IP and innovation in European sectors

Industry-level analysis report

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A joint project of the European Patent Office and the European Union Intellectual Property Office

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Foreword

Innovation is a key component of the growth strategy adopted by the European Union (EU) and its member states, and to that end the EU is implementing several initiatives designed to address the issues identified by Mario Draghi in his September 2024 report. The achievement of these goals depends on many factors, but an efficient system of intellectual property rights (IPRs) undoubtedly ranks among the most important, given the capacity of intellectual property (IP) to encourage ceativity and innovation throughout the economy.

In response to the need to provide policymakers and the public with accurate information, the European Union Intellectual Property Office (EUIPO) and the European Patent Office (EPO) joined forces in 2013 to carry out a study that quantified the economic contribution of intellectual property rights-intensive (IPR-intensive) industries to the EU economy.

Following subsequent editions published in 2016, 2019 and 2022, this study has now been updated with new data for the post-Covid period 2021-2023. The results demonstrate that during the past decade, IPR-intensive industries have become even more integral to GDP, employment and trade in Europe. Other studies published jointly by our two offices have also shown the importance of IPRs in promoting growth and employment at company level, especially among small and medium-sized enterprises, and in securing financing for innovative start-ups.

Europe has a long tradition of encouraging creativity and innovation. The member states of the EU and the European Patent Organisation member states have played a major role in shaping a modern and balanced IPR system which not only guarantees innovators their due reward but also stimulates a competitive market. In today's world of globalised markets and the knowledge economy, it is vital to ensure that this system remains effective for implementing new innovation policies. Consequently, the use of IP to promote innovation in Europe is one of the priorities in the EUIPO Strategic Plan 2030 which entered into force on 1 January 2025 and is likewise reflected in the EPO Strategic Plan 2028, where supporting innovators and strengthening European competitiveness is a central objective.

In addition to the new figures for the importance of IPRs on sectoral and macro levels, this study includes new elements which provide an improved overview of the situation of IPR industries in Europe. The relationship between a sector's IPR intensity and its ability to attract risk financing in the form of venture capital and private equity has been analysed for the first time. In addition, using the latest data from Eurostat, the contribution of the EU's external trade in IPR-intensive products and services to the economy not only of the exporting member state but also other member states, has been examined, highlighting the importance of integration of value chains in the single market and globally. IPR-intensive industries are the backbone of the EU single market and a major driver of cross-border job creation.

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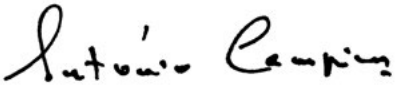
Finally, the database matching used to identify IPR-intensive industries has been refreshed, resulting in an updated list of the sectors concerned. In addition to providing data about the EU, this report also includes information about Iceland, Norway and Switzerland.

The study is designed to provide evidence that can be used by policymakers in their work, and to serve as a basis for raising IP awareness throughout Europe. It is our hope that readers can draw upon this information to ensure the continuing strength not just of our IP system, but of the European economy in which it has been found to play such a vital part.

João Negrão
Executive Director, EUIPO



António Campinos
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List of abbreviations

BvD	Bureau van Dijk
CCMTs	Climate change mitigation technologies
CPA	Classification of products by activity
CPC	Cooperative Patent Classification
CPVO	Community Plant Variety Office
CPVR	Community plant variety right
COMEXT	Eurostat reference database for external trade
CR	Copyright
DES	Design rights
DG AGRI	Directorate-General for Agriculture and Rural Development
DG GROW	Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs
DUO	Domestic ultimate owner
EAA	Economic accounts for agriculture
EC	European Commission
EFTA	European Free Trade Association
EPC	European Patent Convention
EPO	European Patent Office
EU	European Union
EUIPO	European Union Intellectual Property Office
EUTM	European Union Trade Mark
FATS	Foreign affiliates statistics
FIGARO	Full International and Global Accounts for Research in input-Output analysis
GDP	Gross domestic product
GHG	Greenhouse gases
GI	Geographical indication
GVA	Gross value added
IP	Intellectual property
IPR	Intellectual property right
LFS	Labour Force Survey (Eurostat)

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NACE	Nomenclature générale des activités économiques dans les Communautés Européennes (Statistical classification of economic activities in the European Community)
NAICS	North American Industry Classification System
OECD	Organisation for Economic Co operation and Development
OHIM	Office for Harmonization in the Internal Market (from 23 March 2016: EUIPO)
PAT	Patents
PATSTAT	Worldwide Patent Statistical Database (EPO)
PDO	Protected designation of origin
PGI	Protected geographical indication
PVR	Plant variety right
R&D	Research and development
RCD	Registered Community design
SBS	Structural business statistics
SME	Small and medium-sized enterprise
TM	Trade mark
TRIPS	Agreement on Trade Related Aspects of Intellectual Property Rights
TSGs	Traditional specialities guaranteed
UK IPO	United Kingdom Intellectual Property Office
UPOV	International Union for the Protection of New Varieties of Plants
USPTO	United States Patent and Trademark Office
VA	Value added
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

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List of countries

AT	Austria
BE	Belgium
BG	Bulgaria
CH	Switzerland
CY	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
ES	Spain
FI	Finland
FR	France
GR	Greece
HR	Croatia
HU	Hungary
IE	Ireland
IT	Italy

IS	Iceland
LT	Lithuania
LU	Luxembourg
LV	Latvia
MT	Malta
NL	Netherlands
NO	Norway
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovakia
EU28	28 member states of the European Union (pre-Brexit)
EU27	27 member states of the European Union (without the UK)

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About this study

The present report, drawn up as a joint EUIPO-EPO project, is the fifth industry-level IP contribution study resulting from this collaboration, following a first study published by the two offices in 2013[1] and updates released in 2016[2], 2019[3] and 2022[4]. It aims to provide an updated assessment of the combined contribution of industries that make intensive use of the various types of IPRs to the economy of the EU as a whole and of individual European countries. Although this report quantifies the collective contribution of IPR-intensive industries, it does not claim to show causal relationships between IPRs and economic variables.

The study covers a broad range of IPRs[5] – trade marks, patents, designs, copyright, geographical indications (GIs) and plant variety rights (PVRs) – and considers a variety of economic indicators, in particular GDP, employment, external trade and wages.

The 2013 study covered the 2008–2010 period, the 2016 update the 2011–2013 period, the 2019 update was based on the years 2014–2016, and the 2022 update on the period 2017-2019. The present study looks at the 2021–2023 period and uses a methodology similar to that of the previous studies. However, several improvements have been made as regards the underlying data and the methodology. In order to ensure comparability among the previous study and to trace development over time, the results for the period 2017–2019 have been recalculated using the newly identified IPR-intensive industries.

In addition, Iceland, Norway and Switzerland have been included in this study to complement the data for the EU member states. This analysis does not include the United Kingdom.[6]

1 OHIM/EPO: "Intellectual property rights intensive industries: contribution to economic performance and employment in the European Union", September 2013.

2 EPO/EUIPO: "Intellectual property rights intensive industries and economic performance in the European Union", October 2016.

3 EPO/EUIPO: "IPR-intensive industries and economic performance in the European Union", September 2019. It should be noted that, in addition to the industry-level studies, the EUIPO and EPO have also published studies examining the contribution of IPRs to the performance of individual companies, most recently in 2021.

4 EPO/EUIPO: "IPR-intensive industries and economic performance in the European Union", OCTOBER 2022.

5 IP is usually, but not always, a result of innovation. However, it is a broader term than IPR, as it includes other types of knowledge, such as trade secrets and business methods. In this study, IPR is used to refer to the six rights included in the analysis: patents, TMs, registered designs, copyright, GIs and PVRs.

6 Since the UK's withdrawal from the European Union in January 2021, it is no longer part of the European Statistical System (ESS), and the UK Office for National Statistics no longer transmits Structural Business Statistics (SBS) data to Eurostat.

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In addition to the update of the figures on the contribution of IP-intensive industries to the economy, this report contains major new elements. One chapter examines the role of IPR intensity as a potential signal for venture capital financing in the EU, focusing on start-ups in IPR-intensive industries. Using Crunchbase and ORBIS data, it analyses whether sectors with higher IPR intensity attract more early-stage investment, addressing the challenges of information asymmetry in financing innovative businesses.

Another chapter looks at the contribution to the economy of external trade in IPR-intensive sectors, not only in the exporting country, but also in other member states, reflecting the value chains that stretch across the EU.

Executive summary

a. Main findings

- There are now **361 IPR-intensive industries in the EU economy,** of which 234 (65%) are intensive in respect of more than one IPR.
- IPR-intensive industries **generated 30.6% of all jobs in the EU** during the 2021–2023 period, compared to 30.1% in 2017–2019 (adjusting for small differences in methodology between the studies). On average over this period, they **employed more than 65 million people in the EU.**
- Over the same period, IPR-intensive industries generated **47.9% of total economic activity (GDP) in the EU, worth €7.7 trillion.**
- IPR-intensive industries are markedly more **trade-oriented and globally integrated** than non-IPR-intensive sectors. **76.4% of EU imports consist of goods and services from IPR-intensive industries, and their share of EU exports is even higher, at 78.3%,** generating a trade surplus of €108 billion, thus helping to keep the EU's external trade broadly balanced. With 63%, their share of the EU's export-related gross value added exceeds their share of EU GDP (47.9%), and their share of export-supported employment (51.8%) clearly surpasses their share of total EU employment (30.6%), underscoring their strong participation and importance in global value chains.
- IPR-intensive industries make an **important contribution to the functioning of the EU's internal market.** While countries such as Germany, France, Italy and the Netherlands lead in terms of the creation of new IPRs, other countries including the Czech Republic, Latvia, Poland, Romania and Slovakia also strongly benefit from the division of labour within IPR-intensive industries. In total, over **7.2 million IPR-related jobs in EU member states are created by companies from other member states,** with the share of such jobs in IPR-intensive industries exceeding 25% in some countries.
- IPR-intensive industries pay significantly higher wages than other industries, with a **wage premium of 40.9%.** This is consistent with the fact that the value added per worker is higher in IPR-intensive industries than elsewhere in the economy.
- A comparison of the results of this study with those of the 2022 edition reveals that **the relative contribution of IPR-intensive industries to the EU economy increased between 2017–2019 (the 2022 study) and 2021–2023 (the present study) from 47.8% to 47.9% in GDP,** taking into account the change in the list of IPR-intensive industries. The industries that contributed the most to the increase in value added in IPR-intensive industries, are "Manufacture of pharmaceutical preparations", "Manufacture of electronic components" and "Production of electricity".
- IPR-intensive industries **attract the overwhelming majority of private equity and venture capital investment in the EU.** Over 88% of total funding, equivalent to €70.7 billion, was invested between 2021 and 2023 in start-ups operating in IPR-intensive industries, underscoring the importance of IP in fostering innovation and growth.

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b. IPR-intensive industries in the EU economy

IPR-intensive industries are defined[7] as those having an above-average ownership[8] of IPRs per employee, as compared with other IPR-using industries. In principle, this means that an industry is identified as IPR-intensive in the EU if, for at least one of the IPRs under consideration, the number of those IPRs per employee exceeds the average of all EU industries that use that same IPR. These industries are concentrated in the manufacturing, technology and business services sectors.

It should be emphasised, however, that most industries often use IPRs in combination, to some extent. By focusing exclusively on IPR-intensive industries, this study covers that part of the European economy in which IPRs are most prominent.[9]

The contribution of IPR-intensive industries to the two principal economic indicators – employment and output – is summarised in Tables 1 and 2.[10,11]

IPR-intensive industries generated 30.6% of all jobs in the EU during the 2021–2023 period, with 21.6% in trade mark-intensive industries, 13.1% in design-intensive industries, 11.8% in patent-intensive industries, 6.3% in copyright-intensive industries and smaller proportions in GI-intensive and PVR-intensive industries.[12] On average over this period, IPR-intensive industries employed more than 65 million Europeans, out of a total employment figure of approximately 214 million.

7 See Chapter 2, Methodology of the study. Due to the particular nature of copyright, GIs and PVRs, they required different approaches.

8 In this report, the expressions “use of IPRs” and “ownership of IPRs” are used interchangeably and should be understood to refer to ownership of IPRs in all cases.

9 The industries identified as TM-intensive in this report accounted for 73% of the EUTMs, the design-intensive industries for 78% of the RCDs, the patent-intensive industries for 84% of European patents and the PVR-intensive industries for 91% of the Community plant variety rights registered during the period covered.

10 In order to minimise the impact of data gaps in the economic statistics and avoid attaching undue importance to a particular year, the economic indicators were calculated as an average for the years 2021–2023.

11 It should be noted that the shares in GDP and employment shown do not necessarily reflect the degree to which a country is innovative, but rather the importance of these industries in its economy.

12 The total contribution of IPR-intensive industries is less than the sum of the individual contributions of TM-intensive, patent-intensive, design-intensive, copyright-intensive, PVR-intensive and GI-intensive industries because many industries are intensive in respect of more than one IPR. However, the study methodology ensures that there is no double counting of industry contributions.

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Table 1:
Contribution of IPR-intensive industries to employment, 2021–2023 average, EU27

IPR-intensive industries	Employment (direct)	Share in employment (direct)
TM-intensive	46 222 899	21.6%
Design-intensive	28 159 393	13.1%
Patent-intensive	25 243 081	11.8%
Copyright-intensive	13 488 978	6.3%
GI-intensive*	n/a	n/a
PVR-intensive	1 846 356	0.9%
All IPR-intensive	65 463 643	30.6%
Total EU employment	**214 257 643**	

* Not calculated due to gaps in employment statistics for agriculture (farm structure statistics).

Note: Due to overlapping use of IPRs, the sum of the figures for the individual IPRs exceeds the total figure for IPR-intensive industries.

Besides employment, IPR-intensive industries contribute to economic output, as measured by gross domestic product (GDP). Table E2 shows that, overall, almost 48% of EU GDP is generated in IPR-intensive industries, with TM-intensive industries accounting for 39.1%, design-intensive industries for 16.1%, patent-intensive industries for 18.4%, copyright-intensive industries for 7.2%, and GI-intensive and PVR-intensive industries for smaller percentages.

Table 2:
Contribution of IPR-intensive industries to GDP, 2021–2023 average

IPR-intensive industries	Value added/GDP (€ million)	Share in total EU GDP
TM-intensive	6 287 376	39.1%
Design-intensive	2 581 997	16.1%
Patent-intensive	2 953 257	18.4%
Copyright-intensive	1 151 163	7.2%
GI-intensive	15 670	0.1%
PVR-intensive	224 199	1.4%
All IPR-intensive	7 703 734	47.9%
Total EU GDP	**16 066 590**	

Note: Due to overlapping use of IPRs, the sum of the figures for the individual IPRs exceeds the total figure for IPR-intensive industries.

A comparison of the results of this study with those of the 2022 edition reveals that the contribution of IPR-intensive industries to the EU economy has increased between the periods. The contribution to GDP increased from 47.8% in 2017–2019 to 47.9% in 2021–2023, while the share in EU employment grew from 30.1% to 30.6%. In order to ensure comparability between the two periods, the matching exercise used to identify IPR-intensive industries in 2017–2019 was updated to reflect the current industry structure.[13] In Table 3, the figures from the 2022 study have been re-calculated using the new definition of IPR-intensive industries so as to illustrate the true change in the contribution of IPR-intensive industries.

Table 3: Comparison of the main results: 2022 and 2025 studies

Contribution of IPR-intensive industries (EU27)	2022 study (2017–2019)	2025 study (2021–2023)
Employment	30.1%	30.6%
GDP	47.8%	47.9%

Given that 47.9% of GDP (value added) in the economy and 30.6% of employment is generated by IPR-intensive industries, the value added *per employee* is higher in IPR-intensive industries than in the rest of the economy. Economic theory suggests that, *ceteris paribus*, industries in which the average worker produces more value added can be expected to pay their workers higher wages than other industries. It is interesting to examine, therefore, whether this higher value added is reflected in wages in IPR-intensive industries.

13 While the net change in the number of IPR-intensive sectors is small, behind it there are more substantial gross changes.

As shown in Table 4, wages in IPR-intensive industries are indeed higher than in non-IPR-intensive industries. The average weekly wage in IPR-intensive industries is €965, compared with €685 in non-IPR-intensive industries – a difference of almost 41%. This "wage premium" is 33.1% in design-intensive industries, 40.7% in TM-intensive industries, 56.4% in copyright-intensive industries and 58.% in patent-intensive industries.

Table 4:
Personnel costs in IPR-intensive industries, 2021–2023 average

IPR-intensive industries	Average personnel costs (€ per week)	Premium (compared with non-IPR-intensive industries)
TM-intensive	963	40.7%
Design-intensive	911	33.1%
Patent-intensive	1085	58.5%
Copyright-intensive	1071	56.4%
GI-intensive*	n/a	n/a
PVR-intensive	1044	52.6%
All IPR-intensive industries	965	40.9%
Non-IPR-intensive industries	685	

* Not calculated due to lack of remuneration statistics for agriculture.

c. IPR-intensive industries and trade

The role played by IPR-intensive industries in the EU's external trade was also examined. Table 5 summarises trade volumes in IPR-intensive industries based on data from 2021–2023.[14] The bulk of EU trade is in IPR-intensive industries – which, at first glance, may be somewhat surprising. It is explained by the fact that even some industries producing commodities such as energy are IPR intensive.[15,16] For that reason, 76.4% of EU imports consist of goods and services of IPR-intensive industries, and these industries account for an even higher share of EU *exports*, 78.3%.

In 2021–2023, the EU had an average overall trade surplus of approximately €43 billion. The trade surplus in IPR-intensive industries was €107.5 billion, while non-IPR-intensive industries generated a combined trade deficit for the EU. This surplus is principally generated by the patent-intensive and copyright-intensive industries, offsetting deficits in the TM-intensive, design-intensive and PVR-intensive industries.

14 As with the employment and GDP calculations, the figures for the individual IPRs do not add up to the overall figure for IPR-intensive industries due the fact that many industries are intensive in more than one IPR. However, the study methodology ensures that there is no double counting of industry contributions.

15 NACE class 06.10 *(Extraction of crude petroleum)* is patent-, design- and TM-intensive.

16 For example, service industries such as those included in NACE divisions 86 *(Human health activities)* and 96 *(Other personal service activities)*. Such services are generally consumed at the point of production.

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Table 5 summarises trade volumes in IPR-intensive industries based on data from 2021–2023.[17]

Table 5:
EU external trade in IPR-intensive industries, 2021–2023 average

IPR-intensive industries	Exports (€ million)	Imports (€ million)	Net exports (€ million)
TM-intensive	2 257 273	2 306 050	-48 777
Design-intensive	1 916 731	1 966 245	-49 514
Patent-intensive	2 347 111	2 209 093	138 018
Copyright-intensive	474 330	465 471	8 859
GI-intensive*	n/a	n/a	n/a
PVR-intensive	67 575	97 720	-30 145
Total IPR-intensive	2 942 054	2 834 544	107 510
Total EU trade	3 755 574	3 712 465	43 108

*Goods only.
Note: Due to overlapping use of IPRs, the sum of the figures for the individual IPRs exceeds the total figure for IPR-intensive industries.

