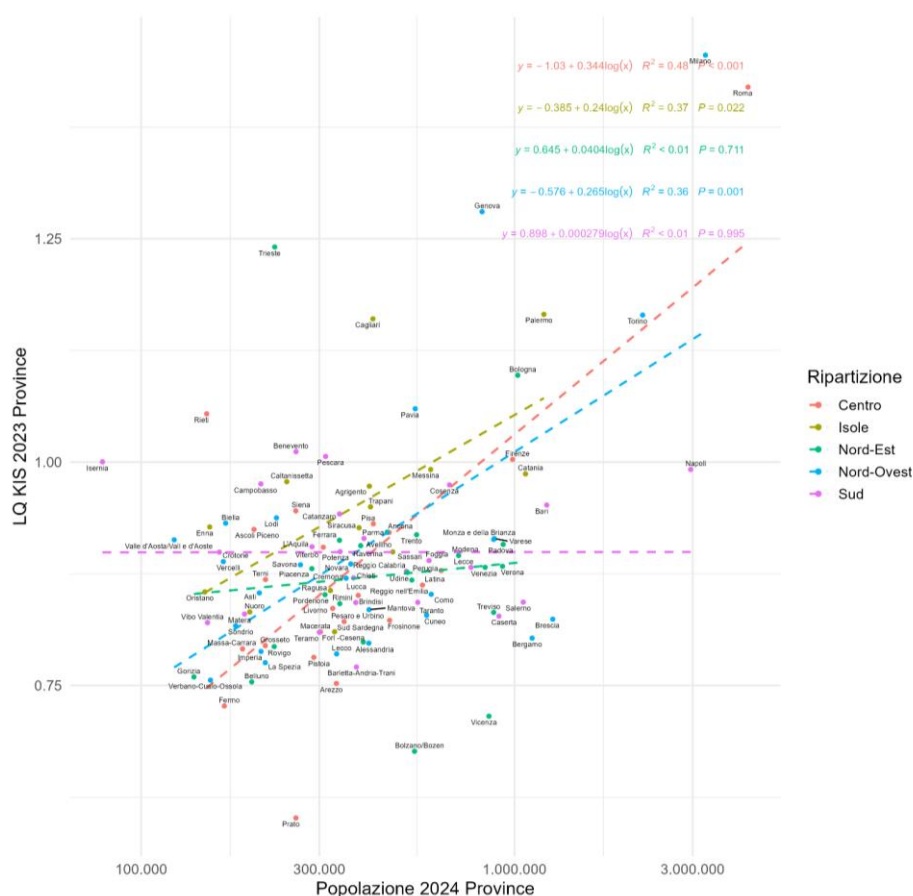
The relationship between provincial population and the KIS specialisation index in services is positive and statistically significant in the Centre, the North-West and the Islands. In these regions, therefore, provinces with larger populations tend to exhibit higher levels of specialisation in knowledge-intensive activities.

In the North-West, the result is partly influenced by the province of Milan, which has the highest specialisation index value, at around 1.45. However, this trend is not limited to Milan; it is also evident in other major provinces, such as Genoa and Turin, both of which have index values above 1. Pavia, too, exhibits a specialisation level above one, likely due to the role of its major university hub and its proximity to Milan. Provinces of intermediate population size, such as Monza, Varese, Novara and Lodi, occupy an intermediate position, benefiting from their proximity to and functional integration with the Milan area. The more peripheral provinces with

smaller populations, on the other hand, generally exhibit lower levels of specialisation.

In Central Italy, there is a marked polarisation between the main urban centres and the rest of the provinces. Rome stands out clearly, while Florence also exhibits a high level of specialisation. The positive correlation observed therefore seems to reflect, at least in part, the role of large urban centres in the concentration of advanced service sector activities. A similar trend, albeit in a different geographical context, is observed in the Islands, where the highest levels of specialisation are concentrated mainly in the main administrative and university centres, such as Palermo, Cagliari, Messina and Catania. Here too, the larger population size of the main urban centres appears to be associated with greater specialisation in KIS services.

Figure 6.18. Population in 2024 of the provinces and the KIS specialisation index in 2023, by ISTAT division.



Source: IDEA analysis based on ISTAT ASIA 2023 and DemoIstat 2024 data.

Particularly interesting, however, is the result for the continental South, where no statistically significant relationship emerges between provincial population and KIS specialisation. Although large provinces such as Naples and Bari exhibit relatively high levels of specialisation, the territorial picture is more complex than that observed in the Centre and the North-West. In fact, small and medium-sized provinces such as Isernia, Campobasso, Benevento and Pescara also stand out, characterised by relatively high levels of specialisation in the advanced tertiary sector compared to their population size. The presence of these cases helps to weaken the overall relationship between population and specialisation, suggesting that other territorial factors may play a significant role in the South.

Finally, in the North-East, the relationship is not statistically significant. This result appears to be strongly influenced by the case of Trieste, which exhibits a particularly high level of specialisation relative to its population size and therefore stands out as an anomaly compared with the general trend. Trieste's distinctiveness can also be attributed to its unique territorial structure and the limited presence of a true urban belt within Italian territory, linked to its geographical location and history. In addition to Trieste, Vicenza and Bolzano also appear to contribute to making the relationship less evident. Vicenza exhibits a high degree of specialisation in technology-based manufacturing (index 2.1), while Bolzano shows specialisation in non-KIS services, including those linked to tourism, with an index of 1.23. These specific characteristics may help to explain the greater variability observed in the relationship between population size and KIS specialisation.

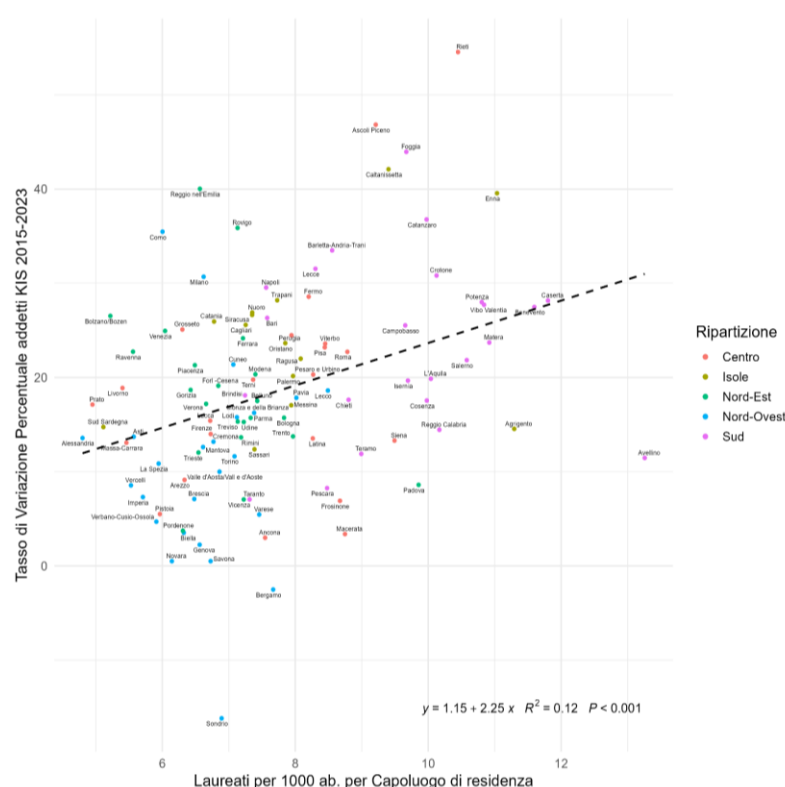
Overall, the picture therefore appears to confirm the role of the urban dimension and of the main administrative, economic and university centres in territorial specialisation in KIS services. At the same time, the presence of relatively small but highly specialised provinces, particularly in the South, shows that population size alone is not a sufficient condition to explain specialisation in the advanced service sector.

6.7. Human capital endowment and changes in KIS employment over the period 2015–2023 in provincial capitals

Figure 6.19 compares the number of graduates residing in provincial capitals in 2024, relative to the resident population (graduates per 1,000 inhabitants), with the percentage change in the number of employees in knowledge-intensive services (KIS) recorded over the period 2015–2023. The ratio of graduates to the population is used as a proxy for the presence of graduates, and therefore for the presence of a local pool of skills that may be relevant to the development of knowledge-intensive activities. The geographical distribution highlights a positive relationship between the share of graduates in the resident population and employment trends in knowledge-intensive services: provincial capitals characterised by a higher share of new graduates relative to the resident population tend, in fact, to record more marked growth in the number of employees in KIS. The data therefore suggest a correlation between the regional availability of qualified human capital and the growth in employment within knowledge-intensive services.

The relationship is statistically significant ($p\text{-value} < 0.001$), although this does not necessarily imply a causal link between the presence of graduates and employment growth in KIS. It is also important to emphasise that the graduate indicator refers to the main town of residence and not to the area in which the degree was obtained: it may therefore reflect the availability of human capital resident in the area, regardless of where that human capital was educated.

Figure 6.19. Graduates per 1,000 inhabitants in the provincial capital of residence in 2024 and percentage change in KIS employees over the period 2015–2023 in provincial capitals.



Source: IDEA analysis based on Istat ASIA data (2015–2023), Demostat 2024 and Ministry of Universities and Research 2024.

6.8. Human capital endowment and KIS specialisation index in provincial capitals

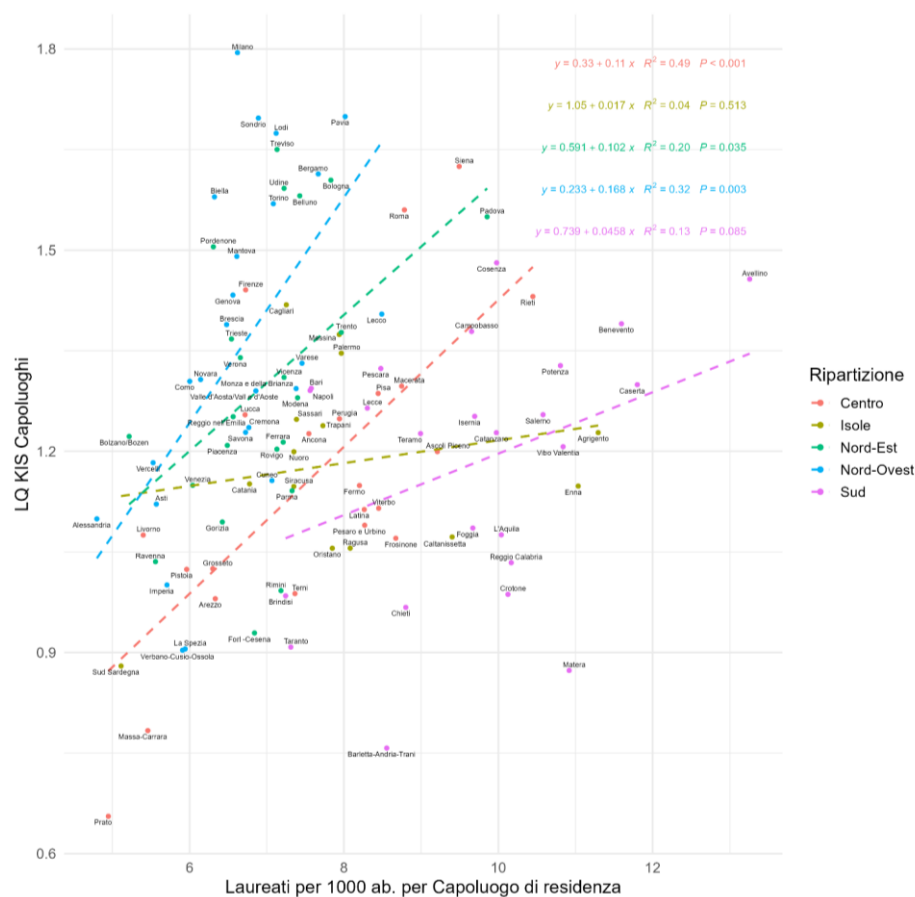
Another interesting finding emerges from the relationship between the number of graduates in 2024 – expressed as the number of people who obtained a degree in that year per 1,000 inhabitants – and the KIS specialisation index in 2023 in provincial capitals. The analysis aims to ascertain whether, and to what extent, in different Italian regional contexts, a higher relative share of new graduates compared to the population in provincial capitals is associated with greater specialisation in knowledge-intensive services.

The breakdown by individual territorial division (Fig. 6.20) highlights differing patterns⁵⁰. In the Centre-North, statistically more significant

⁵⁰ The relationship between graduates per 1,000 inhabitants by provincial capital of residence and the KIS specialisation index, calculated by considering all provincial capitals

relationships are observed, with p-values below the conventional threshold of 5 percent, while in the South and on the Islands the relationships are generally less evident. This result might suggest that, in economically weaker areas – and in particular in the South and on the Islands – the local economic structure has a lower capacity to absorb highly qualified workers, even in relation to the resident population.

Figure 6.20. Graduates per 1,000 inhabitants by provincial capital of residence in 2024 and the KIS specialisation index in provincial capitals, by geographical region.



Source: IDEA analysis based on Istat ASIA (2023), DemoIstat 2024 and Ministry of Universities and Research 2024 data.

regardless of the breakdown, proved to be positive but not significant $R^2 = 0.02$ and p-value = 0.132

A high degree of model fit can be interpreted as an indication that, in areas most specialised in KIS services, the presence of new graduates tends to be more closely associated with the capacity of the local economic structure to absorb skilled human capital. Conversely, in several provincial capitals in the South and the Islands, the lower significance of the relationship does not necessarily indicate a lower presence of graduates, but rather a more limited capacity of the local economic structure to utilise and absorb such human capital through knowledge-intensive activities. Graduates in these areas may therefore find employment in other sectors, remain outside the labour market, or move to areas characterised by greater demand for skilled labour.

There are also cases, such as Prato, Massa-Carrara, Verbania and La Spezia, characterised simultaneously by a relatively small number of new graduates and low levels of KIS specialisation. At the upper end of the regression lines for the individual territorial divisions, on the other hand, are several provincial capitals with a strong university tradition, including Milan and Pavia in the North-West, Bologna and Padua in the North-East, and Rome and Siena in the Centre. These cases appear to highlight a greater ability to combine the presence of skilled human capital with an economic structure characterised by significant specialisation in KIS services.

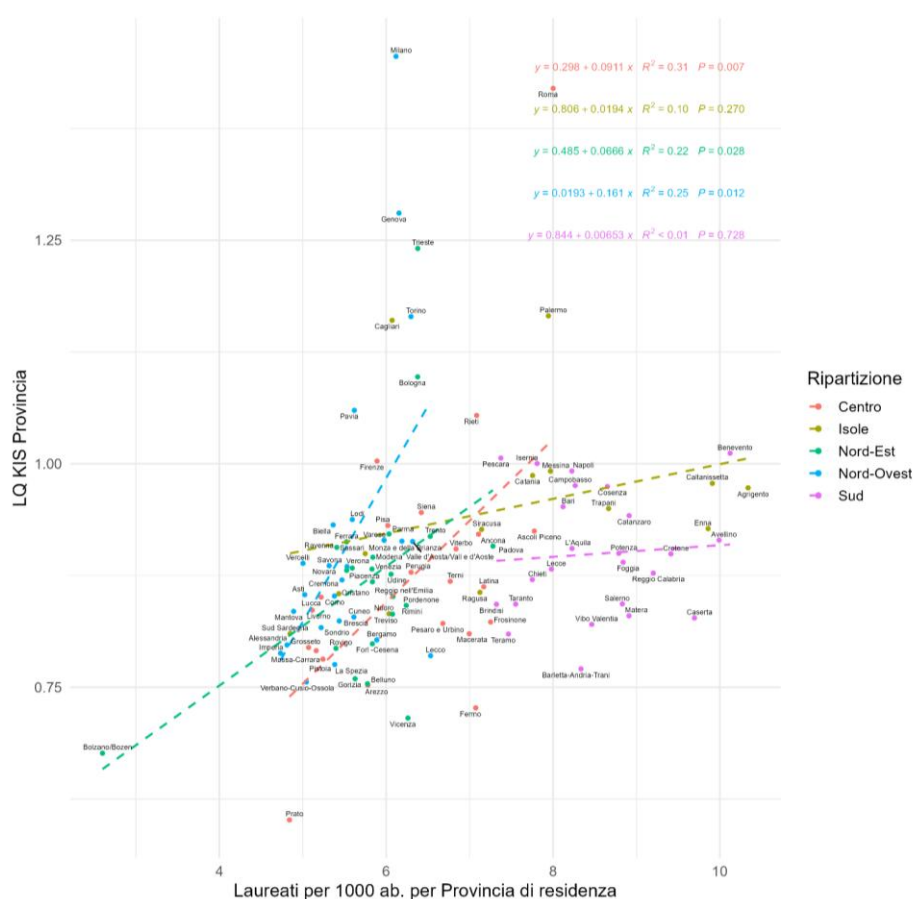
A further factor to consider concerns the presence of a ‘belt effect’ and, more generally, a functional territorial dimension that extends beyond the administrative boundaries of the provincial capital. Workers, in fact, commute daily within urban systems characterised by functional links between the main centre and the surrounding areas. Consequently, graduates residing in a provincial capital may also be employed by firms located in the surrounding municipalities, and vice versa.

The relationship between the presence of human capital and specialisation in KIS services could therefore be better understood by considering a functional territorial unit, rather than the provincial capital alone. From this perspective, the provincial level may also provide a more appropriate approximation of the territorial catchment area within which the integration of residence and work takes place, although the boundaries of the actual functional areas may not necessarily coincide with administrative ones.

6.9. Human capital endowment and KIS specialisation index in the provinces

The same relationship, when applied to the provinces as a whole, proves to be statistically significant, unlike what is observed when taking the provincial capitals as the unit of analysis. This result could indicate that the employment opportunities for graduates are not necessarily limited to the provincial capital where they reside but may also extend to other areas within the same province, reflecting the existence of a broader employment catchment area and functional links between the provincial capital and the surrounding areas. The following Figure (Figure 6.21) shows the breakdown of the analysis by geographical division, with similar results but with even higher levels of statistical significance compared with those discussed for the ratio of resident graduates per 1,000 inhabitants (2024) and the specialisation index.

Figure 6.21. Graduates per 1,000 inhabitants by province of residence in 2024 and the KIS specialisation index in the provinces in 2023, by ISTAT classification.



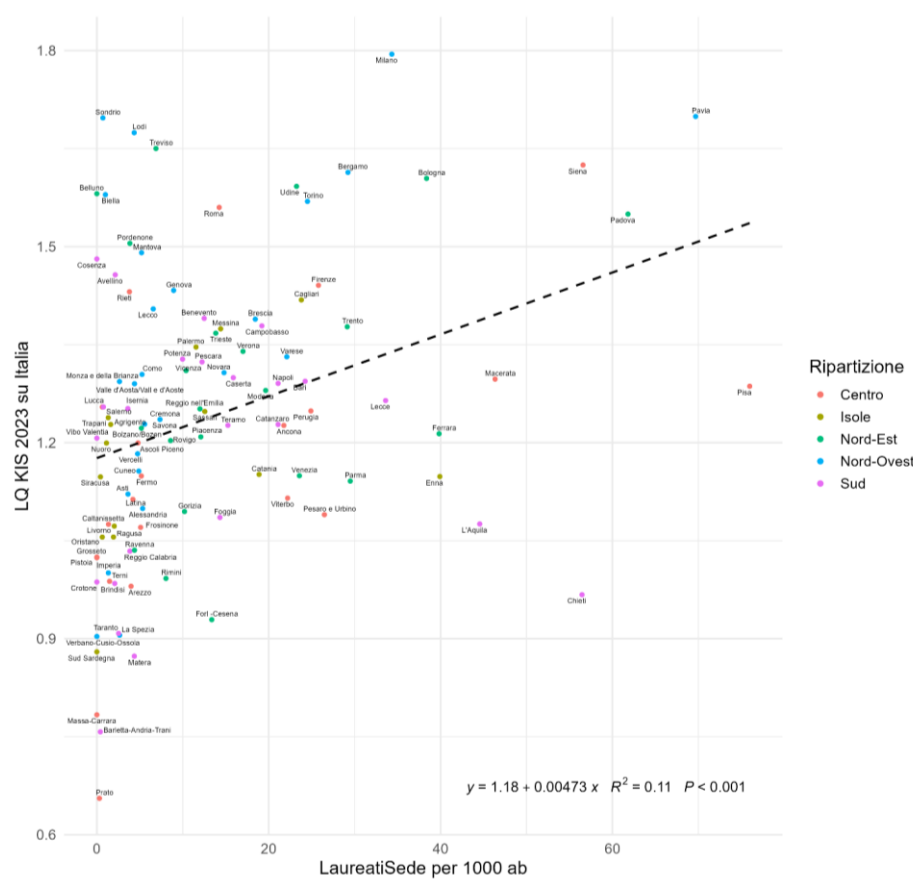
Source: IDEA analysis based on ISTAT ASIA data (2023), DemoIstat 2024 and Ministry of Universities and Research 2024.

6.10. Generation of skilled human capital and the KIS specialisation index in provincial capitals

The aim of this section is to understand the relationship between a territory's capacity to *generate* skilled human capital and its specialisation in knowledge-intensive service activities, in contrast to the previous sections, which examined the regional *stock* of skilled human capital. In this section, therefore, we assess the relationship between the graduates per 1,000 inhabitants by university location in 2024 and the territorial specialisation index in knowledge-intensive services (KIS) in provincial capitals. This indicator is used as a proxy for the significance of the university sector relative to the population of the provincial capital. The hypothesis is that a greater presence of the university sector – and thus a greater capacity to generate skilled human capital – is associated with a higher level of specialisation in KIS.

At the upper end of Figure 6.22 are a number of cities with a strong university tradition, such as Pavia, Siena and Padua, which produce around 50 graduates per 1,000 inhabitants. Pisa, while also demonstrating a high capacity to produce graduates relative to its population, shows KIS specialisation values that are slightly lower than those predicted by the bivariate relationship. Milan and Bologna, while also having a high capacity for producing graduates, show KIS specialisation levels higher than those predicted by the bivariate analysis in relation to their capacity for generating human capital. This could indicate the ability of these regions to attract qualified human capital from outside or to retain graduates trained at their own universities to a greater extent than in other contexts.

Figure 6.22. Graduates per 1,000 inhabitants by university location in 2024 and KIS specialisation index in provincial capitals.



Source: IDEA analysis based on Istat ASIA (2023), DemoIstat 2024 and Ministry of Universities and Research 2024 data.

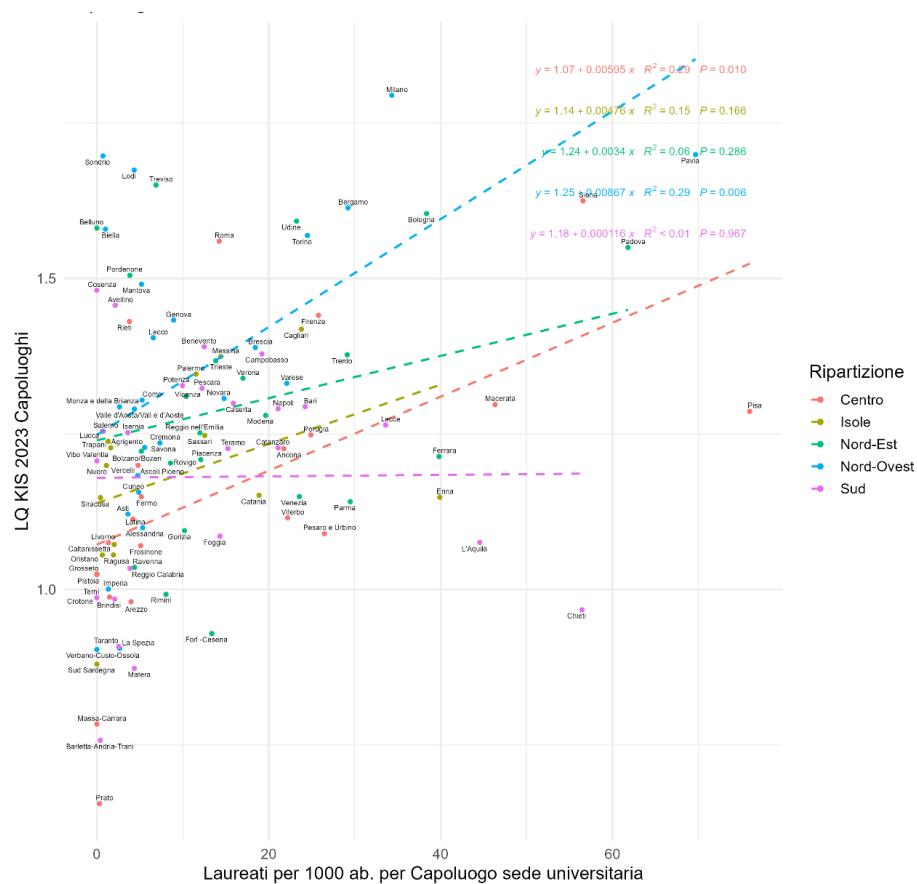
Finally, it is worth noting some smaller provincial capitals, such as Lodi and Treviso, which are characterised by a limited capacity to produce graduates, but which rank fourth and fifth respectively in terms of the KIS specialisation index. This result may be at least partly linked to their proximity to major university and urban centres, such as Milan in the case of Lodi, and Padua and Venice in the case of Treviso, which may facilitate access to a wider pool of qualified human capital.

Analysis carried out at the level of provincial capitals reveals that the specialisation index in KIS activities is more strongly associated with the capacity to produce qualified human capital – measured by the number of graduates in 2024 per 1,000 inhabitants, based on the location where the degree was obtained – rather than with the territorial stock of qualified human capital, measured by the number of graduates per 1,000 inhabitants based on their area of residence. Indeed, when considering provincial

capitals, the relationship between the production of graduates and the KIS specialisation index is highly significant (p-value < 0.001), while no statistically significant relationship emerges between the territorial stock of qualified human capital among residents and specialisation in KIS.

At provincial level, however, the relationship between resident graduates and specialisation in KIS is significant (p-value = 0.006). The result therefore suggests the existence of functional relationships on a broader scale than that of the provincial capital alone, in which a greater stock of qualified human capital is positively associated with greater specialisation in advanced tertiary services.

Figure 6.23. Graduates per 1,000 inhabitants by university location in 2024 and KIS specialisation index in provincial capitals, by geographical area.

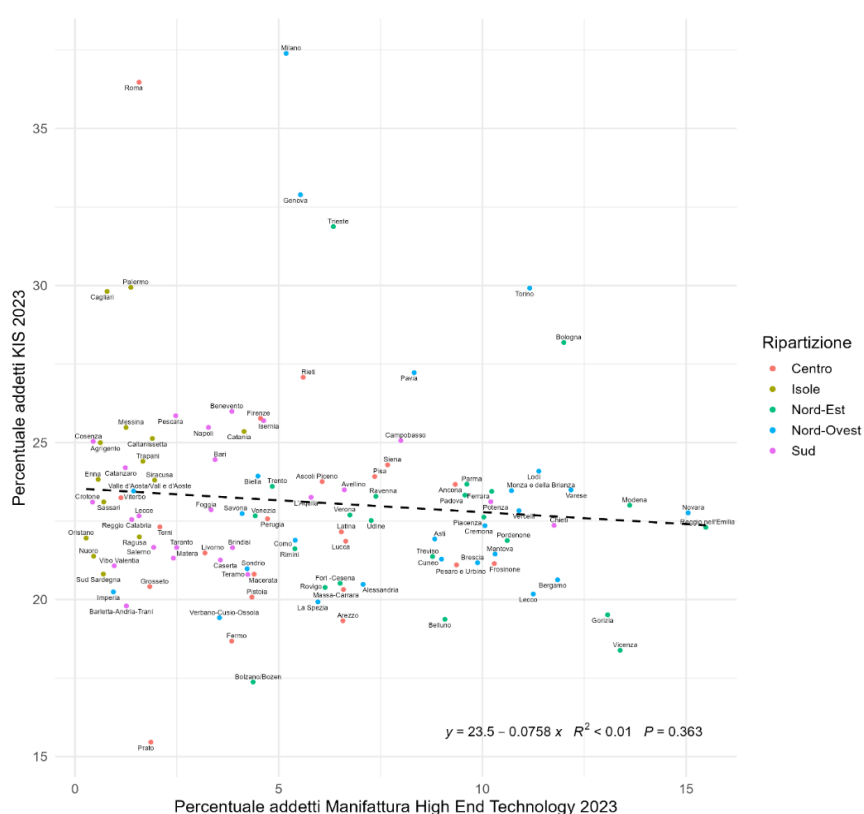


Source: IDEA analysis based on Istat ASIA (2023), DemoIstat 2024 and Ministry of Universities and Research 2024 data.

6.11. Employees in local units in technology-based manufacturing and KIS

At provincial level, the relationship between the share of employees in technology-based manufacturing and that in KIS services is not statistically significant ($p = 0.363$; $R^2 < 0.01$). Although the regression line has a negative slope, the high dispersion of the values indicates the absence of a systematic relationship between the two components. However, certain areas emerge, particularly in Northern Italy, characterised by high levels of both KIS and technology-based manufacturing, such as the provinces of Bologna and Turin. This seems to suggest that, in some production systems, advanced services and technology-based manufacturing can coexist and complement one another, while in others there is greater specialisation towards one of the two components. For example, Vicenza, Gorizia, Reggio nell'Emilia, Modena and Novara are characterised by a high degree of specialisation in technological activities, alongside a low percentage of KIS employees.

Figure 6.24. Percentage share of employees in local units in technology-based manufacturing and percentage share of employees in local units in KIS, by province.

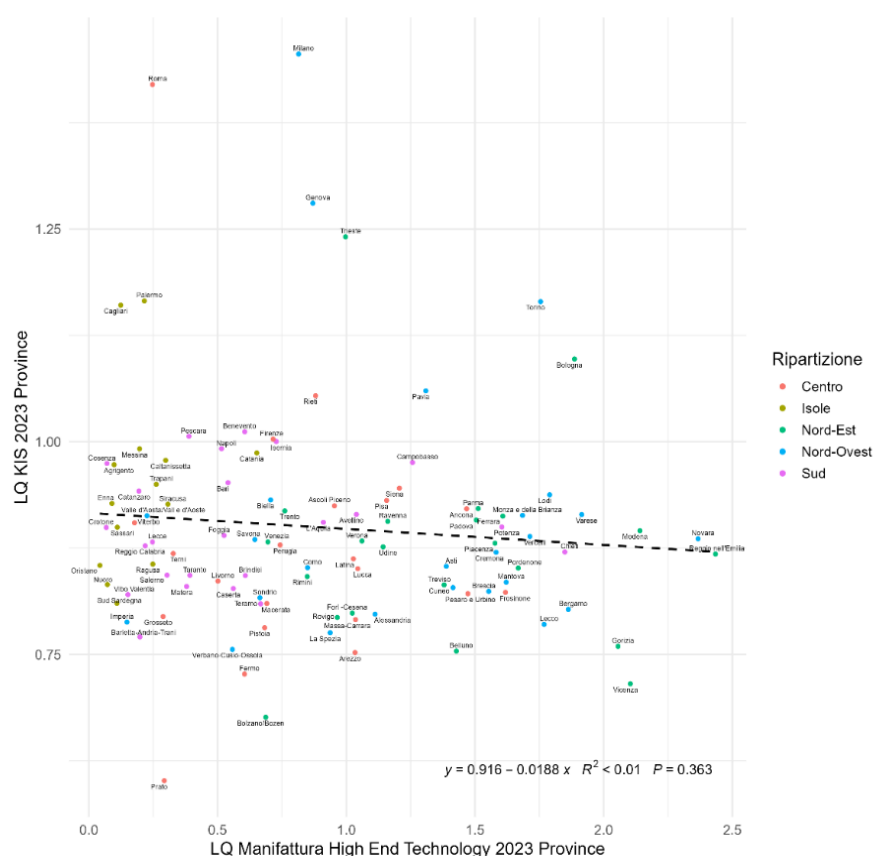


Source: IDEA analysis based on Istat ASIA data (2023).

6.12. Indices of production specialisation in high-tech manufacturing and knowledge-intensive services

The regressions relating the territorial share of KIS employees to that of high- and medium-high-technology manufacturing (Fig. 6.25) yield the same values for the ' R^2 ' and the corresponding significance tests when the variables are expressed using the corresponding territorial specialisation indices LQ .⁵¹ The same considerations made in the previous paragraph therefore apply.

Figure 6.25. Specialisation index of employees in local units in technology-based manufacturing and specialisation index of employees in local units in KIS, by province.



Source: IDEA analysis based on Istat ASIA data (2023).

⁵¹ This stems from the very definition of the specialisation index. For each territory, in fact, the LQ is obtained by dividing the territorial share by the corresponding national share:

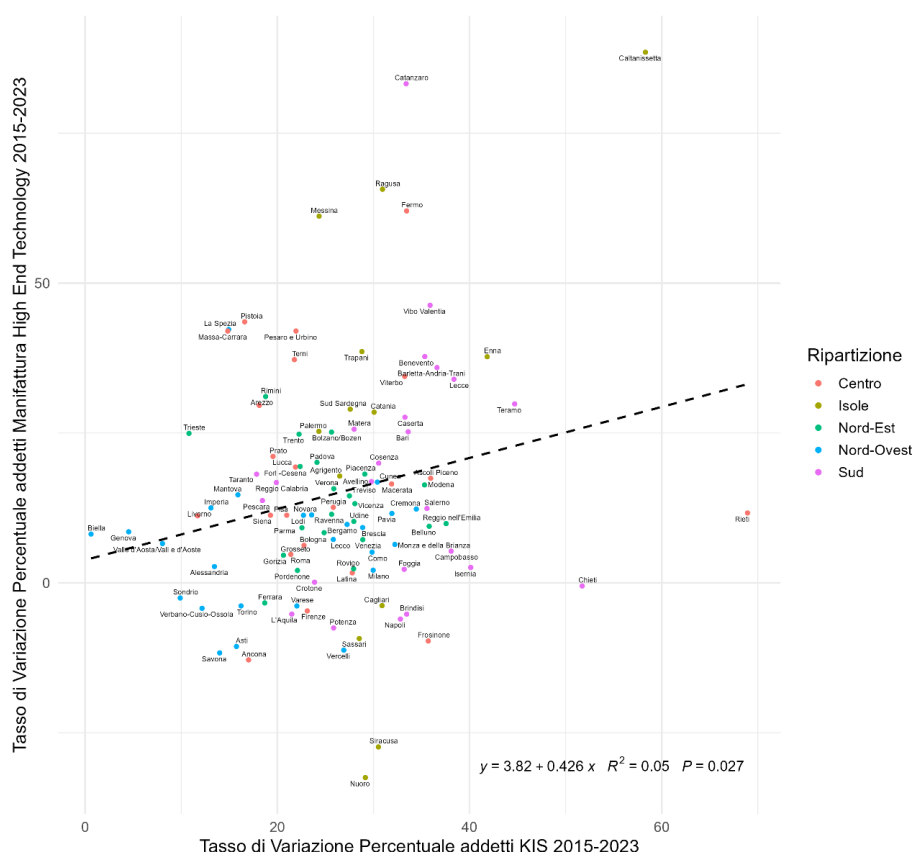
$$LQ_{settorej;territorioi} = \text{quotaaddetti}_{settorej;territorioi} / \text{quotaaddetti}_{settorej;ITALIA}$$

Since $\text{quotaaddetti}_{settorej;ITALIA}$ is a constant common to all territories, the transition from the share to the LQ is the result of a mere linear transformation involving division by a positive constant. This transformation, therefore, does not alter either the coefficient of determination R^2 or the statistical significance of the relationship in the linear regression model.

6.13. Change in the number of employees in local units in KIS and in technology-based manufacturing over the period 2015–2023

Figure 6.26 shows that there is a positive relationship between the percentage change in KIS employees over the period 2015–2023 and the change in the number of employees in technology-based manufacturing. This descriptive association is consistent with a reorganisation of the productive structure characterised by the concurrent growth of knowledge-intensive activities and technology-based manufacturing, which is more pronounced in certain areas of Southern Italy. The bivariate relationship does not, however, allow for the identification of a causal link between the two components.