This report, for the first time, also analyses how IPR-intensive industries participate in global value chains (GVCs) based on FIGARO input-output tables and IPR-intensive contributions at country level to obtain gross value added (VA) and employment embodied in extra-EU exports, generated not only in the exporting country but also in other member states. The results show that IPR-intensive industries are markedly more export-oriented and globally integrated than other sectors. VA embodied in their exports to non-EU countries amounts to €1.8 trillion and supports over 17 million jobs, corresponding to 63% of total export-related VA and roughly half of all export-supported employment in the EU. Their share in export-related VA thus exceeds their 47.9% share in EU GDP, and their share in export-supported employment clearly surpasses their 30.6% share in total EU employment, highlighting their central role in GVCs.

17 As with the employment and GDP calculations, the figures for the individual IPRs do not add up to the overall figure for IPR-intensive industries due the fact that many industries are intensive in more than one IPR. However, the study methodology ensures that there is no double counting of industry contributions.

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Table 6 shows that value added embodied in exports represents 16.3% of EU GDP for the economy as a whole but rises to 23.1% for IPR-intensive industries, while export-supported employment accounts for 15.4% of total EU employment compared with 26.6% within IPR-intensive industries. This systematically higher export intensity underscores the central role of IPR-intensive industries for EU trade and competitiveness. The same pattern is observed in every member state and is particularly pronounced in patent- and design-intensive industries, where value-added-in exports and export-employment ratios reach or exceed 30%, reflecting their strong specialisation in technologically advanced and differentiated products for global markets.

Table 6:
Value added in and employment supported by extra-EU exports in IPR-intensive industries in the EU in 2023

	All industries	IPR-intensive	TM-intensive	DES-intensive	PAT-intensive	CR-intensive
Total VA of EU exports (€ million)	2 816 117	1 778 812	1 400 334	757 925	933 434	296 110
- as a percentage of GDP	16.3%	23.1%	22.3%	29.4%	31.6%	25.7%
Employment supported by exports (in thousands of persons)	33 551	17 387	12 327	8 208	8 326	2 895
- as a percentage of total employment	15.4%	26.6%	26.7%	29.1%	33.0%	21.5%

d. IPR-intensive industries and the EU single market

A closer look at the activity of IPR-intensive industries within the EU single market reveals a division of labour between EU member states. Countries including Austria, Denmark, Germany, Italy, Luxembourg, Malta and Sweden are above the EU average in terms of IPR creation per employee. But the companies in those countries that create the IP, taking advantage of the possibilities offered by the single market, often locate their production facilities in other member states based on cost, marketing and other business considerations.

Thus, IPR-intensive industries in the Czech Republic, Latvia, Poland, Romania and Slovakia have the highest proportion of jobs that are attributed to companies based in other EU member states. As shown in Table 7, overall, 21.2% of jobs in the EU in IPR-intensive industries are generated in subsidiaries of foreign companies, a majority of which are based in another EU member state. Among the EU member states, only in Cyprus, Germany, Ireland and the Netherlands do non-EU companies create more jobs than companies from other EU member states. Overall, companies based in any one of the 27 EU member states created approximately 7.2 million jobs in IPR-intensive industries in other member states.

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Table 7:
Share of employment in IPR-intensive industries attributed to foreign companies 2021–2023, EU average

IPR-intensive industries	EU share	Non-EU share	Total non-domestic share
TM-intensive	11.0%	9.4%	20.4%
Design-intensive	13.1%	10.0%	23.1%
Patent-intensive	14.7%	12.5%	27.2%
All IPR-intensive	11.8%	9.5%	21.2%

Note: "Foreign" companies are companies whose head offices or controlling units are located in another country.

e. IPR intensity and access to venture finance

Access to adequate financial resources is essential for scaling innovative ideas and bringing them to market, making it a critical factor for the EU's economic future. Using data from Crunchbase and ORBIS, covering financing events classified as seed, early-stage or late-stage investments announced between 2021 and 2023, analysis reveals a strong, positive and statistically significant correlation between IPR intensity and financing intensity across industries. This indicates that IPR intensity functions as a reliable signal of industry attractiveness and business opportunities for investors. The results confirm that investors actively channel capital to start-ups in IPR-intensive sectors, accepting higher risk in expectation of superior returns compared with less IPR-intensive industries.

IPR-intensive industries attract most of the private equity and venture capital investment in the EU: in the years 2021-2023 over 88% of total funding, equivalent to EUR 70.7 billion, was invested in start-ups operating in these industries. At all stages, more than 80% of funding goes to trade mark-intensive industries. Copyright-intensive industries also capture a substantial share: in seed and late-stage rounds they account for around 50% of total funding, and in earlier stages their share exceeds 40%, largely reflecting the strong presence of software-related activities. Patent-intensive and design-intensive industries receive over a quarter of all seed and early-stage funding and more than 20% of late-stage funding (see Figure 1).

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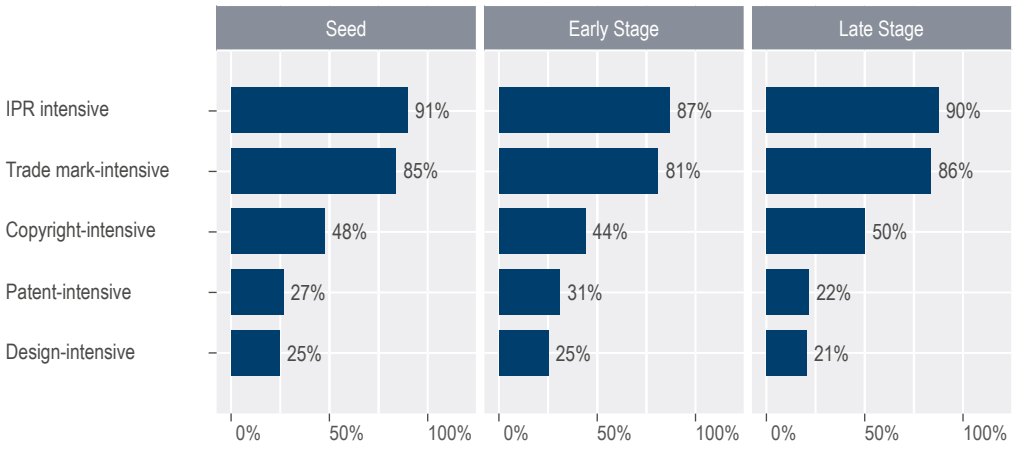
Figure 1:
Share of private equity and venture capital funds directed to IPR-intensive industries at different stages of financing, 2021-2023



f. IPR-intensive industries in the economies of Iceland, Norway and Switzerland

In addition to the 27 EU member states, the study also includes basic results for the EFTA countries Iceland, Norway and Switzerland.[18] The contributions to employment and GDP of IPR-intensive industries in those countries are shown in Table 8. The EU average is included for reference purposes.

Table 8:
Contributions of IPR-intensive industries to employment and GDP in EFTA countries, 2021–2023 average

	Employment (direct)	Share in total employment (direct)	GDP (€ million)	Share in GDP
IS	**60 682**	29.7%	**12 007**	42.9%
NO	**739 072**	25.8%	**195 735**	38.5%
CH	**1 532 870**	30.0%	**425 304**	52.3%
EU member states		**30.6%**		**47.9%**

Note: Due to overlapping use of IPRs, the sum of the figures for the individual IPRs exceeds the total figure for IPR-intensive industries.

The contribution of IPR-intensive industries to GDP is above the EU average in Switzerland, and below the EU average in the other two countries. The contribution to employment in those industries is below the EU average in all three countries.

18 In calculating the contributions of IPR-intensive industries in Iceland, Norway and Switzerland, it was assumed that industries that are IPR-intensive in the EU are also IPR-intensive in these countries. In addition, due to lack of data coverage, it was not possible to calculate the contributions of GI-intensive industries for these countries.

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g. Methodology and data

The basic methodology of this study is the same as that used in the previous studies. Using data from the EUIPO and EPO registers, combined with economic data from other sources, the numbers of TMs, designs, patents and PVRs per employee were calculated for each industry. The industries which were above average according to this measure were considered to be IPR-intensive. This calculation was performed at EU level, with no account being taken of national filings by the companies in the database. This approach, made necessary in part by data limitations, is nevertheless justified by the assumption that an industry which is defined as IPR-intensive based on its registration of EU-level IPRs would also be deemed IPR-intensive if national IPRs per employee were included as well. Due to the particular nature of copyright and GIs, different methods were used to identify the sectors using those IPRs intensively.

A fundamental assumption behind the methodology is that the degree to which an industry is IPR-intensive is an intrinsic characteristic of that industry, regardless of where it is located.[19] In assessing the contribution of each industry to the economy, what is being measured are the jobs and GDP generated by that industry in each member state and in the EU, rather than the origin of the underlying IPRs.

For example, if a car company based in country A builds an assembly plant in country B, then the jobs and value added created as a result accrue to the economy of country B. Therefore, no conclusions as to how innovative a particular country is can be drawn on the basis of the country-level contributions of IPR-incentive industries alone. In this example, the higher contribution of patent-intensive industries in country B is the result of decisions on where to site the production of vehicles, but the underlying R&D could have been performed in country A or indeed any other country.

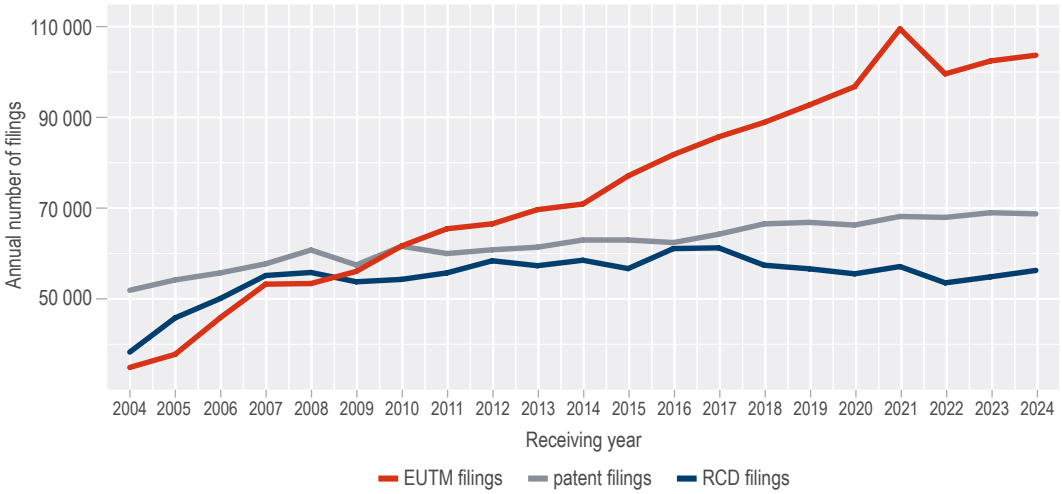
19 The exception is GI, which is analysed on a country-by-country basis.

1. Introduction

Intellectual property is widely recognised as a key driver in modern economies. The emergence of the knowledge economy, globalised markets and the growing complexity of products and services have all served to increase the importance of IPRs. For many companies in advanced economies, their intangible assets are far more valuable than their physical assets. Empirical evidence suggests that, in their attempt to extract additional value from their innovations, companies consider alternative, often complementary means of IP protection. Looking to the future, most policymakers firmly believe that knowledge-intensive industries will drive growth and prosperity not only in Europe, but across the globe.

As shown in Figure 2,[20] filings of European patents, TMs and designs by European applicants have grown significantly since 2004. Overall, filings of EUTMs and European patents have seen growth over the entire period, with faster growth in the case of TMs, despite significant decline in 2021 and 2022. Growth in EU design filings was faster than growth in TM filings during the first few years following the introduction of the RCD in 2003, but has been considerably slower since then. Overall, the resilience of IPR filing activity is yet another indication of the growing importance of IPRs.

Figure 2:
Numbers of EP, EUTM and RCD applications filed by EU applicants between 2004 and 2024



20 In Figure 2, EP = European patent, EUTM = European Union Trade Mark, and RCD = Registered Community Design.

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Quantifying IPRs and their economic contribution is difficult, as the data tend to be fragmented and disaggregated, and focus on individual rights and/or specific industries. In the past, research on the economic impact of IP concentrated on patents. In recent years, however, several studies have also assessed the impact of TMs on innovation, growth, employment and wages, but mostly at a national level.

As was the case with previous reports, this study offers a comprehensive assessment of how IPR-intensive industries contribute to the European economy, with a focus on GDP, employment and external trade. Of course, IP also affects the economy in other ways that are not quantified in our study, including, for example, technology transfer, long-run effects on innovation and growth, and externalities related to the creation and use of IP that are not monetised through market transactions.[21]

This study looks at TMs, patents, designs, copyright, geographical indications (GIs) and plant variety rights (PVRs). It identifies those EU industries with above-average use of those rights in relation to the size of their workforce. It quantifies the weight of those industries in the economy of the EU as a whole and that of each member state. It also includes information on Iceland, Norway and Switzerland.

While this report quantifies the collective contribution of IPRs to the economy, its results do not reveal causal relationships between IP and economic variables. The report does not feature any comparative analysis of the effects of different types of IP protection either. The various IPRs serve different purposes, are used in different sectors of the economy and are also different in terms of scope. Nor does the study analyse the value of IPRs for individual companies. It is concerned, rather, with their contribution at the level of industries and member states. Within any industry, some companies use IPRs more intensively than others. Such variations are not captured in this report. Similarly, companies have adopted different IP protection strategies. For example, some prefer to keep trade secrets rather than file for patents, or work with unregistered rather than registered designs. In other words, a number of key forms of IP are not included in this study.

This report defines IPR intensity as the number of IPRs divided by the number of employees in an industry. This means that industries with a relatively small number of valuable IPRs but a large number of employees would not be identified as IPR-intensive according to this methodology.

A company-level analysis published by the EPO and EUIPO in 2025 compares individual IPR-intensive companies with non-IPR-intensive companies in the same industries to assess whether the IPR-intensive companies perform better on indicators such as employment or wages.[22] Another study, published by the EUIPO and EPO in 2019, focuses on the growth performance of European SMEs that use registered IPRs.[23] Both of these company-level studies indicate a positive relationship between companies' IPR activity and their financial performance and growth potential.

21 Copyright and cultural industries can also affect the economy through the mechanisms of exceptions and limitations. However, these types of contribution are not included in this study.

22 "Intellectual property rights and firm performance in Europe: an economic analysis". Available at euipo.europa.eu/ohimportal/en/web/observatory/ip-contribution#ip-contribution_feb-2021.

23 "High-growth firms and intellectual property rights: the IPR profile of high-potential SMEs in Europe". Available at epo.org/high-growth.

This report offers a brief overview of the IPRs covered and their economic functions. It features a chapter on the methodology of the study, explaining how data were compiled and analytically treated. There are chapters on the results of the industry-level analyses for each of the six IPRs covered, at both EU and individual country level. The most IPR-intensive industries are also discussed in greater detail. The closing chapter of the study looks at the relationship between venture capital financing and IPR intensity in the EU.

1.1. IPRs and their function in the economy

The growing importance of intellectual assets in today's competitive markets has led to the publication, in recent years, of a wealth of economic and management literature dealing with IPRs. The rising number of scientific publications (and the parallel increase in IPR coverage by management press and newspapers) reflects the steep increase in the number of patents, TMs and registered designs worldwide over the past two decades, and their usage as output indicators for observing economic phenomena.

Legal protection of intellectual property encourages individuals and organisations to be creative and innovative by granting them exclusive legal rights to the fruits of their work. This section briefly introduces the six forms of IPRs studied in this report: patents, TMs, registered designs, copyright, GIs and PVRs. It specifies relevant subject-matter, the criteria that need to be met to gain protection and the principal rights conferred. It also provides a brief outline of the economic rationale behind each IPR.

1.1.1. What is patent protection?

Patent protection is available for inventions that aim to offer new solutions to technical problems. To be patentable, inventions must be new, non-obvious (i.e. include an "inventive step") and industrially applicable. The novelty requirement means that, at the filing date, the invention must not be known to the public anywhere. To satisfy the inventive step requirement, the invention must not be obvious to a person who is skilled in the field concerned. Finally, the invention must be susceptible of industrial application. Only patents granted by a patent authority are fully valid and enforceable. Patent authorities examine patent applications and ensure that the invention satisfies all legal requirements for patenting. Once granted, the patent confers on its owner the right to prevent any other entity from commercially exploiting the invention. This exclusive right is only granted for a limited time period. Typically, patent protection lasts 20 years from the date of the application, subject to the payment of renewal fees. It is also limited in space, as the exclusionary power of patents can only be enforced within the jurisdiction of the granting state.

In Europe, inventors can apply for patent protection in individual European states via the national patent systems and/or seek regional protection through a centralised procedure at the European Patent Office (EPO). A European patent granted by the European Patent Office (EPO) offers patent protection in up to 46 countries through a centralised and uniform procedure that requires just one application. Since the launch of the Unitary Patent system on 1 June 2023, applicants get patent protection in currently up to 18 EU member states by submitting a single request to the EPO, making the procedure simpler and more cost effective. Since its launch, the Unitary Patent has gained significant traction among applicants, As of December 2025, the EPO has registered over 75 000 European patents with unitary effect with particularly strong uptake among European SMEs.[24]

There are two main ways in which patent rights promote the progress of technology, innovation and social welfare: they create incentives to innovate, and they promote the dissemination and valorisation of new knowledge.[25]

Patents drive innovation by creating a private reward for innovation in the form of the applicant's exclusive right to use or sell the patented invention ("reward function"). Why is there any need to introduce such an incentive mechanism? Innovation ultimately generates new knowledge. If this knowledge is not protected, rival firms could potentially exploit it, at little or no cost, reducing inventors' rewards to such an extent that it would no longer be worthwhile for them to innovate. Exclusive legal rights to inventions in the form of patents help to limit this risk by providing adequate incentives to engage in innovative activity.

The "contract function" describes the second main way in which patents can promote innovation: they grant inventors exclusive rights to a given invention in exchange for the disclosure of information on the underlying technical solution. The public availability of patent documents in national and international patent offices facilitates the dissemination of technical information, which can then be used by others to develop other novel solutions, creating additional gains for society. The combination of disclosure and legal exclusivity also enables contractual arrangements (such as licences or R&D co-operation agreements) for the exploitation of patented inventions.

1.1.2. What is trade mark protection?

A trade mark (TM) is a distinctive sign that identifies certain goods or services as those provided by a specific person or organisation and distinguishes them from those of other organisations. TMs are intended to reduce information and transaction costs in the marketplace by allowing customers to identify the nature and quality of goods and services before purchase. Among the most common signs eligible for TM protection are words, pictures, stylised words, logos, a colour or colour combination, a shape, a sound or some combination of those signs. Generally, a sign must fulfil the requirements of distinctiveness to serve as a TM. Distinctiveness means that consumers can recognise the sign as a TM and distinguish it from other TMs in the same field.

24 See single-market-economy.ec.europa.eu/industry/strategy/intellectual-property/patent-protection-eu/unitary-patent-system_en for more details on the implementation of the Unitary Patent.

25 There is a rich body of economic literature dedicated to patents (see e.g. Hall and Harhoff, 2012 for a complete overview). This literature discusses the economic functions performed by patents, and aims to assess their actual impact on the economy. It also explores the various ways in which patents are used across sectors and countries, and the economic impact of the legal design of patent systems.

If a TM is likely to deceive the public as to the nature, quality or any other characteristics of the goods and services to which it refers, it does not qualify for registration. TMs can be protected on the basis of either registration through a trade mark office (i.e. registered TMs) or, in some countries, through their actual use in the marketplace (i.e. unregistered TMs). Registering TMs is not compulsory in all countries, but it makes it easier to enforce associated legal rights.[26] A registered TM owner has the exclusive right to use that TM on the goods and services in the product classes for which it has been registered, and to prevent others from exploiting, in the same fields, any sign that is identical or similar to it. The term of protection of a registered TM is typically ten years, but it can be renewed indefinitely for successive periods (typically, ten years each), subject to payment of fees.

The economic rationale underlying the protection of TMs has its roots in economic theories of information and reputation.

Competing products available in the market may differ from one another in terms of several characteristics and attributes. This difference is not a problem per se if consumers can obtain, at no cost, all the relevant information about these products and evaluate them appropriately to guide their purchase decisions. However, that is typically not the case. A product's characteristics are often difficult or impossible for consumers to observe until they have actually purchased the product. In this context, a brand, protected by a TM, acts as signal that a given product is of the consistent quality that the consumer associates with that brand.

The legal protection of TMs provides an incentive to develop and maintain distinguishing product features and create information about them for the benefit of market transparency. Creating this information and building up the reputation that the TM conveys is likely to require significant investments in product quality, service and advertising. In the absence of legal protection, and given the limited costs of imitating a competitor's TM, there would be insufficient incentive to incur such quality investments.

1.1.3. What is design protection?

Design protection[27] covers the visual appearance of a product, part of a product and/or its ornamentation. A product can be any industrial or handicraft item, including packaging, graphic symbols and typefaces. In other words, a design covers the appearance of a product, but cannot protect its functions, which fall under the regime of patent protection. The requirements that must be satisfied to register a design include that it must be new and have an individual character. It is new if no identical design has been made available to the public by the filing date. It has an individual character if the overall impression it produces on an informed user signifies that it differs from any previous designs. Industrial design protection is usually granted pursuant to a procedure for its registration (registered design). Under certain laws, however, design rights may also be automatically acquired by disclosing the design in a document or product (unregistered design). Like TMs, registered designs provide more comprehensive cover than their unregistered counterparts.

26 To enforce the rights associated with an unregistered TM, proprietors must normally produce factual evidence to prove that they have an established TM that has acquired a reputation in the mind of the public.

27 In this report, the term "design" is to be understood to mean "registered design".

Registered design owners have exclusive rights to use the design and can prevent any third parties from using it. In the EU, the rights conferred by registered designs can apply for a maximum of 25 years. Registered EU Designs (REUD)[28] have an initial life of five years from the date of filing and can be renewed for successive five-year periods, up to a maximum of 25 years.

The economic case for design registration builds primarily on the idea of promoting innovation. The production of new designs is a creative activity, requiring significant investments of time, skills and labour. If no exclusive rights were available, any party could replicate a creative design and use it to directly compete with the original creator. Providing a legal mechanism to protect new designs should ultimately enhance investments in design production and creative work.

1.1.4. What is copyright protection?

Copyright gives right-holders exclusive rights to authorise or prohibit the use (e.g. reproduction, distribution, adaptation or translation) of their content (e.g. films, programmes, etc.). It is important to note that copyright is applicable only to the expression of ideas, not to the ideas themselves. No copyright registration is required at EU level;[29] protection is granted automatically from the moment a work is created. In this respect, copyright differs significantly from the other IPRs considered in this report.

Thirteen directives and two regulations have been adopted to harmonise substantive copyright law provisions in the EU member states. Despite this considerable harmonisation, there are still some national differences in copyright protection in areas not harmonised at EU level. In addition, there are slight differences between copyright regimes as implemented in the EU and three EFTA countries (Iceland, Norway and Switzerland). Following Brexit, changes in UK copyright law are under consideration, and over time UK law may also begin to diverge from current EU law due to developing case law. However, certain standards of copyright and related rights protection apply in all these countries under international legislation, such as the Berne Convention for the Protection of Literary and Artistic Works.

The most important economic rights granted to EU creators, performers, producers and broadcasters include:

- right of **reproduction** for authors, performers, producers of phonograms and films and broadcasting organisations
- right of **communication** to the public for authors, performers, producers of phonograms and films and broadcasting organisations
- right of **distribution** for authors and for performers, producers of phonograms and films and broadcasting organisations
- right of **fixation** for performers and broadcasting organisations
- right of **rental** and/or lending for authors, performers and producers of phonograms and films, with an associated right of **equitable remuneration** for lending and/or rental for authors and performers

28 As a result of the new EU design legislative reform, as from 1 May 2025 Registered Community Design became European Union Design.

29 Voluntary registration is, however, possible in many member states.

- right of **resale** *(droit de suite)* for artists who work in visual art forms like sculpture, painting or photography
- right of **broadcasting** for performers, producers of phonograms and broadcasting organisations
- right of **computer program reproduction, distribution and rental** for authors

It should be noted, however, that some rights are not applicable to all right-holders or may only be applicable if certain conditions are met.

The types of works that are protected under all national copyright laws include the following:

- literary works (including novels, short stories, poems, dramatic works and any other writings, irrespective of their content, both fiction and non-fiction)
- musical works
- artistic works (whether two-dimensional such as drawings, paintings, etc. or three-dimensional such as sculptures or architectural works)
- maps and technical drawings (including cartographic works, plans, blueprints, diagrams, etc.)
- photographic works
- cinematographic works
- computer programs and databases

The list is not exhaustive, as some copyright laws may protect other types of works as well.

Independently of the economic rights, authors are granted moral rights (the right of authorship, the right of integrity of work and the right of divulgation), but not through EU legislation. Moral rights can be asserted by the author even if the copyright has been transferred to a third party.

Related rights provide economic protection for performers, producers of phonograms and broadcasting organisations. In the EU, film producers and press publishers are also protected by related rights.

In the EU, copyright protection is currently valid for the author's lifetime and 70 years after their death. The protection conferred by related rights lasts for 50 years after the performance, film or transmission of a broadcast was published or communicated to the public. In 2011, the related rights term for performers and phonogram producers in the EU was extended from 50 to 70 years under certain conditions.

The economic aspects of copyright are complicated, reflecting various trade-offs between the interests of creators, distributors, performers and consumers, and between short-term versus long-term effects. The general objective of the system is to ensure appropriate remuneration for creators and other right-holders (so that a socially optimal level of creative activity is guaranteed), while at the same time providing broad public access to creative works and making it possible for other creators to build upon prior works.

1.1.5. What is geographical indication protection?

A geographical indication (GI) is a name which identifies a product to link it to a specific geographical location or origin (e.g. place, region or country). The use of a GI may act as certification that a product has certain qualities, is made according to traditional methods or enjoys a certain reputation due to its geographical origin.

Their connection with the "territory" and the strict product manufacturing controls in place often lead to vertical integration in the different sectors involved in producing GI goods, starting with farmers and continuing to manufacturers and even wholesalers and retailers.

GIs are mainly used in the agriculture, food and beverage sectors, and primarily in Europe. A new Geographical Indication system for craft and industrial products was launched in the EU on December 1, 2025. As the EU wide system of craft GI protection is new, and data are not yet available, this study considers agricultural, food and beverage GIs only.

The two main types of GI for agricultural products and foodstuffs are summarised below.

Protected designation of origin (PDO): a name which identifies a product that is **produced, processed** and **prepared** in a defined geographical area using recognised know-how. Products owe their characteristics exclusively or essentially to their place of production and the skills of local producers.

Protected geographical indication (PGI): a name which identifies a product whose reputation or characteristics are attributable to its geographical origin. For PGI agricultural products and foodstuffs, at least one of the stages of production, processing or preparation takes place in the geographical area concerned. For PGI wines, at least 85% of the grapes come from the area.

Another difference between GIs and other IPRs is that while TMs, designs, patents, PVRs and copyright are usually applied for and owned by private entities (mostly individual companies), GIs are typically applied for and managed by producer associations in the relevant geographical area. The GI can then be used by all individual producers located in that area and complying with a product specification, including defined production methods.

In terms of their economic function, GIs and TMs both have the basic function of addressing information asymmetries between sellers and buyers and helping consumers to lower their search costs by certifying a product's origin and the manufacturing methods used to make it. This is reflected in the fact that consumers are often prepared to pay a price premium for GI products.[30]

30 See EUIPO: "Infringement of protected geographical indications for wine, spirits, agricultural products and foodstuffs in the European Union", 2016. Available at euipo.europa.eu/tunnel-web/secure/webdav/guest/document_library/observatory/documents/Geographical_indications_report/geographical_indications_report_en.pdf.

1.1.6. What is plant variety right protection?

Plant variety rights or plant breeder's rights (PVRs) are an independent *sui generis* form of intellectual property right, tailored to protect new plant varieties (Article 27(3)(b) TRIPS).

A plant variety is a plant grouping within a single botanical taxon of the lowest known rank, which can be defined by the expression of the characteristics resulting from a given genotype or combination of genotypes, distinguished from any other plant grouping by the expression of at least one of the said characteristics and considered to be a unit with regard to its suitability for being propagated unchanged.

The international legal framework for the protection of PVRs is provided by the International Convention for the Protection of New Varieties of Plants (the UPOV Convention).

As far as the European Union is concerned, the Community Plant Variety Rights (CPVRs) system represents the sole and exclusive form of intellectual property right for plant varieties at the EU level. The CPVR system is managed by the Community Plant Variety Office (CPVO), which is responsible for granting CPVR titles. Titles can be obtained by means of a single procedure and have unitary effects throughout the whole territory of the European Union. The CPVR coexists with the member states' respective own national PVR systems. However, if an EU PVR has been granted, a national right for the same variety cannot be enforced.

For a PVR to be granted, it is necessary to first file an application for examination before a national or regional designated authority. The candidate variety must then fulfil the technical criteria of distinctness, uniformity and stability (known as the "DUS" criteria). It must also be new and bear a suitable denomination. These criteria are tested by the CPVO following a formal, substantive and technical examination, the latter in co-operation with national authorities (entrusted examination offices).

A PVR certificate of protection will be granted for a fixed period if all due requirements are fulfilled. The UPOV 1991 Convention provides protection for a minimum of 20 years. In the EU, protection is granted for 25 years for most species and 30 years for vines, trees and potato species.

Right-holders can bring civil proceedings against any person infringing a CPVR.

The economic rationale for PVRs is similar to that for patents: to incentivise innovation while at the same time promoting the diffusion of knowledge across the economy. In 2022, the EUIPO and CPVO published a joint study on the contribution of the CPVR system to the economy and the environment in the EU.[31]

31 Available at euipo.europa.eu/ohimportal/en/web/observatory/ip-contribution#study_04-2022.

1.2. Summary of the six IPRs

The main characteristics of patents, TMs, registered designs, copyright, GIs and PVRs are summarised in the table below.

Table 9:
Main characteristics of the different types of IPRs

IPR	Patents	Designs	Trade marks	Copyright	Geographical indications	Plant variety rights
Subject-matter	Inventions (solutions to technical problems)	Appearance of an article or product or parts of it and/or its ornamentation	Distinctive signs that identify certain goods or services and distinguish them from those of other businesses	Artistic, literary, dramatic, musical, photographic and cinematographic works; maps and technical drawings; computer programs and databases	Product originating in a particular geographical area whose quality or reputation is linked to its geographical environment or origin	Plant varieties
Requirements for protection	Novelty; inventive step (non-obviousness); industrial applicability	Novelty; individual character	Distinctiveness	Originality of the work, irrespective of its literary or artistic merit	Technical specifications justifying the special characteristics of the product and their link to the geographical area	Distinctness, uniformity, stability and novelty
Acquisition of right	Examination by the patent office, followed by grant and validation	For registered designs, examination by the IP office. For unregistered designs, automatically acquired by the act of disclosure	For registered TMs, examination by the IP office. For unregistered TMs, use in commerce	Automatic upon creation	Examination by the national authority (depending on the country), then by the European Commission	Examination by examination authority chosen by the CPVO, followed by grant
Conferred rights	Exclusive right to make, use and sell the patented invention	Exclusive right to use the design and to prevent any third party from using it without the right-holder's consent	Exclusive right to use the TM in trade	Reproduction, communication to the public, including making the work available to the public, distribution, rental, resale, translation, adaptation, public performance	Collective right. Exclusive rights to commercialise comparable products and prevent imitation, misuse or evocation	Exclusive right to commercialise the protected plant variety
Duration	Typically 20 years from filing, subject to payment of annual renewal fees	For registered designs, the maximum term is 25 years. In the case of RCDs, up to 25 years (in successive 5-year terms)	For registered TMs, commonly 10 years from filing, but can be renewed indefinitely, on payment of fees, for successive periods	For authors, lifetime plus 70 years. For performers, generally 70 years from the date of first public performance, fixation, publication or transmission. For producers of phonograms, 70 years after the fixation is made, the phonogram is published or communicated to the public. For film producers, 70 years after the fixation is made, the film is published or communicated to the public. For broadcasters, 50 years after first transmission	Indefinite; no need for renewal	For most plant varieties, 25 years; 30 years for vines, trees and potatoes, subject to payment of annual fees

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2. Methodology and data

The purpose of the present study is to examine the economic characteristics of IPR-intensive industries. The methodology used for this study follows that applied in the 2022, 2019, 2016 and 2013 studies as closely as possible in order to achieve maximum comparability. Thus, the principles behind the methodologies of the studies are the same: first, determine which industries use IPRs more than others; second, use industry-level economic statistics to determine employment and value added (GDP), trade and wages generated in those industries; third, compare the industry-level economic aggregates to those for the overall economy in order to determine the economic weight of IPR-intensive industries.

2.1. Methodology of the study

As was the case in the 2022 study, a new matching exercise has been carried out to ensure that the classification of industries as IPR-intensive or non-IPR-intensive reflects today's economy as closely as possible. This study identified 361 industries as being IPR-intensive, four more than in the 2022 study.[32] In order to analyse trends, the data for previous periods have been re-calculated using the new set of IPR-intensive industries and excluding the UK to ensure that the figures are comparable.

Three countries that are not members of the EU – Iceland, Norway and Switzerland – are included in the study this time. The calculation of the contribution of IPR-intensive industries in those three countries was based on the assumption that industries that are IPR-intensive in the EU are also IPR-intensive in those countries. In other words, no separate matching exercise was carried out for them. This was done mainly to ensure that their results could be compared with those of the EU. In addition, given that all three of these countries are European economies whose level of economic development is similar to that of many EU member states, it is reasonable to assume that their economic structure does not differ from that of comparable EU member states.

The basic unit of analysis in this study is the industry as defined in the NACE classification used by Eurostat. In this classification, overall economic activity is divided into 22 sections, which are further subdivided into 88 divisions (often referred to as the "two-digit level"), 272 groups (three-digit level) and 615 classes (four-digit level). An example of the hierarchical NACE structure is shown in Figure 3.

32 While the net change in the number of IPR-intensive sectors is small, behind it there are more substantial gross changes. Thus, 17 industries that were patent-intensive in the previous matching are no longer considered patent-intensive; on the other hand, 19 industries that were not previously classified as patent-intensive are now classified as such. In the case of TM-intensive industries, 22 industries were eliminated, while 17 were added. For design-intensive industries, the outflow was 35 industries, while 28 new industries were added.

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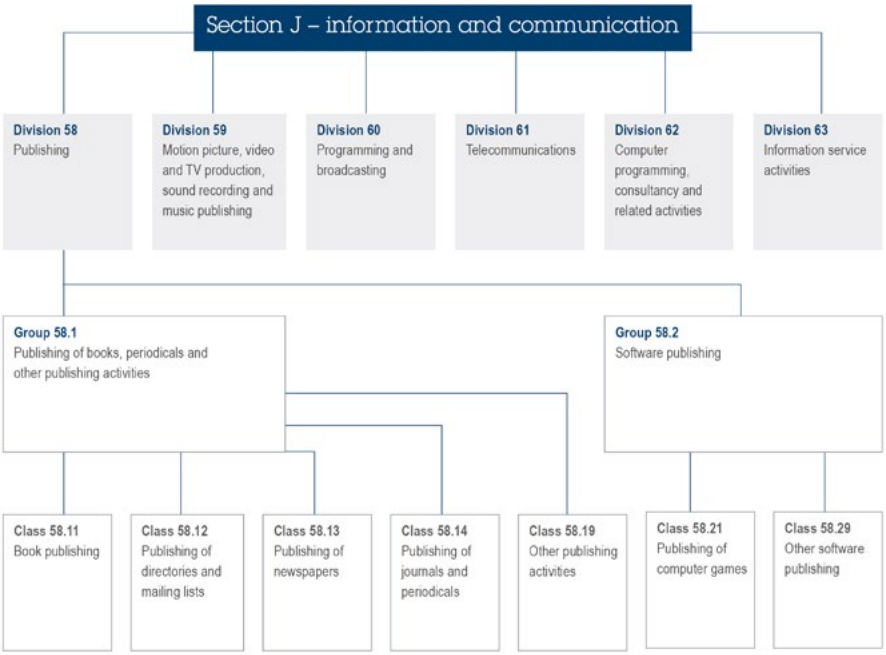
Figure 3:
NACE structure, SECTION J – Information and communication



The list of industries that are intensive in their use of copyright and GIs is pre-determined, as explained in Appendix 10. For patents, TMs, designs and PVRs, IPR intensity is determined by examining the volume of IPRs obtained by all industries at the EUIPO, EPO and CPVO in relation to the level of employment in those industries. This was the most labour-intensive part of the study. The data matching methodology is explained in Appendix 9, while Appendix 10 describes how IPR-intensive industries were identified.

When calculating the IPR intensity of industries, IPRs were associated as far as possible with industries on the four-digit level. Although, Eurostat employment data are now available for more industries at four-digit level than in the past, they are still not available on a sufficient level for all industries. For some industries, the most granular employment data available are by NACE division (two-digit level). The source of the employment data for those industries is the Labour Force Survey (LFS).[33] The IPR intensity of those industries can only be calculated at NACE division level.

Some industries, for which employment data were available in the past or still are available only at the two-digit level in LFS tend to have a relatively high number of employees and relatively low level of IP activity. Including those industries in the calculation of average overall employment-weighted IPR intensity would lower the average, so that a higher number of industries would be classified as IPR-intensive. Therefore, those industries were omitted from the calculation of the weighted average of IPR applications per 1 000[34]. On the other hand, for the purpose of selecting the group of IPR-intensive industries, once the average value had been calculated, all NACE codes were considered, including those for which only LFS employment data were available.