Figure 6.26. Percentage change in the number of employees in local units in KIS and percentage change in the number of employees in local units in technology-based manufacturing over the period 2015–2023, by province.



Source: IDEA analysis based on Istat ASIA data (2015–2023).

6.14. Concluding remarks

This chapter has analysed the geographical distribution of employees in local units across various territorial aggregates: regions, provinces and provincial capitals, by sector and by levels of knowledge and technology intensity. The analysis focused on the share of employees in knowledge-intensive services (KIS) and technology-intensive manufacturing, on the relevant specialisation indices, on changes over the period 2015–2023, and on certain factors that may explain the different specialisations and trends in the changing structure of production across regions. The regional analysis has highlighted some significant findings:

different regional models of specialisation are emerging. Lombardy and Piedmont exhibit a high degree of specialisation in both technology-intensive manufacturing and KIS; Veneto, Emilia-Romagna and Marche, on the other hand, are more specialised in manufacturing, while Lazio shows a strong specialisation in the advanced service sector alongside a lower degree of specialisation in manufacturing. Several regions in Southern Italy, by contrast, display modest levels of specialisation in both sectors.

A combined analysis of specialisation levels and changes in the number of employees reveals distinct, geographically localised trends. Some southern regions, despite having lower levels of specialisation, are recording particularly high increases in the number of employees in KIS and high-tech manufacturing, as is the case in Calabria, Sicily and Puglia. Conversely, the most specialised regions often exhibit less intense trends than those observed in the southern regions, as is the case with Veneto and Emilia-Romagna in high-tech manufacturing, and with Lombardy and Lazio in KIS. Piedmont represents a special case, characterised by high specialisation in high-tech manufacturing but substantial stagnation in the number of employees in the sector.

The relationship between the provincial population and the specialisation index in KIS services is positive and statistically significant. Provinces with larger populations therefore tend to exhibit higher levels of specialisation in knowledge-intensive services.

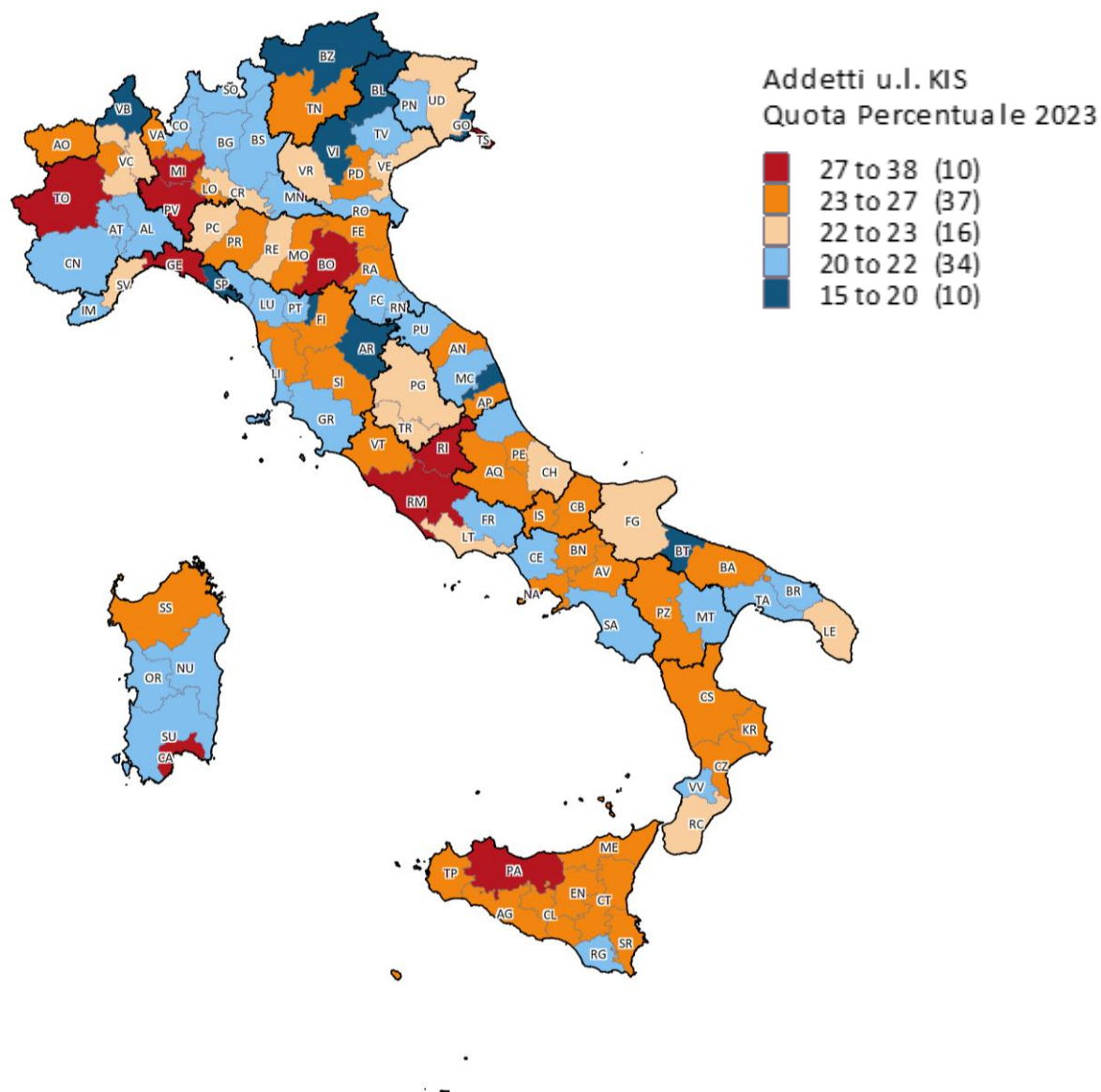
In Northern Italy alone, between 2015 and 2023, a larger population in the provincial capital corresponds to a greater increase in the number of employees in knowledge-intensive services (KIS) across the entire province. This finding may be consistent with the hypothesis that the growth of knowledge-intensive services does not stop at the provincial capital, but

may also extend to surrounding territories and areas functionally integrated with it, and is all the stronger the larger the provincial capital is.

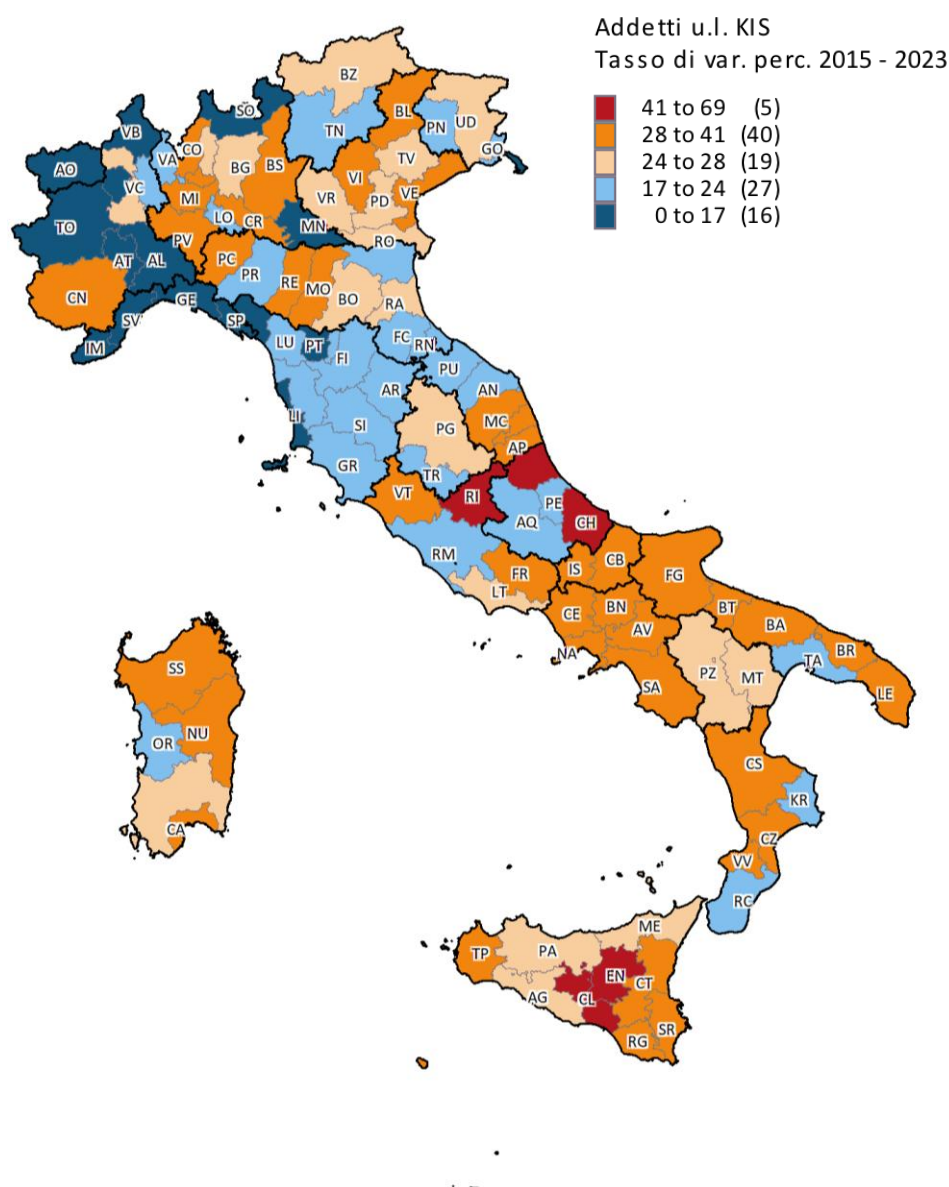
Strong relationships are found between the presence of qualified human capital and specialisation in KIS. In provincial capitals, KIS specialisation is strongly associated with the capacity to produce graduates, confirming the importance of the university system. At the provincial level, however, a significant association emerges with the territorial stock of qualified human capital. The result suggests that the relationship between human capital and specialisation in KIS manifests itself within functional spheres broader than the individual provincial capital: a greater number of graduates within the provincial territory corresponds to greater specialisation in KIS. Furthermore, contexts with a greater presence of qualified human capital in recent years have shown more sustained growth in terms of KIS employees.

6.15. Cartograms

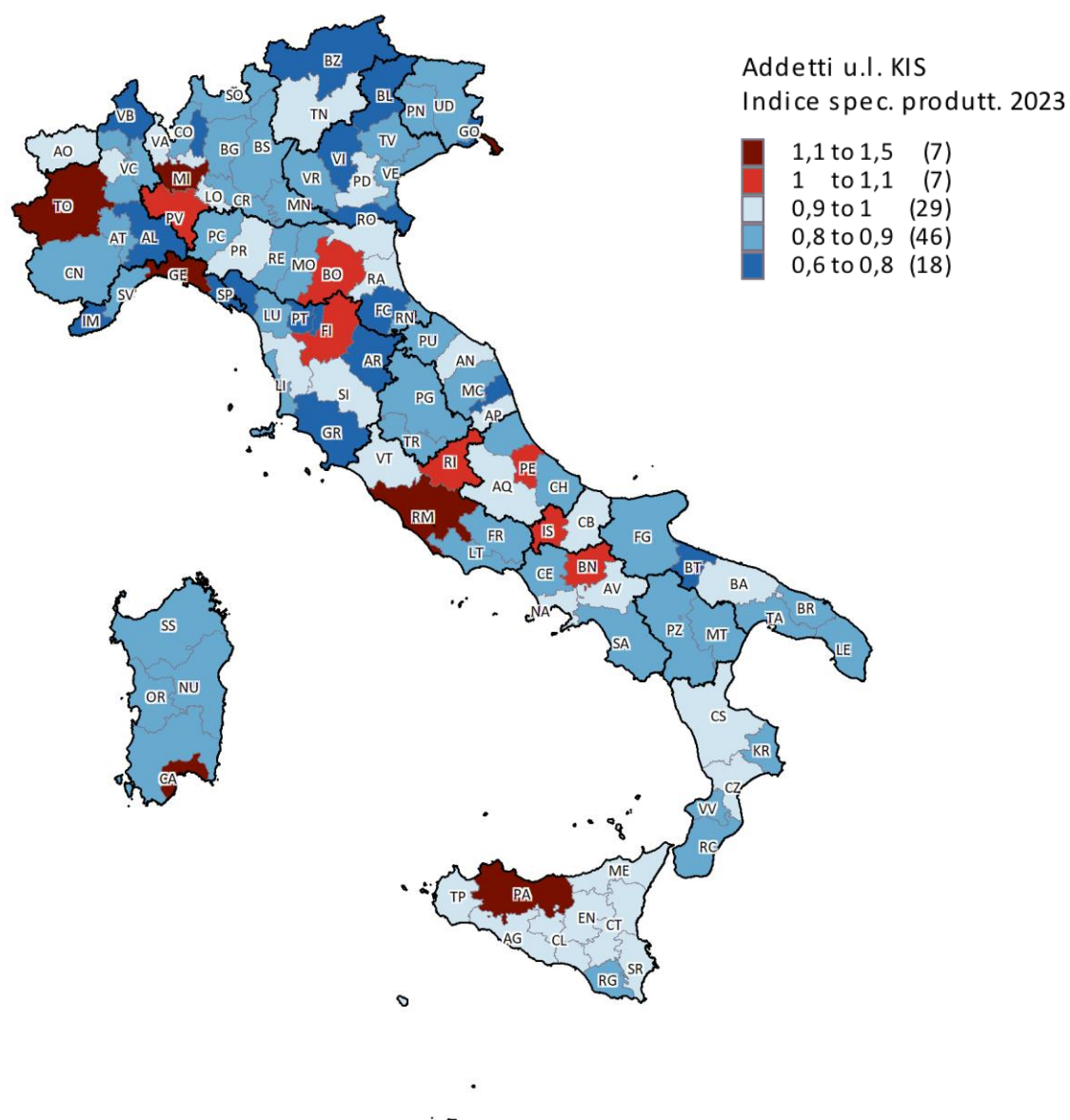
Percentage share of employees in local units in knowledge-intensive services (KIS) in 2023.



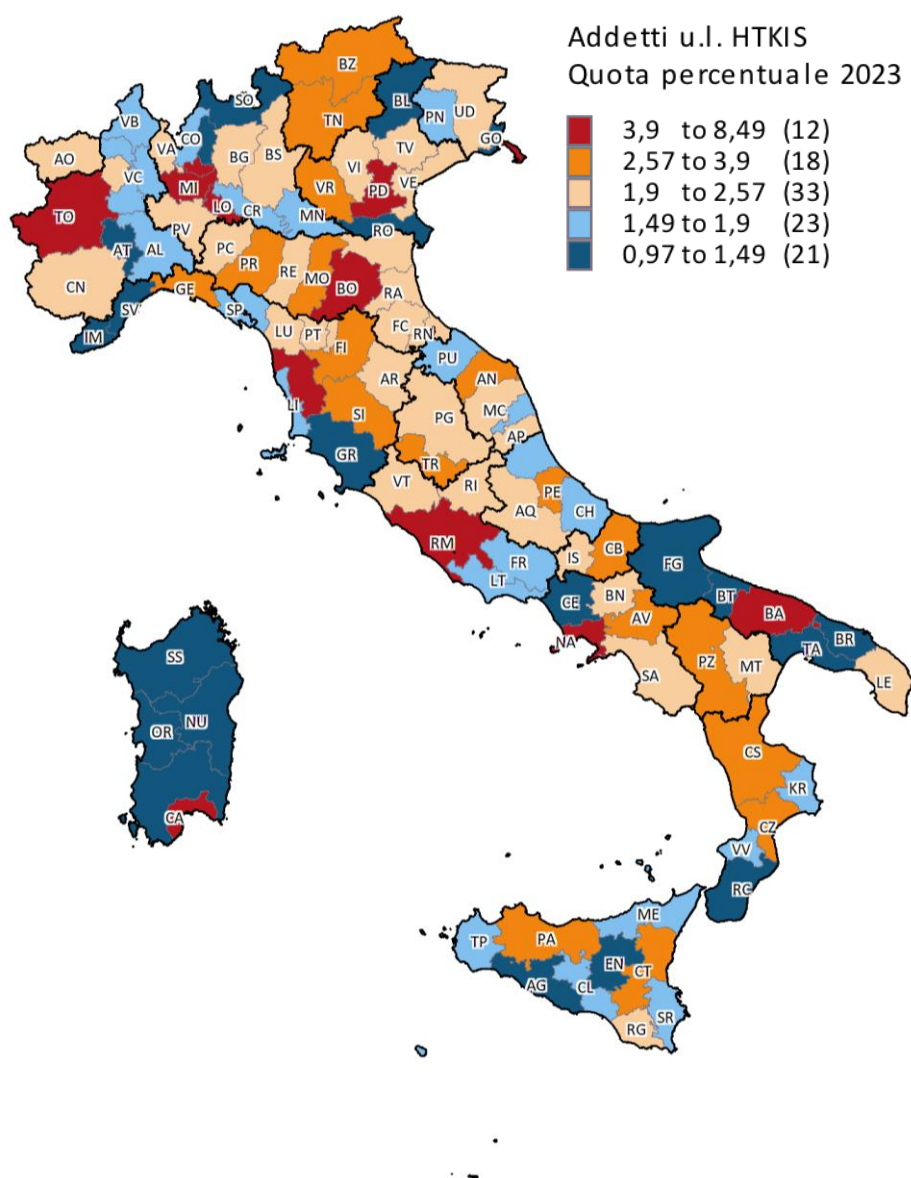
Percentage rate of change in the number of employees in local units in knowledge-intensive services (KIS) over the period 2015–2023.



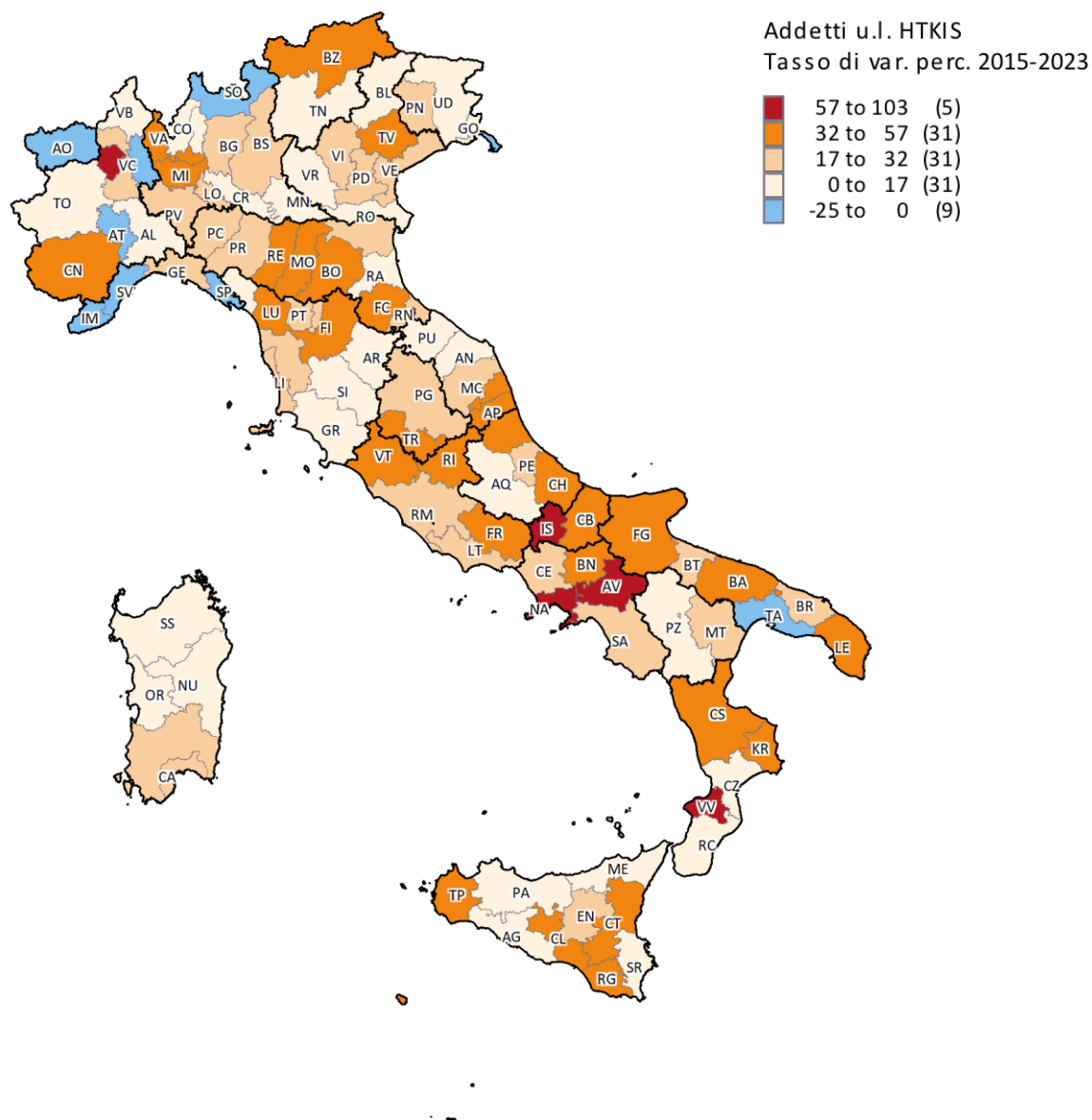
Index of production specialisation in knowledge-intensive services (KIS) in 2023.

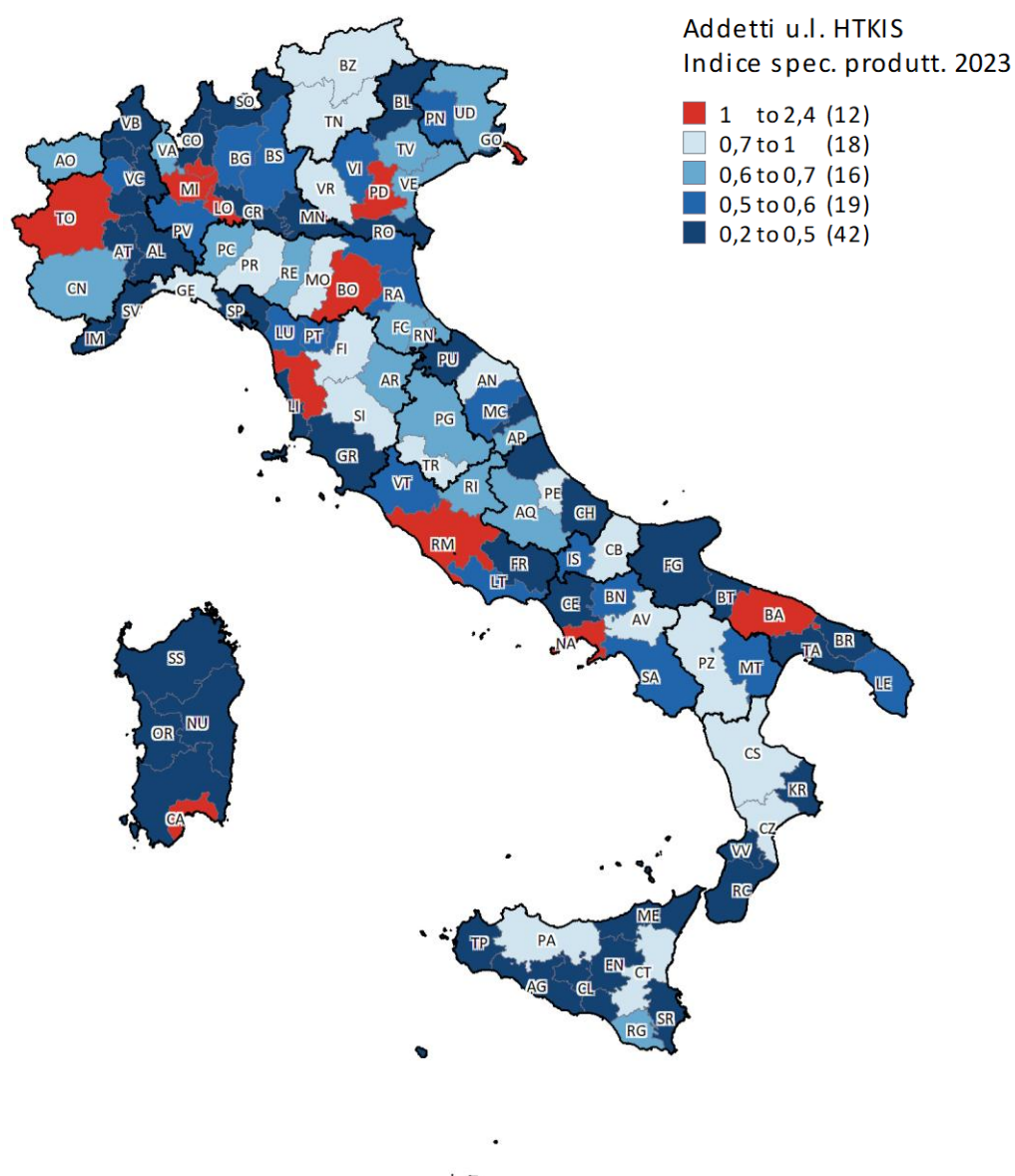


Percentage share of employees in local units within high-technology KIS (HTKIS) in 2023.

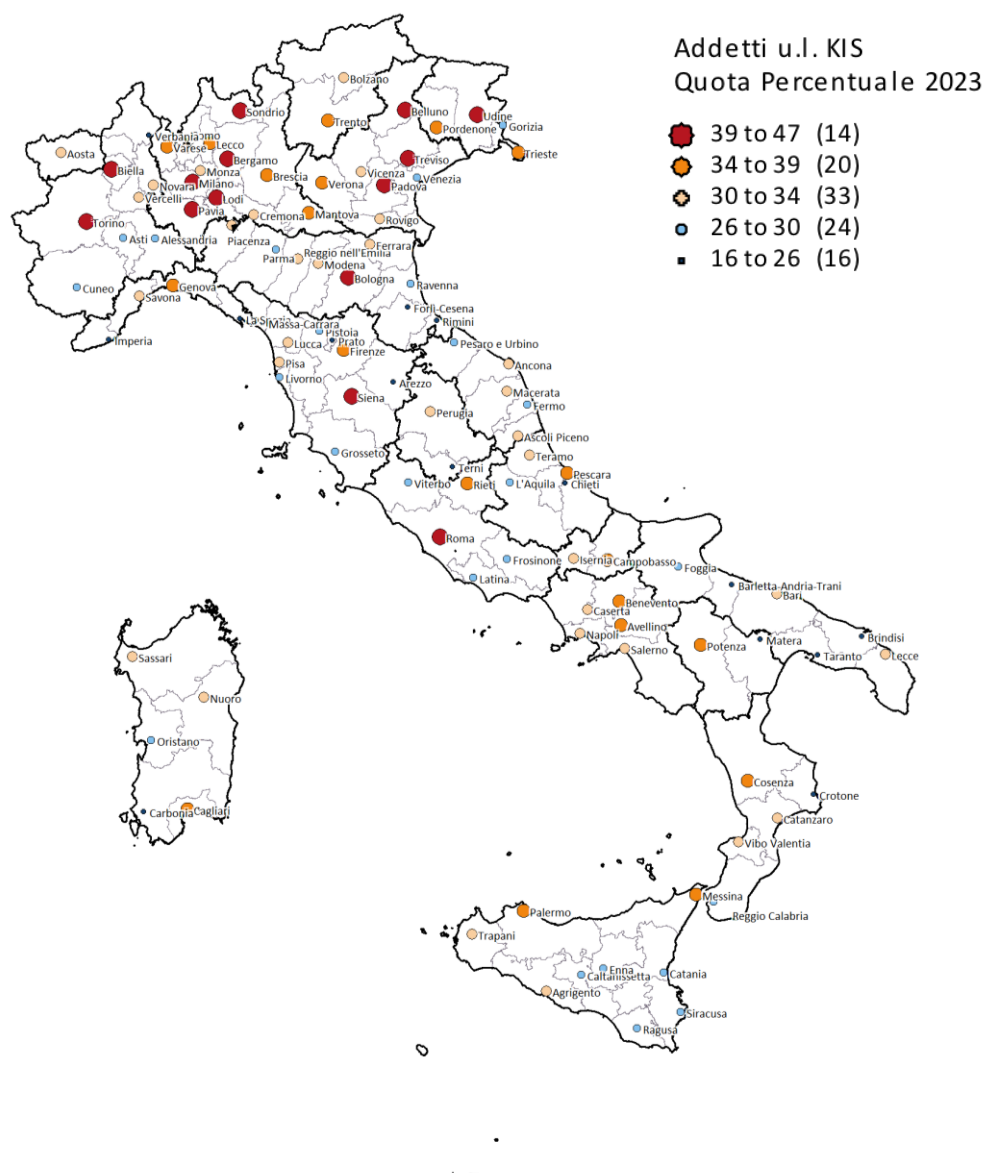


Percentage rate of change in the number of employees in local units within high-technology KIS (HTKIS) in the period 2015–2023.

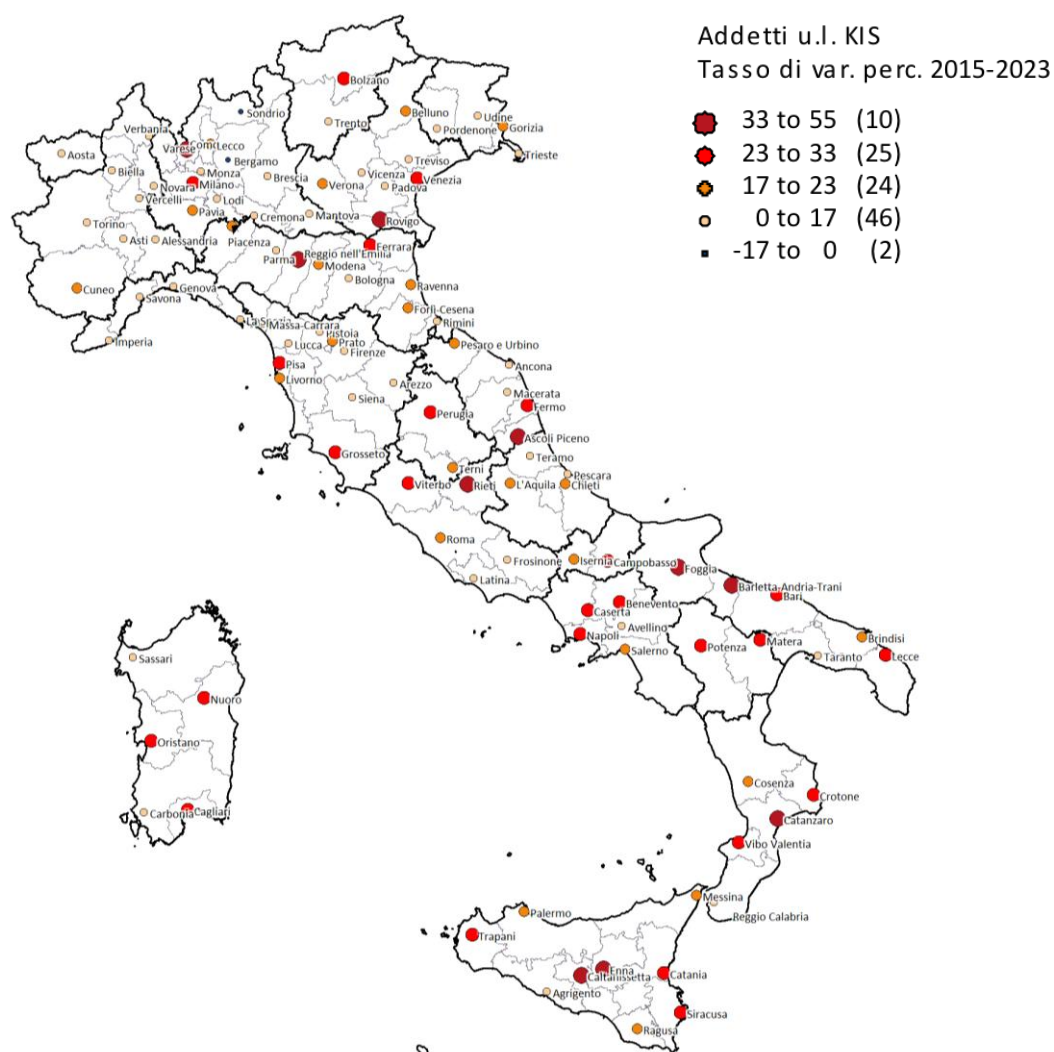




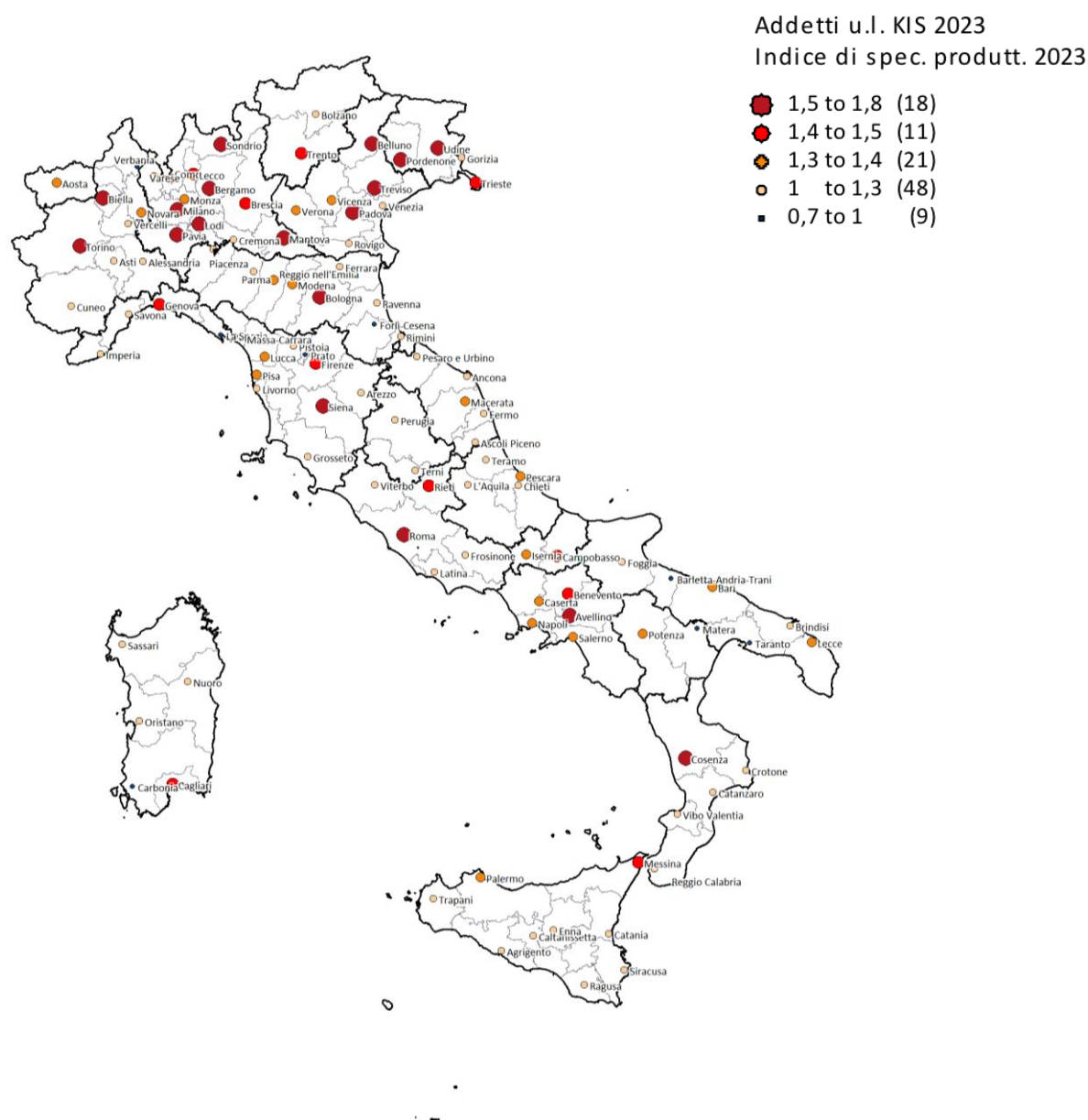
Percentage share of employees in local units within knowledge-intensive services (KIS) in 2023 in the provinces.