33 For more information on the LFS, see ec.europa.eu/eurostat/web/microdata/labour-force-survey.

34 Industries 01.00, 02.00, 03.00, 84.00, 85.00, 86.00, 87.00, 88.00, 94.00, 97.00, 98.00, and 99.00 were excluded when calculating the mean number of IPRs per 1 000 employees. After calculating this benchmark from the remaining industries' data, the excluded industries were then compared against it to determine their IPR intensity

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2.2. Data sources and selection criteria

One of the distinguishing features of this study is the variety of databases and other data sources used to determine which industries are IPR-intensive and to assess the contribution of these industries to employment, GDP and other economic indicators. These databases and sources include:

- the EUIPO's register of EU Trade Marks and Registered EU Designs (former Registered Community Designs)
- the EPO's PATSTAT database, containing information on patent applications that have been published and/or granted by the EPO
- the CPVO's Register of Community Plant Variety Rights
- ORBIS, a commercial database containing industry classification and other information for more than 100 million European companies.[35] Together with the EUIPO, EPO and CPVO databases, this was the basic database of registered intellectual property rights (patents, designs, TMs and PVRs) used for the analysis. ORBIS is provided by Moody's, which compiles data based on filings made by companies in trade registers and similar government records in their respective countries
- COMEXT, Eurostat's reference database for the EU's external trade and intra-EU trade of goods. These data were used to quantify the contribution of IPR-intensive industries to external trade
- Eurostat's Balance of Payment (BoP), which was used to estimate the international trade in services with non-EU countries (extra-EU transactions)
- Eurostat's structural business statistics (SBS) data, showing employment, labour costs and value added for each industry at EU and member state level, as well as in the three non-EU countries included in this study, using the NACE classification of economic activity. These data were the main source for the contribution of IPR-intensive industries to employment and GDP (except for GIs)
- Eurostat's Labour Force Survey (LFS), which was used to estimate employment in certain industries not reported in the SBS
- Eurostat's national accounts statistics, the main source of official data on total GDP, employment and compensation of employees at EU level, for individual member states and for non-EU countries that are members of the European Statistical System. National Accounts are also used to fill SBS gaps on employment and value added at division level.
- economic accounts for agriculture (EAA), Eurostat's main data source for statistics on the agricultural sector. This database was used in the analysis of PVR- and GI-intensive industries for the EU, EU member states and non-EU countries
- FIGARO (Full International and Global Accounts for Research in Input-Output analysis) is the official global input-output tables by Eurostat and Joint Research Centre (JRC). The 2025 edition of this database is used to calculate the participation of IPR-intensive industries in global value chains (GVCs).
- Eurostat's foreign affiliates statistics (FATS), which were used to calculate the number of jobs in IPR-intensive industries created by companies based outside each member state
- E-ambrosia of the European Commission's DG AGRI, showing all GIs registered in the EU
- data on sales of GI products sourced from a study commissioned by DG AGRI, which were used to quantify the contribution of GI-intensive industries to GDP[36]

35 bvdinfo.com/en-gb/our-products/data/international/orbis?gclid=Cj0KCQjwrs2XBhDjARIsAHVymmTfOCRrrr_EcGZXtjJzkovmF4oRyG-8FrY9dBM4tq7X5vvyI1ypI5saAsmKEALw_wcB, consulted on 11 August 2022.

36 Study on economic value of EU quality schemes, geographical indications (GIs) and traditional specialities guaranteed (TSGs). October 2019, AND-International and European Commission.

The IPRs chosen for the analysis were patents, TMs and designs applied for at the EPO or EUIPO during the 2016–2020 period and granted.[37] Using a five-year period rather than a single year has the advantage of avoiding bias resulting from factors that might have affected the economy in any particular year.

When selecting the sample of IPRs for the analysis, a time lag of three to four years was applied, as an innovation is expected to yield economic benefits only after a certain amount of time has elapsed. Accessing complementary assets such as marketing channels, cost-effective manufacturing and after-sales support takes time and is a prerequisite for successful commercialisation in a dynamic environment. Moreover, in the case of new products and services, negotiating licence agreements and attracting financing can be a lengthy process. This may explain the time lag suggested by empirical research between successful patent applications and subsequent changes in company performance.[38] A similar case can be made for TMs and designs, since a newly registered TM or design may not confer the same benefits as one that has been in the market for several years, giving consumers time to gain confidence in that particular company or product.

The economic contribution by the IPR-intensive industries identified according to the methodology described in this chapter was analysed using economic data for the 2021–2023 period, thus updating the earlier study, which used economic data for 2017–2019.

The IPRs used were those registered at EU level, irrespective of any national filings by the companies in the database. This approach, made necessary in part by data limitations, is nevertheless justified by the assumption that an industry which is defined as IPR-intensive based on its registration of EU-level IPRs would also be deemed IPR-intensive if national IPRs were included as well.

The EUIPO, EPO and CPVO data had to be matched to ORBIS. Only patents, TMs, designs and PVRs with at least one EU-based owner were included in this exercise, because the version of the ORBIS database used for this study contains data on EU-based companies, including affiliates of non-EU companies. However, the exclusion of non-EU IPR owners does not affect the ultimate goal of the data matching exercise, namely the selection of IPR-intensive industries. It is a fundamental assumption of this study that whether or not an industry is IPR-intensive is an inherent characteristic of that industry, irrespective of its geographical location. In the subsequent economic analysis of the employment and GDP contribution of IPR-intensive industries to the EU economy, all relevant industries are included, regardless of the ultimate ownership of the companies within each industry. For example, jobs at a Korean-owned car factory located in an EU member state are included in Eurostat's statistics and in the quantification in Chapter 4.

37 In other words, the application was filed during the 2016–2020 period, but the corresponding IPR could have been granted at any time up to the first half of 2025 (when the data used for the matching exercise were extracted from the underlying databases). In case of PVR, due to the labor-intensive process of determining PVR-intensive industries and the lack of employment data on the level comparable to other industries, it was decided to keep the list of PVR-intensive industries unchanged from the last report. As a result, in the current edition of the report, this list is exactly the same as in the previous edition published in 2022.

38 Holger Ernst (2001) examined the relationship between patent applications and subsequent changes in corporate performance for 50 German machine tool manufacturers between 1984 and 1992 and found that the time lag effect can be up to three years after priority in the case of European patents.

2.2.1. Economic data

The primary source of employment and value added data is Eurostat's Structural Business Statistics (SBS) data series, which shows employment in each four-digit NACE sector for the EU and for each member state, as well as for the three non-EU countries included in this study (Iceland, Norway and Switzerland). In practice, there are data gaps in the Eurostat statistics for some years, owing to one or more of the following factors:

- **quality of data:** In some cases, Eurostat and/or the relevant national statistical office may decide that the data for a particular industry is of questionable quality. In those cases, Eurostat does not publish the data. However, it is important to note that, even then, the data are included in Eurostat's aggregate estimate at EU27 level.
- **confidentiality:** It may be that only one company operates in a particular industry in a member state (this is especially true for the smaller member states). In such cases, in order to maintain confidentiality, Eurostat does not report the data at member state level. However, the data are included in aggregate EU-level estimates, and for higher-level (two-digit) NACE industries.

The basic source of data on the EU's external trade of goods is Eurostat's COMEXT database. One difficulty with trade data is they are organised on the basis of products rather than industries or economic activities. COMEXT, however, provides a "translation" through its Classification of Products by Activities (CPA 2008) nomenclature, which is consistent with the NACE classification used throughout this report.

The source of data for the external trade in services is Eurostat's balance of payment compiled on the basis of the extended balance of payment services classification (EBOPS 2010). The correspondence table between EBOPS 2010 and CPA 2008 is used for the calculation of exports and imports from IPR-intensive industries. Data matching for patents, TMs and designs.

In order to determine which industries are IPR-intensive, the EUIPO and CPVO registers and the PATSTAT database were matched with the commercial database ORBIS, which contains industry classification and other information for more than 100 million European companies.[39] The first step in the data preparation process (name harmonisation) was carried out using an algorithm developed at KU Leuven (KUL) and further refined by the project team.[40] The second step, the actual matching of databases, was based on an original methodology developed by the project team. The companies in all databases were matched using name, legal form, postcode and other criteria, in order to overcome the inherent difficulties resulting from inconsistencies in spelling and abbreviations, etc., between the different databases.

39 bvdinfo.com/en-gb/our-products/data/international/orbis?gclid=Cj0KCQjwrs2XBhDjARIsAHVymmTfOCRrrr_EcGZXtjJzkovmF4oRyG-8FrY9dBM4tq7X5vvyI1ypl5saAsmKEALw_wcB consulted on 11/08/2022.

40 For a detailed description of this step, see Appendix 8.

Following the matching, the data was filtered to include only those applications filed during the 2016–2020 period and registered/granted. Depending on the type of IPR, between 78% and 94% of IPRs were matched with the data on their owners.[41] There are various reasons why not all patent, EUTM, RCD or CPVR owners can be found:

- ORBIS does not contain data on private individuals (who may be owners of IPRs).
- Changes of name of applicants may not have been communicated to IP offices.
- There may be errors or gaps in the ORBIS data.
- There may be spelling differences that are not captured by the matching algorithms.

When combined with the industry classification (NACE) used by Eurostat, the data were able to be aggregated to show industries linked with those IPRs. This step is crucial in determining which industries are intensive in their use of TMs, designs, patents and PVRs.[42]

41 The last known owner of the registered IPR was used for the matching. For example, for patents, the applicant mentioned on the publication of the grant was used. No subsequent transfers of rights were taken into account due to data availability. However, it can be assumed that most right transfers take place between entities active in the same industry and will therefore not have any major impact on the results of this study.

42 Although ORBIS is the best available data source for extracting information on companies' industrial activity, IP management practices and the nature of a company's business activity can sometimes distort information on the industrial application of IPRs. That will be the case, for example, if a company operates in multiple industries and protects the IPRs relevant to each of those industries. In ORBIS, each company/branch can be associated with one principal industry only, so all its IPRs will be linked with the NACE code for that principal industry. Similarly, if a company operates in both manufacturing and wholesale trade but wholesale trade is indicated as its principal industry in ORBIS, its IPRs will count as related to wholesale trade although they may in fact relate to manufacturing only.

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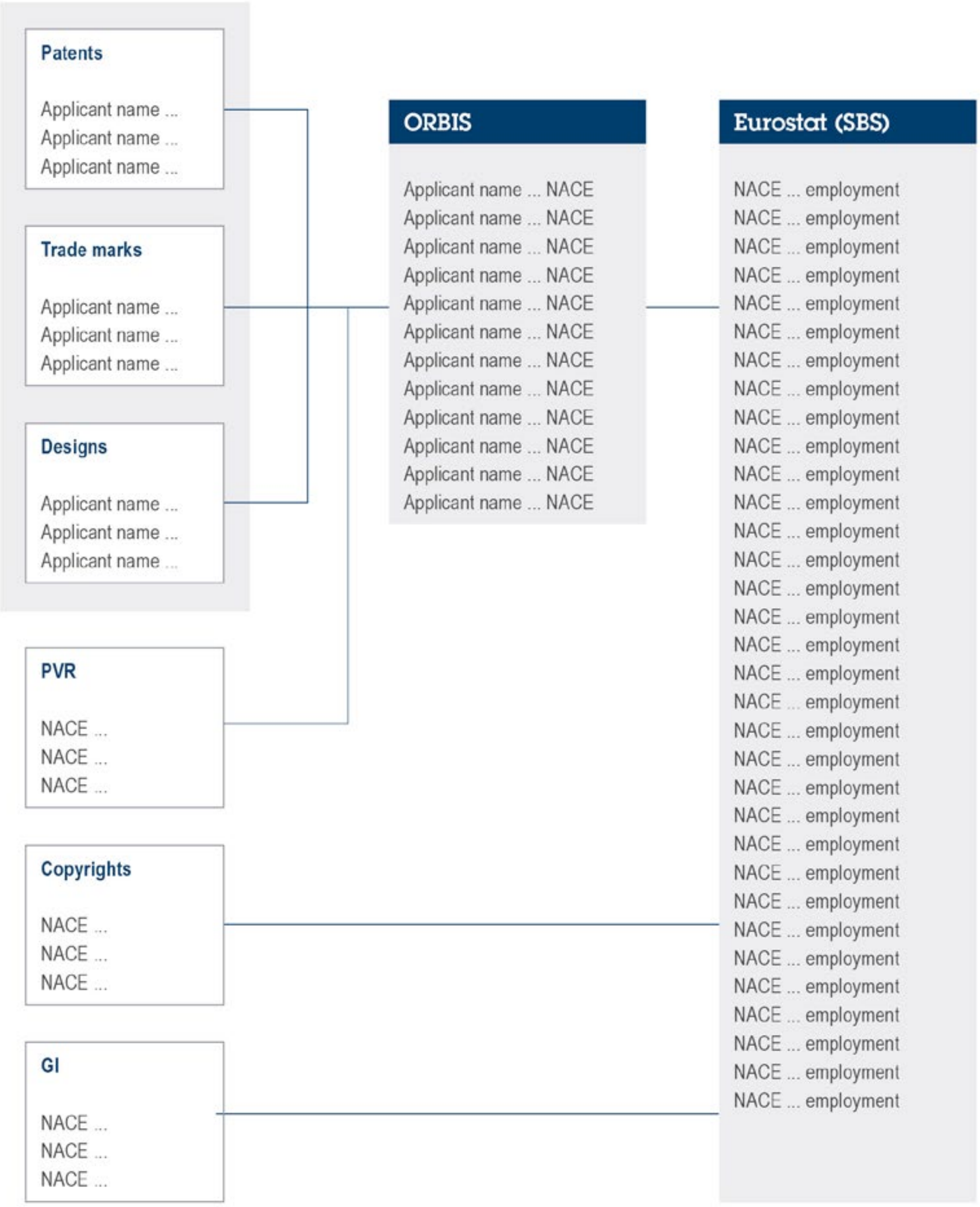
Figure 4:
Simplified illustration of the data matching process



3. IPR-intensive industries at EU level

This chapter presents the main results of the analysis: the identification of IPR-intensive industries at EU level, separately for each of the six IPRs considered in this study, and in terms of overall IPR intensity, i.e. taking the simultaneous use of more than one IPR into account.

3.1. Patent-intensive industries

Out of 615 NACE classes, 501 industries in the matched database filed at least one successful patent application during the 2016–2020 period. Of those industries, 155 are patent-intensive.

Table 10 shows the 20 most patent-intensive industries. The full list of patent-intensive industries is shown in Appendix 12.1.

Table 10:
The 20 most patent-intensive industries

NACE code	NACE description	Patents per 1 000 employees
7740	Leasing of intellectual property and similar products, except copyrighted works	85.73
2824	Manufacture of power-driven hand tools	72.78
2630	Manufacture of communication equipment	35.70
2751	Manufacture of electric domestic appliances	23.02
7211	Research and experimental development on biotechnology	21.39
7219	Other research and experimental development on natural sciences and engineering	20.97
8541	Post-secondary non-tertiary education	18.49
2059	Manufacture of other chemical products n.e.c.	18.08
2891	Manufacture of machinery for metallurgy	16.91
2611	Manufacture of electronic components	16.68
2311	Manufacture of flat glass	15.78

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2211	Manufacture of rubber tyres and tubes; retreading and rebuilding of rubber tyres	14.60
2670	Manufacture of optical instruments and photographic equipment	14.26
2011	Manufacture of industrial gases	13.60
2651	Manufacture of instruments and appliances for measuring, testing and navigation	12.03
2620	Manufacture of computers and peripheral equipment	11.57
2830	Manufacture of agricultural and forestry machinery	11.42
2740	Manufacture of electric lighting equipment	11.38
2894	Manufacture of machinery for textile, apparel and leather production	10.79
2660	Manufacture of irradiation, electromedical and electrotherapeutic equipment	10.75

The list of patent-intensive industries is dominated by manufacturing activities (often referred to as the secondary sector), accounting for 16 of the top 20 industries. There are four service industries (tertiary sector) on the list, including two research-related industries, one representing the education sector, and industry 77.40,[43] which covers activities such as licensing and managing IP portfolios.

3.2. TM-intensive industries

Companies representing 554 industries in the matched database filed at least one successful TM application during the 2016–2020 period. Of those industries, 284 are TM-intensive.

Table 11 shows the 20 most TM-intensive industries. The full list of TM-intensive industries is shown in Appendix 12.2.

Table 11: The 20 most TM-intensive industries

NACE code	NACE description	TMs per 1 000 employees
7740	Leasing of intellectual property and similar products, except copyrighted works	402.16
3099	Manufacture of other transport equipment n.e.c.	248.91
1104	Manufacture of other non-distilled fermented beverages	95.12

43 Official Eurostat definition of class 77.40: This class includes the activities of allowing others to use intellectual property products and similar products for which a royalty payment or licensing fee is paid to the owner of the product (i.e. the asset holder). The leasing of these products can take various forms, such as permission for reproduction, use in subsequent processes or products, operating businesses under a franchise, etc. The current owners may or may not have created these products. This class includes:
- leasing of intellectual property products (except copyrighted works, such as books or software)
- receiving royalties or licensing fees for the use of: patented entities, trade marks or service marks, brand names, mineral exploration and evaluation, and franchise agreements.
Qualitative analysis of the companies associated with NACE industry 77.40 showed that this industry is very heterogenous. It comprises, *inter alia*, special entities within larger economic groups responsible for managing their IP portfolios, the technology transfer offices of educational institutions, facilitators of innovation development and commercialisation, small entities set up to commercialise one innovation or, to a lesser extent, independent companies active in the area of valuation and management of IP assets.
The group of companies associated with this class includes both stand-alone companies without any economic links to other companies and branches whose main activity consists of managing the IP portfolios of their parent companies.

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6430	Trusts, funds and similar financial entities	69.10
6420	Activities of holding companies	65.40
610	Extraction of crude petroleum	64.62
7211	Research and experimental development on biotechnology	59.59
1086	Manufacture of homogenised food preparations and dietetic food	50.87
2042	Manufacture of perfumes and toilet preparations	48.71
3230	Manufacture of sports goods	45.42
6312	Web portals	44.17
2020	Manufacture of pesticides and other agrochemical products	43.81
1101	Distilling, rectifying and blending of spirits	43.12
5920	Sound recording and music publishing activities	41.22
1089	Manufacture of other food products n.e.c.	40.95
1102	Manufacture of wine from grape	40.77
5821	Publishing of computer games	40.26
5913	Motion picture, video and television programme distribution activities	40.02
3240	Manufacture of games and toys	36.58
2652	Manufacture of watches and clocks	34.72

As is the case for patents, manufacturing (or secondary) industries are prominent in the top 20 list for TMs, occupying 12 of the 20 spots. The remaining eight industries on the list belong to the service sector (tertiary industries).

3.3. Design-intensive industries

Companies representing 504 industries in the matched database filed successful design applications during the 2016–2020 period. Of those industries, 176 were found to be design-intensive.

Table 12 shows the 20 most design-intensive industries. The full list of design-intensive industries is shown in Appendix 12.3.