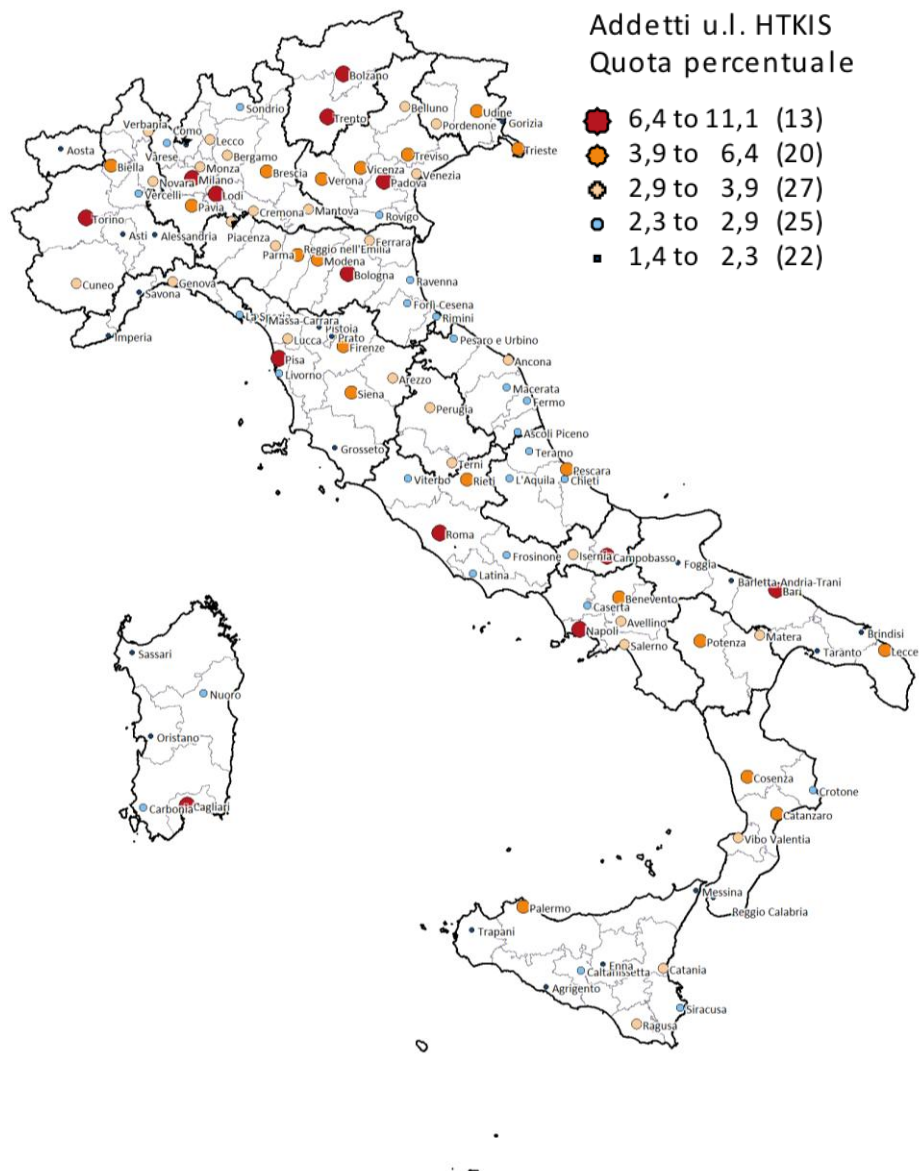
Percentage rate of change in the number of employees in local units within knowledge-intensive services (KIS) over the period 2015–2023 in provincial capitals.



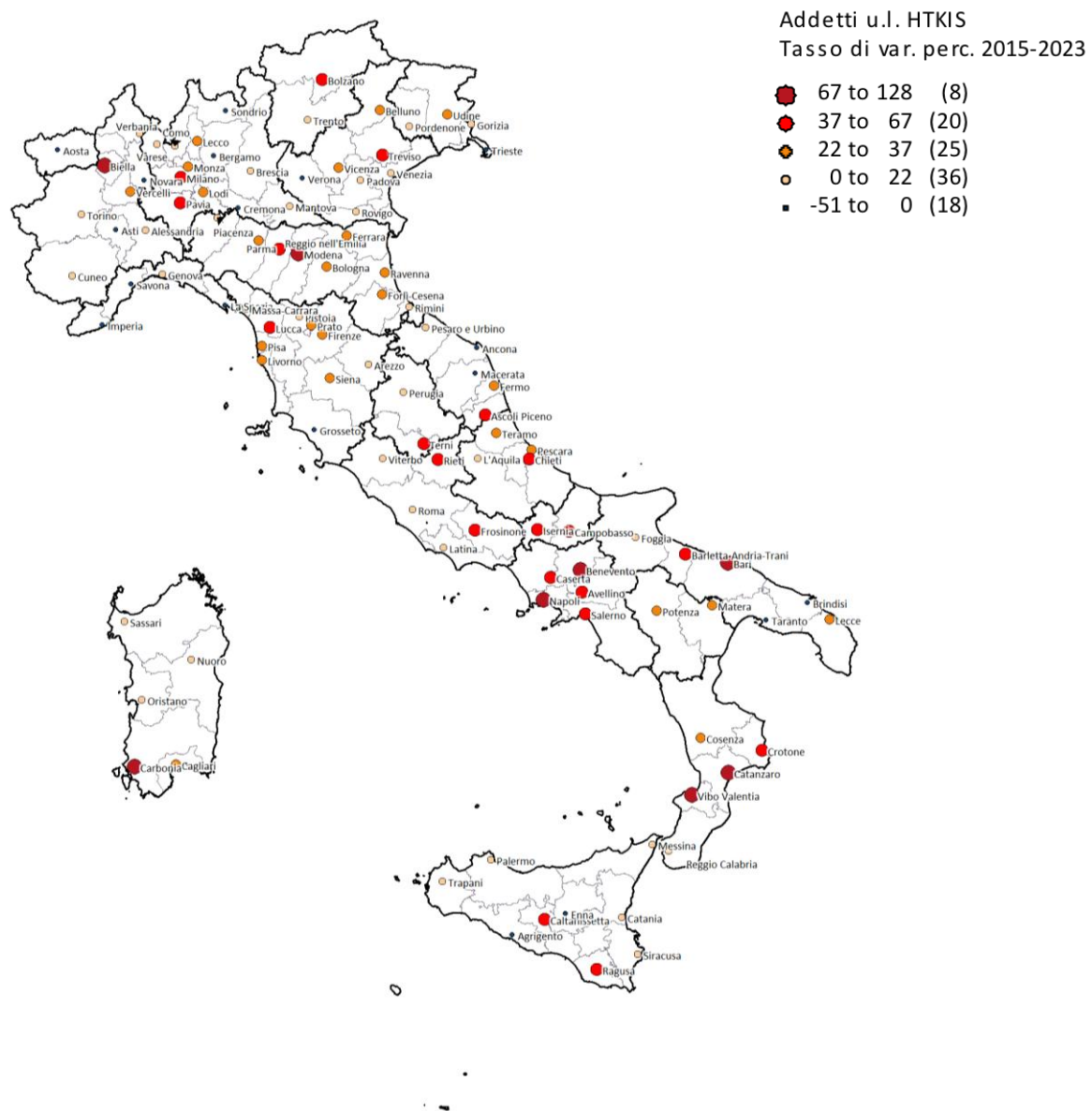
Index of production specialisation in knowledge-intensive services (KIS) in 2023 in provincial capitals.



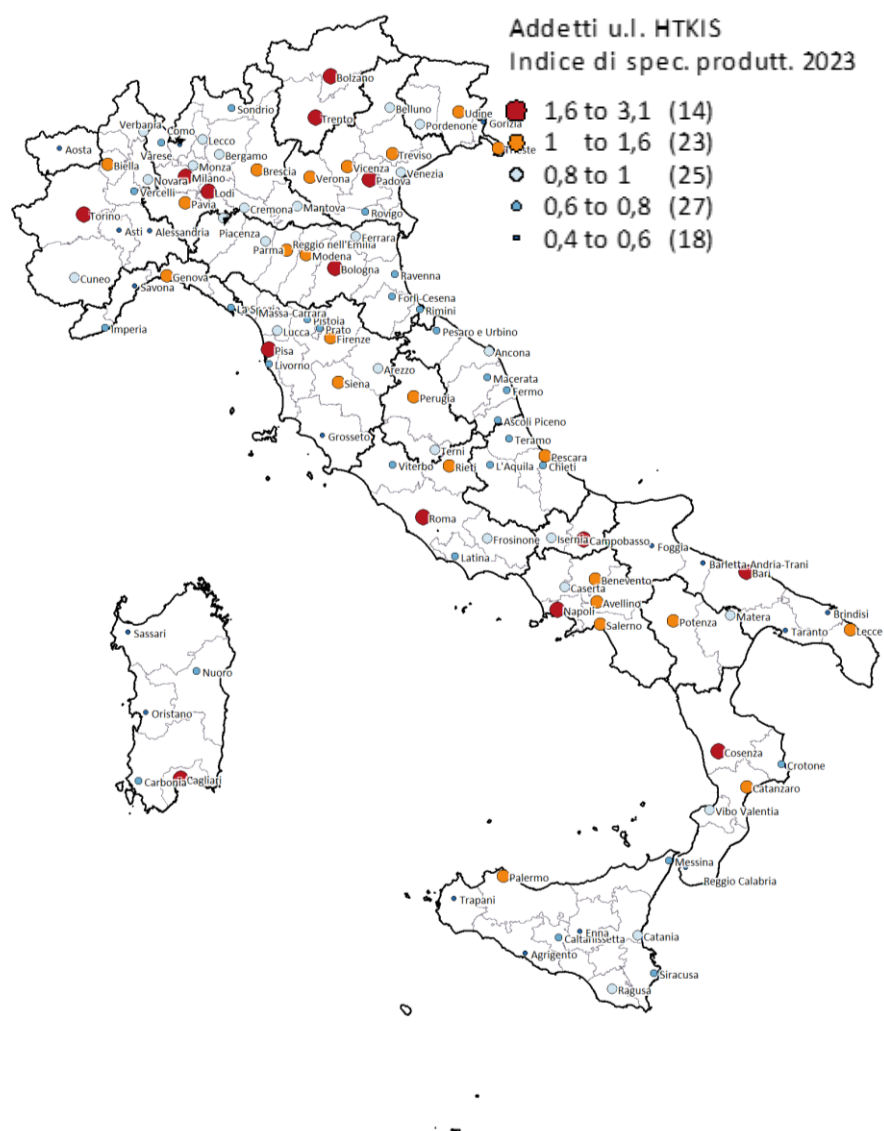
Percentage share of employees in local units within high-technology KIS (HT-KIS) in 2023
in provincial capitals.



Percentage rate of change in the number of employees in local units in high-technology KIS (HT-KIS) in the period 2015–2023 in provincial capitals.



Production specialisation index for high-tech KIS services (HT-KIS) in 2023 in provincial capitals.



Chapter 7. Policy recommendations

The report helps to clarify the focus of economic policy: not to increase the number of service enterprises indiscriminately, but to enhance the capacity of existing organisations to utilise knowledge, invest and reach new markets. In professional, scientific and technical activities, micro-enterprises account for 72.8 percent of the Italian workforce, compared with 51.0 percent in the European Union and 34.1 percent in Germany. These figures highlight the difficulties our country faces in keeping pace with international competition.

To improve Italy's position relative to other European countries, six mutually consistent public policies can be identified: 1) introducing a collective agreement specifically for professional services; 2) providing tax incentives for enterprises to create jobs; 3) funding the adoption of new technologies and artificial intelligence; 4) updating investment assessment criteria to take account of certain operating expenses (OPEX); 5) making cities accessible to skilled labour and well-connected to productive regions; 6) integrating human capital, capitalisation and demand for innovation.

1) Professional Services: the need for a single, dedicated collective agreement

The world of professional services is currently undergoing a period of profound contradiction: on the one hand, it represents one of the most dynamic and strategic sectors of the economy; on the other, it continues to be governed by collective agreements designed for entirely different contexts. Workers find themselves 'split' between the National Collective Labour Agreement for the Metalworking Sector, which applies to those carrying out more technical tasks, and the National Collective Labour Agreement for the Commercial Sector, reserved for those working in consultancy or customer service roles. This fragmentation is not merely a bureaucratic issue; it gives rise to tangible problems that penalise both workers and enterprises in the sector.

The contracts currently in use stem from traditional industrial or commercial needs and fail to capture the specific nature of work based on intellectual skills, consultancy and continuous innovation. For example, professional services require a level of flexibility that current contracts do not guarantee: flexible working arrangements, performance-based

assessment and the constant updating of skills. A dedicated national collective agreement should address these needs:

Remuneration linked to objectives and results, not just to length of service. The system of automatic pay increments based on length of service, typical of existing contracts, is ill-suited to a sector where progression is rapid and merit-based. The new national collective agreement must introduce a structured variable component (*Management by Objectives/bonuses*) accessible at all levels – not just to senior management – with transparent criteria linked to project KPIs, quality of delivery and client development.

Flexible working hours as the rule, not the exception. Current contracts regulate working hours on a rigid daily/weekly basis, with overtime rates that do not reflect the reality of the consultancy sector (intensive weeks alternating with less busy periods, business travel, and *on-site client work*). The new National Collective Labour Agreement must provide for the management of working hours via a ‘time bank’ on a monthly or project basis, with clear safeguards regarding minimum rest periods and the right to disconnect (dynamic management of peaks and troughs).

Classification based on skills and professional role, not on production category. The current contractual levels (e.g. Levels 1–8 in the Tertiary sector) do not reflect the actual roles in the sector: Analyst, Consultant, Manager, Principal, Partner. The National Collective Labour Agreement must define a specific classification for management consultancy, with provisions that recognise decision-making autonomy, client management and team leadership, regardless of seniority.

Continuous professional development as a right and contractually enshrined. A consultant’s capital is their knowledge: keeping up to date is an integral part of the job, not an option. The contract must guarantee a set number of hours per year dedicated to training (certifications, methodologies, sectors), recognise training undertaken outside working hours, and provide for forms of reimbursement or an individual ‘learning account’ managed by the employee.

Specific provisions on business travel and remote/hybrid working. Existing contracts treat business travel as an exceptional occurrence, with reimbursements and allowances designed for industrial logistics. In consultancy, mobility is a structural feature. The new National Collective Labour Agreement must clearly regulate the following: travel allowances

tailored to the sector, standardised expense reimbursement policies, flexibility for remote working on days not spent at the client's premises, and protection of private life during intensive project phases.

Specific safeguards for confidentiality, intellectual property and non-competition. Unlike workers in the metalworking or retail sectors, consultants work daily with sensitive client information and produce high-value methodologies and *deliverables*. The National Collective Labour Agreement must define minimum standards of confidentiality (*Non-Disclosure Agreements*), clarify ownership of the intellectual property rights in *deliverables*, and regulate post-employment non-competition clauses (currently often left solely to individual negotiation) in a manner that is proportionate and protective of both parties.

The introduction of a collective agreement dedicated to professional services is not merely a sectoral demand, but a structural necessity to support the transformation of the labour market. A specific collective agreement would make it possible to:

- overcome current distortions;
- truly recognise the value of skills;
- strengthen the competitiveness of Italian companies;
- offer workers a regulatory framework consistent with their work.

2) An incentive for business growth

The proposed approach involves shifting tax benefits from the company's status to its behaviour. A benefit granted simply for remaining small may conflict with the objective of growth, as is currently the case with the rules on the flat-rate tax regime, whereas a benefit granted for a net and sustained increase in the number of employees can encourage growth in company size. Italy is not starting from scratch: Article 4 of Legislative Decree No. 216 of 2023 introduced a standard 20 percent increase in the deduction for the eligible cost of new permanent hires; the 2025 Budget Law provided for its extension to the three-year period 2025–2027. The increase applies to both permanent and total employment, with adjustments for group companies. An increased deduction, however, does not equate to a tax rebate of the

same percentage: the benefit depends on the applicable tax rate and the possibility of utilising the deduction.⁵²

International experience helps to distinguish between instruments that are often treated as equivalent, but there is no single formula capable, on its own, of producing larger and more productive enterprises. For Italy, it is proposed to trial a credit for organisational growth, which can be used as a tax offset and with any remaining balance refunded within fixed timeframes, so as not to exclude enterprises that do not have sufficient tax liability. The basis for this would be the increase in the number of permanent employees, expressed in full-time equivalents and calculated on the basis of monthly averages. The comparison should be made with the twenty-four months preceding the scheme's launch, with specific rules established for younger enterprises. This measure must be distinguished from the 'employees' figure in statistical tables, which may include self-employed workers. Hiring to replace employees who have left does not, in itself, constitute growth in size.

The support should accompany each eligible increase for three years, with a decreasing intensity and without counting the same positions twice. For information purposes only, rates of 15 percent, 10 percent and 5 percent may be considered, applied to the eligible annual cost up to 50,000 euros per additional employee. A company that increases its workforce from eight to eleven full-time equivalents, incurring an annual cost of 40,000 euros for each of the three positions, would receive 18,000, 12,000 and 6,000 euros over the three years, provided it maintains the increase and the assumed costs. These are proposed parameters, not a measure currently in force nor a quantification of public expenditure: their sustainability requires a simulation based on administrative data, but public finances could benefit from the formalisation of part of the informal economy and from increased productivity, both of which could lead to a rise in tax revenue. The employment benchmark must be consolidated for companies under common control. Intra-group transfers, demergers, redundancies followed by re-hiring, and formal changes of employer must not generate benefits. In the case of acquisitions and mergers, relief should be provided for

⁵² Legislative Decree No. 216 of 30 December 2023, Article 4; Law No. 207 of 30 December 2024, Article 1, paragraph 399. The reference concerns the introduction and extension of the measure, not a comprehensive overview of the implementing regulations. Online source.

integration costs. The tax credit must also be reduced proportionally when the increase ceases, while still allowing for normal employees turnover: the additional posts must be maintained, rather than tying workers to the company by name. An incentive commensurate with the number of employees promotes the expansion of employment, not necessarily its productivity. It must therefore complement, not replace, support for technological innovation. For the employment credit, regular payment of social security contributions, compliance with collective agreements and an essential programme of training and reorganisation would constitute eligibility criteria.

A policy focused on firm size reaches its limits if a company's demand remains confined to the local market. Internationalisation can expand that market, but in turn requires organisational resources. According to some studies, the sluggish growth of Italian service exports is also due to a shortage of medium-to-large enterprises and low productivity.⁵³ Public intervention should therefore reduce the initial costs of establishing an international presence and support the development of the skills needed to sustain it. In this regard, however, it is necessary to have methods for measuring the dynamics of service internationalisation that also take into account the flows of value passing through digital channels. The balance of payments records transactions between residents and non-residents: for goods, the change in economic ownership is what counts, while for services, it is the provision of a service by a resident to a non-resident or vice versa. Consequently, sales made by an Italian subsidiary resident abroad to customers resident in the same country do not constitute Italian exports, whether of goods or services, while intra-group transactions with foreign affiliates do contribute to Italy's credit balance. For services, unlike goods, as there is generally no customs clearance involved, flows are reconstructed primarily through direct surveys of enterprises and other specific sources of the balance of payments. Given the digital transferability not only of knowledge, data and information but also of computational capacity and operational capabilities, the question arises as to how to measure the degree

⁵³ See, for example, Moro A., Tosti E. (2019), *'Italy's international trade in services: a history of stagnant growth?'*, Bank of Italy, 'Questioni di Economia e Finanza', No. 519, in particular pp. 23–29.

of integration and international value flows in a manner appropriate to this type of transaction.

3) A funding scheme for the adoption of new technologies

The ‘Industry 4.0’ initiative provides a model for a second line of action aimed at reducing the cost of introducing new technologies. The hyper-depreciation scheme introduced by the 2017 Budget Act linked the benefit to eligible assets and their interconnection; in particular, specific incentives were provided for certain software. The scheme was not restricted to manufacturing alone; therefore, this is not a matter of extending it to services and the tertiary sector for the first time, but of focusing on intangible investments and the processes that characterise their production.⁵⁴ The subsequent ‘Transition 4.0’ initiative saw an increase in additional investment, while the effects on productivity were limited, particularly in micro and small enterprises.⁵⁵

We therefore propose a three-year plan for digital and AI adoption, with a defined budget and resources earmarked before the project begins. At its core would be a tax credit on eligible expenditure, which could be offset against tax liabilities and, for any unused portion, refunded within pre-set timeframes. This would be complemented by subsidised loans to cover upfront costs, with a partial public guarantee and repayment terms aligned with the project’s commissioning schedule. A grant specifically for the initial assessment would help less well-equipped enterprises to define their investment. These are, of course, proposals that must be coordinated with existing instruments. The project being funded should be an integrated one: software, computing capacity and cloud services, database creation and data cleaning, the adaptation and integration of AI systems, cyber security, applied training and the review of procedures. Entirely intangible projects should also be eligible, without any obligation to purchase hardware. Subscription or licence fees would only be eligible for the portion and duration necessary for the start-up phase, avoiding the funding of routine

⁵⁴ Revenue Agency–Ministry of Economic Development, *Circular No. 4/E*, 30 March 2017, pp. 12–16, 48–49, 54–62. The reference concerns the original draft, not the current regulations.

⁵⁵ Bank of Italy, Ministry of Economy and Finance, Ministry of Infrastructure, Transport and Tourism, (2026) *Transition Plan 4.0: an assessment of the effects on investment, employment and productivity*, summary of the final report, May 2026, pp. 1–2. The analysis covers the period 2020–2023.

computer replacements, general subscriptions and consultancy services without practical application. In the services sector, eligible cases could include computer-aided design, controlled document analysis, demand forecasting and predictive maintenance. The scheme should be accessible to enterprises, professional practices and consortia with effective project management in place. The business should appoint an internal project manager and bear a substantial share of the cost. Contracts should guarantee data portability and interoperability, avoiding irreversible dependence on the supplier.

Final approval of the benefit would require documented expenditure, integration and actual use, verified through proportionate, independent checks carried out by a third party. The effects on productivity, wages and customers should be measured over the following twenty-four to thirty-six months. An increase in employees numbers would not be a general requirement: employment credits and technological support have distinct objectives. Their coordination must ensure that the same costs are not rewarded twice.

4) Focus on OPEX, not just CAPEX

For decades, the Italian and European tax incentive system has followed a clear logic: to encourage investment in fixed assets, known as *CAPital EXpenditure*. Machinery, plant and infrastructure have been at the heart of tax credits, super-depreciation schemes and various other incentives. This model was consistent with an economy heavily geared towards manufacturing, but today it is showing clear cracks and fails to meet the needs of professional services firms.

Modern enterprises – in the service sector and beyond – no longer need just machinery: they require ongoing training, cutting-edge software, specialist consultancy and digital marketing strategies. It is *operational expenditure* that now determines a company's true competitiveness. Yet the incentive system remains stuck in the past, penalising precisely those organisations – innovative SMEs, start-ups and service companies – that represent the future of the national economy. Those who purchase machinery receive significant tax benefits. Those who invest in skills, digital platforms or strategic consultancy, on the other hand, often find themselves excluded from any form of support. This imbalance particularly penalises companies

based on modern business models, such as *Software as a Service* (SaaS) platform, which by their very nature do not require large capital outlays but rely on recurring operating costs.

Supporting *OPEX* would mean rebalancing the system in favour of more agile and innovative enterprises. It would enable companies to grow even without substantial initial capital, promoting skilled employment and the continuous upskilling of employees – factors that are now crucial for remaining competitive on international markets. This is not a matter of abandoning support for productive investment, but of *integrating it* with instruments designed for the new economy of services and knowledge. The financial system and support policies cannot remain anchored to an economic model that increasingly belongs to the past. Recognising the strategic value of operating investments is not merely a technical issue, but a political choice that will determine the country's ability to remain competitive in the coming years.

5) Cities as the infrastructure of productivity

The role of cities is, first and foremost, to bring together skilled workers, universities, sophisticated clients and complementary services. Provincial capitals account for 53.5 percent of employees in knowledge-intensive services, compared with 38.3 percent of the total workforce. The rapid growth of the population outside provincial capitals reflects the expansion of residential demand, which is driven by metropolitan service sector developments. In general, empirical evidence shows that the urban localisation of services is associated with the presence of more productive firms, the availability of human capital and agglomeration economies.⁵⁶

This evidence highlights the need to prioritise measures to reduce the cost of accessing the city, given that a new skilled job loses its appeal if the pay rise is absorbed by housing costs or if commuting makes the job impractical. The availability of housing must be increased alongside accessibility, as these two factors are closely linked. Territorial productivity pacts can be organised between the region, local authorities within the functional area, universities and economic representatives. Their scope should be clearly

⁵⁶ In addition to what has been discussed in the previous chapters, see Di Giacinto V., Micucci G., Tosoni A. (2018), '*Knowledge-intensive business services and urban areas: an analysis of localisation and productivity based on Italian data*', Bank of Italy, "Questioni di Economia e Finanza", No. 443.

defined: links between university campuses and production hubs, housing, joint training, research facilities and a public sector capable of utilising innovative services.

Priorities vary across the different contexts outlined in the report: in Milan, the focus is on making the concentration of expertise accessible and strengthening its links with distributed production; in Rome, public demand can support services that can be replicated beyond a single contract; in the medium-sized towns of Veneto and Emilia-Romagna, the link with manufacturing supply chains is key; in the southern university hubs, the development of a sustained private demand to complement public demand must be envisaged.

6) Capital, skills and demand: assets and research

The focus on technology adoption must be accompanied by support for capitalisation: public and private co-investments can share the risk, while maintaining an effectively exposed private share. One instrument could take the form of transformation contracts between a company and a university or research centre, centred on a production problem and on an individual working on its solution within the organisation.

The UK's *Knowledge Transfer Partnerships* bring together a business, a knowledge institution and a graduate placed within the company for a project lasting between twelve and thirty-six months, with public and private co-funding.⁵⁷ This is a useful model for pairing new hires with new responsibilities, tools and scientific supervision. The additional recruitment must be integrated into an organisation capable of utilising it, bearing in mind that complementary intangible investments may precede, rather than follow, the growth in returns from new technologies.

⁵⁷ UK Research and Innovation, *Knowledge Transfer Partnership guidance* (<https://www.ukri.org/councils/innovate-uk/guidance-for-applicants/guidance-for-specific-funds/knowledge-transfer-partnership-guidance/>).

Chapter 8. Conclusions

The analyses converge on one point: the transformation of the Italian economy towards the service sector has progressed in terms of employment, but remains incomplete in terms of business organisation, productivity and international reach. The growing weight of KIS indicates a broader demand for knowledge, professional services and digital functions, but does not, on its own, demonstrate that these activities have achieved sufficient scale, capital intensity and commercial capacity. The distinction between advanced services and the rest of the service sector is therefore necessary, but it is not sufficient because, within each aggregate, there remain significant differences between size classes and territories. Size structure constitutes a constraint, particularly when it coincides with limited organisational capacity. Micro-enterprises can produce highly skilled services and maintain close relationships with customers; however, they face greater difficulties when production requires databases, cyber security, research, trademarks, international networks and stable managerial functions. The data also show that firm size does not correspond to that of the local unit and that the productivity gradient varies across sectors. Policies should therefore not reward a size threshold for its own sake, but rather support sustainable increases in employment, complementary investment and verifiable forms of organisational growth.

Human capital and the demand for skilled labour are two sides of the same coin. The low number of graduates, the weakness of short tertiary programmes, the specific deficit in ICT skills and late completion reduce the supply. At the same time, the limited scope of many roles, poorly defined career paths and low absorption capacity reduce the value of qualifications. Increasing enrolment figures without addressing mentoring, financial support, accommodation, links with the labour market and the quality of business organisations risks yielding modest results. Conversely, promoting technology without in-house skills and without a review of business organisation may increase investment expenditure without generating sustained productivity gains.

Internationalisation sets apart those firms capable of transforming specialist skills into an ongoing commercial function. Data on multinationals, direct investment and trade in services indicate that Italy's advanced service sector cannot rely solely on local demand or on occasional forays into

foreign markets. Specific capabilities are required for market selection, adapting the product or service offering, protecting intellectual property, contract management, data management, certification and commercial oversight. Public policy can reduce initial costs and coordinate existing instruments; it cannot replace demand assessment nor assume the commercial risk of the enterprise.

The geography of knowledge calls for a differentiated policy. Large urban areas are home to universities, skilled labour, sophisticated clients and complementary services, but they may lose their appeal when housing costs and transport reduce or eliminate the wage advantage. In manufacturing regions, the key challenge is to link advanced services to distributed production networks. In southern university hubs, the supply of graduates does not automatically correspond to sufficient private-sector demand to retain them. Furthermore, the relevant territory often extends beyond the main city: transport, commuting, links between university campuses and production systems, and housing availability must be planned at the scale of the various types of functional areas.

The six proposed policy strands — a dedicated national collective agreement, organisational growth, technology adoption, SaaS platforms, urban accessibility and the integration of capital, skills and research — are complementary. An employment incentive without investment may increase employment without boosting productivity; a technology grant without skills may finance routine replacements; and the expansion of training without housing and career prospects increases drop-out rates and out-migration. Interventions must therefore be selected on the basis of observable projects, with clearly defined responsibilities, effective co-funding and outcome indicators that can be measured over time.

Appendices

Appendix A. Scope of activities of Confindustria Professioni e Management (PROM)

Confindustria Professioni e Management (PROM) is a sectoral federation representing advanced tertiary services derived from intellectual contribution⁵⁸. Table A.1 lists the ATECO divisions falling within the Federation's scope. For the sake of completeness, the Eurostat classification based on the technology and knowledge intensity of manufacturing and services is also provided (for further details, see Appendix B).

Table A.1. ATECO divisions included within the scope of PROM.

ATECO 2-digit	Division name	Eurostat group
59	Production of films, videos and television programmes, and of music and sound recordings	High-tech, knowledge-intensive services
63	Information services and other IT services	High-tech, knowledge-intensive services
69	Legal and accounting services	knowledge-intensive market services
70	Business management and management consultancy services	knowledge-intensive market services
71	Architectural and engineering services; technical testing and analysis	knowledge-intensive market services
73	Advertising and market research	knowledge-intensive market services
74	Other professional, scientific and technical activities	knowledge-intensive market services
85	Education	other knowledge-intensive services

Source: IDEA analysis.

⁵⁸ <https://confindustriaprom.it/chi-siamo/>

Appendix B. Eurostat classification of technology- and knowledge-intensive activities

Table B.1. Eurostat classification of manufacturing activities.

MANUFACTURING			
ATECO 2-digit	Division name	Eurostat grouping	Eurostat aggregated classification
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	High-tech	High-end technology
26	Manufacture of computers, electronic and optical products; electromedical equipment, measuring instruments and watches	High-tech	High-end technology
20	Manufacture of chemical products	medium-high-technology	High-end technology
27	Manufacture of electrical equipment and non-electrical domestic appliances	medium-high-technology	High-end technology
28	Manufacture of machinery and equipment n.e.c.	medium-high-technology	High-end technology
29	Manufacture of motor vehicles, trailers and semi-trailers	medium-high-technology	High-end technology
30	Manufacture of other means of transport	medium-high-technology	High-end technology
19	Manufacture of coke and refined petroleum products	medium-low-technology	Low-end technology
22	Manufacture of rubber and plastic products	medium-low-technology	Low-end technology
23	Manufacture of other non-metallic mineral products	medium-low-technology	Low-end technology
24	Metallurgy	medium-low-technology	Low-end technology
25	Manufacture of metal products (excluding machinery and equipment)	medium-low-technology	Low-end technology
33	Repair, maintenance and installation of machinery and equipment	medium-low-technology	Low-end technology
10	Food industries	low-technology	Low-end technology
11	Beverage industry	low-technology	Low-end technology
12	Tobacco industry	low-technology	Low-end technology
13	Textile industries	low-technology	Low-end technology
14	Manufacture of clothing; manufacture of leather and fur goods	low-technology	Low-end technology
15	Manufacture of leather and similar goods	low-technology	Low-end technology
16	Manufacture of wood, wood products and cork (excluding furniture); manufacture of articles of straw and plaiting materials	low-technology	Low-end technology

17	Manufacture of paper and paper products	low-technology	Low-end technology
18	Printing and reproduction of recorded media	low-technology	Low-end technology
31	Furniture manufacturing	low-technology	Low-end technology
32	Other manufacturing industries	low-technology	Low-end technology

Source: Istat (ATECO classification) and Eurostat.

Table B.2. Eurostat classification of service activities.

SERVICES				
ATECO 2-digit	Division name	Eurostat grouping	PROM classification	Eurostat grouped classification
59	Production of films, videos and television programmes, and of music and sound recordings	high-tech knowledge-intensive services	PROM	Knowledge-Intensive Services
60	Programming and broadcasting	high-tech knowledge-intensive services	NOT PROM	Knowledge-Intensive Services
61	Telecommunications	high-tech knowledge-intensive services	NOT PROM	Knowledge-Intensive Services
62	Software production, IT consultancy and related activities	high-tech knowledge-intensive services	NOT PROM	Knowledge-Intensive Services
63	Information services and other IT services	high-tech knowledge-intensive services	PROM	Knowledge-Intensive Services
72	Scientific research and development	high-tech knowledge-intensive services	NOT PROM	Knowledge-Intensive Services
64	Financial services (excluding insurance and pension funds)	knowledge-intensive financial services	NOT PROM	Knowledge-Intensive Services
65	Insurance, reinsurance and pension funds (excluding compulsory social insurance)	knowledge-intensive financial services	NOT PROM	Knowledge-Intensive Services
66	Support activities for financial and insurance services	knowledge-intensive financial services	NOT PROM	Knowledge-Intensive Services

50	Maritime and inland waterway transport	knowledge-intensive market services	NOT PROM	Knowledge-Intensive Services
51	Air transport	knowledge-intensive market services	NOT PROM	Knowledge-Intensive Services
69	Legal and accounting services	knowledge-intensive market services	PROM	Knowledge-Intensive Services
70	Business management and management consultancy	knowledge-intensive market services	PROM	Knowledge-Intensive Services
71	Architectural and engineering services; technical testing and analysis	knowledge-intensive market services	PROM	Knowledge-Intensive Services
73	Advertising and market research	knowledge-intensive market services	PROM	Knowledge-Intensive Services
74	Other professional, scientific and technical activities	knowledge-intensive market services	PROM	Knowledge-Intensive Services
78	Recruitment, selection and provision of personnel	knowledge-intensive market services	NOT PROM	Knowledge-Intensive Services
80	Security and investigation services	knowledge-intensive market services	NOT PROM	Knowledge-Intensive Services
58	Publishing activities	other knowledge-intensive services	NOT PROM	Knowledge-Intensive Services
75	Veterinary services	other knowledge-intensive services	NOT PROM	Knowledge-Intensive Services
85	Education	other knowledge-intensive services	PROM	Knowledge-Intensive Services
86	Healthcare	other knowledge-intensive services	NOT PROM	Knowledge-Intensive Services
87	Residential social care services	other knowledge-intensive services	NOT PROM	Knowledge-Intensive Services
88	Non-residential social care	other knowledge-	NOT PROM	Knowledge-Intensive Services

		intensive services		
90	Creative, artistic and entertainment activities	other knowledge-intensive services	NOT PROM	Knowledge-Intensive Services
91	Library, archive, museum and other cultural activities	other knowledge-intensive services	NOT PROM	Knowledge-Intensive Services
92	Activities relating to lotteries, betting and casinos	other knowledge-intensive services	NOT PROM	Knowledge-Intensive Services
93	Sports, entertainment and recreational activities	other knowledge-intensive services	NOT PROM	Knowledge-Intensive Services
45	Wholesale and retail trade and repair of motor vehicles and motorcycles	Less knowledge-intensive market services	NOT PROM	Less Knowledge-Intensive Services
46	Wholesale trade (excluding motor vehicles and motorcycles)	Less knowledge-intensive market services	NOT PROM	Less Knowledge-Intensive Services
47	Retail trade (excluding motor vehicles and motorcycles)	Less knowledge-intensive market services	NOT PROM	Less Knowledge-Intensive Services
49	Land transport and transport via pipelines	Less knowledge-intensive market services	NOT PROM	Less Knowledge-Intensive Services
52	Warehousing and transport support activities	Less knowledge-intensive market services	NOT PROM	Less Knowledge-Intensive Services
55	Accommodation	Less knowledge-intensive market services	NOT PROM	Less Knowledge-Intensive Services
56	Food service activities	Less knowledge-intensive market services	NOT PROM	Less Knowledge-Intensive Services
68	Real estate activities	Less knowledge-intensive market services	NOT PROM	Less Knowledge-Intensive Services

77	Rental and operating lease activities	Less knowledge-intensive market services	NOT PROM	Less knowledge-intensive services
79	Services provided by travel agencies, tour operators, booking services and related activities	Less knowledge-intensive market services	NOT PROM	Less Knowledge-Intensive Services
81	Building and landscape services	Less knowledge-intensive market services	NOT PROM	Less Knowledge-Intensive Services
82	Office support activities and other Administrative and support service activities	Less knowledge-intensive market services	NOT PROM	Less Knowledge-Intensive Services
95	Repair of computers and personal and household goods	Less knowledge-intensive market services	NOT PROM	Less Knowledge-Intensive Services
53	Postal and courier services	other less knowledge-intensive	NOT PROM	Less Knowledge-Intensive Services
96	Other personal services	other less knowledge-intensive	NOT PROM	Less Knowledge-Intensive Services

Source: Istat (ATECO classification) and Eurostat.

Table B.3. Eurostat classification of Mining, Utilities and Construction activities.

MINING, UTILITIES AND CONSTRUCTION		
ATECO 2-digit	Division name	Eurostat grouping
05	Coal mining (excluding peat)	Mining, Utilities and Construction
06	Extraction of crude oil and natural gas	Mining, Utilities and Construction
07	Extraction of metal ores	Mining, Utilities and Construction
08	Other mineral extraction activities from quarries and mines	Mining, Utilities and Construction
09	Support services for mining and quarrying	Mining, Utilities and Construction
35	Supply of electricity, gas, steam and air conditioning	Mining, Utilities and Construction
36	Water collection, treatment and supply	Mining, Utilities and Construction
37	Sewerage network management	Mining, Utilities and Construction
38	Waste collection, treatment and disposal; material recovery	Mining, Utilities and Construction
39	Remediation and other waste management services	Mining, Utilities and Construction
41	Building construction	Mining, Utilities and Construction
42	Civil engineering	Mining, Utilities and Construction
43	Specialised construction works	Mining, Utilities and Construction

Source: Istat (ATECO classification) and Eurostat.

Appendix C. Detailed analysis of data on employees in local units, by Eurostat groups and size class of local units

Table C.1. Employees in local units by Eurostat groups and size class of local units, 2001–2023 – absolute figures.

EMPLOYEES – ABSOLUTE FIGURES						
Eurostat group	Employees	2001	2011	2015	2019	2023
high-tech	Up to 9 employees	14,529	14,162	12,592	12,668	11,721
high-tech	10 to 49 employees	36,208	33,158	29,741	28,794	30,037
high-tech	50 to 249 employees	54,337	57,836	48,755	53,608	57,978
high-tech	250 employees and over	103,276	70,605	63,411	64,441	66,781
high-tech	Group total	208,350	175,761	154,499	159,511	166,518
medium-high-technology	Up to 9 employees	90,456	107,113	101,727	90,624	84,866
medium-high-technology	10 to 49 employees	241,352	265,845	251,688	255,384	258,352
medium-high-technology	50 to 249 employees	310,000	303,054	300,985	335,339	360,203
medium-high-technology	250 employees and over	367,929	304,339	288,645	312,871	315,743
medium-high-technology	Group total	1,009,737	980,351	943,046	994,218	1,019,165
medium-low-technology	Up to 9 employees	452,405	356,728	330,362	319,456	321,796
medium-low-technology	10 to 49 employees	636,439	453,235	407,060	439,304	474,780
medium-low-technology	50 to 249 employees	383,280	297,367	273,819	307,121	342,084
medium-low-technology	250 employees and over	162,120	120,035	116,188	120,891	123,807
medium-low-technology	Group total	1,634,244	1,227,365	1,127,429	1,186,771	1,262,467
low-technology	Up to 9 employees	676,970	545,940	511,774	476,264	433,080
low-technology	10 to 49 employees	696,209	517,679	455,293	472,405	470,607
low-technology	50 to 249 employees	410,251	300,720	284,194	314,122	339,497
low-technology	250 employees and over	177,465	133,235	131,789	148,668	167,154
low-technology	Group total	1,960,895	1,497,574	1,383,050	1,411,460	1,410,338

high-tech, knowledge-intensive services	Up to 9 employees	185,582	177,285	184,367	198,363	213,349
high-tech, knowledge-intensive services	10 to 49 employees	111,241	112,896	112,523	132,346	151,326
high-tech, knowledge-intensive services	50 to 249 employees	108,824	106,062	108,074	127,967	158,312
high-tech, knowledge-intensive services	250 employees and over	127,556	125,946	127,173	122,094	147,558
high-tech, knowledge-intensive services	Group total	533,203	522,189	532,136	580,769	670,546
knowledge-intensive financial services	Up to 9 employees	242,807	270,413	256,678	234,076	223,744
knowledge-intensive financial services	10 to 49 employees	148,190	143,084	130,566	124,648	123,480
knowledge-intensive financial services	50 to 249 employees	111,403	88,314	82,364	75,674	89,174
knowledge-intensive financial services	250 employees and over	86,451	95,353	101,010	111,786	101,429
knowledge-intensive financial services	Group total	588,851	597,164	570,617	546,184	537,826
knowledge-intensive market services	Up to 9 employees	763,269	940,684	944,882	968,678	1,162,781
knowledge-intensive market services	10 to 49 employees	132,012	187,579	168,942	207,304	301,380
knowledge-intensive market services	50 to 249 employees	173,165	162,531	241,178	316,752	364,884
knowledge-intensive market services	250 employees and over	90,210	174,061	226,391	295,307	284,109
knowledge-intensive market services	Group total	1,158,656	1,464,855	1,581,393	1,788,041	2,113,153
other knowledge-intensive services	Up to 9 employees	415,600	519,835	599,182	645,941	773,524
other knowledge-intensive services	10 to 49 employees	86,358	129,777	205,549	228,537	310,182
other knowledge-intensive services	50 to 249 employees	72,728	103,370	211,049	249,660	271,678
other knowledge-intensive services	250 employees and over	36,182	52,584	113,030	165,123	112,759
other knowledge-intensive services	Group total	610,868	805,566	1,128,811	1,289,262	1,468,143
Less knowledge-intensive market services	Up to 9 employees	3,543,571	3,926,608	3,927,290	3,970,508	3,910,339
Less knowledge-intensive market services	10 to 49 employees	1,072,033	1,492,385	1,483,354	1,833,553	2,028,920
Less knowledge-intensive market services	50 to 249 employees	610,503	761,851	816,229	961,893	1,038,450

Less knowledge-intensive market services	250 employees and over	371,042	481,429	457,678	509,349	497,934
Less knowledge-intensive market services	Group total	5,597,149	6,662,273	6,684,550	7,275,303	7,475,643
other less knowledge-intensive services	Up to 9 employees	320,671	357,485	361,817	378,652	394,481
other less knowledge-intensive services	10 to 49 employees	76,039	92,674	103,033	100,019	89,178
other less knowledge-intensive services	50 to 249 employees	58,293	56,418	67,347	69,241	61,136
other less knowledge-intensive services	250 employees and over	41,998	31,476	35,813	33,118	31,616
other less knowledge-intensive services	Group total	497,001	538,053	568,011	581,031	576,410
Mining, Utilities and Construction	Up to 9 employees	1,064,314	1,116,313	955,571	903,651	1,101,126
Mining, Utilities and Construction	10 to 49 employees	489,598	495,487	394,617	424,230	531,182
Mining, Utilities and Construction	50 to 249 employees	199,036	211,676	200,790	223,039	238,958
Mining, Utilities and Construction	250 employees and over	62,472	64,912	65,355	74,609	72,946
Mining, Utilities and Construction	Group total	1,815,420	1,888,388	1,616,333	1,625,528	1,944,212
Grand total		15,614,374	16,359,539	16,289,875	17,438,078	18,644,422

Source: IDEA analysis based on Istat ASIA data

Table C.2. Employees in local units by Eurostat group and enterprise size class, 2001–2023
– breakdown by size class relative to the total for the Eurostat group.

COMPOSITION (BASE 100) WITHIN EACH EUROSTAT GROUP						
Eurostat group	Local unit size	2001	2011	2015	2019	2023
high-tech	Up to 9 employees	7.0	8.1	8.2	7.9	7.0
high-tech	10 to 49 employees	17.4	18.9	19.3	18.1	18.0
high-tech	50 to 249 employees	26.1	32.9	31.6	33.6	34.8
high-tech	250 employees and over	49.6	40.2	41.0	40.4	40.1
high-tech	Group total	100.0	100.0	100.0	100.0	100.0
medium-high-technology	Up to 9 employees	9.0	10.9	10.8	9.1	8.3
medium-high-technology	10 to 49 employees	23.9	27.1	26.7	25.7	25.3
medium-high-technology	50 to 249 employees	30.7	30.9	31.9	33.7	35.3
medium-high-technology	250 employees and over	36.4	31.0	30.6	31.5	31.0
medium-high-technology	Group total	100.0	100.0	100.0	100.0	100.0
medium-low-technology	Up to 9 employees	27.7	29.1	29.3	26.9	25.5
medium-low-technology	10 to 49 employees	38.9	36.9	36.1	37.0	37.6
medium-low-technology	50 to 249 employees	23.5	24.2	24.3	25.9	27.1
medium-low-technology	250 employees and over	9.9	9.8	10.3	10.2	9.8
medium-low-technology	Group total	100.0	100.0	100.0	100.0	100.0
low-technology	Up to 9 employees	34.5	36.5	37.0	33.7	30.7
low-technology	10 to 49 employees	35.5	34.6	32.9	33.5	33.4
low-technology	50 to 249 employees	20.9	20.1	20.5	22.3	24.1
low-technology	250 employees and over	9.1	8.9	9.5	10.5	11.9
low-technology	Group total	100.0	100.0	100.0	100.0	100.0
high-tech, knowledge-intensive services	Up to 9 employees	34.8	34.0	34.6	34.2	31.8
high-tech, knowledge-intensive services	10 to 49 employees	20.9	21.6	21.1	22.8	22.6
high-tech, knowledge-intensive services	50 to 249 employees	20.4	20.3	20.3	22.0	23.6
high-tech, knowledge-intensive services	250 employees and over	23.9	24.1	23.9	21.0	22.0
high-tech, knowledge-intensive services	Group total	100.0	100.0	100.0	100.0	100.0

knowledge-intensive financial services	Up to 9 employees	41.2	45.3	45.0	42.9	41.6
knowledge-intensive financial services	10 to 49 employees	25.2	24.0	22.9	22.8	23.0
knowledge-intensive financial services	50 to 249 employees	18.9	14.8	14.4	13.9	16.6
knowledge-intensive financial services	250 employees and over	14.7	16.0	17.7	20.5	18.9
knowledge-intensive financial services	Group total	100.0	100.0	100.0	100.0	100.0
knowledge-intensive market services	Up to 9 employees	65.9	64.2	59.7	54.2	55.0
knowledge-intensive market services	10 to 49 employees	11.4	12.8	10.7	11.6	14.3
knowledge-intensive market services	50 to 249 employees	14.9	11.1	15.3	17.7	17.3
knowledge-intensive market services	250 employees and over	7.8	11.9	14.3	16.5	13.4
knowledge-intensive market services	Group total	100.0	100.0	100.0	100.0	100.0
other knowledge-intensive services	Up to 9 employees	68.0	64.5	53.1	50.1	52.7
other knowledge-intensive services	10 to 49 employees	14.1	16.1	18.2	17.7	21.1
other knowledge-intensive services	50 to 249 employees	11.9	12.8	18.7	19.4	18.5
other knowledge-intensive services	250 employees and over	5.9	6.5	10.0	12.8	7.7
other knowledge-intensive services	Group total	100.0	100.0	100.0	100.0	100.0
less knowledge-intensive market services	Up to 9 employees	63.3	58.9	58.8	54.6	52.3
less knowledge-intensive market services	10 to 49 employees	19.2	22.4	22.2	25.2	27.1
less knowledge-intensive market services	50 to 249 employees	10.9	11.4	12.2	13.2	13.9
less knowledge-intensive market services	250 employees and over	6.6	7.2	6.8	7.0	6.7

less knowledge-intensive market services	Group total	100.0	100.0	100.0	100.0	100.0
other less knowledge-intensive services	Up to 9 employees	64.5	66.4	63.7	65.2	68.4
other less knowledge-intensive services	10 to 49 employees	15.3	17.2	18.1	17.2	15.5
other less knowledge-intensive services	50 to 249 employees	11.7	10.5	11.9	11.9	10.6
other less knowledge-intensive services	250 employees and over	8.5	5.8	6.3	5.7	5.5
other less knowledge-intensive services	Group total	100.0	100.0	100.0	100.0	100.0
Mining, Utilities and Construction	Up to 9 employees	58.6	59.1	59.1	55.6	56.6
Mining, Utilities and Construction	10 to 49 employees	27.0	26.2	24.4	26.1	27.3
Mining, Utilities and Construction	50 to 249 employees	11.0	11.2	12.4	13.7	12.3
Mining, Utilities and Construction	250 employees and over	3.4	3.4	4.0	4.6	3.8
Mining, Utilities and Construction	Group total	100.0	100.0	100.0	100.0	100.0

Source: IDEA analysis based on Istat ASIA data.

Table C.3 Employees in local units by Eurostat groups and size class of the local unit, 2015–2023 – relative changes.

PERCENTAGE CHANGES				
Eurostat group	Local unit size	2015–2019	2019–2023	2015–2023
High-technology	Up to 9 employees	0.6	-7.5	-6.9
High-technology	10 to 49 employees	-3.2	4.3	1.0
High-technology	50 to 249 employees	10.0	8.2	18.9
High-technology	250 employees and over	1.6	3.6	5.3
High-technology	Group total	3.2	4.4	7.8
medium-high-tech	Up to 9 employees	-10.9	-6.4	-16.6
medium-high-tech	10 to 49 employees	1.5	1.2	2.6
medium-high-tech	50 to 249 employees	11.4	7.4	19.7
medium-high-tech	250 employees and over	8.4	0.9	9.4
medium-high-tech	Group total	5.4	2.5	8.1
medium-low-technology	Up to 9 employees	-3.3	0.7	-2.6
medium-low-technology	10 to 49 employees	7.9	8.1	16.6
medium-low-technology	50 to 249 employees	12.2	11.4	24.9
medium-low-technology	250 employees and over	4.0	2.4	6.6
medium-low-technology	Group total	5.3	6.4	12.0
low-technology	Up to 9 employees	-6.9	-9.1	-15.4
low-technology	10 to 49 employees	3.8	-0.4	3.4
low-technology	50 to 249 employees	10.5	8.1	19.5
low-technology	250 employees and over	12.8	12.4	26.8
low-technology	Group total	2.1	-0.1	2.0
high-tech, knowledge-intensive services	Up to 9 employees	7.6	7.6	15.7
high-tech, knowledge-intensive services	10 to 49 employees	17.6	14.3	34.5
high-tech, knowledge-intensive services	50 to 249 employees	18.4	23.7	46.5
high-tech, knowledge-intensive services	250 employees and over	-4.0	20.9	16.0
high-tech, knowledge-intensive services	Group total	9.1	15.5	26.0

knowledge-intensive financial services	Up to 9 employees	-8.8	-4.4	-12.8
knowledge-intensive financial services	10 to 49 employees	-4.5	-0.9	-5.4
knowledge-intensive financial services	50 to 249 employees	-8.1	17.8	8.3
knowledge-intensive financial services	250 employees and over	10.7	-9.3	0.4
knowledge-intensive financial services	Group total	-4.3	-1.5	-5.7
knowledge-intensive market services	Up to 9 employees	2.5	20.0	23.1
knowledge-intensive market services	10 to 49 employees	22.7	45.4	78.4
knowledge-intensive market services	50 to 249 employees	31.3	15.2	51.3
knowledge-intensive market services	250 employees and over	30.4	-3.8	25.5
knowledge-intensive market services	Group total	13.1	18.2	33.6
other knowledge-intensive services	Up to 9 employees	7.8	19.8	29.1
other knowledge-intensive services	10 to 49 employees	11.2	35.7	50.9
other knowledge-intensive services	50 to 249 employees	18.3	8.8	28.7
other knowledge-intensive services	250 employees and over	46.1	-31.7	-0.2
other knowledge-intensive services	Group total	14.2	13.9	30.1
Less knowledge-intensive market services	Up to 9 employees	1.1	-1.5	-0.4
Less knowledge-intensive market services	10 to 49 employees	23.6	10.7	36.8
Less knowledge-intensive market services	50 to 249 employees	17.8	8.0	27.2
Less knowledge-intensive market services	250 employees and over	11.3	-2.2	8.8
Less knowledge-intensive market services	Group total	8.8	2.8	11.8
other less knowledge-intensive services	Up to 9 employees	4.7	4.2	9.0
other less knowledge-intensive services	10 to 49 employees	-2.9	-10.8	-13.4
other less knowledge-intensive services	50 to 249 employees	2.8	-11.7	-9.2
other less knowledge-intensive services	250 employees and over	-7.5	-4.5	-11.7
other less knowledge-intensive services	Group total	2.3	-0.8	1.5
Mining, utilities and construction	Up to 9 employees	-5.4	21.9	15.2

Mining, Utilities and Construction	10 to 49 employees	7.5	25.2	34.6
Mining, utilities and construction	50 to 249 employees	11.1	7.1	19.0
Mining, utilities and construction	250 employees and over	14.2	-2.2	11.6
Mining, utilities and construction	Group total	0.6	19.6	20.3
Grand total		7.0	6.9	14.5

Source: IDEA analysis based on Istat ASIA data.

Table C.4 Employees in local units by Eurostat groups and size class of the local unit, 2015–2023 – absolute changes.

ABSOLUTE CHANGES				
Eurostat group	Local unit size	2015–2019	2019–2023	2015–2023
High-technology	Up to 9 employees	76	-946	-871
High-technology	10 to 49 employees	-947	1,243	296
High-technology	50 to 249 employees	4,853	4,369	9,223
High-technology	250 employees and over	1,029	2,341	3,370
High-technology	Group total	5,011	7,007	12,018
medium-high-tech	Up to 9 employees	-11,103	-5,758	-16,861
medium-high-tech	10 to 49 employees	3,696	2,968	6,664
medium-high-tech	50 to 249 employees	34,354	24,864	59,218
medium-high-tech	250 employees and over	24,226	2,872	27,098
medium-high-tech	Group total	51,173	24,947	76,119
medium-low-technology	Up to 9 employees	-10,906	2,340	-8,566
medium-low-technology	10 to 49 employees	32,243	35,477	67,720
medium-low-technology	50 to 249 employees	33,302	34,963	68,265
medium-low-technology	250 employees and over	4,703	2,916	7,620
medium-low-technology	Group total	59,342	75,696	135,038
low-technology	Up to 9 employees	-35,511	-43,184	-78,694
low-technology	10 to 49 employees	17,113	-1,799	15,314
low-technology	50 to 249 employees	29,928	25,374	55,302
low-technology	250 employees and over	16,879	18,486	35,365
low-technology	Group total	28,409	-1,122	27,288
High-tech, knowledge-intensive services	Up to 9 employees	13,996	14,987	28,983
high-tech knowledge-intensive services	10 to 49 employees	19,823	18,981	38,804
high-tech knowledge-intensive services	50 to 249 employees	19,893	30,345	50,238

high-tech knowledge-intensive services	250 employees and over	-5,078	25,464	20,386
high-tech knowledge-intensive services	Group total	48,633	89,777	138,410
knowledge-intensive financial services	Up to 9 employees	-22,601	-10,333	-32,934
knowledge-intensive financial services	10 to 49 employees	-5,918	-1,168	-7,086
knowledge-intensive financial services	50 to 249 employees	-6,689	13,499	6,810
knowledge-intensive financial services	250 employees and over	10,776	-10,357	420
knowledge-intensive financial services	Group total	-24,432	-8,358	-32,790
knowledge-intensive market services	Up to 9 employees	23,796	194,103	217,899
knowledge-intensive market services	10 to 49 employees	38,362	94,076	132,438
knowledge-intensive market services	50 to 249 employees	75,574	48,131	123,705
knowledge-intensive market services	250 employees and over	68,916	-11,198	57,717
knowledge-intensive market services	Group total	206,648	325,112	531,760
other knowledge-intensive services	Up to 9 employees	46,759	127,583	174,342
other knowledge-intensive services	10 to 49 employees	22,988	81,645	104,633
other knowledge-intensive services	50 to 249 employees	38,611	22,017	60,628
other knowledge-intensive services	250 employees and over	52,094	-52,364	-271
other knowledge-intensive services	Group total	160,451	178,880	339,332
Less knowledge-intensive market services	Up to 9 employees	43,218	-60,169	-16,950
Less knowledge-intensive market services	10 to 49 employees	350,199	195,367	545,566
Less knowledge-intensive market services	50 to 249 employees	145,664	76,557	222,221
less knowledge-intensive market services	250 employees and over	51,671	-11,415	40,256
Less knowledge-intensive market services	Group total	590,752	200,340	791,093
other less knowledge-intensive services	Up to 9 employees	16,834	15,829	32,663
other less knowledge-intensive services	10 to 49 employees	-3,014	-10,841	-13,855
other less knowledge-intensive services	50 to 249 employees	1,893	-8,105	-6,212
other less knowledge-intensive services	250 employees and over	-2,694	-1,503	-4,197

other less knowledge-intensive services	Group total	13,020	-4,620	8,400
Mining, utilities and construction	Up to 9 employees	-51,920	197,475	145,555
Mining, utilities and construction	10 to 49 employees	29,613	106,952	136,565
Mining, utilities and construction	50 to 249 employees	22,249	15,920	38,169
Mining, utilities and construction	250 employees and over	9,254	-1,662	7,591
Mining, utilities and construction	Group total	9,195	318,684	327,880
Grand total		1,148,203	1,206,344	2,354,547

Source: IDEA analysis based on Istat ASIA data.

Appendix D. Detailed analysis of data on enterprise employees by Eurostat groups and enterprise size class

Table D.1. Employees in enterprises by Eurostat groups and enterprise size class, 2015–2024 – absolute figures.

EMPLOYEES – ABSOLUTE FIGURES					
Eurostat group	Enterprise size	2015	2019	2023	2024
High-tech	Up to 9 employees	9,825	9,738	9,066	9,065
High-tech	10 to 49 employees	25,984	24,985	25,759	25,726
High-tech	50 to 249 employees	38,791	43,095	45,416	45,959
High-tech	250 employees and over	79,504	74,714	79,293	84,077
High-tech	Group total	154,104	152,532	159,534	164,826
medium-high-technology	Up to 9 employees	85,045	73,657	67,321	64,023
medium-high-technology	10 to 49 employees	228,518	232,571	227,149	224,037
medium-high-technology	50 to 249 employees	254,289	282,376	306,315	311,113
medium-high-technology	250 employees and over	381,197	420,688	433,509	440,206
medium-high-technology	Group total	949,049	1,009,292	1,034,294	1,039,379
medium-low-technology	Up to 9 employees	299,343	288,123	287,758	280,944
medium-low-technology	10 to 49 employees	385,016	417,115	440,888	442,983
medium-low-technology	50 to 249 employees	253,080	281,132	324,963	332,731
medium-low-technology	250 employees and over	179,983	186,966	195,466	201,315
medium-low-technology	Group total	1,117,422	1,173,337	1,249,075	1,257,973
low-technology	Up to 9 employees	478,931	445,056	401,195	393,653
low-technology	10 to 49 employees	449,760	464,000	453,295	453,803
low-technology	50 to 249 employees	259,349	281,036	305,609	308,400
low-technology	250 employees and over	209,753	237,507	263,145	273,062
low-technology	Group total	1,397,793	1,427,600	1,423,243	1,428,918
high-tech, knowledge-intensive services	Up to 9 employees	167,542	181,551	196,143	194,430

high-tech, knowledge-intensive services	10 to 49 employees	90,503	110,249	124,974	124,617
high-tech, knowledge-intensive services	50 to 249 employees	76,617	94,054	120,666	121,979
high-tech, knowledge-intensive services	250 employees and over	198,608	200,010	228,702	236,028
high-tech, knowledge-intensive services	Group total	533,269	585,864	670,484	677,053
knowledge-intensive financial services	Up to 9 employees	140,294	137,812	146,277	145,105
knowledge-intensive financial services	10 to 49 employees	30,557	31,988	30,385	30,789
knowledge-intensive financial services	50 to 249 employees	49,419	47,810	47,410	46,458
knowledge-intensive financial services	250 employees and over	350,596	328,419	313,882	314,075
knowledge-intensive financial services	Group total	570,866	546,029	537,954	536,427
knowledge-intensive market services	Up to 9 employees	918,190	937,929	1,083,788	1,086,890
knowledge-intensive market services	10 to 49 employees	130,461	153,069	172,030	173,368
knowledge-intensive market services	50 to 249 employees	101,929	122,468	144,811	149,494
knowledge-intensive market services	250 employees and over	418,679	557,835	688,214	694,327
knowledge-intensive market services	Group total	1,569,259	1,771,300	2,088,843	2,104,079
other knowledge-intensive services	Up to 9 employees	570,261	617,410	710,002	746,884
other knowledge-intensive services	10 to 49 employees	168,967	196,662	222,722	237,223
other knowledge-intensive services	50 to 249 employees	195,167	218,108	236,348	241,758
other knowledge-intensive services	250 employees and over	199,404	264,399	308,409	329,038
other knowledge-intensive services	Group total	1,133,800	1,296,579	1,477,482	1,554,903

Less knowledge-intensive market services	Up to 9 employees	3,581,841	3,608,255	3,485,313	3,410,122
Less knowledge-intensive market services	10 to 49 employees	1,232,674	1,502,485	1,604,710	1,651,695
Less knowledge-intensive market services	50 to 249 employees	655,878	787,059	863,979	891,232
Less knowledge-intensive market services	250 employees and over	1,192,927	1,351,199	1,510,410	1,580,412
Less knowledge-intensive market services	Group total	6,663,320	7,248,997	7,464,412	7,533,461
other less knowledge-intensive services	Up to 9 employees	325,960	343,817	359,730	362,428
other less knowledge-intensive services	10 to 49 employees	52,740	59,063	53,954	50,803
other less knowledge-intensive services	50 to 249 employees	25,954	28,660	25,349	22,350
other less knowledge-intensive services	250 employees and over	163,797	151,504	135,809	135,486
other less knowledge-intensive services	Group total	568,450	583,045	574,842	571,067
Mining, Utilities and Construction	Up to 9 employees	916,249	863,512	970,822	941,966
Mining, Utilities and Construction	10 to 49 employees	349,850	381,201	518,373	531,137
Mining, Utilities and Construction	50 to 249 employees	157,771	175,236	229,828	242,602
Mining, Utilities and Construction	250 employees and over	208,673	223,553	245,235	262,034
Mining, Utilities and Construction	Group total	1,632,544	1,643,503	1,964,257	1,977,739
Grand total		16,289,875	17,438,078	18,644,421	18,845,824

Source: IDEA analysis based on Istat ASIA data

Table D.2. Employees in enterprises by Eurostat groups and enterprise size class, 2015–2024 – composition.

BASELINE COMPOSITION (100) FOR EACH EUROSTAT GROUP					
Eurostat group	Enterprise size	2015	2019	2023	2024
High-tech	Up to 9 employees	6	6	6	5
High-tech	10 to 49 employees	17	16	16	16
High-tech	50 to 249 employees	25	28	28	28
High-tech	250 employees and over	52	49	50	51
High-tech	Group total	100	100	100	100
medium-high-technology	Up to 9 employees	9	7	7	6
medium-high-technology	10 to 49 employees	24	23	22	22
medium-high-technology	50 to 249 employees	27	28	30	30
medium-high-technology	250 employees and over	40	42	42	42
medium-high-technology	Group total	100	100	100	100
medium-low-technology	Up to 9 employees	27	25	23	22
medium-low-technology	10 to 49 employees	34	36	35	35
medium-low-technology	50 to 249 employees	23	24	26	26
medium-low-technology	250 employees and over	16	16	16	16
medium-low-technology	Group total	100	100	100	100
low-technology	Up to 9 employees	34	31	28	28
low-technology	10 to 49 employees	32	33	32	32
low-technology	50 to 249 employees	19	20	21	22
low-technology	250 employees and over	15	17	18	19
low-technology	Group total	100	100	100	100
high-tech, knowledge-intensive services	Up to 9 employees	31	31	29	29
high-tech, knowledge-intensive services	10 to 49 employees	17	19	19	18
high-tech, knowledge-intensive services	50 to 249 employees	14	16	18	18
high-tech, knowledge-intensive services	250 employees and over	37	34	34	35
high-tech, knowledge-intensive services	Group total	100	100	100	100

knowledge-intensive financial services	Up to 9 employees	25	25	27	27
knowledge-intensive financial services	10 to 49 employees	5	6	6	6
knowledge-intensive financial services	50 to 249 employees	9	9	9	9
knowledge-intensive financial services	250 employees and over	61	60	58	59
knowledge-intensive financial services	Group total	100	100	100	100
knowledge-intensive market services	Up to 9 employees	59	53	52	52
knowledge-intensive market services	10 to 49 employees	8	9	8	8
knowledge-intensive market services	50 to 249 employees	6	7	7	7
knowledge-intensive market services	250 employees and over	27	31	33	33
knowledge-intensive market services	Group total	100	100	100	100
other knowledge-intensive services	Up to 9 employees	50	48	48	48
other knowledge-intensive services	10 to 49 employees	15	15	15	15
other knowledge-intensive services	50 to 249 employees	17	17	16	16
other knowledge-intensive services	250 employees and over	18	20	21	21
other knowledge-intensive services	Group total	100	100	100	100
Less knowledge-intensive market services	Up to 9 employees	54	50	47	45
Less knowledge-intensive market services	10 to 49 employees	18	21	21	22
Less knowledge-intensive market services	50 to 249 employees	10	11	12	12
Less knowledge-intensive market services	250 employees and over	18	19	20	21
less knowledge-intensive market services	Group total	100	100	100	100
other less knowledge-intensive services	Up to 9 employees	57	59	63	63
other less knowledge-intensive services	10 to 49 employees	9	10	9	9

other less knowledge-intensive services	50 to 249 employees	5	5	4	4
other less knowledge-intensive services	250 employees and over	29	26	24	24
other less knowledge-intensive services	Group total	100	100	100	100
Mining, Utilities and Construction	Up to 9 employees	56	53	49	48
Mining, Utilities and Construction	10 to 49 employees	21	23	26	27
Mining, Utilities and Construction	50 to 249 employees	10	11	12	12
Mining, Utilities and Construction	250 employees and over	13	14	12	13
Mining, Utilities and Construction	Group total	100	100	100	100

Source: IDEA analysis based on Istat ASIA data.

Table D.3. Employees in enterprises by Eurostat groups and enterprise size class, 2015–2023 – relative changes.

PERCENTAGE CHANGES				
Eurostat group	Enterprise size	2015–2019	2019–2023	2015–2023
High-technology	Up to 9 employees	-0.9	-6.9	-7.7
High-technology	10 to 49 employees	-3.8	3.1	-0.9
High-technology	50 to 249 employees	11.1	5.4	17.1
High-technology	250 employees and over	-6.0	6.1	-0.3
High-technology	Group total	-1.0	4.6	3.5
medium-high-tech	Up to 9 employees	-13.4	-8.6	-20.8
medium-high-technology	10 to 49 employees	1.8	-2.3	-0.6
medium-high-tech	50 to 249 employees	11.0	8.5	20.5
medium-high-tech	250 employees and over	10.4	3.0	13.7
medium-high-tech	Group total	6.3	2.5	9.0
medium-low-technology	Up to 9 employees	-3.7	-0.1	-3.9
medium-low-technology	10 to 49 employees	8.3	5.7	14.5
medium-low-technology	50 to 249 employees	11.1	15.6	28.4
medium-low-technology	250 employees and over	3.9	4.5	8.6
medium-low-technology	Group total	5.0	6.5	11.8
low-technology	Up to 9 employees	-7.1	-9.9	-16.2
low-technology	10 to 49 employees	3.2	-2.3	0.8
low-technology	50 to 249 employees	8.4	8.7	17.8
low-technology	250 employees and over	13.2	10.8	25.5
low-technology	Group total	2.1	-0.3	1.8
high-tech, knowledge-intensive services	Up to 9 employees	8.4	8.0	17.1
high-tech, knowledge-intensive services	10 to 49 employees	21.8	13.4	38.1
high-tech, knowledge-intensive services	50 to 249 employees	22.8	28.3	57.5
high-tech, knowledge-intensive services	250 employees and over	0.7	14.3	15.2
high-tech, knowledge-intensive services	Group total	9.9	14.4	25.7

knowledge-intensive financial services	Up to 9 employees	-1.8	6.1	4.3
knowledge-intensive financial services	10 to 49 employees	4.7	-5.0	-0.6
knowledge-intensive financial services	50 to 249 employees	-3.3	-0.8	-4.1
knowledge-intensive financial services	250 employees and over	-6.3	-4.4	-10.5
knowledge-intensive financial services	Group total	-4.4	-1.5	-5.8
knowledge-intensive market services	Up to 9 employees	2.1	15.6	18.0
knowledge-intensive market services	10 to 49 employees	17.3	12.4	31.9
knowledge-intensive market services	50 to 249 employees	20.2	18.2	42.1
knowledge-intensive market services	250 employees and over	33.2	23.4	64.4
knowledge-intensive market services	Group total	12.9	17.9	33.1
other knowledge-intensive services	Up to 9 employees	8.3	15.0	24.5
other knowledge-intensive services	10 to 49 employees	16.4	13.3	31.8
other knowledge-intensive services	50 to 249 employees	11.8	8.4	21.1
other knowledge-intensive services	250 employees and over	32.6	16.6	54.7
other knowledge-intensive services	Group total	14.4	14.0	30.3
Less knowledge-intensive market services	Up to 9 employees	0.7	-3.4	-2.7
less knowledge-intensive market services	10 to 49 employees	21.9	6.8	30.2
Less knowledge-intensive market services	50 to 249 employees	20.0	9.8	31.7
Less knowledge-intensive market services	250 employees and over	13.3	11.8	26.6
Less knowledge-	Group total	8.8	3.0	12.0

intensive market services				
other less knowledge-intensive services	Up to 9 employees	5.5	4.6	10.4
other less knowledge-intensive services	10 to 49 employees	12.0	-8.7	2.3
other less knowledge-intensive services	50 to 249 employees	10.4	-11.6	-2.3
other less knowledge-intensive services	250 employees and over	-7.5	-10.4	-17.1
other less knowledge-intensive services	Group total	2.6	-1.4	1.1
Mining, utilities and construction	Up to 9 employees	-5.8	12.4	6.0
Mining, utilities and construction	10 to 49 employees	9.0	36.0	48.2
Mining, utilities and construction	50 to 249 employees	11.1	31.2	45.7
Mining, utilities and construction	250 employees and over	7.1	9.7	17.5
Mining, utilities and construction	Group total	0.7	19.5	20.3
Grand total		7.0	6.9	14.5

Source: IDEA analysis based on Istat ASIA data.

Table D.4. Employees in enterprises by Eurostat groups and enterprise size class, 2015–2023 – absolute changes.