Table 12:
The 20 most design-intensive industries

NACE code	NACE description	Designs per 1 000 employees
7740	Leasing of intellectual property and similar products, except copyrighted works	128.44
3099	Manufacture of other transport equipment n.e.c.	55.38
4647	Wholesale of furniture, carpets and lighting equipment	48.00
2740	Manufacture of electric lighting equipment	44.72
3212	Manufacture of jewellery and related articles	43.06

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4615	Agents involved in the sale of furniture, household goods, hardware and ironmongery	41.39
2571	Manufacture of cutlery	35.48
1411	Manufacture of leather clothes	31.25
3230	Manufacture of sports goods	30.44
2751	Manufacture of electric domestic appliances	29.79
1104	Manufacture of other non-distilled fermented beverages	29.23
4648	Wholesale of watches and jewellery	28.99
2342	Manufacture of ceramic sanitary fixtures	26.87
3211	Striking of coins	25.21
1439	Manufacture of other knitted and crocheted apparel	24.72
2341	Manufacture of ceramic household and ornamental articles	23.88
1419	Manufacture of other wearing apparel and accessories	23.65
1520	Manufacture of footwear	23.00
1414	Manufacture of underwear	21.90
2814	Manufacture of other taps and valves	20.74

Design-intensive industries, too, are mostly found in the manufacturing (secondary) sector of the economy, occupying 16 of the top 20 spots in that sector. The remaining four spots are taken up by service industries, including three wholesale/distribution industries. As is the case for patents and TMs, sector 77.40 is also one of the most design-intensive industries.

3.4. Copyright-intensive industries

Tables 13 and 14 list the copyright-intensive industries included in this study, identified as described in Appendix 10.4. The “type” column indicates whether the industry is core, inter-dependent or partial copyright-intensive according to the WIPO classification. For inter-dependent and partial copyright industries, the “factor” column shows the percentage of each sector’s activity considered to be related to copyright.

Table 13:
List of core copyright industries

NACE code	NACE description
18.11	Printing of newspapers
18.12	Other printing
18.13	Pre-press and pre-media services
18.14	Binding and related services
18.20	Reproduction of recorded media

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47.61	Retail sale of books in specialised stores
47.62	Retail sale of newspapers and stationery in specialised stores
47.63	Retail sale of music and video recordings in specialised stores
58.11	Book publishing
58.13	Publishing of newspapers
58.14	Publishing of journals and periodicals
58.19	Other publishing activities
58.21	Publishing of computer games
58.29	Other software publishing
59.11	Motion picture, video and television programme production activities
59.12	Motion picture, video and television programme post-production activities
59.13	Motion picture, video and television programme distribution activities
59.14	Motion picture projection activities
59.20	Sound recording and music publishing activities
60.10	Radio broadcasting
60.20	Television programming and broadcasting activities
61.10	Wired telecommunications activities
61.20	Wireless telecommunications activities
61.30	Satellite telecommunications activities
61.90	Other telecommunications activities
62.01	Computer programming activities
62.02	Computer consultancy activities
62.03	Computer facilities management activities
62.09	Other information technology and computer service activities
63.11	Data processing, hosting and related activities
63.12	Web portals
63.91	News agency activities
63.99	Other information service activities n.e.c.
73.11	Advertising agencies
73.12	Media representation
74.10	Specialised design activities
74.20	Photographic activities
74.30	Translation and interpretation activities
79.90	Other reservation service and related activities
82.19	Photocopying, document preparation and other specialised office support activities
85.52	Cultural education
90.01	Performing arts

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90.02	Support activities to performing arts
90.03	Artistic creation
90.04	Operation of arts facilities
91.01	Library and archives activities
93.21	Activities of amusement parks and theme parks
93.29	Other amusement and recreation activities
94.12	Activities of professional membership organisations

Table 14:
Inter-dependent and partial copyright industries

NACE code	NACE description	Type	Factor
17.11	Manufacture of pulp	Inter-dependent	25.0%
17.12	Manufacture of paper and paperboard	Inter-dependent	25.0%
20.59	Manufacture of other chemical products n.e.c.	Inter-dependent	25.0%
26.20	Manufacture of computers and peripheral equipment	Inter-dependent	30.0%
26.30	Manufacture of communication equipment	Inter-dependent	30.0%
26.40	Manufacture of consumer electronics	Inter-dependent	30.0%
26.70	Manufacture of optical instruments and photographic equipment	Inter-dependent	30.0%
27.31	Manufacture of fibre optic cables	Inter-dependent	30.0%
28.23	Manufacture of office machinery and equipment (except computers and peripheral equipment)	Inter-dependent	30.0%
32.20	Manufacture of musical instruments	Inter-dependent	35.0%
46.43	Wholesale of electrical household appliances	Inter-dependent	19.0%
46.51	Wholesale of computers, computer peripheral equipment and software	Inter-dependent	30.0%
46.52	Wholesale of electronic and telecommunications equipment and parts	Inter-dependent	25.0%
46.66	Wholesale of other office machinery and equipment	Inter-dependent	30.0%
46.76	Wholesale of other intermediate products	Inter-dependent	25.0%
47.41	Retail sale of computers, peripheral units and software in specialised stores	Inter-dependent	33.3%
47.43	Retail sale of audio and video equipment in specialised stores	Inter-dependent	33.3%
47.78	Other retail sale of new goods in specialised stores	Inter-dependent	33.3%
77.22	Renting of video tapes and disks	Inter-dependent	20.0%
77.29	Renting and leasing of other personal and household goods	Inter-dependent	20.0%

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77.33	Renting and leasing of office machinery and equipment (including computers)	Inter-dependent	35.0%
77.39	Renting and leasing of other machinery, equipment and tangible goods n.e.c.	Inter-dependent	20.0%
32.11	Striking of coins	Partial	33.5%
32.12	Manufacture of jewellery and related articles	Partial	33.5%
32.40	Manufacture of games and toys	Partial	41.0%
91.02	Museums activities	Partial	46.0%
91.03	Operation of historical sites and buildings and similar visitor attractions	Partial	50.0%
94.99	Activities of other membership organisation n.e.c.	Partial	50.0%

3.5. GI-intensive industries

The methodology used to identify the GI-intensive industries was to some extent analogous to the WIPO methodology used to identify copyright-intensive sectors (see Appendix 10.5). The data from DG AGRI showed that the core GI-intensive industries are those set out in Table 15.

Table 15:
Core GI-intensive industries

NACE code	NACE description
10.51	Operation of dairies and cheese making
11.01	Distilling, rectifying and blending of spirits
11.02	Manufacture of wine from grape (including part of 01.21 Growing of grapes)
11.05	Manufacture of beer

Analogously to the industries considered copyright-intensive, the above industries are responsible for the *production* of GI goods, but not for wholesale or retail distribution. All four GI-intensive industries belong to the manufacturing (secondary) sector. Part of the primary sector 01.21 is also included.

3.6. PVR-intensive industries

Companies representing 41 different industries filed successful CPVR applications between 2013 and 2017. Of those industries, 11 are CPVR-intensive.

The final list of PVR-intensive industries identified as described in Section 10.6 is shown in Table 16.

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Table 16:
PVR-intensive industries

NACE code	NACE description	PVRs per 1 000 employees
77.40	Leasing of intellectual property and similar products, except copyrighted works	10.76
46.22	Wholesale of flowers and plants	5.86
72.11	Research and experimental development on biotechnology	5.31
46.21	Wholesale of grain, unmanufactured tobacco, seeds and animal feeds	3.84
72.19	Other research and experimental development on natural sciences and engineering	1.27
46.11	Agents involved in the sale of agricultural raw materials, live animals, textile raw materials and semi-finished goods	1.16
01.00 (p)	Horticulture	0.53
77.31	Renting and leasing of agricultural machinery and equipment	0.41
10.61	Manufacture of grain mill products	0.24
20.53	Manufacture of essential oils	0.22
13.10	Preparation and spinning of textile fibres	0.17

3.7. All IPR-intensive industries

The results show that many industries are intensive in more than one of the IPRs analysed. For example, industry 23.43 *Manufacture of ceramic insulators and insulating fittings* is an intensive user of both TMs and patents. Some industries, for example 30.99 *Manufacture of other transport equipment n.e.c.*, intensively use TMs, designs and patents. Most of the copyright-intensive industries are also TM-intensive, and all four GI-intensive industries are TM-intensive as well. Appendix 8 summarises the preceding sections by listing all 361 IPR-intensive industries and, for each of them, specifying the IPRs used intensively. The overlaps are shown in Table 17.

Table 17:
Overlapping use of IPRs

IPR	Number of industries intensive in each IPR combination
TM	62
PAT	27
DES	14
CR	22
PVR	2
TM and PVR	2
TM, PAT and CR	4

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TM and PAT	32
TM and GI	1
TM, PAT, DES and PVR	3
TM, PAT, DES and CR	11
TM, PAT and DES	67
TM, DES and PVR	3
TM, DES and GI	3
TM, DES and CR	8
TM and DES	55
TM and CR	33
PAT and DES	11
DES and CR	1

TMs are used intensively by most of the industries (284 out of 361). Patents tend to be used more intensively in the manufacturing sector. A total of 67 industries are intensive in patents, TMs *and* designs. Other significant overlaps are between TMs and designs (55 industries), TMs and patents (33 industries) and TMs and copyright (33 industries).

Conversely, some industries use only one of the analysed IPRs intensively. Thus, 62 industries are TM-intensive only, 27 patent-intensive only, 14 design-intensive only and 20 copyright-intensive only. Two industries are exclusively PVR-intensive.

It is worthwhile examining more closely the industries that are intensive in just one of the IPRs considered, since such industries can be considered to reflect the contribution of that particular IPR as opposed to IPRs in general. The 62 industries that are exclusively TM-intensive do not differ significantly from the larger group of 222 TM-intensive industries that also use another IPR intensively.

The 27 industries that are exclusively patent-intensive are concentrated in manufacturing, energy and technical services. Examples of such industries include 24.52 *Casting of steel* and 71.12 *Engineering activities and related technical consultancy*. What these industries have in common is that many of them sell their products and services to other industries, not to end consumers. Branding and thus TMs seem to be less important in business-to-business than in business-to-consumer commerce.

The 14 exclusively design-intensive industries are concentrated in manufacturing, such as 31.02 *Manufacture of kitchen furniture*. There are also some trade sectors in this group, for example 47.59 *Retail sale of furniture*. As a group, these industries market their products and services to both businesses and consumers.

To prevent double counting, the fact that some IPR-intensive industries use multiple rights intensively was taken into account when quantifying their employment and value-added contributions in Chapter 4 below.

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4. Contribution of IPR-intensive industries to the EU economy

4.1. Contribution to employment, GDP and trade at EU level

The preceding chapter explained how the industries that use IPRs intensively were identified. In order to calculate the contributions of those industries in terms of employment, GDP and external trade to the economy of the EU as a whole and the economies of the individual member states, the list of IPR-intensive industries was combined with data from Eurostat and, where necessary, other EU or national sources.[44]

4.1.1. Employment

In total, on average approximately 214 million people were employed within the EU27 during the 2021–2023 period.[45] A significant proportion of these jobs are in NACE divisions O–Q (public administration, defence, education, human health and social work activities), concerning services which are mostly provided in the public sector.[46]

Table 18 shows the share of IPR-intensive industries in EU employment for each of the six IPRs.

44 In particular, in the case of GIs, extensive use was made of information from agricultural statistics published by DG AGRI, and in the case of PVRs, data provided by the CPVO. In addition, in the case of copyright, Eurostat data were supplemented with data from several national statistical offices.

45 The definition of "employment" used by Eurostat and other statistical agencies is as follows: Employed persons are persons aged 15 and over (with some country-specific exceptions) who, during the reference week, performed work, even for just one hour a week, for pay, profit or family gain, or who were not at work but had a job or business from which they were temporarily absent because of illness, holidays, industrial dispute or education and training.

46 If such non-market-based activities were excluded from the calculation, the share in employment and GDP would be significantly higher than shown in this report. However, it was considered more appropriate to err on the side of caution and base the calculations on total employment and GDP.

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Table 18:
Direct contribution of IPR-intensive industries to employment, 2021–2023 average

IPR-intensive industries	Employment (direct)	Share in total employment (direct)
TM-intensive	46 222 899	21.6%
Design-intensive	28 159 393	13.1%
Patent-intensive	25 243 081	11.8%
Copyright-intensive	13 488 978	6.3%
GI-intensive *	n/a	n/a
PVR-intensive	1 846 356	0.9%
All IPR-intensive	65 463 643	**30.6%**
Total EU employment	214 257 643	

* Not calculated due to gaps in employment statistics for agriculture (farm structure statistics).
Note: Due to overlapping use of IPRs, the sum of the shares of the individual IPRs exceeds the total share of IPR-intensive industries.

Thus, **IPR-intensive industries account for more than 65 million jobs, or 30.6% of total employment, in the EU**. More than 21% of those jobs are in TM-intensive industries, 13.1% in design-intensive industries, 11.8% in patent-intensive industries and 6.3% in copyright-intensive industries, with lower prcentages for PVR-intensive and GI-intensive industries.

As noted above, many industries are IPR-intensive in respect of more than one IPR. To avoid double counting, therefore, total employment in all IPR-intensive industries is less than the sum of the individual employment figures for each IPR. In other words, for the purpose of calculating employment in all IPR-intensive industries, each industry was counted only once, even if it used more than one IPR intensively.

4.1.2. GDP

Gross domestic product (GDP) is the total value of the goods and services produced in a given territory during a given time period. It is the most common measure of economic activity. GDP is calculated in the national accounts of a country (or the EU) by adding up the value added produced in each industry, including product-specific taxes and excluding product-specific subsidies. The value added equals the industry's sales minus its purchases of goods and services from other industries. When these quantities are added up across the entire economy, the inter-industry purchases cancel each other out and what is left is the overall value added, or GDP, for the economy. Total average annual EU GDP was approximately €16 trillion in the 2021–2023 period.

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The starting point for estimating the share of IPR-intensive industries in GDP were the value added figures for each industry at four-digit level in Eurostat's SBS, on the one hand, and the overall GDP figure from the national accounts, on the other. However, before the sectoral figures could be compared with the overall economy-wide figure, they had to be adjusted in order to ensure that the numerators in the calculations of the weight of IPR-intensive industries in the economy were consistent with the denominator, i.e. overall GDP.

The industry-level value added in SBS is defined at *factor cost*, which excludes taxes linked to production. On the other hand, GDP is the sum of *gross value added* (GVA) at *basic prices* in all industries of the economy plus taxes less subsidies on production. The difference between factor cost and basic prices is that the latter (for each industry) include other taxes less subsidies on production.

Therefore, in order to obtain a homogeneous ratio based on GDP, the figures from SBS had to be converted so as to be consistent with the GDP definition. Otherwise, the ratios of sectoral GDP to total GDP would be understated because the nominator and denominator would not be defined in the same way.

In order to achieve consistency, the SBS data were adjusted as follows. Firstly, a factor was applied to the value added obtained from SBS for each IPR-intensive industry. This factor was calculated for each of the 65 industries (divisions) in national accounts as the ratio between value added at factor cost in SBS and GVA at basic prices in national accounts for each industry. All classes within each division were divided by the same factor.

Secondly, the ratio between GDP and GVA for the whole economy was applied to each adjusted value added figure from the first step.

The resulting adjusted industry-level value added figures are compatible with GDP. The contribution of IPR-intensive industries to the EU economy is shown in Table 19.[47] Almost 48% of total economic output in the EU is generated in IPR-intensive industries. TM-intensive industries contribute 39.1% of GDP, while patent-intensive and design-intensive industries contribute 18.4% and 16.1%, respectively, with smaller contributions from copyright-intensive (7.2%), PVR-intensive and GI-intensive industries. As for the employment calculation described in the preceding section, for the purpose of calculating the total contribution of IPR-intensive industries to GDP, each industry was counted only once, even if it used more than one IP right intensively.

47 As in the case of employment, the value added/GDP figures are averages for the period 2021–2023.

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Table 19:
Contribution of IPR-intensive industries to GDP, 2021–2023 average

IPR-intensive industries	Value added/GDP (€ million)	Share in total EU GDP
TM-intensive	6 287 376	39.1%
Patent-intensive	2 953 257	18.4%
Design-intensive	2 581 997	16.1%
Copyright-intensive	1 151 163	7.2%
GI-intensive	15 670	0.1%
PVR-intensive	224 199	1.4%
All IPR-intensive	7 703 734	**47.9%**
Total EU GDP	16 066 590	

Note: Due to overlapping use of IPRs, the sum of the figures for the individual IPRs exceeds the total figure of IPR-intensive industries.

It is worth noting that the share of IPR-intensive industries of GDP is significantly higher than that of employment, most likely reflecting the higher value added associated with their output. As will be seen in Section 4.1.5, this is also reflected in the wages paid to workers in IPR-intensive industries.

A comparison of the results of this study with those of the 2022 edition reveals that the contribution of IPR-intensive industries to the EU economy was higher in the 2021–2023 period than in 2017–2019. However, the comparison is complicated by the fact that, in order to ensure that this study reflects the current structure of the EU economy, the matching exercise used to identify IPR-intensive industries was updated, resulting in an increase in the number of these industries from 357 in the 2022 study to 361 in the present one.[48] In Table 20, the figures from the earlier study have been re-calculated using the new definitions of IPR-intensive industries.

48 While the net change in the number of IPR-intensive industries is small, behind it there are more substantial gross changes, as explained in Chapter 2.

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Table 20:
Comparison of the main results: 2022 and 2025 studies

	Employment		GDP		Exports of goods and services	
Contribution (%) EU27	2022 study (2017–2019)	2025 study (2021–2023)	2022 study (2017–2019)	2025 study (2021–2023)	2022 study (2017–2019)	2025 study (2021–2023)
TM-intensive	21.0%	21.6%	38.3%	39.1%	58.0%	60.1%
Design-intensive	13.2%	13.1%	15.7%	16.1%	52.7%	51.0%
Patent-intensive	11.8%	11.8%	17.7%	18.4%	65.6%	62.5%
Copyright-intensive	6.0%	6.3%	6.8%	7.2%	8.5%	12.6%
GI-intensive	0.1%	n/a	0.1%	0.1%	n/a	n/a
PVR-intensive	0.9%	0.9%	1.4%	1.4%	1.6%	1.8%
All IPR-intensive	30.1%	30.6%	47.8%	47.9%	81.4%	78.3%

Note: Due to overlapping use of IPRs, the sum of the figures for the individual IPRs exceeds the total figure of IPR-intensive industries.

Thus, the contribution of IPR-intensive industries increased compared to the 2017–2019 period, whether measured by GDP or employment and decreased by external trade. In particular, the contribution of those industries to employment increased by 0.5 percentage points during that period, largely due an increase in the contribution on TM- and copyright-intensive industries. The contribution to GDP rose by 0.1 percentage points for all IPR-intensive industries, and even more for most of the individual IP rights. The contribution to extra-EU exports decreased by 3.1 percentage points.

Table 21 shows the six industries that contribute most to the increase in value added (VA) of IPR-intensive industries between 2017–2019 and 2021–2023. For each industries the table provides the NACE code, industry name, its contribution to the total VA increase of IPR-intensive industries between 2017–2019 and 2021–2023 and its VA growth rate between the two periods. Together, these six industries account for 27.2% of the total VA growth of all IPR-intensive industries. All six are trade mark-intensive. Manufacture of pharmaceutical preparations and Production of electricity are also patent-intensive, while Manufacture of electronic components is trade mark-, design- and patent-intensive. Computer programming and consultancy activities are both copyright-intensive, jointly explaining 45% of the VA increase in copyright-intensive industries.

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Table 21:
Industries that contribute most to the increase in VA of IPR-intensive industries between 2017–-2019 and 2021–-2023

NACE code	NACE description	Contribution to growth in VA in IPR-intensive industries (in %)	Growth rate in VA (in %)
2120	Manufacture of pharmaceutical preparations	5.4	70.7
2611	Manufacture of electronic components	4.9	229.3
3511	Production of electricity	4.4	52.6
6201	Computer programming activities	4.1	42.0
6202	Computer consultancy activities	4.2	46.6
6600	Activities auxiliary to financial services and insurance activities	4.2	54.5

4.1.3. Trade

The third major economic variable to which IPR-intensive industries contribute is the EU's external trade. Indeed, the vast majority of both EU imports and exports are IPR-intensive.

Table 22 summarises trade in IPR-intensive industries, based on data from 2021–2023. As in the case of the employment and GDP figures, the trade figures for the six IPRs add up to more than the overall figure for IPR-intensive industries because many industries are intensive in more than one IPR.

The bulk of EU trade is in IPR-intensive industries which, at first glance, may be somewhat surprising. It is explained by the fact that even some industries producing commodities such as energy are IPR-intensive,[49] while many non-IPR-intensive activities are also non-tradable, for example services that are consumed when and where they are produced.[50] For that reason, a very large share of EU goods imports and exports consist of products of IPR-intensive industries. In the case of trade in services, the share of IPR-intensive industries is lower but still very significant. Taking both goods and services trade into account, in 2021–2023, 76.4% of EU imports and 78.3% of EU exports were generated by IPR-intensive industries.

49 NACE class 06.10 *(Extraction of crude petroleum)* is patent, design and TM intensive.

50 For example, service industries such as those included in NACE divisions 86 *(Human health activities)* and 96 *(Other personal service activities)*. Such services are generally consumed at the point of production.

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Table 22:
EU external trade in IPR-intensive industries, 2021–2023

IPR-intensive industries	Exports (€ million)	Imports (€ million)	Net exports (€ million)
TM-intensive	2 257 668	2 306 086	-48 418
Design-intensive	1 916 731	1 966 245	-49 514
Patent-intensive	2 347 111	2 209 093	138 018
Copyright-intensive	474 330	465 471	8 859
GI-intensive	n/a	n/a	n/a
PVR-intensive	67 575	97 720	-30 145
Total IPR-intensive	2 942 054	2 834 544	107 510
Total EU trade	3 755 574	3 712 465	43 108
IPR-intensive share	78.3%	76.4%	

Note: Due to overlapping use of IPRs, the sum of the figures for the individual IPRs exceeds the total figure of IPR-intensive industries.

The EU as a whole had an overall annual trade surplus in 2021–2023 of approximately €43 billion. That surplus was largely generated by IPR-intensive industries, where it amounted to €108 billion in the same period. This surplus is principally generated by the patent-intensive industries, offsetting small deficits in the TM-intensive, design-intensive and PVR-intensive industries.

4.1.4. Wages

As noted above, 47.9% of GDP (value added) in the economy and 30.6% of employment is generated in IPR-intensive industries. This implies that value added *per employee* is higher in IPR-intensive industries than in the rest of the economy. It is relevant, therefore, to examine whether this higher value added is reflected in relative remuneration in the IPR-intensive industries.

Using SBS data from Eurostat, it is possible to calculate the average compensation paid by each industry to its workforce.[51] In SBS, *personnel costs* are defined as the total remuneration, in cash or in kind, payable by an employer to an employee in return for work done by the latter during the reference period. Personnel costs are made up of wages, salaries and employers' social security contributions, both compulsory and voluntary. *Average personnel costs* (or *unit labour costs*) equal personnel costs divided by the number of employees (persons who are paid and have an employment contract). This is the definition of "wages" used in this report.

51 Because SBS employment and compensation data were not available for the main public-sector industries, the analysis in this section is confined to the private sector.

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Data are available in SBS for most industries. However, for three industries, no personnel cost data were available at all.[52] Those industries were omitted from the analysis.

On average, remuneration in IPR-intensive industries is indeed higher than in non-IPR-intensive industries. The average weekly compensation in IPR-intensive industries is €965, compared with €685 in non-IPR-intensive industries: a difference of 40.9%. This "wage premium" is 40.7% in TM-intensive industries, 33.1% in design-intensive industries, 58.5% in patent-intensive industries, 56.4% in copyright-intensive industries, and 52.6% in PVR-intensive industries.

Table 23:
Average personnel costs in IPR-intensive industries, 2021–2023

IPR-intensive industries	Average personnel costs (€ per week)	Premium (compared with non-IPR-intensive industries)
TM-intensive	963	40.7%
Design-intensive	911	33.1%
Patent-intensive	1 085	58.5%
Copyright-intensive	1 071	56.4%
GI-intensive*	n/a	n/a
PVR-intensive*	1 044	52.6%
All IPR-intensive industries	**965**	**40.9%**
Non-IPR-intensive industries	**685**	

*Not calculated because of lack of wage statistics for agriculture.

Compared with the situation in the 2022 study, the wage premium has remained largely unchanged.

4.2. The main IPR-intensive industries at EU level

So far, the analysis in this chapter has focused on the IPR-intensive industries aggregated by IPR or in total. In this section, the contributions to employment and GDP are broken down by industry. Table 24 shows the 20 IPR-intensive industries making the largest contributions to employment.

52 The industries for which no personnel cost data were available are: 01.00 (p) *Horticulture*, 94.12 *Activities of professional membership organisations*, and 94.99 *Activities of other membership organisations n.e.c.*

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Table 24:
Top 20 IPR-intensive industries (employment, 2021–2023 average)

NACE code	NACE description	Type*	Employment	Intensive IPR
71.12	Engineering activities and related technical consultancy	SERV	2 049 507	PAT
62.01	Computer programming activities	SERV	1 974 914	TM, CR
94.12	Activities of professional membership organisations	SERV	1 868 681	CR
70.22	Business and other management consultancy activities	SERV	1 810 960	TM
43.21	Electrical installation	CONS	1 724 239	DES
62.02	Computer consultancy activities	SERV	1 575 789	TM, CR
66.00	Activities auxiliary to financial services and insurance activities	SERV	1 475 041	TM
68.20	Renting and operating of own or leased real estate	SERV	1 394 274	TM
29.10	Manufacture of motor vehicles	MAN	1 093 333	PAT, DES
29.32	Manufacture of other parts and accessories for motor vehicles	MAN	911 610	PAT, DES
47.91	Retail sale via mail order houses or via Internet	SERV	820 333	TM, DES
01.00	Horticulture	AGRI	813 265	PV
46.69	Wholesale of other machinery and equipment	SERV	799 460	TM, PAT, DES
46.73	Wholesale of wood, construction materials and sanitary equipment	SERV	789 794	TM, DES
73.11	Advertising agencies	SERV	754 738	TM, CR
25.11	Manufacture of metal structures and parts of structures	MAN	746 409	PAT
35.11	Production of electricity	MAN	727 453	TM, PAT
47.59	Retail sale of furniture, lighting equipment and other household articles in specialised stores	SERV	719 214	DES
46.46	Wholesale of pharmaceutical goods	SERV	657 784	TM, PAT
47.78	Other retail sale of new goods in specialised stores	SERV	647 516	CR
TOP 20			**23 354 314**	

Note: Due to overlapping use of IPRs, the sum of the figures for the individual IPRs exceeds the total figure of IPR-intensive industries.

Employment in these 20 industries, at almost 23.5 million, accounts for 35.6% of total employment in the 361 IPR-intensive industries identified in this report. The list is dominated by patent-intensive and TM-intensive industries, but designs also play a major role: seven of the top 20 industries are design-intensive, and two of them are exclusively design-intensive.

Table 25 shows the top 20 IPR-intensive industries, ranked according to their contributions to GDP.

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Table 25:
Top 20 IPR-intensive industries (GDP, 2021–2023 average)

NACE code	NACE description	Type*	Value added (€ million, adjusted to GDP)	Intensive IPR
68.20	Renting and operating of own or leased real estate	SERV	1 456 452	TM
70.22	Business and other management consultancy activities	SERV	193 037	TM
62.01	Computer programming activities	SERV	188 140	TM, CR
62.02	Computer consultancy activities	SERV	178 469	TM, CR
21.20	Manufacture of pharmaceutical preparations	MAN	176 914	TM, PAT
29.10	Manufacture of motor vehicles	MAN	175 867	PAT, DES
35.11	Production of electricity	MAN	172 879	TM, PAT
71.12	Engineering activities and related technical consultancy	SERV	167 685	PAT
66.00	Activities auxiliary to financial services and insurance activities	SERV	158 511	TM
43.21	Electrical installation	CONS	111 733	DES
72.19	Other research and experimental development on natural sciences and engineering	SERV	99 437	TM, PAT, DES, PV
26.11	Manufacture of electronic components	MAN	94 324	TM, PAT, DES
46.46	Wholesale of pharmaceutical goods	SERV	92 350	TM, PAT
46.69	Wholesale of other machinery and equipment	SERV	88 032	TM, PAT, DES
61.10	Wired telecommunications activities	SERV	81 833	CR
64.90	Other financial service activities, except insurance and pension funding	SERV	78 415	TM
58.29	Other software publishing	SERV	77 259	TM, PAT, CR
70.10	Activities of head offices	SERV	71 344	TM
92.00	Gambling and betting activities	SERV	68 676	TM
29.32	Manufacture of other parts and accessories for motor vehicles	MAN	67 639	PAT, DES
TOP 20			**3 798 996**	

*MAN = manufacturing industry; CONS = construction industry; SERV = service industry.

In total, these 20 industries account for 49.3% of the total GDP generated in the 361 IPR-intensive industries.[53] There is a great deal of overlap between the two top 20 lists, with 12 industries appearing on both lists.

53 This very high share is partly due to the fact that the top-ranked industry, NACE 68.20 *Renting and operating of own or leased real estate*, includes imputed rent on owner-occupied housing. This is in keeping with the national accounting standard applied by Eurostat and other statistical offices. It was decided to retain the imputed rent in order to ensure compatibility between the numerator and denominator in the calculation of GDP shares, since imputed rent is included in the overall GDP figure from national accounts.

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There are, however, some industries, for example 61.20 *Wireless telecommunications activities*, which generate high value added relative to employment and hence appear in the top 20 GDP list but not in the top 20 employment list, and others, for example 73.11 Advertising agencies, which do appear in the top 20 list for employment but not in that for GDP.

4.3. Analysis by member state

This section presents the contribution of IPR-intensive industries to employment and GDP in each member state. This part of the analysis was challenging because the availability of data at member state level is more limited than at EU level. Consequently, more estimates and imputations were required, so that some of the results in this section may be less robust than those in Sections 4.1 and 4.2. It is also important to reiterate that the IPR-intensive industries were identified at the level of the EU27, not at individual member state level. As stated above, this study assumes that if an industry is IPR-intensive in one member state, it is also IPR-intensive in all other member states because IPR intensity is considered to be an intrinsic characteristic of an industry. The accuracy of the results presented in this section depends on the validity of this assumption.

The contribution of each industry to a member state's economy is measured in terms of the jobs and GDP generated by that industry in that member state. For example, if a car company from member state A builds an assembly plant in member state B, then the resulting jobs and value added accrue to the economy of member state B. In other words, the measure of IPR intensity employed does not address the origin of the IPR being used, only its deployment. It cannot be concluded on the basis of this study, therefore, that if patent-intensive industries contribute more in terms of jobs and value added in country A than in country B, then country A is more innovative. The higher contribution made by patent-intensive industries to employment or GDP in country A could equally be the result of decisions on where to site production that were made in country C. The issue of the origin of IPRs and their relationship with economic prosperity is the subject of Chapter 5.

In this study, data for the EFTA member countries Iceland, Norway and Switzerland are also included. The EU average is shown for reference and always refers to the EU27.

Because of data gaps, the employment contribution of GI-intensive industries by member state is not calculated. However, since those industries are also intensive in other IPRs, this limitation does not affect the overall results on the contribution of IPR-intensive industries to employment.

4.3.1. Patent-intensive industries

Patent-intensive industries contribute 11.8% of employment and 18.4% of GDP in the EU. Above-average shares of employment are found in Austria, the Czech Republic, Germany, Hungary, Ireland, Slovakia, Slovenia and Sweden. When measured by contribution to value added, patent-intensive industries have an above-average share in Austria, Bulgaria, the Czech Republic, Denmark, Germany, Finland, Hungary, Ireland, Slovakia, Slovenia and Sweden. Of the largest EU economies, Germany's high shares for patent-intensive industries in employment and GDP, reflect the high share of manufacturing industries (which predominate among the patent-intensive industries) in the German economy.

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The high shares of employment and GDP accounted for by patent-intensive industries in several of the member states that joined the EU in 2004 and 2007 could also be related to the high share of manufacturing in their economies.

Among EFTA countries, Norway and Switzerland have higher GDP shares of patent-intensive industries than the EU average, and Switzerland is also above average in terms of employment shares of those industries. The shares of patent-intensive industries of employment and GDP in Iceland are below the EU average.

Table 26: GDP and employment shares of patent-intensive industries by member state, 2021–2023 average

Country	Share of GDP (%)	Share in employment (%)
AT	19.4%	14.1%
BE	15.7%	9.1%
BG	21.4%	10.4%
CY	7.4%	6.2%
CZ	24.2%	20.2%
DE	23.1%	16.4%
DK	19.9%	10.8%
EE	12.9%	11.0%
ES	13.2%	8.4%
FI	20.0%	11.3%
FR	13.9%	9.7%
GR	13.1%	6.5%
HR	13.2%	9.6%
HU	21.1%	14.1%
IE	39.7%	12.1%
IT	16.5%	11.2%
LT	13.5%	8.9%
LU	n/a	n/a
LV	12.1%	8.1%
MT	8.3%	7.5%
NL	15.5%	8.8%
PL	16.8%	11.2%
PT	12.0%	8.9%
RO	16.3%	9.2%
SE	20.2%	12.6%

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SI	23.9%	16.8%
SK	18.8%	16.2%
EU27	**18.4%**	**11.8%**
CH	25.5%	12.4%
IS	11.8%	7.4%
NO	22.6%	9.1%

4.3.2. TM-intensive industries

In the EU as a whole, TM-intensive industries contribute 21.6% of employment and 39.1% of GDP. The countries with above-average shares of employment in TM-intensive industries are Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Germany, Denmark, Estonia, Croatia, Hungary, Ireland, Latvia, Lithuania, Malta, the Netherlands, Portugal, Slovakia, Slovenia and Sweden. In Bulgaria, the Czech Republic, Denmark, Estonia, Finland, France, Greece, Hungary, Ireland, Italy, Malta, the Netherlands and Romania, the shares of GDP coming from TM-intensive industries are above average.

Table 27:
GDP and employment shares of TM-intensive industries by member state, 2021–2023 average

Country	Share of GDP (%)	Share in employment (%)
AT	35.8%	23.0%
BE	39.1%	21.9%
BG	47.0%	22.9%
CY	38.8%	23.6%
CZ	46.2%	26.0%
DE	35.4%	23.0%
DK	41.3%	23.9%
EE	43.2%	27.2%
ES	37.9%	20.9%
FI	42.1%	18.4%
FR	39.5%	18.2%
GR	45.0%	18.1%
HR	34.1%	22.2%
HU	42.2%	23.5%
IE	61.8%	28.0%
IT	42.2%	21.6%
LT	34.5%	25.4%

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LU	n/a	n/a
LV	33.4%	23.2%
MT	45.7%	26.7%
NL	41.8%	23.9%
PL	32.7%	21.5%
PT	35.5%	23.8%
RO	40.1%	17.1%
SE	38.4%	22.2%
SI	34.8%	23.8%
SK	38.2%	24.6%
EU27	**39.1%**	**21.6%**
CH	45.7%	22.3%
IS	35.4%	21.8%
NO	33.0%	17.8%

Among non-EU countries, Switzerland has a higher GDP share of TM-intensive industries than the EU average, while in terms of employment shares of those industries, Switzerland and Iceland are above the EU average.

4.3.3. Design-intensive industries

Design-intensive industries contribute 13.1% of employment and 16.1% of GDP in the EU. Austria, the Czech Republic, Estonia, Germany, Estonia, Hungary, Italy, Lithuania, Poland, Portugal, Slovakia and Slovenia all have design-intensive employment shares above the EU average. A broadly similar pattern holds for GDP.

Table 28:
GDP and employment shares of design-intensive industries by member state, 2021–2023 average

Country	Share of GDP (%)	Share in employment (%)
AT	17.1%	14.5%
BE	10.3%	9.6%
BG	16.2%	13.1%
CY	10.0%	9.0%
CZ	20.6%	20.6%
DE	19.4%	15.6%
DK	16.0%	12.3%
EE	12.7%	14.2%
ES	11.6%	10.4%

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FI	14.6%	10.0%
FR	12.0%	9.9%
GR	10.2%	8.4%
HR	12.5%	13.1%
HU	17.0%	15.0%
IE	22.7%	12.2%
IT	17.4%	14.7%
LT	16.0%	15.2%
LU	n/a	n/a
LV	11.3%	10.7%
MT	7.4%	9.7%
NL	19.0%	11.0%
PL	16.6%	14.6%
PT	13.4%	14.8%
RO	14.2%	11.3%
SE	16.2%	12.8%
SI	20.0%	16.4%
SK	16.7%	18.0%
EU27	**16.1%**	**13.1%**
CH	20.8%	12.2%
IS	10.8%	10.1%
NO	16.7%	8.5%

Among non-EU countries, Switzerland and Norway have a higher GDP share of design-intensive industries than the EU average. In terms of employment shares of those industries, all three countries are below the EU average.

4.3.4. Copyright-intensive industries

Overall employment in copyright-intensive industries in the EU is 6.3% of total employment, and those industries contribute 7.2% of the EU's GDP.

Table 29:
GDP and employment shares of copyright-intensive industries by member state, 2021–2023 average

Country	Share of GDP (%)	Share in employment (%)
AT	6.2%	6.8%
BE	6.3%	6.4%
BG	9.8%	6.4%
CY	11.8%	7.8%

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CZ	9.0%	6.5%
DE	6.6%	6.3%
DK	6.9%	7.4%
EE	10.8%	9.9%
ES	5.5%	6.1%
FI	8.7%	7.1%
FR	7.8%	6.3%
GR	5.0%	5.2%
HR	8.3%	6.8%
HU	7.2%	6.6%
IE	15.4%	8.8%
IT	5.4%	5.4%
LT	6.9%	8.0%
LU	n/a	n/a
LV	9.3%	8.1%
MT	16.7%	9.2%
NL	7.5%	7.6%
PL	6.5%	5.6%
PT	6.2%	6.8%
RO	9.7%	5.4%
SE	11.0%	8.8%
SI	7.1%	6.6%
SK	7.1%	6.8%
EU27	**7.2%**	**6.3%**
CH	6.7%	6.1%
IS	7.2%	9.0%
NO	5.0%	6.7%

Most of EU member states have above-average employment in copyright-intensive industries, except for Romania, Poland, Italy, Greece, France, Spain and Germany.

In terms of GDP shares attributable to copyright-intensive industries, Malta and Ireland show the highest, while Greece, Italy and Spain the lowest values. All three non-EU countries are below or at the EU average when it comes to GDP contribution, and Iceland and Norway are above the EU average in terms of employment.