ABSOLUTE CHANGES				
Eurostat group	Enterprise size	2015–2019	2019–2023	2015–2023
High-tech	Up to 9 employees	-87	-672	-759
High-tech	10 to 49 employees	-999	774	-225
High-tech	50 to 249 employees	4,304	2,321	6,625
High-tech	250 employees and over	-4,790	4,579	-211
High-tech	Group total	-1,572	7,002	5,430
medium-high-tech	Up to 9 employees	-11,389	-6,336	-17,724
medium-high-tech	10 to 49 employees	4,053	-5,422	-1,369
medium-high-tech	50 to 249 employees	28,087	23,939	52,026
medium-high-tech	250 employees and over	39,491	12,821	52,312
medium-high-tech	Group total	60,243	25,002	85,245
medium-low-technology	Up to 9 employees	-11,220	-366	-11,585
medium-low-technology	10 to 49 employees	32,099	23,773	55,872
medium-low-technology	50 to 249 employees	28,053	43,830	71,883
medium-low-technology	250 employees and over	6,983	8,500	15,483
medium-low-technology	Group total	55,914	75,738	131,652
low-technology	Up to 9 employees	-33,874	-43,862	-77,736
low-technology	10 to 49 employees	14,241	-10,705	3,536
low-technology	50 to 249 employees	21,687	24,572	46,259
low-technology	250 employees and over	27,754	25,638	53,392
low-technology	Group total	29,807	-4,357	25,451
High-tech, knowledge-intensive services	Up to 9 employees	14,010	14,591	28,601
High-tech, knowledge-intensive services	10 to 49 employees	19,746	14,725	34,471
High-tech, knowledge-intensive services	50 to 249 employees	17,437	26,612	44,049
High-tech, knowledge-intensive services	250 employees and over	1,402	28,692	30,094
high-tech knowledge- - intensive services	Group total	52,595	84,620	137,215
knowledge-intensive financial services	Up to 9 employees	-2,482	8,465	5,983
knowledge-intensive financial services	10 to 49 employees	1,431	-1,603	-172

knowledge-intensive financial services	50 to 249 employees	-1,609	-400	-2,008
knowledge-intensive financial services	250 employees and over	-22,176	-14,537	-36,714
knowledge-intensive financial services	Group total	-24,836	-8,075	-32,912
knowledge-intensive market services	Up to 9 employees	19,739	145,859	165,598
knowledge-intensive market services	10 to 49 employees	22,608	18,961	41,569
knowledge-intensive market services	50 to 249 employees	20,539	22,343	42,882
knowledge-intensive market services	250 employees and over	139,156	130,379	269,535
knowledge-intensive market services	Group total	202,042	317,543	519,584
other knowledge-intensive services	Up to 9 employees	47,149	92,592	139,741
other knowledge-intensive services	10 to 49 employees	27,695	26,060	53,755
other knowledge-intensive services	50 to 249 employees	22,941	18,240	41,181
other knowledge-intensive services	250 employees and over	64,995	44,010	109,005
other knowledge-intensive services	Group total	162,780	180,902	343,682
Less knowledge-intensive market services	Up to 9 employees	26,413	-122,942	-96,528
Less knowledge-intensive market services	10 to 49 employees	269,811	102,225	372,036
Less knowledge-intensive market services	50 to 249 employees	131,181	76,920	208,101
Less knowledge-intensive market services	250 employees and over	158,272	159,211	317,484
less knowledge-intensive market services	Group total	585,677	215,415	801,093
other less knowledge-intensive services	Up to 9 employees	17,857	15,913	33,770
other less knowledge-intensive services	10 to 49 employees	6,323	-5,109	1,214
other less knowledge-intensive services	50 to 249 employees	2,706	-3,311	-605
other less knowledge-intensive services	250 employees and over	-12,293	-15,695	-27,987

other less knowledge-intensive services	Group total	14,594	-8,202	6,392
Mining, utilities and construction	Up to 9 employees	-52,736	107,310	54,573
Mining, utilities and construction	10 to 49 employees	31,351	137,171	168,522
Mining, utilities and construction	50 to 249 employees	17,465	54,592	72,057
Mining, utilities and construction	250 employees and over	14,880	21,682	36,561
Mining, utilities and construction	Group total	10,959	320,754	331,713
Grand total		1,148,203	1,206,343	2,354,546

Source: IDEA analysis based on Istat ASIA data.

Appendix E. Detailed analysis of employees in local units and enterprises, by ATECO division within the KIS and PROM scopes and by size class

Table E.1. Employees in local units by Istat divisions (2-digit) within the PROM scope, by size class of local units, 2023 – absolute figures.

VALORI ASSOLUTI 2023		ATECO	Classificazione PROM	Denominazione divisione	Dimensione unità locale				Totale
Gruppo Eurostat					Fino a 9 addetti	Da 10 a 49 addetti	Da 50 a 249 addetti	250 addetti e oltre	
high-tech knowledge-intensive services	59	PROM		Attività di produzione cinematografica, di video e di programmi televisivi, di registrazioni musicali e sonore	12.951	8.684	7.575	5.042	34.252
high-tech knowledge-intensive services	60	NON PROM		Attività di programmazione e trasmissione	2.583	3.354	2.096	5.104	13.137
high-tech knowledge-intensive services	61	NON PROM		Telecomunicazioni	8.505	12.514	14.351	37.753	73.124
high-tech knowledge-intensive services	62	NON PROM		Produzione di software, consulenza informatica e attività connesse	91.689	89.546	107.305	82.283	370.823
high-tech knowledge-intensive services	63	PROM		Attività dei servizi d'informazione e altri servizi	79.468	28.177	18.171	8.214	134.029
high-tech knowledge-intensive services	72	NON PROM		Ricerca scientifica e sviluppo	18.153	9.051	8.813	9.163	45.181
high-tech knowledge-intensive services				Totale gruppo	213.349	151.326	158.312	147.558	670.546
knowledge-intensive financial services	64	NON PROM		Attività di servizi finanziari (escluse le assicurazioni e i fondi pensione)	79.254	95.953	70.842	69.680	315.730
knowledge-intensive financial services	65	NON PROM		Assicurazioni, riassicurazioni e fondi pensione (escluse le assicurazioni sociali obbligatorie)	2.575	6.112	9.742	25.878	44.307
knowledge-intensive financial services	66	NON PROM		Attività ausiliarie dei servizi finanziari e delle attività assicurative	141.915	21.415	8.589	5.870	177.789
knowledge-intensive financial services				Totale gruppo	223.744	123.480	89.174	101.429	537.826
knowledge-intensive market services	50	NON PROM		Trasporto marittimo e per vie d'acqua	4.352	3.022	4.916	32.421	44.711
knowledge-intensive market services	51	NON PROM		Trasporto aereo	254	1.118	2.124	10.580	14.076
knowledge-intensive market services	69	PROM		Attività legali e contabilità	441.590	53.645	15.668	5.668	516.572
knowledge-intensive market services	70	PROM		Attività di direzione aziendale e di consulenza	124.967	49.648	51.214	64.568	290.397
knowledge-intensive market services	71	PROM		Attività degli studi di architettura e d'ingegneria; collaudi ed analisi tecniche	274.207	32.632	30.330	15.677	352.846
knowledge-intensive market services	73	PROM		Pubblicità e ricerche di mercato	40.689	14.453	16.748	13.755	85.645
knowledge-intensive market services	74	PROM		Altre attività professionali, scientifiche e tecniche	215.224	28.299	14.583	4.018	262.124
knowledge-intensive market services	78	NON PROM		Attività di ricerca, selezione, fornitura di personale	52.729	94.936	186.962	117.064	451.691
knowledge-intensive market services	80	NON PROM		Servizi di vigilanza e investigazione	8.771	23.626	42.339	20.356	95.091
knowledge-intensive market services				Totale gruppo	1.162.781	301.380	364.884	284.109	2.113.153
other knowledge-intensive services	58	NON PROM		Attività editoriali	8.546	8.508	9.876	4.733	31.663
other knowledge-intensive services	75	NON PROM		Servizi veterinari	21.467	597	241	0	22.306
other knowledge-intensive services	85	PROM		Istruzione	72.483	44.690	24.328	3.595	145.096
other knowledge-intensive services	86	NON PROM		Assistenza sanitaria	467.056	60.454	74.703	43.388	645.601
other knowledge-intensive services	87	NON PROM		Servizi di assistenza sociale residenziale	28.837	82.772	63.879	17.703	193.191
other knowledge-intensive services	88	NON PROM		Assistenza sociale non residenziale	43.775	70.481	75.487	30.519	220.263
other knowledge-intensive services	90	NON PROM		Attività creative, artistiche e di intrattenimento	47.689	7.177	3.948	0	58.813
other knowledge-intensive services	91	NON PROM		Attività di biblioteche, archivi, musei ed altre attività culturali	2.388	3.194	3.784	4.083	13.450
other knowledge-intensive services	92	NON PROM		Attività riguardanti le lotterie, le scommesse, le case da gioco	21.803	7.198	3.262	4.781	37.045
other knowledge-intensive services	93	NON PROM		Attività sportive, di intrattenimento e di divertimento	59.480	25.110	12.169	3.957	100.716
other knowledge-intensive services				Totale gruppo	773.524	310.182	271.678	112.759	1.468.143
Totale complessivo					2.373.398	886.368	884.047	645.855	4.789.669

Source: IDEA analysis based on Istat ASIA data.

Table E.2. Employees in local units by ISTAT divisions (2-digit) within the PROM scope, by size class of local units, 2015–2023 – absolute changes.

VARIAZIONE ASSOLUTA 2015–2023		ATECO	Classificazione PROM	Denominazione divisione	Dimensione unità locale				Totale
Gruppo Eurostat					Fino a 9 addetti	Da 10 a 49 addetti	Da 50 a 249 addetti	250 addetti e oltre	
high-tech knowledge-intensive services	59	PROM	Attività di produzione cinematografica, di video e di programmi televisivi, di registrazioni musicali e sonore		2.330	946	3.467	3.513	10.256
high-tech knowledge-intensive services	60	NON PROM	Attività di programmazione e trasmissione		-985	-212	-3.442	-8.229	-12.868
high-tech knowledge-intensive services	61	NON PROM	Telecomunicazioni		-1.427	399	-5.194	-6.613	-12.835
high-tech knowledge-intensive services	62	NON PROM	Produzione di software, consulenza informatica e attività connesse		16.828	29.503	47.855	26.914	121.100
high-tech knowledge-intensive services	63	PROM	Attività dei servizi d'informazione e altri servizi informatici		5.135	3.972	3.340	128	12.575
high-tech knowledge-intensive services	72	NON PROM	Ricerca scientifica e sviluppo		7.101	4.196	4.211	4.673	20.181
high-tech knowledge-intensive services			Totale gruppo		28.983	38.804	50.238	20.386	138.410
knowledge-intensive financial services	64	NON PROM	Attività di servizi finanziari (escluse le assicurazioni e i fondi pensione)		-35.126	-11.158	4.335	-3.605	-45.555
knowledge-intensive financial services	65	NON PROM	Assicurazioni, riassicurazioni e fondi pensione (escluse le assicurazioni sociali obbligatorie)		402	-1.813	-626	1.185	-852
knowledge-intensive financial services	66	NON PROM	Attività ausiliarie dei servizi finanziari e delle attività assicurative		1.790	5.885	3.101	2.839	13.616
knowledge-intensive financial services			Totale gruppo		-32.934	-7.086	6.810	420	-32.790
knowledge-intensive market services	50	NON PROM	Trasporto marittimo e per vie d'acqua		1.057	-48	-1.102	-3.472	-3.565
knowledge-intensive market services	51	NON PROM	Trasporto aereo		-366	-1.413	-119	-4.037	-5.936
knowledge-intensive market services	69	PROM	Attività legali e contabilità		15.019	9.442	6.404	1.906	32.771
knowledge-intensive market services	70	PROM	Attività di direzione aziendale e di consulenza gestionale		51.343	24.646	26.644	38.159	140.792
knowledge-intensive market services	71	PROM	Attività degli studi di architettura e d'ingegneria; collaudi ed analisi tecniche		36.064	11.209	14.453	-127	61.599
knowledge-intensive market services	73	PROM	Pubblicità e ricerche di mercato		9.692	2.001	6.424	1.626	19.744
knowledge-intensive market services	74	PROM	Altre attività professionali, scientifiche e tecniche		53.752	6.698	6.616	1.495	68.560
knowledge-intensive market services	78	NON PROM	Attività di ricerca, selezione, fornitura di personale		47.607	72.885	52.815	21.463	194.770
knowledge-intensive market services	80	NON PROM	Servizi di vigilanza e investigazione		3.732	7.018	11.571	705	23.025
knowledge-intensive market services			Totale gruppo		217.899	132.438	123.705	57.717	531.760
other knowledge-intensive services	58	NON PROM	Attività editoriali		-746	2	758	-951	-937
other knowledge-intensive services	75	NON PROM	Servizi veterinari		6.300	479	241	0	7.020
other knowledge-intensive services	85	PROM	Istruzione		18.711	12.715	12.617	2.934	46.977
other knowledge-intensive services	86	NON PROM	Assistenza sanitaria		92.554	18.636	14.020	4.865	130.075
other knowledge-intensive services	87	NON PROM	Servizi di assistenza sociale residenziale		12.023	33.861	8.520	-9.741	44.663
other knowledge-intensive services	88	NON PROM	Assistenza sociale non residenziale		22.161	30.548	15.469	-1.179	66.999
other knowledge-intensive services	90	NON PROM	Attività creative, artistiche e di intrattenimento		17.024	2.653	2.273	-604	21.347
other knowledge-intensive services	91	NON PROM	Attività di biblioteche, archivi, musei ed altre attività culturali		273	895	2.034	1.117	4.320
other knowledge-intensive services	92	NON PROM	Attività riguardanti le lotterie, le scommesse, le case da gioco		186	-943	434	651	327
other knowledge-intensive services	93	NON PROM	Attività sportive, di intrattenimento e di divertimento		5.856	5.785	4.264	2.636	18.541
other knowledge-intensive services			Totale gruppo		174.342	104.633	60.628	-271	339.332
Totale complessivo					388.290	268.789	241.381	78.252	976.712

Source: IDEA analysis based on Istat ASIA data.

Table E.3. Employees in local units by Istat divisions (2-digit) within the PROM scope, by size class of local units, 2015–2023 – relative changes.

VARIAZIONE RELATIVA 2015-2023									
Gruppo Eurostat		ATECO	Classificazione PROM	Denominazione e divisione	Fino a 9 addetti	Dimensione unità locale			Totale
						Da 10 a 49 addetti	Da 50 a 249 addetti	250 addetti e oltre	
high-tech knowledge-intensive services	59	PROM	Attività di produzione cinematografica, di video e di programmi televisivi, di registrazioni musicali e sonore		21,9	12,2	84,4	229,8	42,7
high-tech knowledge-intensive services	60	NON PROM	Attività di programmazione e trasmissione		-27,6	-5,9	-62,1	-61,7	-49,5
high-tech knowledge-intensive services	61	NON PROM	Telecomunicazioni		-14,4	3,3	-26,6	-14,9	-14,9
high-tech knowledge-intensive services	62	NON PROM	Produzione di software, consulenza informatica e attività connesse		22,5	49,1	80,5	48,6	48,5
high-tech knowledge-intensive services	63	PROM	Attività dei servizi d'informazione e altri servizi informatici		6,9	16,4	22,5	1,6	10,4
high-tech knowledge-intensive services	72	NON PROM	Ricerca scientifica e sviluppo		64,3	86,4	91,5	104,1	80,7
high-tech knowledge-intensive services			Totale gruppo		15,7	34,5	46,5	16,0	26,0
knowledge-intensive financial services	64	NON PROM	Attività di servizi finanziari (escluse le assicurazioni e i fondi pensione)		-30,7	-10,4	6,5	-4,9	-12,6
knowledge-intensive financial services	65	NON PROM	Assicurazioni, riassicurazioni e fondi pensione (escluse le assicurazioni sociali obbligatorie)		18,5	-22,9	-6,0	4,8	-1,9
knowledge-intensive financial services	66	NON PROM	Attività ausiliarie dei servizi finanziari e delle attività assicurative		1,3	37,9	56,5	99,7	8,3
knowledge-intensive financial services			Totale gruppo		-12,8	-5,4	8,3	0,4	-5,7
knowledge-intensive market services	50	NON PROM	Trasporto marittimo e per vie d'acqua		32,1	-1,6	-18,3	-9,7	-7,4
knowledge-intensive market services	51	NON PROM	Trasporto aereo		-59,0	-55,8	-5,3	-27,6	-29,7
knowledge-intensive market services	69	PROM	Attività legali e contabilità		3,5	21,4	69,1	50,7	6,8
knowledge-intensive market services	70	PROM	Attività di direzione aziendale e di consulenza gestionale		69,7	98,6	108,4	144,5	94,1
knowledge-intensive market services	71	PROM	Attività degli studi di architettura e d'ingegneria; collaudi ed analisi tecniche		15,1	52,3	91,0	-0,8	21,2
knowledge-intensive market services	73	PROM	Pubblicità e ricerche di mercato		31,3	16,1	62,2	13,4	30,0
knowledge-intensive market services	74	PROM	Altre attività professionali, scientifiche e tecniche		33,3	31,0	83,0	59,2	35,4
knowledge-intensive market services	78	NON PROM	Attività di ricerca, selezione, fornitura di personale		929,5	330,5	39,4	22,5	75,8
knowledge-intensive market services	80	NON PROM	Servizi di vigilanza e investigazione		74,1	42,3	37,6	3,6	31,9
knowledge-intensive market services			Totale gruppo		23,1	78,4	51,3	25,5	33,6
other knowledge-intensive services	58	NON PROM	Attività editoriali		-8,0	0,0	8,3	-16,7	-2,9
other knowledge-intensive services	75	NON PROM	Servizi veterinari		41,5	405,6			45,9
other knowledge-intensive services	85	PROM	Istruzione		34,8	39,8	107,7	444,2	47,9
other knowledge-intensive services	86	NON PROM	Assistenza sanitaria		24,7	44,6	23,1	12,6	25,2
other knowledge-intensive services	87	NON PROM	Servizi di assistenza sociale residenziale		71,5	69,2	15,4	-35,5	30,1
other knowledge-intensive services	88	NON PROM	Assistenza sociale non residenziale		102,5	76,5	25,8	-3,7	43,7
other knowledge-intensive services	90	NON PROM	Attività creative, artistiche e di intrattenimento		55,5	58,7	135,7	-100,0	57,0
other knowledge-intensive services	91	NON PROM	Attività di biblioteche, archivi, musei ed altre attività culturali		12,9	38,9	116,2	37,7	47,3
other knowledge-intensive services	92	NON PROM	Attività riguardanti le lotterie, le scommesse, le case da gioco		0,9	-11,6	15,3	15,8	0,9
other knowledge-intensive services	93	NON PROM	Attività sportive, di intrattenimento e di divertimento		10,9	29,9	53,9	199,5	22,6
other knowledge-intensive services			Totale gruppo		29,1	50,9	28,7	-0,2	30,1
Totale complessivo					19,6	43,5	37,6	13,8	25,6

Source: IDEA analysis based on Istat ASIA data.

Table E.4. Employees in enterprises within the KIS scope, 2024 – absolute figures by enterprise size class and by PROM classification.

VALORI ASSOLUTI 2024		Dimensione Impresa					Denominazione divisione	ATECO	Classificazione e PROM	Fino a 9 addetti	Da 10 a 49 addetti	Da 50 a 249 addetti	250 addetti e oltre	Totale
Gruppo Eurostat														
high-tech knowledge-intensive services	59	PROM		Attività di produzione cinematografica, di video e di programmi televisivi, di registrazioni musicali e sonore	13.141	7.062	8.099	4.278						32.580
high-tech knowledge-intensive services	60	NON PROM		Attività di programmazione e trasmissione	2.183	3.449	1.231	6.094						12.956
high-tech knowledge-intensive services	61	NON PROM		Telecomunicazioni	5.653	4.722	3.443	55.828						69.646
high-tech knowledge-intensive services	62	NON PROM		Produzione di software, consulenza informatica e attività connesse	82.758	74.718	85.055	144.223						386.755
high-tech knowledge-intensive services	63	PROM		Attività dei servizi d'informazione e altri servizi informatici	71.834	26.154	16.744	15.755						130.488
high-tech knowledge-intensive services	72	NON PROM		Ricerca scientifica e sviluppo	18.861	8.511	7.406	9.849						44.627
high-tech knowledge-intensive services	64	NON PROM		Totale gruppo	194.430	124.617	121.979	236.028						677.053
knowledge-intensive financial services				Attività di servizi finanziari (escluse le assicurazioni e i fondi pensione)	8.064	6.887	32.900	267.023						314.874
knowledge-intensive financial services	65	NON PROM		Assicurazioni, riassicurazioni e fondi pensione (escluse le assicurazioni sociali obbligatorie)	127	1.230	5.565	38.645						45.567
knowledge-intensive financial services	66	NON PROM		Attività ausiliarie dei servizi finanziari e delle attività assicurative	136.914	22.672	7.993	8.408						175.986
knowledge-intensive financial services				Totale gruppo	145.105	30.789	46.458	314.075						536.427
knowledge-intensive market services	50	NON PROM		Trasporto marittimo e per vie d'acqua	4.257	2.881	4.027	36.076						47.241
knowledge-intensive market services	51	NON PROM		Trasporto aereo	148	603	1.346	13.422						15.519
knowledge-intensive market services	69	PROM		Attività legali e contabilità	436.796	46.219	19.135	15.476						517.626
knowledge-intensive market services	70	PROM		Attività di direzione aziendale e di consulenza gestionale	126.567	39.958	40.703	72.063						279.291
knowledge-intensive market services	71	PROM		Attività degli studi di architettura e d'ingegneria, collaudi ed analisi tecniche	272.630	28.545	25.916	32.484						359.576
knowledge-intensive market services	73	PROM		Pubblicità e ricerche di mercato	43.709	15.761	15.884	15.845						91.200
knowledge-intensive market services	74	PROM		Altre attività professionali, scientifiche e tecniche	197.455	25.129	11.896	5.754						240.235
knowledge-intensive market services	78	NON PROM		Attività di ricerca, selezione, fornitura di personale	1.612	2.209	6.806	436.291						446.918
knowledge-intensive market services	80	NON PROM		Servizi di vigilanza e investigazione	3.717	12.061	23.781	66.915						106.473
knowledge-intensive market services				Totale gruppo	1.086.890	173.368	149.494	694.327						2.104.079
other knowledge-intensive services	58	NON PROM		Attività editoriali	8.675	8.102	8.415	8.334						33.526
other knowledge-intensive services	75	NON PROM		Servizi veterinari	22.065	603	216	342						23.227
other knowledge-intensive services	85	PROM		Istruzione	75.310	44.135	24.929	6.248						150.622
other knowledge-intensive services	86	NON PROM		Assistenza sanitaria	468.991	46.222	57.350	83.758						656.321
other knowledge-intensive services	87	NON PROM		Servizi di assistenza sociale residenziale	13.310	47.564	55.201	95.447						211.523
other knowledge-intensive services	88	NON PROM		Assistenza sociale non residenziale	24.197	43.035	72.517	109.408						249.158
other knowledge-intensive services	90	NON PROM		Attività creative, artistiche e di intrattenimento	48.998	7.629	3.147	1.464						61.238
other knowledge-intensive services	91	NON PROM		Attività di biblioteche, archivi, musei ed altre attività culturali	1.891	2.638	2.993	7.518						15.040
other knowledge-intensive services	92	NON PROM		Attività riguardanti le lotterie, le scommesse, le case da gioco	17.833	7.038	4.545	7.395						36.811
other knowledge-intensive services	93	NON PROM		Attività sportive, di intrattenimento e di divertimento	65.615	30.255	12.444	9.123						117.438
other knowledge-intensive services				Totale gruppo	746.884	237.223	241.758	329.038						1.554.903
Totale complessivo					2.173.309	565.996	559.688	1.573.468						4.872.461

Source: IDEA analysis based on Istat ASIA data

Table E.5. Employees in enterprises within the KIS scope, 2024 – breakdown by enterprise size class and PROM classification.

COMPOSIZIONE DI RICA 2024			Dimensione Impresa					
Gruppo Eurostat	ATECO	Classificazione PROM	Denominazione e divisione	Fino a 9 addetti	Da 10 a 49 addetti	Da 50 a 249 addetti	250 addetti e oltre	Totale
high-tech knowledge-intensive services	59	PROM	Attività di produzione cinematografica, di video e di programmi televisivi, di registrazioni musicali e sonore	40,3	21,7	24,9	13,1	100,0
	60	NON PROM	Attività di programmazione e trasmissione	16,9	26,6	9,5	47,0	100,0
	61	NON PROM	Telecomunicazioni	8,1	6,8	4,9	80,2	100,0
high-tech knowledge-intensive services	62	NON PROM	Produzione di software, consulenza informatica e attività connesse	21,4	19,3	22,0	37,3	100,0
	63	PROM	Attività dei servizi d'informazione e altri servizi informatici	55,1	20,0	12,8	12,1	100,0
high-tech knowledge-intensive services	72	NON PROM	Ricerca scientifica e sviluppo	42,3	19,1	16,6	22,1	100,0
high-tech knowledge-intensive services	64	NON PROM	Totale gruppo Attività di servizi finanziari (escluse le assicurazioni e i fondi pensione)	28,7	18,4	18,0	34,9	100,0
	65	NON PROM	Assicurazioni, riassicurazioni e fondi pensione (escluse le assicurazioni sociali obbligatorie)	0,3	2,7	12,2	84,8	100,0
knowledge-intensive financial services	66	NON PROM	Attività ausiliarie dei servizi finanziari e delle attività assicurative	77,8	12,9	4,5	4,8	100,0
knowledge-intensive financial services	50	NON PROM	Totale gruppo Trasporto marittimo e per vie d'acqua	27,1	5,7	8,7	58,5	100,0
	51	NON PROM	Trasporto aereo	1,0	3,9	8,7	86,5	100,0
	69	PROM	Attività legali e contabilità	84,4	8,9	3,7	3,0	100,0
knowledge-intensive market services	70	PROM	Attività di direzione aziendale e di consulenza gestionale	45,3	14,3	14,6	25,8	100,0
	71	PROM	Attività degli studi di architettura e d'ingegneria, collaudi ed analisi tecniche	75,8	7,9	7,2	9,0	100,0
knowledge-intensive market services	73	PROM	Pubblicità e ricerche di mercato	47,9	17,3	17,4	17,4	100,0
	74	PROM	Altre attività professionali, scientifiche e tecniche	82,2	10,5	5,0	2,4	100,0
knowledge-intensive market services	78	NON PROM	Attività di ricerca, selezione, fornitura di personale	0,4	0,5	1,5	97,6	100,0
	80	NON PROM	Servizi di vigilanza e investigazione	3,5	11,3	22,3	62,8	100,0
knowledge-intensive market services	58	NON PROM	Totale gruppo Attività editoriali	51,7	8,2	7,1	33,0	100,0
	75	NON PROM	Servizi veterinari	95,0	2,6	0,9	1,5	100,0
other knowledge-intensive services	85	PROM	Istruzione	50,0	29,3	16,6	4,1	100,0
other knowledge-intensive services	86	NON PROM	Assistenza sanitaria	71,5	7,0	8,7	12,8	100,0
other knowledge-intensive services	87	NON PROM	Servizi di assistenza sociale residenziale	6,3	22,5	26,1	45,1	100,0
other knowledge-intensive services	88	NON PROM	Assistenza sociale non residenziale	9,7	17,3	29,1	43,9	100,0
other knowledge-intensive services	90	NON PROM	Attività creative, artistiche e di intrattenimento	80,0	12,5	5,1	2,4	100,0
	91	NON PROM	Attività di biblioteche, archivi, musei ed altre attività culturali	12,6	17,5	19,9	50,0	100,0
other knowledge-intensive services	92	NON PROM	Attività riguardanti le lotterie, le scommesse, le case da gioco	48,4	19,1	12,3	20,1	100,0
other knowledge-intensive services	93	NON PROM	Attività sportive, di intrattenimento e di divertimento	55,9	25,8	10,6	7,8	100,0
other knowledge-intensive services			Totale gruppo	48,0	15,3	15,5	21,2	100,0
			Totale complessivo	44,6	11,6	11,5	32,3	100,0

Source: IDEA analysis based on Istat ASIA data

Table E.6. Employees in enterprises within the KIS scope, 2015–2023 – absolute changes by enterprise size class and PROM classification.

VARIAZIONE ASSOLUTA 2015–2023			Dimensione Impresa				Denominazione divisione	Classificazione PROM	ATECO	Gruppo Eurostat	
			Fino a 9 addetti	Da 10 a 49 addetti	Da 50 a 249 addetti	250 addetti e oltre					Totale
high-tech knowledge-intensive services	59	PROM	3.036	911	973	5.360	Attività di produzione cinematografica, di video e di programmi televisivi, di registrazioni musicali e sonore				10.280
	60	NON PROM	-650	-103	-375	-12.093	Attività di programmazione e trasmissione				-13.222
	61	NON PROM	-800	836	227	-11.819	Telecomunicazioni				-11.556
	62	NON PROM	14.883	25.062	36.716	42.382	Produzione di software, consulenza informatica e attività connesse				119.043
	63	PROM	5.208	3.967	2.875	1.756	Attività dei servizi d'informazione e altri servizi informatici				13.805
	72	NON PROM	6.924	3.798	3.634	4.509	Ricerca scientifica e sviluppo				18.866
			28.601	34.471	44.049	30.094	Totale gruppo				137.215
	64	NON PROM	2.411	-4.302	-4.069	-39.673	Attività di servizi finanziari (escluse le assicurazioni e i fondi pensione)				-45.633
	65	NON PROM	-92	-352	-435	-273	Assicurazioni, riassicurazioni e fondi pensione (escluse le assicurazioni sociali obbligatorie)				-1.152
	66	NON PROM	3.663	4.482	2.496	3.233	Attività ausiliarie dei servizi finanziari e delle attività assicurative				13.873
knowledge-intensive financial services			5.983	-172	-2.008	-36.714	Totale gruppo				-32.912
	50	NON PROM	869	59	-1.173	-1.720	Trasporto marittimo e per vie d'acqua				-1.964
	51	NON PROM	-185	-649	-937	-4.312	Trasporto aereo				-6.083
	69	PROM	18.063	7.266	3.179	4.661	Attività legali e contabilità				33.169
	70	PROM	48.745	16.925	18.661	40.225	Attività di direzione aziendale e di consulenza gestionale				124.555
	71	PROM	34.935	8.138	8.175	10.696	Attività degli studi di architettura e d'ingegneria, collaudi ed analisi tecniche				61.943
	73	PROM	9.673	1.636	5.617	1.963	Pubblicità e ricerche di mercato				18.889
	74	PROM	53.815	6.824	4.382	697	Altre attività professionali, scientifiche e tecniche				65.718
	78	NON PROM	16	1.002	4.005	190.348	Attività di ricerca, selezione, fornitura di personale				195.371
	80	NON PROM	-334	368	974	27.987	Servizi di vigilanza e investigazione				27.987
knowledge-intensive market services			165.598	41.569	42.882	269.535	Totale gruppo				519.584
	58	NON PROM	74	433	194	-1.402	Attività editoriali				-1.402
	75	NON PROM	6.192	550	307	0	Servizi veterinari				7.048
	85	PROM	19.623	11.397	11.442	3.892	Istruzione				46.355
	86	NON PROM	82.101	10.083	5.190	28.312	Assistenza sanitaria				125.686
	87	NON PROM	2.520	12.198	6.515	23.851	Servizi di assistenza sociale residenziale				45.083
	88	NON PROM	6.315	10.491	11.925	48.832	Assistenza sociale non residenziale				77.564
	90	NON PROM	16.861	2.650	1.550	12	Attività creative, artistiche e di intrattenimento				21.073
	91	NON PROM	230	486	749	1.981	Attività di biblioteche, archivi, musei ed altre attività culturali				3.446
	92	NON PROM	177	-206	-7	292	Attività riguardanti le lotterie, le scommesse, le case da gioco				256
other knowledge-intensive services	93	NON PROM	5.649	5.673	3.315	3.936	Attività sportive, di intrattenimento e di divertimento				18.574
			139.741	53.755	41.181	109.005	Totale gruppo				343.682
Totale complessivo			339.922	129.623	126.104	371.920					967.570

Source: IDEA analysis based on Istat ASIA data.

Table E.7. Employees in enterprises within the KIS scope, 2015–2023 – relative changes by enterprise size class and PROM classification.

VARIAZIONE RELATIVA 2015–2023		Dimensione Impresa							
Gruppo Eurostat		ATECO	Classificazione PROM	Denominazione divisione	Fino a 9 addetti	Da 10 a 49 addetti	Da 50 a 249 addetti	250 addetti e oltre	Totale
high-tech knowledge-intensive services		59 PROM		Attività di produzione cinematografica, di video e di programmi televisivi, di registrazioni musicali e sonore	31,3	14,6	14,8	341,6	42,7
high-tech knowledge-intensive services		60 NON PROM		Attività di programmazione e trasmissione	-20,6	-3,2	-25,9	-66,1	-50,5
high-tech knowledge-intensive services		61 NON PROM		Telecomunicazioni	-11,7	21,1	6,5	-16,8	-13,7
high-tech knowledge-intensive services		62 NON PROM		Produzione di software, consulenza informatica e attività connesse	22,1	51,1	77,5	45,7	46,4
high-tech knowledge-intensive services		63 PROM		Attività dei servizi d'informazione e altri servizi informatici	7,4	16,8	21,7	17,2	11,8
high-tech knowledge-intensive services		72 NON PROM		Ricerca scientifica e sviluppo	66,8	85,6	81,1	83,4	76,4
high-tech knowledge-intensive services				Totale gruppo	17,1	38,1	57,5	15,2	25,7
knowledge-intensive financial services		64 NON PROM		Attività di servizi finanziari (escluse le assicurazioni e i fondi pensione)	45,3	-36,9	-10,7	-12,9	-12,6
knowledge-intensive financial services		65 NON PROM		Assicurazioni, riassicurazioni e fondi pensione (escluse le assicurazioni sociali obbligatorie)	-39,6	-24,8	-7,3	-0,7	-2,5
knowledge-intensive financial services		66 NON PROM		Attività ausiliarie dei servizi finanziari e delle attività assicurative	2,7	25,6	45,4	55,9	8,5
knowledge-intensive financial services				Totale gruppo	4,3	-0,6	-4,1	-10,5	-5,8
knowledge-intensive market services		50 NON PROM		Trasporto marittimo e per vie d'acqua	28,8	2,1	-21,7	-4,6	-4,0
knowledge-intensive market services		51 NON PROM		Trasporto aereo	-55,7	-50,1	-42,0	-26,7	-30,4
knowledge-intensive market services		69 PROM		Attività legali e contabilità	4,3	17,8	19,4	54,3	6,9
knowledge-intensive market services		70 PROM		Attività di direzione aziendale e di consulenza gestionale	70,4	77,7	90,7	124,6	86,6
knowledge-intensive market services		71 PROM		Attività degli studi di architettura e d'ingegneria, collaudi ed analisi tecniche	14,9	46,4	53,5	56,9	21,6
knowledge-intensive market services		73 PROM		Pubblicità e ricerche di mercato	32,8	13,3	51,0	14,5	28,5
knowledge-intensive market services		74 PROM		Altre attività professionali, scientifiche e tecniche	34,0	32,1	57,7	15,3	34,3
knowledge-intensive market services		78 NON PROM		Attività di ricerca, selezione, fornitura di personale	1,1	76,0	186,9	75,4	75,9
knowledge-intensive market services		80 NON PROM		Servizi di vigilanza e investigazione	-7,8	3,2	4,6	77,0	38,9
knowledge-intensive market services				Totale gruppo	18,0	31,9	42,1	64,4	33,1
other knowledge-intensive services		58 NON PROM		Attività editoriali	0,9	6,6	2,4	-19,3	-4,2
other knowledge-intensive services		75 NON PROM		Servizi veterinari	40,8	465,1	0,0	0,0	46,1
other knowledge-intensive services		85 PROM		Istruzione	39,3	37,9	75,3	259,4	48,0
other knowledge-intensive services		86 NON PROM		Assistenza sanitaria	22,3	28,2	10,0	52,2	24,6
other knowledge-intensive services		87 NON PROM		Servizi di assistenza sociale residenziale	24,3	38,8	14,5	34,7	29,0
other knowledge-intensive services		88 NON PROM		Assistenza sociale non residenziale	35,5	32,9	20,0	100,4	49,1
other knowledge-intensive services		90 NON PROM		Attività creative, artistiche e di intrattenimento	55,9	57,7	157,6	0,9	56,9
other knowledge-intensive services		91 NON PROM		Attività di biblioteche, archivi, musei ed altre attività culturali	13,2	24,9	41,2	42,8	34,0
other knowledge-intensive services		92 NON PROM		Attività riguardanti le lotterie, le scommesse, le case da gioco	0,9	-2,7	-0,2	4,3	0,7
other knowledge-intensive services		93 NON PROM		Attività sportive, di intrattenimento e di divertimento	11,5	29,8	39,5	147,2	23,5
other knowledge-intensive services				Totale gruppo	24,5	31,8	21,1	54,7	30,3
Totale complessivo					18,9	30,8	29,8	31,9	25,4

Source: IDEA analysis based on Istat ASIA data.

Appendix F. 2010 Extended Balance of Payments Services Classification

In the case of the trade flows examined in Chapter 5, the definition of sectors does not refer to the ATECO classification, but rather to the 2010 Extended Balance of Payments Services Classification (EBOPS 2010). This classification provides for the following breakdowns (for further details, please consult the Manual on Statistics of International Trade in Services 2010):

Processing services on goods owned by third parties comprise activities such as processing, transformation, assembly, labelling and packaging carried out on goods owned by third parties, without the enterprise carrying out the processing acquiring ownership of the goods. These include, for example, the refining of crude oil, the liquefaction of natural gas and the assembly of clothing and electronic products. Excluded are assembly activities relating to prefabricated buildings and labelling and packaging activities associated with transport.

Maintenance and repair services include maintenance and repair activities carried out on goods owned by non-residents, and vice versa, whether at the service provider's premises or elsewhere. They also include the maintenance and repair of ships, aircraft and other means of transport. Excluded are cleaning activities for means of transport, which are included in transport services, as well as the maintenance and repair of buildings and computers, which are included in construction services and IT services respectively.

Transport comprises international passenger and freight transport services carried out by sea, air, rail, road, inland waterways and pipelines, as well as space transport services and postal and courier services. It also includes transport support and auxiliary services not covered by other categories. Other exclusions include the value of goods transported and expenditure relating to cruises, which are classified under travel.

Travel comprises goods and services purchased by non-residents while staying in an economy other than their country of residence, for their own use or for use by others, provided that the stay does not involve a change of residence. It also includes purchases made abroad for the purposes of study or medical treatment, and those made by seasonal workers, cross-border workers and other temporary workers in the country where they are working.

Construction includes the construction, operation, renovation, repair and extension of fixed assets, such as buildings, land improvement works and infrastructure such as roads, bridges and dams. It also includes site preparation, installation and assembly, and specialist services such as painting, plumbing and demolition. This category covers both work carried out abroad by resident enterprises and work carried out in the reporting country by non-resident enterprises, including goods and services purchased by construction enterprises from operators resident in the location where the work is carried out.

Insurance and pension services cover activities relating to the provision of insurance and the management of pension funds between residents and non-residents. They include life insurance, cargo insurance and other direct insurance, as well as reinsurance services, auxiliary insurance services and pension services. They also include services relating to standardised guarantee schemes, such as export credit guarantees and student loan guarantees.

Financial services encompass financial intermediation services and related auxiliary services, excluding insurance and pension services. These include, amongst others, the taking of deposits and the granting of loans, services relating to credit cards and letters of credit, financial leasing, factoring, payment processing and clearing, financial advice, the custody and management of financial assets, rating services, stock exchange services and trust services. They also include financial intermediation services indirectly measured (FISIM), which are remunerated through the margin between the interest rates applied to loans and deposits and a reference rate.

Royalties for the use of intellectual property encompasses payments and fees relating to the right to use intellectual property and related rights. This includes licences for the use of trade marks and franchises, the results of research and development, as well as rights to reproduce and/or distribute software, audiovisual products and other protected works. This category therefore mainly concerns rights to use, reproduce or distribute intellectual property, rather than the sale of related products for individual use.

IT, information and telecommunications services encompass services for the transmission of sound, images, data and other information via telecommunications networks and systems, including telephony, the Internet, corporate networks and network access services. They also include the development, production, supply, installation, maintenance and

support of software and IT systems, as well as data and application processing and hosting services. Finally, this category includes information services, such as those provided by news agencies, databases, search engines, online content providers, libraries and archives.

‘Other business services’ refers to a wide range of professional, technical and operational services provided to enterprises and not included in other categories. The definition includes research and development services, legal, accounting and tax services, business and management consultancy, public relations, advertising, market research, the organisation of trade fairs and conferences, architecture, engineering and other technical services. Also included are environmental services, services related to agriculture, forestry and fishing, operating leases, trade-related services and other business services not classified elsewhere, including security, translation and interpreting, photography, building cleaning and business property services.

Personal, cultural and recreational services comprise audiovisual services and those related to artistic and entertainment activities, including the production of films, radio and television programmes, music recordings, artistic performances and services provided by artists, authors and other entertainment professionals. They also include health and education services provided to non-residents outside their territory of residence, as well as cultural, sporting and recreational services, such as those offered by museums and other cultural and recreational facilities. Excluded are health, education and recreational services used by non-residents while staying in the provider’s country, which are classified under travel.

Goods and services for public administrations comprise goods and services supplied to or by public administrations and their international offices, including embassies, consulates, military bases and units. They also include goods and services purchased in the host country by diplomats, consular and military personnel and their family members, as well as other services supplied to or by public administrations that cannot be classified under other categories of services.

It follows from the definitions set out above that the sectors attributable to the advanced tertiary sector are insurance and pension services, financial services, royalties for the use of intellectual property, IT, information and telecommunications services, and activities categorised as other business services.

Appendix G. Trends relating to employees in knowledge- and technology-intensive sectors

The tables below provide the data used in the regional analysis of employees in the various Eurostat groupings, the corresponding rates of change and the specialisation indices, as presented in Chapter 6.

Table G.1. Employees in local units in 2023 in knowledge-intensive services and high-end technology manufacturing: absolute figures, shares and percentage rate of change, 2015–2023. Source: IDEA analysis based on Istat ASIA data (2015–2023) and DemoIstat 2024.

Region	Total employees in local units 2023	KIS employees 2023	KIS employee share 2023	Change in KIS employees 2015–2023	High-end technology employees 2023	High-end technology employee share 2023	Change in high-end technology employees 2015–2023	Population 2024
Abruzzo	380,644	87,420	23.0%	33.7%	24,836	6.5%	3.7%	1,269,118
Basilicata	128,167	28,869	22.5%	26.5%	9,793	7.6%	-4.9%	530,004
Bolzano/Bozen	218,986	38,047	17.4%	25.6%	9,573	4.4%	25.2%	539,679
Calabria	326,648	77,567	23.7%	28.2%	2,928	0.9%	32.9%	1,834,646
Campania	1,298,160	311,454	24.0%	33.3%	42,908	3.3%	4.8%	5,582,337
Emilia-Romagna	1,711,530	409,847	23.9%	26.8%	185,990	10.9%	11.7%	4,461,998
Friuli-Venezia Giulia	398,222	94,393	23.7%	21.3%	34,336	8.6%	8.1%	1,193,284
Lazio	1,785,947	601,064	33.7%	23.0%	46,490	2.6%	0.5%	5,709,178
Lazio without Rome provincial capital	676,215	156,327	23.1%	23.9%	32,903	4.9%	-4.3%	2,961,888
Liguria	484,124	135,585	28.0%	7.3%	23,468	4.8%	9.5%	1,510,143
Lombardy	4,020,566	1,151,856	28.6%	28.6%	323,274	8.0%	5.6%	10,033,918
Marche	513,169	112,467	21.9%	24.8%	37,538	7.3%	10.1%	1,480,545
Molise	69,032	17,431	25.3%	38.7%	4,836	7.0%	4.8%	287,814
Piedmont	1,427,028	372,323	26.1%	17.6%	145,812	10.2%	0.1%	4,251,868
Apulia	932,601	213,488	22.9%	32.5%	25,953	2.8%	17.2%	3,877,395
Sardinia	379,158	93,935	24.8%	28.9%	2,553	0.7%	-4.2%	1,562,381
Sicily	924,644	240,208	26.0%	28.7%	19,229	2.1%	26.5%	4,787,390
Tuscany	1,283,740	287,595	22.4%	20.2%	65,138	5.1%	11.8%	3,657,716
Trento	189,829	44,803	23.6%	22.3%	9,191	4.8%	24.8%	546,573
Umbria	265,386	59,745	22.5%	24.9%	10,904	4.1%	15.0%	851,473
Valle d'Aosta	43,222	10,138	23.5%	8.1%	621	1.4%	6.6%	122,532
Veneto	1,863,618	401,435	21.5%	27.1%	160,313	8.6%	14.2%	4,853,472
Italy total	18,644,422	4,789,669	25.7%	25.6%	1,185,682	6.4%	8.0%	58,943,464

Source: IDEA analysis based on Istat ASIA data (2015–2023) and DemoIstat 2024.

Table G.2. Employees in local units in 2023 in the manufacturing sector by Eurostat classification – absolute figures and share.

Region	High-technology	Medium-low-technology	Low-technology	Mining, Utilities and Construction	Share of high-technology	Share of medium-high-technology	Share of medium-low-technology	Share of low-technology	Share of MUC
Abruzzo	4,177	26,188	33,997	49,040	1.1%	5.4%	6.9%	8.9%	12.9%
Basilicata	186	7,429	8,365	19,911	0.1%	7.5%	5.8%	6.5%	15.5%
Bolzano	603	9,569	18,220	27,069	0.3%	4.1%	4.4%	8.3%	12.4%
Calabria	269	11,020	14,884	44,537	0.1%	0.8%	3.4%	4.6%	13.6%
Campania	4,238	60,616	96,047	154,656	0.3%	3.0%	4.7%	7.4%	11.9%
Emilia-Romagna	18,375	148,237	134,191	151,449	1.1%	9.8%	8.7%	7.8%	8.8%
Friuli-Venezia Giulia	3,879	40,092	34,442	38,157	1.0%	7.6%	10.1%	8.6%	9.6%
Lazio	17,001	48,369	47,524	182,284	1.0%	1.7%	2.7%	2.7%	10.2%
Lazio without Rome provincial capital	12,707	33,451	28,230	88,964	1.0%	1.6%	2.6%	2.2%	6.9%
Liguria	3,664	23,334	15,601	57,409	0.8%	4.1%	4.8%	3.2%	11.9%
Lombardy	56,199	333,079	262,667	362,750	1.4%	6.6%	8.3%	6.5%	9.0%
Rome provincial capital	4,294	14,918	19,294	93,320	0.4%	0.8%	1.3%	1.7%	8.4%
Marche	5,343	45,259	73,845	50,304	1.0%	6.3%	8.8%	14.4%	9.8%
Molise	637	3,131	4,201	9,668	0.9%	6.1%	4.5%	6.1%	14.0%
Piedmont	10,083	113,955	98,737	140,274	0.7%	9.5%	8.0%	6.9%	9.8%
Apulia	1,705	52,294	73,137	118,953	0.2%	2.6%	5.6%	7.8%	12.8%
Sardinia	304	15,460	16,279	53,700	0.1%	0.6%	4.1%	4.3%	14.2%
Sicily	7,658	37,905	42,753	124,272	0.8%	1.3%	4.1%	4.6%	13.4%
Tuscan y	13,692	71,623	175,863	130,384	1.1%	4.0%	5.6%	13.7%	10.2%
Trento	952	10,899	15,178	22,758	0.5%	4.3%	5.7%	8.0%	12.0%
Umbria	1,071	21,139	27,332	30,273	0.4%	3.7%	8.0%	10.3%	11.4%
Valle d'Aosta	73	2,313	1,701	6,467	0.2%	1.3%	5.4%	3.9%	15.0%
Veneto	16,410	180,558	215,374	169,896	0.9%	7.7%	9.7%	11.6%	9.1%
Italy total	166,518	1,262,467	1,410,338	1,944,212	0.9%	5.5%	6.8%	7.6%	10.4%

Source: IDEA analysis based on Istat ASIA 2023 data.

Table G.3. Employees in local units in 2023 in the services sector by Eurostat classification – absolute figures.

Region	Geographical area	High-tech knowledge e-intensive services	Knowledge e-intensive financial services	Knowledge e-intensive market services	Other knowledge e-intensive services	Less knowledge e-intensive market services	Other less knowledge e-intensive services	Less knowledge e-intensive services
Abruzzo	South	7,611	7,702	43,563	28,544	144,400	14,764	159,164
Basilicata	South	3,303	2,535	13,241	9,791	49,576	4,225	53,801
Bolzano	North-East	6,126	5,689	15,330	10,902	112,305	4,204	116,509
Calabria	South	7,682	7,455	32,560	29,871	160,891	14,820	175,711
Campania	South	41,018	26,306	127,873	116,257	586,936	45,543	632,480
Emilia-Romagna	North-East	51,752	46,150	186,333	125,612	635,546	46,270	681,816
Friuli-Venezia Giulia	North-East	9,432	12,592	41,896	30,473	145,475	11,327	156,802
Lazio	Centre	127,633	64,689	235,505	173,236	794,336	65,881	860,217
Lazio without Rome provincial capital	Centre	15,435	13,503	66,177	61,212	308,671	27,668	336,340
Liguria	North-West	12,150	13,024	73,342	37,069	212,968	15,758	228,727
Lombardy	North-West	183,550	146,052	535,824	286,430	1,480,502	106,438	1,586,940
Marche	Centre	11,241	11,984	53,157	36,084	177,770	15,985	193,755
Molise	South	1,801	1,527	6,653	7,451	26,801	2,964	29,765
Piedmont	North-West	55,622	45,706	163,348	107,646	515,051	40,876	555,927
Apulia	South	23,137	19,791	86,052	84,508	414,044	34,732	448,777
Rome	Islands	112,198	51,186	169,327	112,025	485,664	38,213	523,877
Sardinia	Islands	9,478	8,381	36,885	39,191	183,227	14,005	197,232
Sicily	Centre	21,066	22,033	91,834	105,276	426,317	33,961	460,278
Tuscany	North-East	35,324	35,185	128,235	88,851	512,231	40,907	553,138
Trento	North-West	6,420	5,604	16,290	16,490	82,380	4,619	86,999
Umbria	North-East	6,527	5,916	27,832	19,470	106,721	9,272	115,994
Valle d'Aosta	North-West	1,072	901	3,936	4,230	20,634	1,349	21,983
Veneto	North-East	48,603	48,604	193,467	110,762	687,532	48,511	736,042
Italy total		670,546	537,826	2,113,153	1,468,143	7,475,643	576,410	8,052,053

Source: IDEA analysis based on Istat ASIA 2023 data.

Table G.4. Employees in local units in 2023 in the services sector by Eurostat classification – weights.

Region	Geographical area	Share of high-tech knowledg e-intensive services	Share of knowledg e-intensive financial services	Share of knowledg e-intensive market services	Share of other knowledg e-intensive services	Share of less knowledg e-intensive market services	Share of other less knowledg e-intensive services	Share of less knowledg e-intensive services
Abruzzo	South	2.0%	2.0%	11.4%	7.5%	37.9%	3.9%	41.8%
Basilicata	South	2.6%	2.0%	10.3%	7.6%	38.7%	3.3%	42.0%
Bolzano	North-East	2.8%	2.6%	7.0%	5.0%	51.3%	1.9%	53.2%
Calabria	South	2.4%	2.3%	10.0%	9.1%	49.3%	4.5%	53.8%
Campania	South	3.2%	2.0%	9.9%	9.0%	45.2%	3.5%	48.7%
Emilia-Romagna	North-East	3.0%	2.7%	10.9%	7.3%	37.1%	2.7%	39.8%
Friuli-Venezia Giulia	North-East	2.4%	3.2%	10.5%	7.7%	36.5%	2.8%	39.4%
Lazio	Centre	7.1%	3.6%	13.2%	9.7%	44.5%	3.7%	48.2%
Lazio without Rome provincial capital	Centre	1.2%	1.0%	5.1%	4.7%	23.8%	2.1%	49.7%
Liguria	North-West	2.5%	2.7%	15.1%	7.7%	44.0%	3.3%	47.2%
Lombardy	North-West	4.6%	3.6%	13.3%	7.1%	36.8%	2.6%	39.5%
Marche	Centre	2.2%	2.3%	10.4%	7.0%	34.6%	3.1%	37.8%
Molise	South	2.6%	2.2%	9.6%	10.8%	38.8%	4.3%	43.1%
Piedmont	North-West	3.9%	3.2%	11.4%	7.5%	36.1%	2.9%	39.0%
Apulia	South	2.5%	2.1%	9.2%	9.1%	44.4%	3.7%	48.1%
Sardinia	Islands	2.5%	2.2%	9.7%	10.3%	48.3%	3.7%	52.0%
Sicily	Centre	2.3%	2.4%	9.9%	11.4%	46.1%	3.7%	49.8%
Tuscany	North-East	2.8%	2.7%	10.0%	6.9%	39.9%	3.2%	43.1%
Trento	North-West	3.4%	3.0%	8.6%	8.7%	43.4%	2.4%	45.8%
Umbria	North-East	2.5%	2.2%	10.5%	7.3%	40.2%	3.5%	43.7%
Valle d'Aosta	North-West	2.5%	2.1%	9.1%	9.8%	47.7%	3.1%	50.9%
Veneto	North-East	2.6%	2.6%	10.4%	5.9%	36.9%	2.6%	39.5%
Italy total		3.6%	2.9%	11.3%	7.9%	40.1%	3.1%	43.2%

Source: IDEA analysis based on Istat ASIA 2023 data.

Table G.5. Eurostat Location Quotient 2023 – Regions at the national level.

Region	High technology	Medium-high technology	Medium-low technology	Low technology	MU C	High - tech KIS	Financial KIS	Market KIS	Other KIS	Less KIS market services	Other less KIS services
Abruzzo	1.23	0.99	1.02	1.18	1.24	0.56	0.70	1.01	0.95	0.95	1.25
Basilicata	0.16	1.37	0.86	0.86	1.49	0.72	0.69	0.91	0.97	0.96	1.07
Bolzano	0.31	0.75	0.65	1.10	1.19	0.78	0.90	0.62	0.63	1.28	0.62
Calabria	0.09	0.15	0.50	0.60	1.31	0.65	0.79	0.88	1.16	1.23	1.47
Campania	0.37	0.54	0.69	0.98	1.14	0.88	0.70	0.87	1.14	1.13	1.13
Emilia-Romagna	1.20	1.79	1.28	1.04	0.85	0.84	0.93	0.96	0.93	0.93	0.87
Friuli-Venezia Giulia	1.09	1.40	1.49	1.14	0.92	0.66	1.10	0.93	0.97	0.91	0.92
Lazio	1.07	0.30	0.40	0.35	0.98	1.99	1.26	1.16	1.23	1.11	1.19
Lazio without Rome provincial capital	2.10	0.55	0.73	0.55	1.26	0.63	0.69	0.86	1.15	1.14	1.32
Liguria	0.85	0.75	0.71	0.43	1.14	0.70	0.93	1.34	0.97	1.10	1.05
Lombardy	1.57	1.22	1.22	0.86	0.87	1.27	1.26	1.18	0.90	0.92	0.86
Marche	1.17	1.15	1.30	1.90	0.94	0.61	0.81	0.91	0.89	0.86	1.01
Molise	1.03	1.11	0.67	0.80	1.34	0.73	0.77	0.85	1.37	0.97	1.39
Piedmont	0.79	1.74	1.18	0.91	0.94	1.08	1.11	1.01	0.96	0.90	0.93
Apulia	0.20	0.48	0.83	1.04	1.22	0.69	0.74	0.81	1.15	1.11	1.20
Sardinia	0.09	0.11	0.60	0.57	1.36	0.70	0.77	0.86	1.31	1.21	1.19
Sicily	0.93	0.23	0.61	0.61	1.29	0.63	0.83	0.88	1.45	1.15	1.19
Tuscany	1.19	0.73	0.82	1.81	0.97	0.77	0.95	0.88	0.88	1.00	1.03
Trento	0.56	0.79	0.85	1.06	1.15	0.94	1.02	0.76	1.10	1.08	0.79
Umbria	0.45	0.68	1.18	1.36	1.09	0.68	0.77	0.93	0.93	1.00	1.13
Valle d'Aosta	0.19	0.23	0.79	0.52	1.43	0.69	0.72	0.80	1.24	1.19	1.01
Veneto	0.99	1.41	1.43	1.53	0.87	0.73	0.90	0.92	0.75	0.92	0.84
Italy total	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Source: IDEA analysis based on Istat ASIA 2023 data

$LQ = \text{share of the grouping within the region} / \text{share of the same grouping in the national total for 2023}$. An $LQ > 1$ indicates relative specialisation; the Italian total is equal to 1 by definition.

Table G.6. Demographic and university variables, with corresponding indices

Region	Total employees in local units 2023	Graduates by university location 2024	Resident graduates 2024	Population 2024	Employees/population index	Graduates by university location/employees index	Ratio of graduates by university location to resident graduates	Ratio of resident graduates to population	Ratio of manufacturing employees to service employees
Abruzzo	380,644	8,132	9,771	1,269,118	30.0%	2.1%	0.83	0.8%	0.34
Basilicata	128,167	936	4,681	530,004	24.2%	0.7%	0.20	0.9%	0.31
Bolzano	218,986	849	1,403	539,679	40.6%	0.4%	0.61	0.3%	0.24
Calabria	326,648	6,058	16,339	1,834,646	17.8%	1.9%	0.37	0.9%	0.11
Campania	1,298,160	28,905	49,082	5,582,337	23.3%	2.2%	0.59	0.9%	0.21
Emilia-Romagna	1,711,530	38,098	26,462	4,461,998	38.4%	2.2%	1.44	0.6%	0.43
Friuli-Venezia Giulia	398,222	5,686	7,250	1,193,284	33.4%	1.4%	0.78	0.6%	0.43
Lazio	1,785,947	43,527	44,369	5,709,178	31.3%	2.4%	0.98	0.8%	0.10
Lazio without Rome provincial capital	676,215	7,296	20,239	2,961,888	-126.3%	1.1%	-0.50	2.8%	0.10
Liguria	484,124	5,705	8,664	1,510,143	32.1%	1.2%	0.66	0.6%	0.17
Lombardy	4,020,566	66,161	58,617	10,033,918	40.1%	1.6%	1.13	0.6%	0.34
Marche	513,169	8,208	10,468	1,480,545	34.7%	1.6%	0.78	0.7%	0.51
Molise	69,032	1,203	2,343	287,814	24.0%	1.7%	0.51	0.8%	0.26
Piedmont	1,427,028	24,924	24,587	4,251,868	33.6%	1.7%	1.01	0.6%	0.39
Apulia	932,601	14,408	31,272	3,877,395	24.1%	1.5%	0.46	0.8%	0.23
Sardinia	379,158	5,164	8,829	1,562,381	24.3%	1.4%	0.58	0.6%	0.12
Sicily	924,644	17,628	39,323	4,787,390	19.3%	1.9%	0.45	0.8%	0.14
Tuscany	1,283,740	19,899	20,419	3,657,716	35.1%	1.6%	0.97	0.6%	0.37
Trento	189,829	3,980	3,568	546,573	34.7%	2.1%	1.12	0.7%	0.27
Umbria	265,386	4,485	5,464	851,473	31.2%	1.7%	0.82	0.6%	0.34
Valle d'Aosta	43,222	236	774	122,532	35.3%	0.5%	0.30	0.6%	0.14
Veneto	1,863,618	26,902	29,904	4,853,472	38.4%	1.4%	0.90	0.6%	0.49
Italy total	18,644,422	331,094	403,589	58,943,464	31.6%	1.8%	0.82	0.7%	0.30

Source: IDEA analysis based on Istat ASIA data (2015–2023), DemoIstat 2024 and the Ministry of Universities and Research 2024

The variable ‘Graduates by location 2024’ refers to the number of graduates in 2024 in the region where the university from which the degree was obtained is located, while the variable ‘Resident graduates 2024’ relates to the number of graduates in 2024 by the graduate’s region of residence.



Labour Productivity in Market Services

Statistical Issues, Limitations of the Traditional Approach, and the Need for a New Perspective

Mariano Bella and Luciano Mauro¹

Introduction

Over the past thirty years in Italy, changes in standard labour units (SLUs) indicate an increase of 14.9% in the economy as a whole, corresponding to approximately 3.3 million full-time equivalent workers. This result, however, reflects a decline of more than 700,000 units in industry and agriculture, alongside an increase of approximately 4 million in services. Excluding public administration and financial and insurance activities, the remainder of the service sector – the so-called market services sector – recorded an increase of more than 4 million units.

Against this official evidence, two main interpretative approaches emerge. The first, which is examined in this contribution, gives priority to increasing labour productivity and total factor productivity in sectors characterised by employment growth, including services related broadly to tourism, culture, transport and trade.

The second interpretative approach, which is widely represented in the economic policy debate, broadly attributes the structural decline in Italy's economic growth rate, at least in part, to the tertiarisation of the economy. From this perspective, the decline in manufacturing employment would entail a shift of workers towards sectors characterised by lower productivity. This constitutes a composition effect, which is accompanied by a dynamic effect. According to this interpretation, market services, which are extensively affected by Baumol's cost disease, would face difficulties in generating endogenous growth in output per worker. As a result, an increasing share of the economy could be characterised by subdued dynamics in the various forms of productivity and, in aggregate terms, by weaker growth.

From this perspective, phenomena such as low wages, tax evasion, the small average size of firms in market services, limited levels of innovation and investment, and a lower propensity to take risks may be traced back to weak productivity dynamics in their various forms.

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This contribution aims to highlight a number of elements that may contribute to a more nuanced interpretation of the condition of the Italian economy, taking into account also the conditions that may foster the development of market services and the contribution of services to economic growth.

Employment growth in market services needs to be interpreted in light of sectoral composition and value-added dynamics. In the economy as a whole, real value added increased by 24.9% between 1995 and 2025; over the same period, agriculture grew by 0.6%, industry by 3.9% and services by 34.2%. Within the service sector, particularly strong growth was recorded in high-technology services (+166%), as well as in professional activities and business services. These trends also reflect changes in the governance and production processes of firms, particularly manufacturing firms, which have progressively outsourced certain service activities. This reorganisation may help explain the greater statistical weight of services and the search for greater organisational efficiency.

However, the dynamics of services are not confined to high-technology sectors. Value added in wholesale and retail trade increased by more than 56%, while value added in entertainment, cultural and other leisure activities increased by 53%. These results highlight the economic importance of a more differentiated interpretation of market services, one that also takes traditional sectors into account. By contrast, accommodation and food services grew by 26.6% overall, a rate broadly in line with the economy-wide average.

When considered in terms of value added per worker, the picture is exceptionally heterogeneous. Over the past thirty years, labour productivity increased by 81% in information and communication activities, compared with an average increase of just under 10% in market services. Industry, understood as manufacturing and construction, also recorded an increase of just under 10%, while agriculture grew by almost 35%; accommodation and food services, by contrast, recorded a reduction of approximately one quarter in value added per worker.

Given the considerable divergence in sectoral trajectories, changes in output per worker do not, in themselves, appear sufficient to assess the performance of individual sectors. At the same time, comparing labour productivity dynamics across sectors characterised by different developments in labour input can be misleading. For example,

accommodation and food services recorded a reduction of approximately 25% in value added per worker, while employment in the sector increased by 69.7% over the period under consideration. This employment dynamic must therefore be taken into account when interpreting sectoral performance. Furthermore, the econometric analyses presented in Section 3.3 show that, in the sectors considered, employment growth is frequently associated with a reduction in value added per worker. This evidence suggests that the contextual conditions in which firms operate may affect their ability to increase employment and productivity simultaneously. Consequently, a reduction in labour input may mechanically increase productivity per worker, without implying that a reduction in employment is a necessary condition for increasing productivity or wages. Rather, the analysis points to the need for further investigation of the institutional, organisational and contextual factors that may support joint growth in employment and productivity. In purely arithmetic terms, it is easier to increase productivity per worker in a sector that has experienced a substantial decline in employment; the effect is different when employment is growing strongly. Representations of changes in output per worker across sectors are therefore incomplete when they are not accompanied by the corresponding employment dynamics over the period considered.

Another recurring issue in the productivity debate concerns the effect of firm size on productivity. Representations of changes in output per worker across sectors are therefore incomplete when they are not accompanied by the corresponding employment dynamics over the period considered. Since value added per worker tends to be higher in larger firms, one possible interpretation is that policies should foster the expansion of the productive system's average firm size. However, the observed relationship between firm size and productivity does not necessarily imply that such a transformation represents the only or the principal policy response.

Section 3.2 examines this issue in greater detail with reference to firms operating in market services, with particular attention to productivity differences associated with firm size and contextual conditions.

On the one hand, the low productivity of these sectors depends on the context in which firms operate, as they are affected by bureaucratic, fiscal and logistical constraints that have a particularly negative impact on smaller productive units; on the other hand, the labour productivity

performance of sectors characterised by substantial employment growth should not be interpreted solely in the light of this latter phenomenon.

Assessing the performance of market services requires employment and productivity changes to be considered jointly over the long term. If domestic and foreign demand is generating increasing demand for services, the performance of the less productive sectors must also be analysed by considering the conditions that may foster their efficiency and growth capacity.

This section presents preliminary descriptive empirical evidence on an issue that is relevant to the interpretation of productivity differences: micro-enterprises (fewer than 10 employees) in market services are less productive, for a given size class, than their French or German counterparts. The comparison is consistent both with an interpretation based on firms' internal characteristics and with a significant role for contextual conditions. The subsequent analysis shows that, for a given firm-size class, improving contextual variables could lead to productivity gains without necessarily requiring a change in the size structure of the productive system.

Fig. A – Two simple exercises on the role of the composition of productive activities by enterprise size class and output per employee.

Panel A: absolute and percentage change in output per employee in the market-oriented service sector and in the Italian economy as a whole if, within the market-oriented service sector, the distribution of employees by enterprise size class were the same as in Germany – reference year 2026

	% share of employees in Italy	output per employee in Italy – euros (000)	Value added per employee – euros (000)	% change
Micro (1–9)	43.4	37.5	53.0	
small (10–49)	18.4	56.2		
medium and large (>50)	38.2	69.0		
	% of German employees	output per employee in Italy – euros (000)	Value added per employee – euros (000)	
Micro (1–9)	21.1	37.5	59.4	12.1
small (10–49)	23.2	56.2		
medium and large (>50)	55.7	69.0		
Overall, value added per employee rises from €62,700 to €66,700 (+6.4 percent)				

Panel B: absolute and percentage change in output per employee in the market-oriented service sector and in the Italian economy as a whole, assuming that productivity per employee by firm size class in the market-oriented service sector were equal to that of France – reference year 2026

	Percentage share of Italian employees	output per employee in Italy – euros (000)	Value added per employee – euros (000)	% change
Micro (1–9)	43.4	37.5	53.0	
small (10–49)	18.4	56.2		
medium and large (>50)	38.2	69.0		
	Percentage share of Italian employees	output per employee – Fra – euros (000)	Value added per employee – euros (000)	
Micro (1–9)	43.4	48.6	62.5	18.0
small (10–49)	18.4	64.0		
medium and large (>50)	38.2	77.6		
Overall, value added per employee rises from €62,700 to €68,600 (+9.5%)				

The hypothesis that service-sector micro-enterprises, considered less innovative and more exposed to rents or tax evasion, should necessarily evolve into larger firms does not appear sufficient to capture the complexity of Italy's productive structure. The size configuration of the productive system is the outcome of choices and conditions that have developed over several decades. In the economic policy debate, the different degree of exposure to international competition between manufacturing and services has also contributed to strengthening different interpretations of the role of firm size. For tourism, retail and hospitality services, demand from non-resident consumers creates forms of international competition that are not always fully captured by traditional classifications. Comparisons between tourist destinations show that firms operating in services also compete in international markets through their ability to attract foreign demand. A more developed classification of exporting firms could therefore improve the statistical representation of these activities.

Reducing incentives that discourage increases in firms' average size is a distinct issue from defining a target size structure for the productive system. Policies may therefore focus on improving contextual conditions, while taking into account the current structure of the productive fabric and the time required for possible processes of firm expansion.

The simulation of the composition effect is based on simplifying assumptions and should therefore be interpreted as a theoretical exercise rather than as a forecast of the results that could actually be achieved.

The exercise concerning the effect of average output per worker is instead more closely related to an observable case, namely that of a comparable country in which, for a given size class, the productivity of service-sector firms is higher than in Italy. Service-sector firms in the 1–9 employee class (micro-enterprises) in France, despite having an average size of 1.3 employees compared with 1.8 employees in Italy, record value added per worker of €49,000, compared with €41,000 in Italy. The result should nevertheless be interpreted in light of the potential measurement and estimation errors present in the data. Tables 6 and 7 indicate that, even without radically changing the size structure of the productive system, there is scope for increasing both sectoral and aggregate productivity.

Differences in productivity per worker for a given firm size may also be attributable to differences in contextual conditions. Relevant factors include administrative complexity, institutional quality, social capital, the tax burden relative to the services provided, and energy costs. Available evidence indicates that these variables may affect the ability of micro and small enterprises to achieve productivity levels comparable to those observed in other European countries.

Lastly, the issue of exports also requires consideration of the contribution made by service activities, including tourism-related activities, which are often not fully captured by statistics based on customs declarations.

Indeed, the analytical discrepancy between customs data and the National Accounts (ESA 2010) highlights the inadequacy of current statistical classifications in quantifying the actual weight of services, particularly tourism and food services, in Italian exports. Whereas customs statistics are based on the physical crossing of national borders by goods and therefore, by their nature, exclude services, the National Accounts apply the principle of change in economic ownership. However, transactions relating to the Horeca sector (Hotels, Restaurants and Cafés) fail to emerge because of a major structural limitation in data classification: expenditure by non-residents on Italian territory, although constituting an export of services in all respects, is recorded in aggregate under the macroeconomic item “Travel”. This category follows a demand-oriented rather than supply-oriented logic, preventing the direct and systematic allocation of such

transactions to the relevant ATECO economic activity classes, such as accommodation and food services. Consequently, hotels and restaurants generating turnover from foreign customers remain statistically invisible and are never classified as exporting firms. This methodological shortcoming obscures the tourism value chain at the micro-data level, perpetuating a narrative of the country's economy that is unbalanced and centred almost exclusively on industry.

In conclusion, the interpretation of tradable and non-tradable activities must take into account the different ways in which services are exposed to international demand. The distinction between activities exposed and not exposed to international competition does not necessarily coincide with the distinction between manufacturing and services.

The development of market services can also be supported by greater attention to the ways in which language, statistical classifications and public policies represent the contribution of services to growth and innovation, including the effects of artificial intelligence technologies. Contemporary debate on artificial intelligence tends to focus primarily on industrial and manufacturing applications, while potential applications in services also deserve attention. International experience, including developments in China in the hospitality and food-service sectors, offers examples of the automation and digitalisation of specific activities. In this context, the adoption of AI may help address certain labour-availability constraints and improve the efficiency of specific processes, particularly in the presence of demographic and organisational changes. The nature and magnitude of these effects nevertheless remain to be assessed on the basis of the available evidence.

Structure of the contribution

The introductory section addresses the methodological issues relating to the scope of market services, namely the transition from the aggregate category of services to the definition of market services. Correctly delimiting this scope is important in order to avoid misleading interpretations of productivity indicators. The analysis of labour productivity in services is in fact affected by methodological difficulties in measuring output, which lead national accounts to exclude specific sectors in order to define a perimeter that reflects actual business activity and avoids statistical distortions. In the service sector, the intangible nature of part of the output and the difficulty

of measuring quality and volumes may result in differences compared with the measurement of output in industrial sectors.