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4.3.5. PVR-intensive industries

PVR-intensive industries in the EU contribute 0.9% of employment and 1.4% of GDP in the EU. Among the member states, Austria, Bulgaria, Germany, Denmark, Hungary, the Netherlands, Ireland, Lithuania, the Netherlands and Slovenia have a PVR-intensive industry with employment shares above the EU average.

Table 30:
GDP shares of PVR-intensive industries by member state, 2021–2023 average

Country	Share of GDP (%)	Share in employment (%)
AT	0.9%	1.3%
BE	0.7%	0.8%
BG	1.5%	1.1%
CY	0.3%	0.3%
CZ	1.0%	0.8%
DE	1.3%	0.9%
DK	1.5%	1.1%
EE	1.3%	0.7%
ES	1.2%	0.7%
FI	0.9%	0.7%
FR	2.2%	0.8%
GR	0.8%	0.8%
HR	1.1%	0.6%
HU	1.5%	1.2%
IE	1.1%	1.1%
IT	1.4%	0.6%
LT	1.1%	1.2%
LU	n/a	n/a
LV	1.1%	0.6%
MT	0.6%	0.4%
NL	2.1%	1.6%
PL	0.8%	0.8%
PT	0.8%	0.7%
RO	1.2%	0.8%
SE	0.8%	0.8%

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SI	1.3%	1.2%
SK	0.6%	0.4%
EU27	**1.4%**	**0.9%**
CH	1.7%	1.1%
IS	1.5%	0.8%
NO	0.6%	0.9%

Member states with above-average GDP contributions from PVR-intensive industries are Denmark, Bulgaria, France, Hungary, Italy and the Netherlands. Switzerland matches the EU average for both employment and GDP contribution, while Norway is below the EU average in GDP and Iceland lies below the EU employment average.

4.3.6. GI-intensive industries

Only the share of GI-intensive industries in GDP is calculated for the EU and the member states due to limited data on employment in the wine industry. While the EU average for the share of GI-intensive industries in GDP is a modest 0.1%, these industries are heavily concentrated in particular regions of the member states with relatively high contributions in Slovenia, France, Portugal, Greece and Italy.

Table 31:
GDP shares of GI-intensive industries by member state, 2021–2023 average

Country	Share of GDP (%)
AT	0.0%
BE	0.0%
BG	0.0%
CY	0.0%
CZ	0.1%
DE	0.0%
DK	0.0%
EE	0.0%
ES	0.1%
FI	0.0%
FR	0.2%
GR	0.2%
HR	0.1%
HU	0.0%

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IE	0.0%
IT	0.2%
LT	0.0%
LU	n/a
LV	0.0%
MT	0.0%
NL	0.0%
PL	0.0%
PT	0.4%
RO	0.0%
SE	0.0%
SI	0.2%
SK	0.0%
EU27	**0.1%**
CH	n/a
IS	n/a
NO	n/a

As noted above, the estimates of value added of GI-intensive industries were calculated using the shares of the relevant industries that produce the GI products in each member state. This is in contrast to the estimates for the other IPRs, which are predicated on the assumption that IPR intensity is a fundamental characteristic of an industry, irrespective of its geographical location.

4.3.7. All IPR-intensive industries

If all six IPRs are combined and the overlaps eliminated, the overall contribution of IPR-intensive industries to the economies of the member states is as shown in Table 32. At EU level, IPR-intensive industries contribute 30.6% of employment and 47.9% of GDP.

Table 32:
GDP and employment shares of all IPR-intensive industries by member state, 2021–2023 average

Country	Share of GDP (%)	Share in employment (%)
AT	45.2%	33.3%
BE	46.1%	29.3%
BG	55.2%	30.5%
CY	42.9%	29.9%
CZ	58.1%	38.6%
DE	47.2%	34.1%

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DK	47.5%	31.6%
EE	50.7%	36.9%
ES	44.9%	28.4%
FI	50.1%	26.4%
FR	47.1%	26.1%
GR	50.6%	24.0%
HR	42.4%	31.2%
HU	52.6%	33.9%
IE	68.5%	35.0%
IT	50.4%	29.9%
LT	41.5%	35.2%
LU	n/a	n/a
LV	40.0%	30.8%
MT	51.8%	35.0%
NL	48.8%	30.9%
PL	41.2%	30.5%
PT	42.8%	32.6%
RO	48.7%	25.2%
SE	48.7%	32.9%
SI	45.6%	35.3%
SK	49.3%	36.5%
EU27	**47.9%**	**30.6%**
CH	52.3%	30.0%
IS	42.9%	29.7%
NO	38.5%	25.8%

Overall, IPR-intensive industries have an above-average share in employment in Austria, the Czech Republic, Denmark, Estonia, Germany, Croatia, Hungary, Ireland, Latvia, Lithuania, Malta, the Netherlands, Portugal, Slovakia, Slovenia and Sweden.

In terms of GDP contribution, Bulgaria, the Czech Republic, Estonia, Finland, Greece, Hungary, Ireland, Italy, Malta, Romania, Slovakia and Sweden have shares above the EU average.

Of the three non-EU countries, Switzerland has an above-EU average contribution to its GDP from IPR-intensive industries. The other two countries both lie below the EU average in terms of contribution of IPR-intensive industries to employment and GDP.

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5. Participation of IPR-intensive industries in global value chains

Modern production involves internationally dispersed supply chains where value is added across multiple stages and countries. Inputs included in production of IPR-intensive industries may be sourced in the EU or outside the EU so that the final value of these products may well reflect value that has been added in many different stages of the production chain and located in many different countries. This fact is not visible in conventional trade statistics, which reflect the total value of a product when traded. A more comprehensive analysis of gross value added (VA) and employment embodied in exports provides deeper insights into international trade relationships.

This chapter analyses the VA and employment in the EU associated with the IPR-intensive industries' participation in global value chains (GVCs) using FIGARO[54] tables (Full International and Global Accounts for Research in input-output analysis). Developed jointly by Eurostat and the European Commission's Joint Research Centre (JRC), FIGARO tables describe relationships between economies at the detailed level of 64 industries and products. The data were provided by JRC, including all industries classified as IPR-, trade mark-, design-, patent- and copyright-intensive in the EU for the period 2021–2023. Regardless of whether presenting data for the EU as a whole or for individual EU member states, all references to exports in this chapter concern exports to non-EU countries, i.e. extra-EU exports. Also, all references to VA should be understood as gross value added.[55]

5.1. EU value added in exports

From an EU perspective, IPR-intensive industries' VA is generated to supply domestic consumption in the EU and to export to non-EU countries. Total exports of IPR-intensive industries amounted to almost €3 trillion on annual average in 2021–2023, representing 78.3% of all EU exports: €2.2 trillion in goods and €0.7 trillion in services.

54 https://joint-research-centre.ec.europa.eu/projects-and-activities/trade-and-industrial-policy-analysis/input-output-accounts/figaro-tables_en

55 Gross value added (GVA) is defined as output minus intermediate consumption. The sum of GVA across all industries and sectors in an economy plus taxes on products net of subsidies on products equals that economy's gross domestic product (GDP). By subtracting consumption of fixed capital (CFC) from GVA, the corresponding net value added (NVA) is obtained.

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This chapter examines EU value added in exports, i.e. the VA generated within the EU (both in the exporting IPR-intensive industries and in their EU upstream suppliers). This excludes foreign (non-EU) VA embodied in exports[56] and is therefore a key indicator of GVC participation.

Based on FIGARO tables, EU VA embodied in EU exports from IPR-intensive industries amounts to €1.8 trillion, accounting for 63% of total VA in exports of the whole EU economy (€2.8 trillion). This means that IPR-intensive industries account for a higher share of VA in EU's exports than in EU's GDP (48%), reflecting the strong participation of EU IPR-intensive industries in GVCs. The share of VA in exports of IPR-intensive industries is as high as 86% of total VA in exports in Ireland and as high as 68% in the Czech Republic. Hungary, Latvia and Lithuania registered the lowest ratios, below 50%. Spain (54%) and France (57%) are below the EU average while Italy and Germany are above (65%).

At the EU level, 83.6% of the EU VA generated by exports of IPR-intensive industries is generated in the exporting country, while the remaining 16.4% is generated in EU countries other than the exporting economy.

As shown in Table 33, Germany is the country generating the highest VA from EU exports of IPR-intensive industries, accounting for nearly one quarter of the total (€431 billion). France is second (€222 billion), followed closely by Ireland (€211 billion). When analysing specific IPRs, Ireland ranks second after Germany in trade mark- and patent-intensive industries, and it is first in copyright-intensive industries' exports.

A deeper analysis of GVCs shows that Ireland plays an important role in IPR-intensive industries' trade due to a strong presence of multinational enterprises (MNEs) in industries such as pharmaceuticals and ICT manufacturing, as well as its strong position in copyright-intensive services.

Table 33: VA in exports in IPR-intensive industries by country of origin, € million, 2023

Country of origin	Total VA of EU exports	IPR	TM	DES	PAT	CR
AT	71 019	45 421	32 721	23 498	27 879	5 077
BE	104 393	62 782	54 505	15 617	24 127	8 313
BG	19 516	12 330	10 091	4 243	4 221	2 534
CY	8 565	4 997	4 781	1 068	904	2 392
CZ	46 132	31 344	21 286	17 209	18 875	4 792
DE	661 226	431 207	295 388	213 220	271 969	57 320
DK	82 633	53 430	48 255	21 252	30 177	6 169

58 The non-EU VA in exports is the VA generated elsewhere outside the EU, due to the EU imports of goods and services used to6produce other goods and services that will be exported. Then, this VA is generated in any non-EU upstream industry along the production value chain, and it is an indicator of the overall dependence of the EU on imports from non-EU suppliers along the full GVC of IPR-intensive industries' exports.

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EE	6 755	4 056	3 436	1 190	1 266	1 214
ES	198 422	106 992	86 395	39 338	41 356	15 475
FI	42 302	27 279	21 749	11 443	16 549	6 253
FR	386 002	221 866	174 005	84 491	107 972	32 999
GR	27 203	15 932	13 838	4 701	4 817	1 351
HR	7 522	3 755	2 883	1 197	1 211	939
HU	31 573	20 785	15 031	9 689	12 027	2 847
IE	244 036	211 070	193 947	70 147	129 074	69 939
IT	272 157	176 179	134 336	96 487	89 480	15 510
LT	15 832	7 648	6 360	3 567	2 389	1 278
LU	24 845	n/a	n/a	n/a	n/a	n/a
LV	6 932	3 391	2 817	1 102	976	1 031
MT	5 640	3 422	3 079	574	641	1 121
NL	212 980	132 610	119 131	50 663	51 498	20 279
PL	133 079	73 412	57 078	32 634	31 127	11 703
PT	30 856	18 080	13 683	9 226	7 297	2 671
RO	43 932	24 389	18 305	8 415	10 907	6 480
SE	100 403	66 708	53 993	27 005	34 708	16,016
SI	11 823	7 288	5 604	3 245	4 633	881
SK	20 338	12 438	7 636	6 706	7 352	1 526
EU27	2 816 117	1 778 812	1 400 334	757 925	933 434	296 110

Source: JRC calculations using the Eurostat's macroeconomic globalisation indicators based on the FIGARO database (2025 edition).
Note: Due to overlapping use of IPRs, the sum of the figures for the individual IPRs exceeds the total figure for IPR-intensive industries.

Table 34 compares the VA in exports to GDP generated by IPR-intensive industries by country of origin. This indicator shows how strongly IPR-intensive industries are connected to global trade. A higher ratio means that, in that country, these industries are more export-oriented, while a lower ratio means they are more focused on producing for the EU market.

For the whole EU economy, VA in exports represents 16.3% of the EU GDP, a ratio exceeded by all IPR-intensive industries (23.1%), with the highest participation in GVCs found in patent- and design-intensive industries, both around 30%. This is true for all EU member states.

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These results show that IPR-intensive industries are substantially more export-oriented and globally integrated than non-IPR-intensive sectors. Patent- and design-intensive industries, in particular, display exceptionally high GVC participation rates, reflecting their focus on producing technologically advanced and differentiated products for international markets. The higher share of exports in IPR-intensive industries is associated with their reliance on IP protection, which facilitates the development of competitive advantages through innovation, quality differentiation and/or brand recognition. This stronger global integration confirms that IPR-intensive industries are more exposed to international demand, and account for a disproportionate share of EU export performance and external competitiveness.

Table 34:
VA in exports as a percentage of GDP, total and IPR-intensive industries, by country of origin, 2023

Country of origin	All industries	IPR	TM	DES	PAT	CR
AT	14.9%	22.6%	20.6%	30.8%	32.3%	18.4%
BE	17.5%	24.5%	25.1%	27.3%	27.6%	23.9%
BG	20.6%	26.6%	25.5%	31.2%	23.5%	30.7%
CY	27.3%	40.5%	42.8%	37.0%	42.5%	70.6%
CZ	14.5%	19.0%	16.2%	29.4%	27.4%	18.8%
DE	15.7%	23.0%	21.0%	27.7%	29.7%	21.8%
DK	22.1%	30.7%	31.9%	36.3%	41.5%	24.5%
EE	17.6%	22.6%	22.5%	26.6%	27.7%	31.7%
ES	13.2%	17.4%	16.7%	24.7%	22.9%	20.6%
FI	15.5%	20.7%	19.7%	29.9%	31.6%	27.4%
FR	13.7%	17.7%	16.5%	26.3%	29.2%	15.9%
GR	12.1%	15.3%	14.9%	22.3%	17.9%	13.2%
HR	9.6%	13.0%	12.4%	14.0%	13.5%	16.7%
HU	16.0%	22.8%	20.5%	32.9%	32.8%	22.7%
IE	46.5%	61.9%	63.1%	62.0%	65.4%	91.1%
IT	12.7%	17.5%	15.9%	27.8%	27.2%	14.4%
LT	21.3%	27.9%	28.0%	33.8%	26.9%	28.0%
LU	30.3%	n/a	n/a	n/a	n/a	n/a
LV	17.5%	23.6%	23.5%	27.1%	22.4%	30.7%
MT	27.0%	35.7%	36.3%	41.7%	41.7%	36.1%
NL	20.3%	27.8%	29.1%	27.3%	34.0%	27.7%
PL	17.7%	26.8%	26.2%	29.5%	27.8%	26.9%

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PT	11.4%	17.3%	15.8%	28.3%	24.9%	17.6%
RO	13.7%	17.8%	16.3%	21.1%	23.8%	23.8%
SE	18.8%	25.4%	26.1%	30.9%	31.9%	27.1%
SI	18.5%	27.7%	27.9%	28.2%	33.6%	21.7%
SK	16.4%	22.5%	17.8%	35.8%	35.0%	19.3%
EU27	16.3%	23.1%	22.3%	29.4%	31.6%	25.7%

Source: JRC calculations using the Eurostat's macroeconomic globalisation indicators based on the FIGARO database (2025 edition) and EPO/EUIPO own calculations.

Ireland also stands out when analysing VA in exports relative to GDP contributions of IPR-intensive industries and relative to the whole economy. Its ratios are more than double the EU average for IPR-intensive industries overall, and more than triple for copyright-intensive industries. Cyprus and Malta also show very high export-related VA ratios across all IPRs. Denmark shows consistently high ratios except in copyright-intensive industries. Other member states with high ratios include: the Netherlands (trade marks and patents), Slovakia (designs and patents) and Bulgaria, Estonia and Latvia (copyright). Croatia shows uniformly low ratios, signalling limited engagement in GVCs by its IPR-intensive industries. It is also remarkable that the four largest EU economies show ratios of EU VA in exports below the EU average, probably explained by their big domestic markets as well as strong intra-EU orientation. IPR-intensive industries most engaged in GVC in the countries mentioned above are pharmaceuticals, computer manufacturing and services, and motor vehicles.

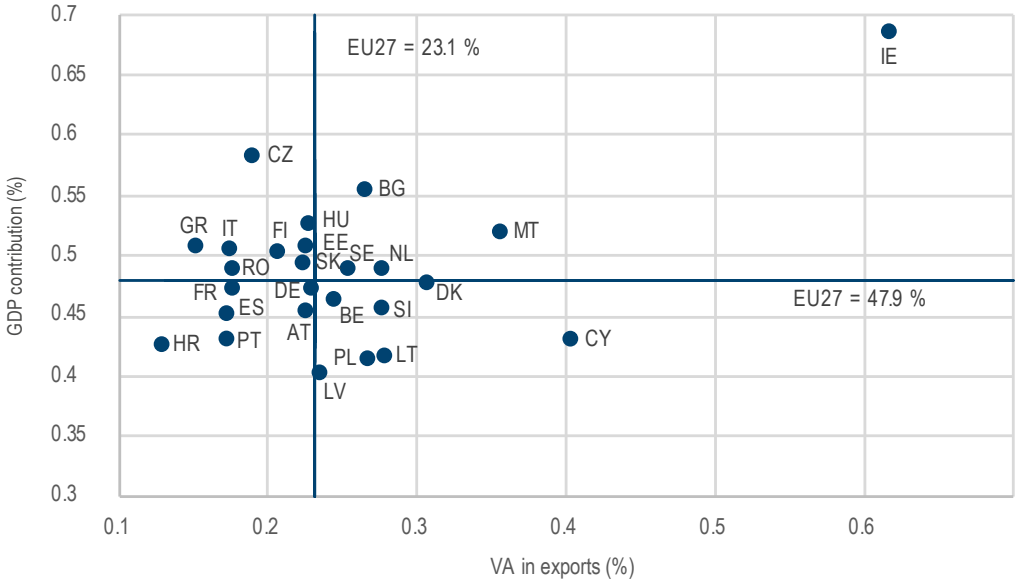
Figure 5 shows for each EU member state the relationship between two dimensions of IPR-intensive industries: their contribution to national GDP (vertical axis) and their participation in global value chains through exports (horizontal axis, measured as value added in exports as a percentage of total value added generated by IPR-intensive industries). The EU averages (23.1% for VA in exports and 47.9% for GDP contribution) divide the chart into four quadrants, each representing a distinct profile of IPR-intensive industry engagement in global value chains.

Quadrant interpretation:

- Upper-right: high GDP contribution of IPR-intensive industries and high GVC participation. Countries: Ireland (IE), Malta (MT), Bulgaria (BG), Netherlands (NL) and Sweden (SE).These countries have IPR-intensive industries that represent a large share of GDP and demonstrate strong integration into GVCs through high export intensity. This profile suggests economies where IPR-intensive sectors are both economically dominant internally and internationally competitive.
- Upper-left: high GDP contribution, low GVC participation. Countries: Czech Republic (CZ), Greece (GR), Italy (IT), Finland (FI), Romania (RO), Hungary (HU), Estonia (EE) and Slovakia (SK). These countries have IPR-intensive industries that contribute significantly to GDP (above EU average) but show lower EU-external export intensity relative to their total GDP. This pattern may indicate that IPR-intensive industries in these economies are more oriented toward internal market (domestic or intra-EU) rather than extra-EU exports.