The second chapter sets out a rigorous statistical framework for the empirical evidence concerning market services within the Italian economy, including their evolution over the 1995–2025 period.

The third and final chapter presents a theoretical discussion of labour productivity (Section 3.1), with reference to Baumol's cost disease hypothesis and to the possibility that the adoption of AI may alter, in some services, the constraints traditionally associated with this hypothesis. These are preliminary considerations that require further empirical verification. Finally, Sections 3.2 to 3.4 address a number of issues of primary importance.

Before considering possible processes of firm expansion, an analysis is presented to assess the possibility of bringing labour productivity in market-service firms, for a given firm size, closer to the levels observed in the main European partner countries.

Section 3.3 analyses the relationship between labour input and productivity in Italy over the period 1995–2025, based on a sample of 47 sectors. It shows that, by demonstrating that ignoring inter-sectoral employment dynamics leads to erroneous assessments and ineffective policies, the OLS approach suffers from endogeneity because labour input appears on both sides of the equation, making the use of the TSLS model necessary in order to isolate the actual causal effects. The econometric results show a negative relationship between changes in labour input and productivity, with differing sensitivities across manufacturing and services. The disaggregated analysis ultimately shows that in as many as 31 of the 47 sectors, productivity declines as employment increases, highlighting the importance of considering employment and production dynamics jointly.

Lastly, Section 3.4 highlights the methodological mismatch between export data derived from customs declarations, which are based on the physical crossing of the border and measured at FOB value, and the National Accounts (ESA 2010), which are based on the change in economic ownership and measured at basic prices. This difference contributes to a partial representation of the contribution of services to international trade. The section therefore considers the potential use, for analytical and policy purposes, of Input-Output matrices and the Supply and Use Tables of the National Accounts.

1. Methodological Background: Productivity and Definitions

The analysis of labour productivity dynamics is based on the National Accounts data periodically updated by Istat, which are still based on NACE Rev. 2 and ATECO 2007 – 2022 Update.

The selected indicators refer to value added at basic prices, expressed in chain-linked volumes², and to standard labour units (SLUs). The ratio between the two measures is then used to derive output per unit of labour, commonly referred to as labour productivity³.

Naturally, as productivity is a ratio, its dynamics are affected by the behaviour of the two components from which it is derived. The resulting measure is therefore an apparent measure, in the sense that improvements or deteriorations in the indicator simply reflect the statistical changes recorded over time in the numerator and denominator of the ratio, depending on the direction and magnitude of those changes. Extreme caution should therefore always be exercised when drawing conclusions from labour productivity dynamics concerning the relative performance or efficiency of one sector compared with another.

Unlike Tables 2 and 3, which present the levels and dynamics of the various economic activity sectors – from agriculture to services disaggregated according to the different NACE/ATECO sections – without excluding any branches, Table 4, which plays a central role in this contribution, incorporates a complex but necessary adjustment, consistent with the calculation and dissemination of productivity measures by Istat, both with regard to the value-added component and to SLUs.

² The reference year chosen is 2025. This was obtained by correctly applying the procedures linking current prices to prices of the previous year, thereby replacing the official reference year used for data dissemination, namely 2020. This was done in order to provide a more immediate representation of the absolute levels reported in the tables, even though these are measured in real terms and therefore net of price changes.

³ Throughout this contribution, the term productivity is also used on its own. This terminology is technically imprecise, but it is used because it has become established in common usage. What matters is that the meaning is clear: by labour productivity, or simply productivity, we mean the ratio between value added and a labour input, in this contribution measured in standard labour units (SLUs). Total factor productivity falls outside the scope of this contribution.

The adjustment is summarised in Table 1, which sets out in detail the reasons for excluding certain economic activities from the calculation of labour productivity in services.

The reclassification of economic activities consists in excluding from both value added and SLUs Section L, covering real estate activities, and Sections O, P and Q, which essentially correspond to public administration activities, even though the ATECO classification does not coincide with the institutional sector classification and therefore does not correspond to S13, which specifically identifies general government.

Table 1 – How to correctly measure labour productivity in market services.

SEC 2010 services	Market services: SEC services net of (a)
[G] Wholesale and retail trade	[G] Wholesale and retail trade
[H] Transport and storage	[H] Transport and storage
[I] Accommodation and food services	[I] Accommodation and food services
[J] Information and communication services	[J] Information and communication services
[K] Financial and insurance activities	moved to the residual sector 'Other market services'
[L] Real estate activities	excluded entirely
[M] Professional, scientific and technical activities	[M] Professional, scientific and technical activities
[N] Administrative and support service activities	[N] Administrative and support service activities
[O] Public administration and defence	excluded entirely
[P] Education	partially excluded
[Q] Health and social care	partially excluded
[R] Arts, entertainment and recreation	[R] Arts, entertainment and recreation
[S] Other service activities	[K, OPQ excluding S13, S] Other market services: see Technical Note
[T] Activities of households and cohabiting households	excluded entirely
	(a) [L] real estate activities, [S13] General government and [T] Activities of households and cohabiting households as domestic employers

Analyses by the Confcommercio Research Department (USC) based on Istat data.

Within Sections P and Q, a share of market services remains to be appropriately identified, as described below. Section T, which covers activities of households as employers of domestic personnel and the production of undifferentiated goods and services by households and family units for their own use, is entirely excluded.

These adjustments, which are conventionally applied in productivity analyses conducted by all institutional bodies, are necessary in order to exclude a number of elements that could compromise the accurate measurement of productivity in services.

For Sections P and Q, a more refined calculation was undertaken of the component attributable to general government, using the Accounts and Economic Aggregates of General Government. In the statement of expenditure on final consumption, these data allow the value added of S13 to be precisely isolated, expressed at current prices only. In order to obtain a historical series in chain-linked volumes, this value added was deflated using the implicit value-added price deflator in the National Accounts for the entire Public Administration and Defence, Compulsory Social Security, Education, Human Health and Social Work Activities sector (ATECO Sections O to Q). By subtracting only the component relating to S13 in this way, the market share of Sections P and Q, namely education and human health and social work activities, could be retained. The exact subtraction of the corresponding SLUs for S13 was also based on the “Employment by subsector” data contained in the aforementioned Accounts and Economic Aggregates of General Government.

Consequently, the “Other market services” row in Table 4 comprises the residual services of Section K (Financial and insurance activities), the market shares of Sections P and Q, and Section S (Other service activities), which includes activities of membership organisations, repair of computers and personal and household goods, and other personal service activities, such as laundry and dry-cleaning services, hairdressing salons, beauty treatments, manicure and pedicure services, funeral and related activities, and other personal services such as physical wellness centres, saunas, body-care centres and pet-care services.

Turning to real estate activities, Section L is excluded primarily because its value added is significantly distorted by imputed rents, i.e. rents attributed to dwellings occupied by their owners, an accounting component that does not reflect actual labour productivity. In 2025, value added at basic prices at current prices for real estate activities amounted to €258.8 billion, a considerable figure, of which more than two thirds consisted of imputed rents, amounting to almost €170 billion. However, even after subtracting this component from the total amount, the resulting residual does not coincide with the value added generated solely by real estate

intermediation activities. Indeed, data from Istat's ASIA archive indicate that Division 68 recorded value added, at factor cost, of approximately €22.4 billion in 2023, which is lower than the residual value recorded in the National Accounts. This remaining discrepancy suggests that caution is warranted when constructing productivity indicators that include the real estate sector in its entirety.

Secondly, general government is excluded because it produces services that are not intended for sale, governed by institutional rules and established for collective purposes. Moreover, in general government in the strict sense, as well as in the non-market component of education and human health and social work activities, there is no market price that can be used as an indicator of the economic value generated. Historically, the National Accounts have assumed that the value of government output was equal to the sum of the costs incurred (wages and intermediate consumption). Under this convention (Input-Output Coincidence), productivity gains are mathematically impossible, and the measurement of output per SLU itself loses meaning, effectively resembling a unit labour cost.

Furthermore, the recent shift towards direct physical indicators – such as the number of procedures performed or the number of pupils enrolled – introduced by Eurostat, although an improvement, continues to disregard the intrinsic quality of the service provided, thereby distorting the sector's actual contribution to economic well-being.

The *Handbook on prices and volumes measures in national accounts*⁴, prepared in 2016 to update the previous 2001 edition following the entry into force of ESA 2010, sets out methodological guidelines for moving beyond the former “input-based method”, i.e. measuring public production solely on the basis of the costs incurred, such as staff wages, in favour of direct methods for measuring output volume (*Direct Output Methods*), based precisely on physical indicators.

Eurostat classifies methods for measuring the output of non-market services, which are typical of general government, into three quality categories: A, B and C.

Education (Type A – Optimal Method): Eurostat requires the use of the number of pupil-hours spent at school. Where this information is

⁴ <https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-gq-14-005>.

unavailable, the number of enrolled pupils is accepted as a Type B method, appropriately stratified by school level and grade, e.g. primary and secondary education.

Health (Type A/B Method): Eurostat defines health-care output in terms of completed treatments, such as hospital stays classified according to DRG codes/complexity indices (see below), or the number of specific procedures performed, medical consultations and outpatient services, weighted by their unit cost in the previous year.

Category C identifies less informative or non-recommended measurement methods, including those explicitly excluded by Eurostat methodologies, such as:

a) Input-based methods (Input Methods): for example, measuring education output simply by counting the number of teachers employed or the total amount of wages paid. Eurostat prohibits this approach, classifying it as Category C, because it erroneously assumes constant productivity.

b) Mismatched or generic indicators: for example, using price indices that are not directly related to the public service being analysed, such as the general consumer price index to calculate inflation in health expenditure.

c) Lack of stratification: for example, using a direct physical indicator in an excessively aggregated form, such as adding together patients undergoing heart transplants and patients receiving routine outpatient check-ups without applying any economic weighting or DRG classification. DRG stands for *Diagnosis Related Groups*, translated into Italian as *Raggruppamenti Omogenei di Diagnosi* (ROD).

Furthermore, Eurostat reaffirmed the mandatory use of these physical indicators for non-market output in subsequent operational documents, such as the 2020 *Guidance on non market output in the context of the COVID-19 pandemic*⁵, which specifies that, for education and public health, volume estimates must be based on direct output measures (“estimates [...] have to be calculated on the basis of direct output measures”).

⁵ Eurostat, *Guidance on non market output in the context of the COVID-19 pandemic* <https://ec.europa.eu/eurostat/documents/10186/10693286/Non-market+output+guidance.pdf>.

Thirdly and lastly, activities of households as employers of domestic personnel and the production of undifferentiated goods and services by households and family units for their own use, covered by Section T, are excluded because they represent a form of self-consumption of care and support services without an organisational or competitive business structure. Domestic personnel – domestic cleaners, carers, babysitters, etc. – produce services that are entirely consumed within the household itself.

Since there is no market selling price for the final service generated, the value added of this sector is calculated in the National Accounts solely on a “cost basis”, making it exactly equal to the compensation of employees paid by households, namely wages and social contributions. As a result, output always varies in exactly the same share as labour input, making it mathematically impossible to record productivity gains or losses.

Furthermore, households do not make use of a genuine productive or commercial capital stock to generate profits or improve the efficiency of domestic labour, which limits the applicability of certain standard economic models, such as the “growth accounting” approach, to the measurement of multifactor productivity. The statistical measurability of output represents one of the most complex methodological challenges in applied economics and in National Accounts under ESA 2010.

Differences in productivity between industry and services are partly attributable precisely to a measurement bias that penalises both market services and general government. Whereas in industrial sectors the quantification of production is relatively straightforward and based on tangible, standardised physical quantities – tonnes of steel, units of motor vehicles – in services the boundaries between input, output and quality may be more difficult to define. In market services – such as trade, transport and professional services – this difficulty can be particularly significant for activities in which improvements in service quality are not fully captured by hours worked or hours billed. Moreover, establishing a “unit price” with which to deflate turnover is extremely complex; official statistics often use factor-input costs, such as wages, as a proxy. This creates an accounting paradox: if output is measured through inputs, productivity (Output/Input) will, by definition, remain constant or stagnant. In general government and in the non-market component of education and human health and social work activities, the problem reaches its most acute form because there is no market price that can serve as an indicator of the economic value generated.

2. Productivity Components: Value Added and Labour Inputs

2.1. Value added

The long-term analysis (1995–2025) unequivocally highlights the consolidation of the tertiarisation process in the Italian economy. Value added for the Italian economy as a whole increased from just over €1.6 trillion to more than €2 trillion (+24.9% cumulatively; Table 2), but the sectoral breakdown reveals a profound asymmetry generated by progressive deindustrialisation and the parallel expansion of services.

Table 2 – Value added at basic prices

billions of euros in chained values, reference year 2025, absolute changes and percentage changes

	1995	2019	2025	2025/2019		2025/1995	
				absolute change	cumulative % change	absolute change	cumulative % change
Agriculture, forestry and fishing	46.3	48.8	46.6	-2.1	-4.4	0.3	0.6
Industry	491.9	463.6	511.2	47.6	10.3	19.3	3.9
Services	1,085.2	1,374.6	1,456.8	82.1	6.0	371.6	34.2
– Trade	145.5	217.8	227.8	9.9	4.6	82.2	56.5
– Transport and warehousing	73.6	102.2	104.6	2.4	2.3	31.0	42.1
– Accommodation and catering	66.0	84.7	83.6	-1.1	-1.3	17.6	26.6
– Information and communication	26.6	57.7	70.9	13.1	22.7	44.3	166.3
– Professional activities	90.3	107.8	144.1	36.3	33.6	53.7	59.5
– Administrative and support service activities	38.4	70.8	75.6	4.8	6.8	37.2	97.0
– Entertainment activities	14.3	21.1	21.9	0.8	4.0	7.6	53.0

– Other public and private services	660.7	717.4	728.3	10.9	1.5	67.7	10.2
Total economic activities	1,612.8	1,886.0	2,014.6	128.6	6.8	401.8	24.9

USC analysis based on Istat data.

The services macro-sector makes a significant contribution to the resilience of the economic system, having grown by 34.2% over the thirty-year period analysed and generating an absolute increase of more than €371 billion. By contrast, industry as narrowly defined recorded substantially lower growth (+3.9% cumulatively since 1995), while the primary sector showed substantial structural stagnation (+0.6%).

Looking at the two periods separately, the divergence between sectors becomes particularly pronounced during the more recent cycle (2019–2025), which was strongly affected by the pandemic and geopolitical shocks and by the subsequent economic policy responses. The economy as a whole recorded growth of 6.8%, driven largely by industry (+10.3%) and services (+6.0%). Agriculture, by contrast, recorded a marked contraction (-4.4%), confirming its vulnerability to exogenous factors.

Within services, the 2019–2025 period reveals sharply differentiated trajectories: professional, scientific and technical activities recorded an increase of 33.6%, corresponding to an absolute increase of €36.2 billion, followed by information and communication services (+22.7%), also in connection with the digital transition and growing demand for consultancy services.

Business support services (+6.8%) and trade (+4.6%) also recorded positive dynamics. By contrast, accommodation and food services registered a 1.3% decline compared with 2019, reflecting the prolonged effects of structural changes in tourism consumption.

Over the longer period (1995–2025), the Information and Communication Technology (ICT) and professional services sectors recorded cumulative increases of +166.3% and +59.5%, respectively. The evidence is consistent with the growing importance of knowledge-intensive services.

Within market services, changes in value added were positive across a number of subsectors, ranging from trade and accommodation and food services to entertainment and cultural activities.

These findings suggest that market services should be represented taking their internal heterogeneity into account.

2.2. Labour input

The analysis of labour units (SLUs) provides a useful perspective for understanding how the process of economic tertiarisation has affected the labour market, highlighting the contribution of the services sector to job creation. The standard labour unit, abbreviated as SLU, represents the total volume of labour obtained by converting jobs into full-time equivalent units, also referred to as *full-time equivalents* in the international statistics published by Eurostat and the OECD.

Data expressed in SLUs are used primarily in the National Accounts to measure the actual labour input employed in the production of goods and services contributing to Gross Domestic Product (GDP), overcoming the limitations of simply counting “heads”, i.e. individual persons, which would not reflect the actual number of hours worked.

Between 1995 and 2025, total SLUs in Italy increased by 14.9%, from 22.1 million to 25.4 million units (Table 3). This overall increase was driven by the tertiary sector, where labour units increased by 27.4% (+4 million SLUs in absolute terms). This performance contrasts with the decline recorded both in agriculture (-25.2%, equivalent to approximately 388,000 SLUs lost) and in industry (-5.3%, with a net loss of 315,000 SLUs), resulting in a reallocation of employment across sectors (Table 3).

Table 3 – Total labour units (FTE).

figures in thousands, absolute and percentage changes

	1995	2019	2025	2025/2019		2025/1995	
				absolute change	cumulative % change	absolute change	cumulative % change
Agriculture, forestry and fishing	1,540	1,155	1,152	-3	-0.2	-388	-25.2
Industry	5,958	5,143	5,642	499	9.7	-316	-5.3
Services	14,664	17,458	18,679	1,222	7.0	4,015	27.4
– Retail	3,554	3,473	3,449	-24	-0.7	-105	-3.0
– Transport and warehousing	968	1,151	1,202	52	4.5	234	24.2
– Accommodation and catering	1,003	1,534	1,702	167	10.9	699	69.7
– Information and communication	436	584	642	58	9.9	206	47.1
– Professional activities	986	1,653	1,999	345	20.9	1,013	102.7
– Administrative and support service activities	531	1,245	1,344	99	8.0	813	153.0
– Entertainment activities	319	448	475	27	6.0	156	48.8
– Other public and private services	6,866	7,369	7,867	498	6.8	1,001	14.6
Total economic activities	22,162	23,755	25,473	1,718	7.2	3,311	14.9

USC analysis based on Istat data.

Over the most recent medium-term period (2019–2025), the Italian labour market demonstrated post-pandemic resilience, with total SLUs increasing by 7.2%. During this phase as well, growth was driven by services (+7.0%, or +1.2 million units) and industry (+9.7%), while agriculture continued its downward trend (-0.2%; Table 3).

Disaggregating the tertiary sector clearly highlights the significant role played by professional, scientific and technical activities, whose workforce expanded by 20.9% between 2019 and 2025, equivalent to more than 345,000 additional units. Looking at the thirty-year period from 1995 to 2025, the

figure is even more striking, with employment in professional activities more than doubling (+102.7%; Table 3).

Business support services also made a significant contribution, growing by 8% over the short term and by 153.0% over the longer term. Accommodation and food services, despite stagnating in terms of real value added, recorded employment growth of 10.9% between 2019 and 2025 (+69.7% since 1995). ICT continued its expansion, growing by 9.9% over the recent period and by 47.1% over the thirty-year period.

Trade, by contrast, recorded a decline (-0.7% in 2019–2025; -3.0% since 1995), signalling a process of rationalisation and restructuring of distribution networks in favour of e-commerce. This has been accompanied by a gradual evolution in firms' organisational and corporate structures towards more structured arrangements: in overall trade, the share of limited companies increased from 14.7% in 2012 to 24.2% in 2025, while in retail trade it rose from 9.0% to 17.4%, almost doubling its share.

In summary, employment data confirm the role of the tertiary sector in supporting labour-market inclusion in the country, even in the face of automation processes and the downsizing of the manufacturing and agricultural employment base.

3. Labour productivity in Services and Market Services

3.1. Labour productivity in services and the Baumol hypothesis

In addition to the statistical issues described above, the economic literature identifies a phenomenon related to the hypothesis of unbalanced growth and the so-called “Baumol disease”, or *Baumol’s cost disease*, formulated by economists William Baumol and William Bowen in their studies of 1966/1967.⁶ The hypothesis provides a useful interpretative framework for analysing certain employment and productivity dynamics in services, which will be explored in greater detail in the following sections.

In their 1966 book, the two authors use the example of a string quartet: performing a Schubert quartet in 1815 required four musicians and approximately 45 minutes; today, in 2026, exactly four musicians and the same amount of time are required. Labour productivity in the cultural sector, and in many traditional services, is structurally stagnant because human labour is not a means of production but is itself the product.

Baumol’s central hypothesis identifies a structural dualism in mature economies, divided between a “progressive” sector (industry and knowledge-intensive services) and a “stagnant” sector (traditional or labour-intensive services). In progressive sectors, the accumulation of physical capital and technological innovation generate systematic increases in labour productivity. By contrast, in stagnant sectors, the relational component and the human factor constitute the very essence of economic output, creating an intrinsic technological constraint on the standardisation and automation of processes. As a result, labour productivity in these areas is structurally flat or declining.

The macroeconomic paradox analysed by Baumol lies in wage dynamics and their effects on relative costs. In order for traditional service sectors to attract and retain labour, their nominal wages must tend to converge

⁶ W.J. Baumol and W.G. Bowen, (1966), *Performing Arts. The Economic Dilemma. A Study of Problems Common to Theater, Opera, Music and Dance*, New York, The Twentieth Century Fund, XVI, p. 582; W.J. Baumol, (1967), “Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crisis”, *The American Economic Review*, 57(3), June, pp. 415–426.

towards the levels prevailing in high-productivity sectors, as a result of competition in the labour market. This dynamic leads to an increase in unit labour costs in labour-intensive services, giving rise to the well-known phenomenon of “cost disease”.

Applied to the data in Table 4, this theoretical mechanism may help explain the marked decline in productivity recorded over the long term (1995–2025) in accommodation and food services (-25.4%) and business support services (-22.2%). These sectors have effectively acted as “employment buffers” for the Italian economic system. In the face of growing aggregate demand for tertiary consumption and in the presence of technological barriers to increasing efficiency per unit of labour, the increase in sectoral value added has been pursued through a substantial expansion of labour input. While this absorption of labour has supported overall employment, thereby acting as a driver of the labour market, it has inevitably compressed average output per unit of labour, empirically reflecting the transition towards an economy characterised by slower aggregate productivity growth but high employment intensity.

However, the latest-generation digital technologies and Artificial Intelligence (AI) are redefining the boundaries of the service economy. For the first time since 1967, the advent of generative AI and advanced automation appears to challenge the core assumption of the Baumol model: the impossibility of decoupling human labour input from the volume of output in traditional services. Tertiary sectors may therefore not remain condemned to an eternal Baumol effect.

In this respect, an analysis of particular interest is that developed in a recent article published in *The Economist*⁷, which starts precisely from Baumol’s well-known example of a Schubert quartet, whose duration and number of performers have remained unchanged from 1815 to the present day, while costs have inevitably increased, in order to demonstrate how technological innovation across service sectors may enable them to escape Baumol’s cost disease.

The article examines the evolution of healthcare expenditure and the effects of technological innovation in relation to population ageing. In the United States, for example, real healthcare expenditure in 2024 was as much as one

⁷ An Ageing Society Might Not Cost Too Much, *The Economist*, 11 July 2026, p. 71.

trillion dollars lower than the official forecasts made in 2010, while the costs associated with the Medicare programme increased at a much slower rate than pension expenditure.

According to the interpretation proposed in the article, this development is associated with two main factors. On the one hand, the nature of technological innovation in medicine has changed: whereas in the past technological advances introduced complex and costly treatments, today new technologies are primarily aimed at making existing services more affordable and efficient. On the other hand, there has been a marked “compression” of morbidity: older people are not only living longer, but are spending the additional years of life in good health, substantially reducing the final phase of life characterised by severe illness and requiring costly care or home-based assistance.

The slowdown in medical expenditure is a trend shared by almost all high-income OECD countries and is accompanied by another unexpected demographic effect: ageing societies are not becoming poorer. Labour shortages resulting from declining birth rates are in fact pushing firms to adopt advanced automation technologies more rapidly, increasing the productivity of the workers who remain. Although the management of pension systems and the raising of the retirement age remain complex political and economic challenges, the scientific literature suggests that demography does not necessarily represent an inevitable path towards decline.⁸

⁸ There are, however, dissenting views on this issue, such as that of Christopher Pissarides, an economist at the London School of Economics and recipient of the 2010 Nobel Prize in Economics, as well as one of the leading experts on the effects of automation on the labour market. Pissarides has called for more measured expectations regarding artificial intelligence, which is often presented as the technology capable of reviving productivity growth in Western economies after years of weak performance. As reported by the Italian technology website Hardware Upgrade (<https://www.hwupgrade.it/news/web/l-era-della-grande-crescita-e-finita-il-nobel-smonta-le-promesse-sull-intelligenza-artificiale-155960.html>), in an interview with Bloomberg and during a conference organised by the Royal Economic Society in Newcastle, the economist argued that, at present, there is insufficient evidence to suggest the emergence of a new productivity growth cycle comparable to that generated by the diffusion of personal computers in the 1980s and 1990s.

According to Pissarides, a significant share of employment in Western countries will remain largely unaffected by artificial intelligence. Activities such as nursing, hospitality and many occupations with a strong relational component will continue to depend

Returning to the empirical evidence on labour productivity in market services, the long-term trend over 1995–2025 reflects Italy’s transition towards a mature economy with a strong service-sector orientation, albeit with complex sector-specific characteristics. Total economic activities recorded a cumulative increase in labour productivity of 11.2%, rising from €64,276 in 1995 to €71,476 in 2025 (Table 4).

Against this background, the services macro-sector, excluding real estate activities, public administration and domestic work, recorded a cumulative increase of 9.6%, contributing to the structural reorientation of the productive system.

Table 4 – Value added per unit of labour

euros in chained values, reference year 2025, absolute changes and percentage changes

	1995	2019	2025	2025/2019		2025/1995	
				absolute change	cumulative % change	absolute change	cumulative % change
Agriculture, forestry and fishing	30,090	42,260	40,490	-1,770	-4.2	10,399	34.6
Industry	82,567	90,152	90,617	466	0.5	8,051	9.8
Services net of (a)	60,378	66,366	66,189	-177	-0.3	5,811	9.6
– Trade	40,947	62,718	66,041	3,323	5.3	25,094	61.3
– Transport and warehousing	75,996	88,813	86,963	-1,849	-2.1	10,967	14.4
– Accommodation and catering	65,855	55,174	49,129	-6,046	-11.0	-16,727	-25.4
– Information and communication	61,013	98,878	110,439	11,560	11.7	49,426	81.0
– Professional activities	91,641	65,210	72,089	6,879	10.5	-19,552	-21.3
– Administrative and support service activities	72,297	56,858	56,270	-587	-1.0	-16,027	-22.2

predominantly on human labour. “Up to 40% of jobs in the United Kingdom, or at least a very large share, are not exposed to artificial intelligence and will therefore not benefit from productivity gains thanks to AI”, the economist stated.

- Entertainment activities	44,927	47,068	46,187	-881	-1.9	1,260	2.8
- Other retail services (b)	76,585	72,077	61,718	-10,358	-14.4	-14,866	-19.4
Total economic activities net of (a)	64,276	71,304	71,476	171	0.2	7,200	11.2

(a) real estate, public administration and domestic work; (b) see Table 1.

USC analyses based on Istat data.

Industry also recorded productivity growth of similar magnitude over the entire thirty-year period (+9.8%), but services absorbed an increasing share of labour input, emerging as the country's main employment reservoir. The tertiarisation process was not, however, homogeneous. Sectors associated with the technological and digital transition recorded exceptionally strong performances: information and communication activities stand out, with a cumulative increase of 81.0%, raising value added per labour unit from €61,012 to €110,439.

Significantly positive dynamics can also be observed in trade, which recorded a +61.3% increase over the long term, driven by the modernisation of large-scale retail and the expansion of e-commerce (Table 4). By contrast, traditional sectors such as accommodation and food services (-25.4%) and business support services (-22.2%) recorded a decline in average productivity, a phenomenon typically associated with high labour intensity and low capital intensity, where employment growth exceeded the increase in value added generated (Table 4).

We will return to this important issue in Sections 3.3 and 3.4. On the one hand, the low productivity of these sectors depends on the context in which firms operate, as they are affected by bureaucratic, fiscal and logistical constraints that have a particularly negative impact on smaller productive units; on the other, the labour productivity performance of sectors experiencing substantial employment growth should be interpreted in light of this very phenomenon. In other words, it is easier to increase productivity per worker in a sector that has shed hundreds of thousands of workers over time; increasing it is somewhat more difficult when employment is growing rapidly.

Focusing on the most recent period (2019–2025), the cyclical and structural asymmetries relative to traditional sectors become particularly clear.

Agriculture shows clear signs of structural weakness, with productivity declining by 4.2% over 2019–2025, despite growth over the very long term (Table 4).

Industry, by contrast, experienced almost complete stagnation in the post-pandemic period, recording a marginal change of 0.5% (+€466 per labour unit; Table 4), adversely affected by energy costs, tensions in global supply chains and a slowdown in investment in capital goods.

Against this backdrop of weakness in industrial and primary sectors, services continue to represent a major driver of the economy, not so much because of growth in average productivity as a whole, which declined by 0.3% between 2019 and 2025, but because of their extraordinary capacity to withstand shocks and absorb labour (Table 4).

The internal breakdown of the tertiary sector reveals contrasting dynamics: knowledge-intensive sectors continue to push the efficiency frontier. Information and communication activities accelerated, with an increase of 11.7% in 2019–2025, while professional activities rebounded with an increase of 10.5% (Table 4).

By contrast, accommodation and food services experienced a substantial contraction of 11.0% over the 2019–2025 sub-period (equivalent to a decrease of €6,046 per labour unit; Table 4). Viewed from a macroeconomic perspective, this figure does not necessarily indicate a decline in the sector; rather, it reflects a major recovery in employment levels and hours worked that outpaced the growth of real value added. Low-skilled and labour-intensive services have performed a social and employment-buffering function, absorbing flows of workers leaving industrial sectors undergoing restructuring.

As a result, the Italian tertiary sector appears as a dual sector: on the one hand, technology-intensive, professional, and information and communication activities drive allocative efficiency; on the other, traditional services act as an employment buffer for the system, stabilising overall employment levels, sometimes at the expense of growth in average productivity per worker.

The spread of generative AI is bringing to light a number of mechanisms through which tertiary firms may alter the relationship between labour intensity and productivity.

First, through the scalability of services. In the classical Baumol model, the human factor represents the product itself, reflecting a one-to-one relationship between worker and customer. The introduction of AI-based systems transforms services into partially scalable goods, characterised by marginal costs tending towards zero. An example could be found in legal services, consulting or customer care, where an algorithmic infrastructure enables a single operator, supported by digital copilots, to handle an exponentially larger volume of cases or interactions, generating economies of scale in the advanced tertiary sector for the first time.

Second, a process of sectoral transition could get underway, as AI is reshaping the taxonomy of economic sectors, pushing historically labour-intensive activities towards the technological efficiency frontier.

Consider business support services, such as administrative activities, accounting and human-resource management: these will be subject to profound process automation, through Robotic Process Automation and document processing using language models. This could explain an acceleration in productivity in these segments over the medium term.

The same applies to information and communication activities: as shown by the data for 2019–2025, this sector does not appear to be affected by the “Baumol disease”; on the contrary, it benefits from AI, which amplifies content creation, software development and data analysis, decoupling the growth of value added from the linear expansion of labour units.

Lastly, education and healthcare – theoretically the sectors most emblematic of Baumol’s cost disease – could evolve towards AI-based adaptive learning platforms and predictive medical-diagnosis systems capable of delivering services tailored to the specific needs of individual users, while multiplying and replicating such services in standardised forms for very large numbers of users, whether the service is educational or medical, and at extremely low cost.⁹

⁹ For example, in the case of healthcare, the transition would be from what is currently reactive medicine – people go to the doctor once they are already ill, and the doctor makes a diagnosis on the basis of standard tests – to predictive medicine, in which AI makes it possible to anticipate illness. Starting from algorithms that analyse enormous amounts of data, including DNA, medical history and an individual’s lifestyle, AI can identify, for example, micro-variations in heart rate or blood parameters months before symptoms are experienced, and inform the physician that the monitored individual has a certain

It remains to be assessed whether the restaurant and tourism sectors, characterised by a strong labour-intensive and relational component, can also benefit from the opportunities offered by technological change.

In highly relational and manual services, such as accommodation and food services, physical experience and human interaction currently appear to be irreplaceable. Although AI can optimise booking logistics, inventory management and menus, food preparation and table service would nevertheless appear to remain dependent on physical presence. In this context, innovation may have its greatest impact on process reorganisation and service quality.

However, in the Horeca sector, demographic transition and social progress – particularly in the form of rising levels of education and training – could, in the not-too-distant future, lead, on the one hand, to a disruption of the intergenerational transmission mechanism of tourism and hospitality businesses, as younger generations increasingly favour alternative activities involving lower safety risks, lower tax burdens, lower bureaucratic burdens and fewer stringent constraints and obligations, such as those deriving, for example, from HACCP regulations; and, on the other hand, to a progressive decline in the availability of unskilled labour to be trained.

If a production model structurally biased towards labour intensity, typical of the “Baumol disease”, were to persist without a radical and transformative large-scale deployment of AI and integrated robotics, the structural pressures described above could lead to a progressive disappearance of such businesses and to an increasingly negative net demographic balance of firms.

China is leading a smart-hospitality revolution, particularly in Hangzhou (Xihu District), as well as in Shanghai, Beijing (in the E-Town high-tech district) and Shenzhen. Experiments include venues such as the 24 Jieqi Robot Restaurant, where a fleet of machines connected to advanced algorithms manages more than 60% of the overall workload, cooking autonomously up to 100 different traditional recipes, preparing coffee, serving customers at tables and even analysing customers’ biological

probability of developing a specific condition within the following two years unless, for instance, their diet is modified. Intervention can therefore take place before the disease manifests itself.

parameters, such as facial and tongue characteristics, in order to recommend personalised healthy dishes.

With regard to freeing workers from repetitive and physically demanding tasks, the automation of robotic woks (automated cooking devices) and mechanical arms for washing or transporting could help fill the gap in basic services arising from low-skilled or low-value-added tasks.

In terms of intergenerational transmission, i.e. business continuity, AI could make it possible to institutionalise and “preserve” know-how: Chinese kitchen robots are trained by digitally cloning the movements, heat management and timing of leading human chefs, making business continuity independent of biological succession.

With regard to economic sustainability and scalability, a smart restaurant system would make it possible to drastically reduce kitchen staffing, for example from six or seven chefs to just two human supervisors, thereby optimising fixed costs in contexts historically characterised by the availability of low-cost labour.

Lastly, the adoption of androids, automated sommeliers and robot waiters would not necessarily eliminate human interaction, but rather shift its centre of gravity in three ways:

a) Separation between logistics and interaction: service automation and robots would take over physically demanding tasks, such as carrying heavy dishes or delivering items to hotel rooms;

b) Focus on the customer: freeing staff from physical fatigue and routine tasks would enable the remaining human workforce to focus exclusively on empathetic hospitality, product storytelling, including food and wine narratives, and the management of complex guest needs, i.e. those relational and interpretative aspects in which algorithms cannot compete;

c) Adoption of hybrid and closed-loop models: these include advanced projects in China involving the imminent launch of entire closed-loop smart hotels, in which robotics covers every potential operational “gap”, leaving humans with supervisory roles or purely premium guest-care functions.

International experience in the hospitality and food-service sectors shows that even highly labour-intensive activities can adopt automation and robotic solutions capable of modifying certain production and organisational processes.

3.1.1. Activities of households as employers of domestic personnel: the Italian anomaly

Italy is the only one among the major European countries in which the welfare system for care services relies extensively on the role of the family as a formal and direct employer.

Table 5 – Professional carers employed by households as employers

thousands of employees

2023				
	Total economic activity	[N78] Recruitment, selection and supply of personnel	[Q87_88] Social work	[T] Activities of households and cohabiting households as employers of domestic employees; production of undifferentiated goods and services for own use by households and cohabiting households
Germany	42,148.0	834.0	2,879.0	947.0
Spain	18,368.9	241.0	600.9	564.7
France	27,054.7	1,038.8	2,127.8	138.1
Italy	20,052.8	451.1	564.9	1,260.9
share				
Germany	100.0	2.0	6.8	2.2
Spain	100.0	1.3	3.3	3.1
France	100.0	3.8	7.9	0.5
Italy	100.0	2.2	2.8	6.3

USC analysis based on Eurostat data.

National Accounts data on dependent employment, expressed in terms of persons rather than jobs or hours, show that over the past thirty years, between 1995 and 2025, the number of employees attributable to Section T, according to the NACE/ATECO classification – i.e. the sector covering activities of households as employers of domestic personnel and the production of undifferentiated goods and services by households and family units for their own use – increased by more than 45%, from almost 875,000 in 1995 to approximately 1.273 million in 2025.

A comparison using Eurostat data for Germany, France and Spain, referring to 2023, the year for which data are available for all the countries selected, shows that the Italian situation may be considered a genuine anomaly in what can more generally be defined as the formal or professional caregiver sector, namely workers trained and regularly remunerated to perform care-related tasks, such as nurses, social and healthcare workers or care assistants.

Table 5 clearly shows that in Italy Section T accounts for more than 6% of all employees, compared with just over 2% in Germany, approximately 3% in Spain and as little as 0.5% in France.

Conversely, if sectors such as N78, which includes employment and staffing activities, and sector Q87_88, relating to social work activities, are considered together, their combined share of total employment approaches 9% in Germany, reaches almost 12% in France, while in Italy it stands at around 5%. Spain records a slightly lower figure than Italy, at 4.6%, but, as will be seen below, this may depend on the way in which caregiver employment relationships are regulated in that country, with employment being allocated in the National Accounts to other NACE sectors as well.

Moreover, it should be borne in mind that National Accounts data are available only at NACE Division level and therefore involve a degree of aggregation, particularly in N78, which does not make it possible to identify precisely the share of employees engaged in domestic work, broadly understood, within employment activities.

Nevertheless, more than sufficient evidence emerges to confirm the Italian anomaly in this particular area of employment, which, moreover, favours forms of informal organisation typical of the shadow economy, given that in Italy the rate of undeclared employment in Section T, although it has declined by twenty percentage points over the past thirty years, is still close to 49%.

The differences observed may be traced back to the different ways in which domestic and care work is organised and classified in the countries considered.

In France, a significant share of domestic work, including cleaning and elderly care, is not directly performed by households, which would fall under NACE T, but is mediated through personal-service companies (*agences de services à la personne*). These workers are classified within service companies under NACE N – Administrative and support service activities – rather than as directly employed domestic personnel.

Furthermore, since ESA 2010 distinguishes activities involving the production of undifferentiated goods and services for own use (NACE T and U) from professional service activities, if a worker is employed through an agency or an authorised association, the employment is recorded within

the broader personal and business services sector rather than under households as employers.

Table 6 – Summary of classification differences

Country	Predominant employer	Predominant NACE section for care/domestic work
Italy	Private household (direct employment)	Section T (Highest concentration)
France	Personal care service providers (<i>agences de services à la personne</i>); agencies or formalisation via specific vouchers (CESU – <i>Chèque Emploi Service Universel</i>)	Section N (Support services) or Section Q (Health and care)
Germany	Temporary employment agencies, co-operatives, welfare organisations	Section N (Support services) or Section Q (Health and care)
Spain	Outsourced service providers (post-reform)	Section N (Support services) or Section Q (Health and care)

Lastly, French *Services à la personne* policies strongly encourage the use of agencies or regularisation through dedicated instruments, such as CESU (*Chèque Emploi Service Universel*), thereby shifting employment away from undeclared or informal work and direct ad hoc employment towards more structured contractual arrangements, often involving intermediaries.

In summary, the very low number of employees recorded under NACE T in France does not indicate a lack of domestic work, but rather a high degree of outsourcing or professional intermediation, which shifts its statistical classification to other sectors under ESA 2010.

The number of dependent employees in NACE Section T in Germany and Spain is likewise significantly lower than in Italy because of profound structural, welfare and regulatory differences.

The gap does not indicate a lack of care or domestic services in Germany and Spain, but is attributable to the way these markets are organised and to the extent to which undeclared work has been brought into the formal economy.

Whereas in Italy, for elderly care, including care assistants (*badanti*), and household management, including domestic workers (*colf*), Italian families directly employ workers as private employers, in Germany long-term care is covered by compulsory public insurance (*Pflegeversicherung*). German families almost never employ workers directly. Instead, they rely on private

agencies, cooperatives or non-profit organisations, which fall under NACE Section Q – Human health and social work activities – or use temporary-agency arrangements. As a result, a domestic worker in Germany is employed by an organisation rather than by the household and therefore disappears from Section T.

In Spain, the domestic work sector (*Empleo del Hogar*) has historically been large, but has undergone radical reforms that have changed the way it is recorded:

- a) through a legislative measure adopted in 2022, Spain introduced stronger protections for domestic workers, including the extension of unemployment benefits and a ban on unjustified dismissal;
- b) a shift towards companies, insofar as the increase in legal and administrative costs for individual households has pushed the market towards professionalisation through service companies and outsourcing, recorded under other NACE sections, such as cleaning or social services. As a result, direct contracts with households (Section T) have declined sharply in social-security registers and, consequently, in Eurostat data.

Ultimately, in order to align with the main European countries and substantially reduce undeclared work, Italy should move beyond the current “familialist” model based on direct household employment. This would require a structural transition towards outsourcing and professional intermediation, encouraging the creation and use of personal-service agencies, cooperatives and third-sector organisations.

By transferring the role of formal employer from individual households to structured legal entities, domestic employment would naturally migrate from NACE Section T to NACE Sections N and Q. This process of formalisation and compliance should be supported by strong fiscal incentives, such as substantial tax deductions and dedicated traceable payment instruments modelled on the French or German systems, capable of making formal employment economically more attractive than undeclared work.

At the same time, the State should strengthen public welfare provision for long-term care and dependency, thereby reducing the administrative burden and direct legal costs borne by households.

Lastly, a gradual extension of contractual protections, mediated through service companies rather than private individuals, would make it possible to stabilise the sector without discouraging households because of a potential increase in legal costs, thereby completing the process of bringing undeclared employment into the formal economy.

3.2. Increasing average firm size or increasing average output at a given firm size? A European comparison

In the public debate, the low productivity characterising large segments of the service sector is frequently cited as one of the main constraints on our economic system. One possible interpretation combines a composition effect, linked to employment growth in sectors with lower output per worker, with a dynamic effect related to the different evolution of output per worker in market services and manufacturing. An analysis of the data must nevertheless take both components into account.

If the long-term employment dynamics across the various macro-sectors were correctly assessed, as shown in the last two columns of Table 3, it would immediately become clear that stigmatising the performance of market services, whether considered right or wrong, is of little use. If Italian consumers and their counterparts in major cities around the world want services – that is, skills, other people’s time, solutions and experiences – perhaps the appropriate response is to accommodate that demand and finally recognise the value of the less productive service sectors.

This section presents preliminary descriptive empirical evidence on productivity differences between micro-enterprises in market services and their French and German counterparts. For a given firm size, Italian micro-enterprises display lower productivity levels. The comparison is consistent with a role for contextual conditions, in addition to differences internal to firms. This suggests that policies aimed at improving firms’ operating and institutional conditions should also be considered, without necessarily assuming that transforming the size structure is the only solution.

The literature provides extensive evidence that firm size is one of the factors relevant to determining firms’ productivity. Against this background, the prevalence of small firms in Italy’s productive system has frequently been identified as one of the factors potentially exerting a negative effect on productivity performance. In a globalised economy, international

strategies, integrated supply chains and the ability to operate in foreign markets play a fundamental role in supporting economic growth.

Recent studies [Bugamelli et al. 2018, Mocetti et al. 2019, Duerneker et al. 2018]¹⁰ show that:

- a) inefficiencies in local public expenditure hinder labour productivity in micro and small enterprises; this contextual factor plays a considerably greater role for smaller firms;
- b) the institutional quality and social capital characterising the environment in which firms operate improve productivity levels, particularly in micro-enterprises [Barone and Mocetti 2009, Quintieri et al. 2023]¹¹;
- c) the tax burden has a negative impact on labour productivity.

To fully understand Italy's distinctive structure, it is useful to compare selected productive parameters of the Italian economy with those of its main European partners, particularly Germany and France, as reported in Table 7. The data are broken down into three firm-size classes, defined on the basis of the number of employees.

The figures reported in the table require no lengthy or complex commentary, since the evidence they provide is relatively clear and, in many respects, already well known, although often overlooked or forgotten. It is nevertheless useful to focus on one element: the gap in value added per worker between Italy and the other countries.

Considering market services and the economy as a whole, net of public administration, agriculture, financial and insurance activities, the comparison between Italy, Germany and France shows value added per worker of approximately €63,000 in Italy, compared with more than €80,000 in Germany and approximately €74,000 in France. This differential can be

¹⁰ M. Bugamelli et al., (2018), "Productivity Growth in Italy: A Tale of a Slow-Motion Change", *Questioni di Economia e Finanza (Occasional Papers)*, No. 422, Banca d'Italia; S. Mocetti, A. Baltrunaite and E. Brodi, (2019), "Ownership Structure and Governance of Italian Companies: New Evidence and Effects on Performance", *Questioni di Economia e Finanza (Occasional Papers)*, No. 514, Banca d'Italia; G. Duernecker, B. Herrendorf and B. Bridgman, (2018), "Structural Transformation, Marketization, and Household Production Around the World", *Journal of Development Economics*, 133, pp. 102–126.

¹¹ G. Barone and S. Mocetti, (2009), "Tax Morale and Public Spending Inefficiency", *Temi di discussione (Economic Working Papers)*, No. 732, Banca d'Italia; B. Quintieri et al., (2023), "Qualità istituzionale e produttività delle imprese", *Economia italiana*, 2, pp. 15–50.

attributed to two main components: composition effects within the productive fabric, namely the different distribution of firms across size classes, and effects related to productivity within the various sectors, i.e. value added per worker in the macro-sectors and, within them, in firms belonging to the different size classes.

It is clear that Germany has a substantially different composition of its business fabric from Italy. The composition effect is significant: the gap in output per worker, i.e. value added per worker as an indicator of productivity, between Italy and Germany can be attributed, at least in part, to the different distribution of workers among firms belonging to different size classes.

In the German economy as a whole, only 19.0% of employees work in micro-enterprises, namely firms with 1–9 employees, whereas in Italy the share of employees working in the smallest firms reaches 39.3%. This marked difference in the employment structure in favour of micro-enterprises is particularly evident in market services, where the gap exceeds 22 percentage points: 43.4% of Italian employees work in firms with fewer than 10 employees, compared with 21.1% in Germany.

The comparison with France reveals smaller differences in the distribution of employees across size classes. The gap remains significant for micro-enterprises, while among small enterprises, those with 10–49 employees, Italy's composition is actually more heavily weighted towards this class, with 18.4% of employees working in such firms in Italy compared with 15.4% in France.

Table 7 – Descriptive statistics by enterprise size: Italy, Germany and France – 2026¹².

	number of enterprises (%)			Number of employees (%)		
	Italy	Germany	France	Italy	Germany	France
Total economy						
micro (1–9)	94.1	84.5	95.4	39.3	19.0	25.4
small (10–49)	5.2	13.0	3.8	21.1	21.1	15.2
medium and large (>50)	0.8	2.5	0.8	39.6	59.9	59.4
total	100.0	100.0	100.0	100.0	100.0	100.0
Market services						
micro (1–9)	95.3	85.1	95.4	43.4	21.1	26.0
small (10–49)	4.2	12.7	3.8	18.4	23.2	15.4
medium and large (>50)	0.5	2.2	0.8	38.2	55.7	58.5
total	100.0	100.0	100.0	100.0	100.0	100.0

	value added per employee (000 euros)			number of employees per company (no.)		
	Italy	Germany	France	Italy	Germany	France
Total economy						
Micro (1–9)	41.0	62.6	49.0	1.8	2.6	1.3
small (10–49)	61.6	64.9	65.1	17.9	18.7	19.7
medium and large (>50)	84.7	92.1	87.2	231.1	273.9	386.8
total	62.7	80.8	74.1	4.4	11.5	4.9
market services						
Micro (1–9)	37.5	59.3	48.6	1.8	2.6	1.3
small (10–49)	56.2	61.0	64.0	17.4	18.8	19.4
medium and large (>50)	69.0	74.1	77.6	277.2	259.4	361.4
total	53.0	68.0	68.0	3.9	10.3	4.8

The total for the economy excludes agriculture, financial and insurance activities, and the public sector.

USC analyses based on European Commission data, 2026¹³.

¹² These are, of course, estimates. Given the authority of the source – which is widely used by the European Commission – the figures presented in the table are considered reliable, particularly as the estimates for 2026 are based on models calibrated using data derived from official statistics produced using standardised methods adopted by each country.

¹³ The report is produced by the JRC. The Joint Research Centre (JRC) is the European Commission's research and analysis centre, tasked with providing expert scientific support to underpin the Commission's decision-making process. With the publication of *the Annual*

Perhaps the most relevant aspect concerns differences in value added per worker. Looking at the differences by firm-size class across countries and macro-sectors, significant gaps emerge both for the economy as a whole and for market services.

Without any claim to put forward simulations of particular scientific significance, the two exercises presented below – which are purely arithmetical – are intended to highlight an aspect that is often overlooked in the public debate: the modest productivity per worker in market services, particularly among micro-enterprises, does not depend exclusively on firms' internal characteristics but also, and perhaps above all, on the contextual variables within which these productive units operate.

Table 7 provides a highly concise presentation of the results of these two simple exercises. Taking 2026 as the reference year, in Panel A we replace, for the market services sector alone in Italy, the shares of employees by firm-size class with those observed in Germany and recalculate value added per worker for Italian market services and for the economy as a whole, as defined above.

If Italy had the same distribution of employees across firm-size classes in market services as Germany, all other conditions being equal, value added per worker in the tertiary sector would increase by 12.1%, with an effect on value added per worker for the economy as a whole equivalent to a 6.4% increase. This is the composition effect and is the effect most frequently emphasised in the public debate: the need for Italian firms, particularly in services, to achieve a larger average size.

Even with productivity per employee held constant for each size class, the change in composition alone would have a significant effect because output per worker in services increases with firm size. Therefore, the larger the share of non-micro firms, the greater the aggregate output, even without changing the distribution of employees outside the services sector.

The exercise presented in Panel B of Table 7 is based on an entirely different approach. Here we keep the distribution of employees by firm-size class

Report on European SMEs 2025/2026, the JRC provides detailed data for all European countries (EU-27) on micro, small and medium-sized enterprises, as well as large enterprises, offering an overview of the past and projected performance of SMEs from 2008 to 2026 and enabling a comparison between different countries.

unchanged and, again only for market services, apply the productivity per worker observed in France to each firm-size class.

Table 8 – Two simple analyses of the role of the composition of productive activities by firm size class and output per employee.

Panel A: absolute and percentage change in output per employee in the market-oriented services sector and in the Italian economy as a whole if, in the market-oriented services sector, the shares of employees by firm size class were those of Germany – reference year 2026

	% share of employees in Italy	output per employee in Italy – euros (000)	Value added per employee – euros (000)	% change
Micro (1–9)	43.4	37.5	53.0	
small (10–49)	18.4	56.2		
medium and large (>50)	38.2	69.0		

	Percentage of German employees	Output per employee in Italy – euros (000)	value added per employee – euros (000)	% change
micro (1–9)	21.1	37.5	59.4	12.1
small (10–49)	23.2	56.2		
medium and large (>50)	55.7	69.0		

Overall, value added per employee rises from €62,700 to €66,700 (+6.4 percent)

Panel B: absolute and percentage change in output per employee in the market-oriented service sector and in the Italian economy as a whole, assuming that productivity per employee by firm size class in the market-oriented service sector were equal to that of France – reference year 2026

	Percentage share of Italian employees	output per employee in Italy – euros (000)	Value added per employee – euros (000)	% change
Micro (1–9)	43.4	37.5	53.0	
small (10–49)	18.4	56.2		
medium and large (>50)	38.2	69.0		

	Percentage share of Italian employees	Output per employee – Fra – euros (000)	Value added per employee – euros (000)	% change
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Micro (1–9)	43.4	48.6	62.5	18.0
small (10–49)	18.4	64.0		
medium and large (>50)	38.2	77.6		

Overall, value added per employee rose from €62,700 to €68,600 (+9.5 percent)

see note to the previous table.

Naturally, analogous results – and even higher ones – would be obtained by using average productivity in Germany, which is higher. The comparison with France is, moreover, more meaningful given the greater proximity between the two economic systems compared with the distance separating Italy and Germany.

The result of the productivity-effect exercise is noteworthy: an 18% increase in average output in services, which translates, all else being equal, into a 9.5% increase in output per worker for the economy as a whole. Even in this case, the gap with the benchmark country would not be eliminated, but a significant part of the distance would nevertheless be closed: the gap between France and Italy in average output per worker would move from €74,100 versus €62,700 (Table 4) to €74,100 versus €68,600 (Table 5).¹⁴

The assumptions underlying the simulations are highly simplifying and the exercises should therefore be interpreted as theoretical simulations, rather than as forecasts. Their purpose is to isolate separately the effects of firm-size composition and productivity for a given size class.

The assumption that service-sector micro-enterprises, which in some sectors are characterised by lower levels of innovation and greater exposure to rents or tax evasion, should necessarily transform themselves into larger firms does not exhaust the complexity of Italy's productive structure. The size configuration of the productive system is the outcome of choices and

¹⁴ These arithmetical exercises would also help anchor the somewhat vague media debate on the relatively low average wages paid to Italian workers in some more robust empirical evidence. Further exploration of this issue, however, would take us too far from the subject under consideration.

conditions developed over decades and must also be interpreted in light of institutional, competitive and territorial factors.¹⁵

Reducing incentives that hinder increases in firms' average size is a distinct issue from defining a target size structure. Policies can therefore intervene on contextual conditions and incentives, taking into account the current structure of the productive system and the time required for possible processes of firm expansion.

The simulation of the composition effect is not realistic, and this is a major shortcoming that undermines the credibility of the results, even though they are purely theoretical.

The exercise concerning the effect of average output per worker is more closely related to an observable case: that of a comparable country in which, for a given size class, the productivity of service-sector firms is higher than in Italy.

Returning to Table 6, it is clear that service-sector firms in France belonging to the 1–9 employee class, i.e. micro-enterprises, although having an average size of 1.3 employees compared with 1.8 employees in Italy, record value added per worker of €49,000, compared with €41,000 in Italy. The result should be interpreted taking into account possible measurement and estimation errors.

Overall, Tables 4 and 5 show that, even without radically changing the size structure of the productive system, there is scope for increasing productivity.

Differences in productivity per worker for a given firm size may also be attributable to contextual conditions. Relevant factors include administrative complexity, social capital, the tax burden relative to the services provided and energy costs. The observed differences may therefore

¹⁵ The possibility of extracting rents may depend on the absence of, or limited exposure to, international competition. In the economic policy debate, the distinction between exporting manufacturing activities and non-tradable services has contributed to a differentiated representation of exposure to international competition. However, certain service activities, particularly tourism-related activities, are exposed to foreign demand through consumer mobility. Comparisons between destinations such as the Balearic Islands and Sicily show that the ability to attract international demand depends on various factors, including accessibility, organisation of supply and market strategies. A more detailed classification of exporting firms could contribute to a better representation of these activities, as discussed in Section 3.4.

reflect not only firms' characteristics but also the institutional, organisational and infrastructural context in which they operate.¹⁶

The following may suffice as a reference to a recent study [Quintieri et al. 2023, cited above]: accurate empirical evidence derived from econometric estimates based on micro-data suggests that removing structural deficiencies or excesses characterising the environment in which firms operate would benefit micro and small enterprises more than other firms. In other words, there is a positive differential in favour of smaller firms when policies improve the business environment.

The analysis suggests that, alongside measures aimed at increasing firm size, it may be useful to consider measures aimed at improving the operating conditions of Italian micro and small enterprises, particularly in market services.

3.3. Comparability of sectoral labour productivity dynamics in the presence of different changes in labour input

In light of the findings emerging from the preceding sections, a methodological question naturally arises: is it appropriate to equate and compare productivity performance across sectors characterised by such heterogeneous employment dynamics?

More precisely: does it make sense to compare labour productivity trends across sectors characterised by profoundly different developments in labour input?

The prevailing view in the economic debate is that Italy's fragile growth is attributable to the low productivity of certain segments of market services. However, such assessments are often formulated without considering the impact of changes in labour input. Indeed, while manufacturing has experienced a progressive decline in employment over the past thirty years, the services sector has absorbed almost the entire increase in employment.

Since productivity metrics are intrinsically affected by changes in employment, an inter-sectoral comparison based exclusively on the

¹⁶ Contextual shortcomings may include, in addition to the tax burden and administrative costs, issues relating to logistics and the accessibility of territories. These factors may affect firms' operating conditions and their ability to realise the innovation and productivity potential associated with younger generations.

evolution of average output per worker risks generating distorted and misleading interpretations.

From this perspective, this section proposes a descriptive analysis of the relationship between productivity and employment, with the aim of mapping this relationship without, however, addressing the structural determinants of productivity. The exceptionally simple research hypothesis is that there is a systematic relationship between changes in labour input and changes in productivity, such that the two phenomena need to be interpreted jointly.

In order to investigate this dynamic empirically, the analysis uses a panel-data econometric model described by the following equation:

$$\mathbf{dlog}\left(\frac{Y_{it}}{L_{it}}\right) = \alpha_i + \delta_t + \beta \mathbf{dlog}(L_{it}) + \varepsilon_{it}, \quad \varepsilon_{it} \sim N(0, \sigma^2) \quad (1)$$

where Y_{it} denotes value added measured in sector i at time t ; L_{it} measures labour input expressed in labour units (SLUs), and Y_{it}/L_{it} represents labour productivity. β is the parameter of interest, while ε_{it} represents the stochastic error term. α_i and δ_t capture, respectively, sectoral and time fixed effects, thereby controlling for unobserved heterogeneity.

The exercise is based on a panel covering the 1995–2025 period and including 47 sectors belonging to both manufacturing and services. It should nevertheless be noted that, owing to the limited availability of the most recent data, observations for 2024–2025 cover only a subset of sectors. Consequently, the dataset is an unbalanced panel in the final two years of the sample.

More precisely, when estimating log differences, as in Table 4, for example, there should have been 1,410 observations, whereas there are “only” 1,339.

The model described by Equation (1) was initially estimated using Ordinary Least Squares (OLS). However, the OLS estimate is affected by endogeneity because the independent variable appears on both the right-hand and left-hand sides of the equation. This simultaneity generates a spurious correlation between the regressor and the error term and, in practice, makes the OLS estimator inconsistent. Formally, this implies:

$$\text{Cov}(L_{it}, \varepsilon_{it}) \neq 0.$$

In order to achieve correct identification of the causal relationship, the empirical strategy was recalibrated by adopting an Instrumental Variables (IV) approach using the Two-Stage Least Squares (TSLS) estimator.¹⁷ Through the use of appropriate instruments, TSLS makes it possible to isolate the exogenous variation in the regressor, ensuring consistent estimates even in the presence of simultaneity.¹⁸

Table 8 reports the results obtained using OLS and TSLS. The first two rows refer to coefficients estimated using the full sample, while the final two rows report estimates obtained by differentiating the sample between manufacturing and services.

Table 9 – Estimates of model parameters (1) OLS and TSLS

dependent variable: VA/ULA	Coefficient	Standard error	t-stat	n
β_{ols}	-0.065	0.009	-7.6	1,339
β_{iv}	-0.260	0.034	-7.8	1,339
β_{iv} manufacturing	-0.509	0.023	-22.1	622
β_{iv} services	-0.333	0.058	-5.7	717

the variables are expressed as logarithmic differences; estimation period: 1995–2025; for the years 2024 and 2025, data are available only for a subset of sectors.

As clearly shown by the results, the estimates confirm a negative and statistically significant relationship between labour input and productivity.

At the same time, the reading of the coefficients in Table 4 confirms the methodological need to neutralise endogeneity biases and the importance of considering sectoral heterogeneity when investigating the structural relationship between employment dynamics and productive efficiency.

¹⁷ J.M. Wooldridge, (2010), *Econometric Analysis of Cross Section and Panel Data*, 2nd ed., Cambridge, MA: The MIT Press.

¹⁸ In this study, the lagged SLU variable was used.

Indeed, whereas the OLS estimate returns a negative and significant coefficient of -0.065, the use of the TSLS model produces a substantially larger parameter, equal to -0.260. Accordingly, a 1% increase in SLUs is, on average, associated with a 0.26% reduction in labour productivity. Once simultaneity has been neutralised, the actual impact of changes in employment on productivity is therefore considerably more pronounced.

Disaggregating the analysis by macro-sector reveals structural differences. In manufacturing, the sensitivity of labour productivity to changes in employment is greater, with a coefficient of -0.509. In services, the estimated elasticity is considerably lower, at -0.333.

A further potential source of bias in the estimates is attributable to the impact of the economic cycle. Short-term cyclical fluctuations tend to affect employment levels and value added simultaneously, thereby potentially distorting the underlying structural relationship.

To verify that the results are not driven by the cyclical component, the model described in Equation (1) was estimated by replacing the original variables with their respective time series after removing cyclical fluctuations.

Two different approaches were adopted for this purpose. First, the Hodrick–Prescott (HP) filter¹⁹ was applied to separate the trend from the cyclical component and isolate the long-term evolution of the variables.

Second, a temporal aggregation method was explored according to the following procedure:

- a) periods in which the log difference of SLUs was positive and periods in which it was negative were identified;
- b) each period was aggregated using the log difference between the first and last value in the sequence, thereby obtaining a single temporal observation for each period.²⁰

¹⁹ R.J. Hodrick and E.C. Prescott, (1997), “Postwar U.S. Business Cycles: An Empirical Investigation”, *Journal of Money, Credit and Banking*, 29(1), pp. 1–16.

²⁰ By way of example, suppose that sector *i* has the following annual time sequence of labour input: 100, 98, 97, 96, 98. In the regression that aggregates periods according to whether the sign of the changes remains constant, there would no longer be four changes, corresponding to five years, but only two changes: $\ln 96 - \ln 100$ and $\ln 98 - \ln 96$, precisely in order to consider periods that are homogeneous in terms of the sign of the change in labour input.

This approach makes it possible to capture growth and contraction dynamics within each sector while eliminating short-term fluctuations associated with the economic cycle.

Tables 9 and 10 illustrate the results. The Hodrick–Prescott estimates are reported both for the aggregate sample and by splitting the sample according to the sign of the change in labour input. This step makes it possible to explore and isolate any asymmetries affecting productivity dynamics during phases of employment expansion and contraction.

Table 10 – Estimates of the model parameters (1) using HP

Dependent variable: VA/ULA	Coefficient	Std. err	t-stat	n
β_{Hp}	-0.664	0.010	-69.28	1,339
β_{Hp} (ULA > 0)	-0.575	0.011	-53.02	695
β_{Hp} (ULA variance < 0)	0.382	0.055	6.99	644

the variables are expressed in logarithmic differences; estimation period: 1995–2025; for the years 2024 and 2025, data are available only for a subset of sectors.

Table 11 – Estimates of the model parameters (1) with temporal aggregation

Dependent variable: VA/ULA	Coefficient	Std. err	t-stat	n
β_{Agg}	-0.188	0.032	-5.79	592

the variables are expressed in logarithmic differences; estimation period: 1995–2025; for the years 2024 and 2025, data are available only for a subset of sectors.

Considering the full sample, the overall coefficient β_{HP} is negative and statistically significant. This parameter indicates that a structural 1% increase in SLUs is associated, on average, with a 0.66% contraction in productivity dynamics (Table 7), confirming that the inverse relationship is not merely an effect associated with cyclical fluctuations but remains a robust and structural dynamic even over the long term. The same relationship is also confirmed by the temporal aggregation method, which produces a negative elasticity estimate of approximately 0.19 (Table 10).

Looking at the breakdown of the sample according to the direction of employment changes (Table 5), the relationship is confirmed. In sectors characterised by an expansionary dynamic – i.e. sectors where changes in

SLUs are greater than zero – the estimated coefficient remains negative at - 0.575. This implies that, during phases of expanding labour input, a 1% increase in SLUs translates into a trend decline of 0.57% in productivity.

Conversely, the analysis of sectors experiencing employment contraction leads to entirely analogous considerations.

The empirical evidence presented confirms the methodological relevance of considering employment dynamics and productivity jointly. Ignoring the relationship between the two variables may lead to incomplete interpretations of sectoral performance and to an inadequate classification of the growth trajectories of different sectors.

To understand the actual extent of this dynamic within the economic fabric, it is necessary to move to a more disaggregated level of analysis. A detailed examination of the dynamics of the relevant variables across the 47 sectors considered shows that, over the entire 1995–2025 period, employment and productivity changes have the same sign in only 16 cases.

Excluding three marginal sectors in outright productive decline – i.e. sectors showing negative changes both in value added per worker and in labour input – 13 cases remain.

Two sizeable sectors are worth mentioning among them. The first is the manufacture of electrical and electronic equipment, where employment exceeds 442,000 workers (+18.7% compared with 1995), while output per worker simultaneously increased by almost 11.6% in real terms.

The other significant case concerns wholesale trade excluding motor vehicles, where employment approaches 1.174 million workers in 2025 (+10.7% compared with 1995), while labour productivity increases by 83%.

The fact remains that in 31 of the 47 cases, productivity declines as employment increases or, conversely, productivity rises as labour input decreases.

The relationship between productivity and employment must therefore be explicitly taken into account when interpreting sectoral productivity gaps. Assessing inter-sectoral productivity gaps while ignoring the specific employment dynamics underlying them may result in a specification error and lead to distorted interpretations and potentially to the development of sectoral policies that are not consistent with the evidence.

3.4. Classifications and measurement of service exports

The analytical discrepancy between export data recorded through customs declarations and those recorded in the National Accounts under the European System of Accounts (ESA 2010) constitutes a key methodological issue. Both time series are produced by Istat in the Italian context, but they are based on structurally different theoretical approaches and recording criteria.

Understanding this discrepancy is essential not only for the correct quantification of Gross Domestic Product (GDP), but also for accurately interpreting the contribution of services to international trade. The almost exclusive identification of Italian exports with manufacturing may, in fact, result in the statistical under-representation of service sectors, particularly the Horeca sector, transport and trade.

The first discrepancy is purely accounting in nature and lies in the criteria used to record trade flows.

The trade balance, i.e. statistics on foreign trade in goods, is based on customs declarations, specifically Intrastat forms for intra-EU trade and customs declarations for extra-EU trade. This system applies the principle of physical crossing of the border. Every good that physically crosses the customs border is recorded as an export, irrespective of who legally owns it.

By contrast, the National Accounts under ESA 2010 follow the principle of a change in economic ownership between residents and non-residents. If a good crosses the border but economic ownership remains with a resident entity – as in the case of processing, i.e. processing on behalf of third parties abroad without a transfer of ownership – ESA 2010 does not record an export of goods.

Since there is no transfer of ownership, i.e. no sale, at most, in such a case there may be an export or import of manufacturing services resulting from the change in value associated with processing the goods or transporting them; whether the transaction is classified as an import or export depends on the residence of the entity producing and selling those services.

Conversely, if ownership of a good is transferred between a resident and a non-resident without the good physically crossing the national border, as in the case of merchanting, the National Accounts record the transaction, while customs statistics disregard it.

These conceptual differences are compounded by differences in the valuation of goods. Customs statistics value exports at FOB (Free on Board), which includes the price of the goods and transportation and insurance costs up to the national border.

The National Accounts, by contrast, strip these distribution-related components from the flows in order to express them strictly at basic production prices, allocating international transport and insurance services to the corresponding service categories.

This reveals a difference in the statistical representation of manufacturing and services, stemming largely from their different methods of measurement.

Public debate and much of the applied economic literature tend to conflate export propensity with manufacturing performance. This phenomenon generates both a perceptual and an economic distortion. Export reports focus on the traditional sectors of *Made in Italy*, such as machinery, fashion, agri-food and design, measured through customs data.

This approach may reduce the statistical visibility of the value chain and the contribution of non-manufacturing sectors.

With regard to transport and logistics, manufactured goods could not reach foreign markets without the logistics infrastructure and cross-border transport services provided by resident operators. In customs statistics, this value is incorporated into the price of the good, which is measured on an FOB basis, thereby attributing the entire export value to manufacturing and making the transport sector invisible.

As regards trade, both wholesale and retail, trading companies perform a fundamental intermediary role in international markets, including merchanting and the management of distribution networks. However, their value added is recorded as a trading margin and is often incorporated into the final value of the industrial product being exported.

Particularly relevant is the accounting treatment of tourism and, more generally, the Horeca system, which is linked to expenditure by non-residents on the national territory.

According to National Accounts and balance-of-payments rules, expenditure by non-resident citizens, including tourists and business travellers, within the national economic territory constitutes, in all respects,

an export of services, specifically accommodation, food, leisure and local transport services.

The paradox lies in the way these data are classified and published:

- a) **Absence of a direct ATECO code for exports:** official statistics on service exports aggregate expenditure by non-residents under the macroeconomic item “Travel”. This is a functional category defined from the demand side, i.e. by who spends, rather than from the supply side, i.e. by who produces the service.
- b) **Lack of sectoral allocation:** in the aggregated National Accounts there is no direct and systematic attribution of these exports to individual ATECO economic activity classes, for example Section I for accommodation and food services or Section G for retail trade.

As a result, a hotel or restaurant generating its entire turnover from foreign customers will never appear, at the micro-data level or in standard sectoral statistics, as an “exporting” firm. Its output is simply recorded as being consumed within the national territory.

In summary, the discrepancy between customs data and ESA 2010 data does not stem from a simple measurement error, but is the consequence of two radically different perspectives on the same economic phenomenon. The exclusive use of customs data may result in a partial representation of the sectoral composition of Italian exports.

For the purposes of properly formulating industrial and internationalisation policies, it may therefore be useful to integrate Input-Output matrices and the Supply and Use Tables of the National Accounts. Only through these applied-economics instruments is it possible to estimate the actual foreign value added activated by service sectors, thereby providing a more complete representation of the contribution made by trade, transport and the tourism value chain.

Within the Italian macroeconomic framework, the monetary discrepancy between exports of goods calculated by customs, i.e. special trade, and those recorded in the National Economic Accounts under ESA 2010 is structural and has historically fluctuated within a significant order of magnitude.

Taking as a reference the foreign-trade statistics released by Istat for 2025, goods exports according to customs statistics, valued on an FOB basis, recorded trade flows at border crossings amounting to slightly more than €643 billion.

By contrast, in goods exports according to the National Accounts, the redefinition of flows based on the criterion of transfer of economic ownership reduces the overall value of goods exports to slightly more than €579 billion.

The resulting net discrepancy is therefore approximately €64 billion lower in the National Accounts. From a statistical perspective, this divergence, equivalent to approximately 11% of total goods exports recorded in the National Accounts, does not represent an accounting error, but rather the combined effect of three adjustments that modify the perimeter of exports in the transition from customs data to the National Accounts, carried out by Istat in accordance with Eurostat regulations:

Customs exports (FOB)

– **(Deduction) Transport and insurance components beyond the border**
(*reallocated to Services*)

– **(Deduction) Goods that crossed the border without a change in ownership** (*e.g. processing*)

+ **(Addition) Goods sold abroad without physical transit across the border** (*e.g. intermediation / merchanting*)

= **ESA 2010 exports (basic prices)**

The final critical aspect concerns the impact of the “Travel” component on service exports. Whereas goods exports decline when moving from customs statistics to ESA 2010, service exports benefit from the recording of consumption by non-residents on the national territory, identified through the Bank of Italy’s international tourism survey. Italy’s total service exports, according to the National Accounts, exceeded €148 billion in 2025. Within this aggregate, the “Travel” component represents the fundamental pillar:

a) Gross tourism receipts (expenditure by non-residents): according to balance-of-payments statistics, which correspond to the National Accounts, expenditure by foreign travellers in Italy amounted to almost €57 billion, further driven by exceptional cyclical factors.