- Lower-right: low GDP contribution and high GVC participation. Countries: Cyprus (CY), Denmark (DK), Slovenia (SI), Belgium (BE), Lithuania (LT), Poland (PL) and Latvia (LV). In these countries, IPR-intensive industries represent a smaller share of GDP but demonstrate high export intensity. This suggests that while IPR-intensive industries are relatively smaller in their economy scale, they are highly internationalised and integrated into global production networks, potentially serving as specialised suppliers or participants in specific value chain segments.
- Lower-left: low GDP contribution and low GVC participation. Countries: Croatia (HR), Portugal (PT), Spain (ES), France (FR), Austria (AT) and Germany (DE). These countries show both below-average GDP contribution from IPR-intensive industries and lower export intensity. This profile may reflect economies where IPR-intensive sectors play a more modest role both domestically and in international trade.

Figure 5:
GDP contribution vs. global value chain participation of IPR-intensive industries by EU member state



Source: JRC calculations using the Eurostat's macroeconomic globalisation indicators based on the FIGARO database (2025 edition) and EPO/EUIPO own calculations.

The following analysis complements the country-of-origin perspective by examining the value added generated within the EU that is embodied in each member state's exports. This distinction is important because it shows where value is actually created versus where goods and services are exported from. As an example, Table 33 above shows that €431 billion of VA is generated in Germany due to EU IPR-intensive industries' exports. We can now add that the VA of German exports of IPR-intensive industries was €401 billion (see Table 35 below), meaning that the VA of extra-EU trade generated in Germany is higher than the VA of German exports. This means Germany benefits more from other countries' exports (in terms of VA) than other countries benefit from German exports. This pattern holds across all IPR categories: trade mark-, design-, patent- and copyright-intensive industries. Note that the total value added generated across all EU member states equals the total value added embodied in all EU member states' exports.

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Table 35 presents these figures for all member states, revealing which countries are net beneficiaries of cross-border value creation within European supply chains.

Table 35: VA in exports in IPR-intensive industries by exporting country, € million, 2023

Exporting country	IPR	TM	DES	PAT	CR
AT	48 470	34 979	24 833	29 503	5 607
BE	63 326	54 552	17 923	26 552	8 939
BG	11 645	9 521	4 164	4 210	2 261
CY	6 167	5 823	1 283	1 182	2 948
CZ	30 773	20 939	16 606	18 427	4 680
DE	401 031	277 316	196 249	249 518	54 695
DK	57 716	51 538	22 007	31 536	7 323
EE	4 261	3 581	1 345	1 444	1 266
ES	101 977	81 718	38 406	41 434	14 903
FI	29 082	23 295	12 161	17 076	6 407
FR	226 210	176 084	88 729	113 192	32 227
GR	16 170	14 071	4 773	4 967	1 406
HR	3 671	2 816	1 252	1 302	835
HU	24 651	17 831	11 962	14 617	3 249
IE	220 613	201 628	73 307	129 366	70 212
IT	181 344	138 380	97 984	93 707	16 439
LT	7 885	6 381	3 744	2 868	1 139
LU	n/a	n/a	n/a	n/a	n/a
LV	3 371	2 778	1 171	1 113	872
MT	4 496	4 022	924	1 010	1 543
NL	125 265	110 998	48 249	48 972	19 489
PL	67 994	52 453	30 304	30 223	10 796
PT	20 628	15 589	10 419	8 999	2 638
RO	22 733	17 001	8 485	10 711	5 378
SE	68 150	55 026	27 994	35 241	15 814
SI	7 010	5 456	2 964	4 380	858
SK	16 146	9 228	9 316	10 348	1 723
EU27	1 778 812	1 400 334	757 925	933 434	296 110

Source: JRC calculations using the Eurostat's macroeconomic globalisation indicators based on the FIGARO database (2025 edition).
Note: Due to overlapping use of IPRs, the sum of the figures for the individual IPRs exceeds the total figure for IPR-intensive industries.

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Beyond Germany, several other EU member states benefit from cross-border value creation in IPR-intensive industries' exports. Bulgaria, Czech Republic, Spain, Croatia, Latvia, the Netherlands, Poland, Romania and Slovenia. France, Lithuania, Portugal and Sweden derive particularly strong benefits in copyright-intensive industries.

Ireland presents a contrasting case: the value added embodied in its own exports exceeds the value added generated domestically through other countries' exports. This reflects Ireland's position as a net exporter of high-value-added products rather than a net supplier of intermediate inputs to other EU exporters.

In relative terms, Germany, Poland and Romania show the largest net benefits from cross-border value flows across all IPR-intensive industries. For copyright-intensive industries specifically, Bulgaria, Croatia, Lithuania, Latvia and Romania benefit the most. Conversely, Hungary, Portugal, Slovakia, Cyprus and Malta experience the opposite pattern: the value added in their own exports exceeds the value added generated domestically by EU exports.

5.2. Employment supported in the EU by export

More than 65 million persons were employed in IPR-intensive industries in the EU on average during 2021–2023. According to FIGARO-based calculations, exports to non-EU countries by IPR-intensive industries supported more than 17 million jobs in 2023. This figure includes both direct employment within IPR-intensive industries themselves and indirect employment in supplier industries that provide intermediate goods and services to EU exporters, representing 8% of all employment in the EU.

The significance of this employment contribution becomes apparent when compared to broader trade patterns. These 17 million jobs represent approximately half of all employment supported by EU exports to non-EU countries (33.6 million people in 2023) – a substantially higher share than IPR-intensive industries' contribution to total EU employment (30.6%). This discrepancy reveals the strong export orientation and deep integration of IPR-intensive industries in global value chains, consistent with the value-added analysis presented above.

Trade mark-intensive industries support the largest employment base, with more than 12 million jobs, followed by both design-intensive and patent-intensive industries with more than 8 million jobs each, and copyright-intensive industries with nearly 3 million jobs. Additionally, of the employment supported by these exports, 82% is located in the exporting country, while 18% is generated in other EU member states through cross-border supply chain linkages.

Table 36: Employment supported by exports of IPR-intensive industries by country of origin, thousand persons, 2023

Country of origin	IPR	TM	DES	PAT	CR
AT	407	280	208	236	58
BE	467	379	123	141	72
BG	365	266	170	131	63
CY	49	45	8	8	17
CZ	538	328	336	359	62
DE	3 827	2 554	1 902	2 287	594
DK	299	247	135	133	56
EE	67	49	28	27	19
ES	1 381	1 043	578	489	254
FI	227	169	94	126	60
FR	1 947	1 407	762	840	378
GR	293	222	102	82	37
HR	83	54	32	32	18
HU	477	326	254	269	73
IE	494	393	156	197	124
IT	2 004	1 473	1 186	982	215
LT	140	98	74	47	26
LU	n/a	n/a	n/a	n/a	n/a
LV	70	55	28	20	18
MT	37	28	10	9	8
NL	973	751	339	304	192
PL	1 542	1 018	774	708	275
PT	360	255	213	131	48
RO	501	300	272	301	56
SE	467	352	211	241	125
SI	116	82	58	69	18
SK	256	156	157	157	28
EU27	17 387	12 327	8 208	8 326	2 895

Source: JRC calculations using the Eurostat's macroeconomic globalisation indicators based on the FIGARO database (2025 edition).
Note: Due to overlapping use of IPRs, the sum of the figures for the individual IPRs exceeds the total figure for IPR-intensive industries.

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Germany dominates export-supported employment in IPR-intensive industries, with 3.8 million jobs accounting for 22% of the EU total, and rising to 27% in patent-intensive industries. Italy ranks second with 2 million jobs, followed by France (1.9 million), Poland (1.5 million) and Spain (1.4 million). Ireland, despite its significant role in value-added exports, ranks ninth in absolute employment terms, behind the Netherlands, Romania and the Czech Republic.

Export-supported employment in IPR-intensive industries represents 26.6% of total employment in these sectors, substantially higher than the EU average for all exports (15.4%). This difference reflects the greater integration of knowledge-intensive industries into global supply chains. However, this integration varies significantly by IPR type. Patent-intensive industries show the strongest export orientation, with 33.0% of employment linked to extra-EU exports, reflecting their critical role as technology providers in global production networks. Copyright-intensive industries, conversely, display the lowest export-employment ratio at 21.5%, indicating these sectors predominantly serve EU and domestic markets rather than extra-EU customers.

Table 37 presents employment-supported export ratios for each EU member state, revealing substantial variation in how deeply different economies are integrated into global value chains for IPR-intensive industries. All member states display higher employment-supported export ratios for IPR-intensive industries compared with total EU exports, confirming that these knowledge-intensive sectors are more export-oriented than the economy-wide average. However, the magnitude of this difference varies considerably across countries. Finland, Greece, Italy, France, Hungary and Ireland show particularly pronounced differences, indicating especially strong export orientation of their IPR-intensive sectors. A notable exception is Romania and Slovakia, where copyright-intensive industries show marginally lower export-employment ratios than the EU average for all exports.

Ireland stands out as exceptionally export-oriented across all IPR categories. More than half of employment in IPR-intensive industries (54.9%) is linked to extra-EU exports, rising to 63.3% in patent-intensive industries. This reflects Ireland's prominent position as a specialised hub for highly knowledge-intensive activities, particularly in pharmaceuticals, software and business services. In contrast, the four largest EU economies – Germany, France, Spain and Italy – display below-average export-employment ratios despite accounting for the majority of absolute export-supported jobs. This pattern reflects the presence of large domestic markets that sustain substantial IPR-intensive sectors which serve primarily EU and domestic demand rather than extra-EU customers. Bulgaria, Cyprus, Denmark, Finland, Malta and Slovenia demonstrate a different profile: despite smaller total employment bases in IPR-intensive industries, these countries achieve above-average export-employment ratios. This indicates they occupy specialised positions in international production networks, either as technology specialists or as nodes in cross-border supply chains serving global demand.

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Table 37:
Employment supported by exports by country of origin as a percentage of total employment, total EU exports and IPR-intensive industries, 2023

Country of origin	Total EU exports	IPR	TM	DES	PAT	CR
AT	14.4%	26.2%	26.1%	30.8%	36.1%	18.2%
BE	17.6%	31.6%	34.3%	25.5%	30.8%	22.3%
BG	24.9%	34.8%	33.7%	37.6%	36.4%	28.4%
CY	21.0%	34.3%	40.0%	19.6%	27.2%	45.4%
CZ	16.3%	26.1%	23.6%	30.6%	33.3%	17.7%
DE	15.0%	24.6%	24.4%	26.7%	30.6%	20.8%
DK	17.3%	30.2%	33.0%	35.1%	39.5%	24.1%
EE	18.4%	27.4%	27.0%	29.7%	36.7%	28.8%
ES	14.5%	23.5%	24.0%	26.7%	28.2%	19.9%
FI	15.5%	31.7%	33.6%	34.4%	41.2%	31.2%
FR	13.4%	24.9%	25.9%	25.8%	29.0%	20.2%
GR	12.5%	24.6%	24.8%	24.3%	25.7%	14.2%
HR	11.4%	15.9%	14.5%	14.6%	20.0%	16.1%
HU	16.1%	29.8%	29.4%	35.8%	40.4%	23.3%
IE	29.6%	54.9%	54.7%	49.5%	63.3%	55.3%
IT	13.4%	26.2%	26.7%	31.7%	34.4%	15.6%
LT	21.0%	27.6%	26.8%	33.7%	36.8%	22.1%
LU	26.2%	n/a	n/a	n/a	n/a	n/a
LV	18.9%	25.2%	25.9%	29.2%	27.0%	24.4%
MT	24.3%	36.2%	36.6%	35.1%	43.8%	31.8%
NL	18.4%	31.6%	31.6%	30.9%	34.6%	25.3%
PL	17.3%	29.0%	27.2%	30.4%	36.3%	28.4%
PT	13.2%	21.6%	21.0%	28.3%	28.9%	13.8%
RO	15.1%	23.3%	20.6%	28.3%	38.2%	12.1%
SE	15.6%	26.5%	29.6%	30.7%	35.6%	26.6%
SI	18.9%	30.4%	31.8%	32.9%	38.1%	25.8%
SK	18.0%	29.1%	26.2%	36.2%	40.2%	17.2%
EU	15.4%	26.6%	26.7%	29.1%	33.0%	21.5%

Source: JRC calculations using the Eurostat's macroeconomic globalisation indicators based on the FIGARO database (2025 edition) and EPO/EUIPO own calculations.

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Overall, the analysis of VA and employment embodied in EU exports of IPR-intensive industries reveals broad differences among member states. As shown above, Ireland stands out across all ratios, showing very high contributions of IPR-intensive industries to VA and employment, as well as high shares assigned to extra-EU exports. The country is a central actor in EU GVCs, likely due to the strong presence of MNEs in IPR-intensive sectors. Denmark and Bulgaria also play key roles in GVCs, displaying high ratios of VA and employment supported by exports. At the other end, exports from Croatia involve low shares of VA and employment, while France and Spain, despite being large economies, are less integrated in GVCs of IPR-intensive industries.

To complement the analysis of EU value creation, it is important to understand the foreign value added that flows into European IPR-intensive industries. This is measured by the share of non-EU value added incorporated into EU final use (or final demand)[57] for IPR-intensive products and services. The FIGARO tables identify 22 non-EU countries individually, with the remaining countries aggregated as "Rest of the World" accounting for 30% of all foreign value added in IPR-intensive industries. Three non-EU countries dominate as sources of foreign value added in EU IPR-intensive industries. The United States accounts for 18.2% of foreign content, China for 11.4%, and the United Kingdom for 9.1%. However, these countries' contributions vary significantly across IPR types. The United States and United Kingdom are heavily concentrated in copyright-intensive industries, representing 27.3% and 12.5% of foreign content, respectively, reflecting their strength in software, media and digital services. Chinese value added, conversely, is most prominent in patent-intensive and design-intensive industries at approximately 15% of total foreign VA from China.

57 In input output tables, final use, or final demand, refers to all goods and services that are not used as inputs for further production, but instead are consumed or invested at the end of the production process, as opposed to intermediate use. It includes household and government consumption, investment and exports. EU final use does not include extra-EU exports.

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6. Origins of IPRs and job creation in the single market

It is important to bear in mind that the shares in GDP and employment shown in this report do not necessarily reflect the degree to which a country's economy is innovative. For example, a country may be a good location for patent-intensive manufacturing industries due to low costs, a favourable business climate or the availability of natural resources. That country may then have a high share of employment in patent-intensive industries even though the manufacturing firms that built the factories and created the jobs in its territory have their head offices and carry out their research and development (as opposed to production) elsewhere.

Therefore, this chapter explores two basic questions:

- Which EU member states create the IPRs analysed in this report?
- What proportion of jobs in IPR-intensive industries in each member state is created by companies from other member states?

6.1. Origins of IPRs within the EU

So far, this report has examined where jobs and economic activity in IPR-intensive industries are created. As already noted, this is not necessarily a reflection of the relative "IP-creating power" of the member states. In the single market, companies may have their head offices in one country, create their IPRs in another country and manufacture the resulting products in yet another. In particular, decisions as to where to site production facilities depend on many factors, including the cost and availability of labour with the necessary skills, the cost and availability of land, raw materials and other resources, the business environment and tax regime in the various countries and so on.

Using the data on filings and employment, it is possible to explore where the TMs and designs filed at the EUIPO, the patent applications filed at the EPO and the PVRs filed at the CPVO originate (as indicated by the nationality of the owner). The tables in this section show the number of patents, TMs, designs and PVRs originating in each member state during the 2021-23 period. It should be noted that, in order to provide a complete picture of IPR-generating activities in each country, filings from companies in all industries are included in these tables. Therefore, the figures are not directly comparable with those in the previous chapters of this report, which analysed IPR-intensive industries only.[58]

58 As is the case throughout this report, the analysis is based on EU27-level filings. Future studies could include national filings as well to provide a more complete picture.

Table 38:
IPR filings by country of origin in all industries, 2021–2023 average

Country	PAT	PAT rank	TM	TM rank	DES	DES rank	EMPL ('000)	PATs per 1 000 empl.	TMs per 1 000 empl.	DES per 1 000 empl.
AT	2 341	8	4 101	7	2 343	7	4 328	0.54	0.95	0.54
BE	2 557	7	2 780	9	1 098	10	4 890	0.52	0.57	0.22
BG	43	24	1 301	17	703	14	2 816	0.02	0.46	0.25
CY	47	23	1 104	18	75	26	447	0.11	2.47	0.17
CZ	221	15	1 899	12	739	13	4 993	0.04	0.38	0.15
DE	2 5148	1	24 337	1	14 093	1	40 240	0.62	0.6	0.35
DK	2 643	6	2 177	10	1 327	9	2 846	0.93	0.76	0.47
EE	69	20	902	23	172	22	635	0.11	1.42	0.27
ES	2 016	10	11 262	3	3 767	5	20 211	0.1	0.56	0.19
FI	2 195	9	1 595	14	769	12	2 509	0.87	0.64	0.31
FR	10 847	2	9 212	4	5 714	3	27 701	0.39	0.33	0.21
GR	183	16	1 454	15	214	19	3 977	0.05	0.37	0.05
HR	37	26	402	26	102	24	1 576	0.02	0.26	0.06
HU	111	18	925	21	190	20	4 550	0.02	0.2	0.04
IE	1 089	11	1 442	16	405	16	2 462	0.44	0.59	0.16
IT	4 956	5	14 122	2	11 159	2	22 365	0.22	0.63	0.5
LT	93	19	1 044	19	216	18	1344	0.07	0.78	0.16
LU	373	13	924	22	242	17	310	1.2	2.98	0.78
LV	23	27	381	27	91	25	832	0.03	0.46	0.11
MT	59	21	950	20	74	27	278	0.21	3.42	0.27
NL	6 810	3	5 912	6	3 059	6	9199	0.74	0.64	0.33
PL	599	12	6 463	5	5 130	4	16 806	0.04	0.38	0.31
PT	311	14	2 067	11	804	11	4 716	0.07	0.44	0.17
RO	40	25	1 790	13	529	15	7 670	0.01	0.23	0.07
SE	5 037	4	3 790	8	1 439	8	4 966	1.01	0.76	0.29
SI	131	17	580	25	176	21	964	0.14	0.6	0.18
SK	49	22	681	24	163	23	2 547	0.02	0.27	0.06
EU27	**68 028**		**103 597**		**54 793**		**196 178**	**0.35**	**0.53**	**0.28**

Note: The table shows the mean number of annual filings per country of origin of the applicant calculated from the dataset of all the applications filed between 2021 and 2023. Applicants were linked with countries of origin based on the seat country as shown in the application. Calculations in this table take into account all the applications received by the respective IP offices, and not just those matched with ORBIS. Employment data sourced from Eurostat LFS (lfsi_emp_a) represent total employment among residents between 15 and 64 years.

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In absolute terms, Germany ranks first for patents, TMs and designs, followed by France, the Netherlands, Italy and Spain. There is some variation between the various IPRs. For example, while Spain is in third place for TMs and fifth place in designs, it is in tenth place for patents. The group made up of the largest economies is followed by a group of smaller, mostly northern European countries, including Austria, Belgium, Denmark and Sweden. The highest-placed among the 13 countries that joined the EU from 2004 onwards is Poland (fifth in TMs, fourth in designs and twelfth in patents), which is also the largest country in this group.

Of course, all other things being equal, large countries will tend to have more IPR filings. Therefore, Table 38 also shows the number of IPR filings per 1 000 employees. This is the measure of IPR intensity employed throughout this report. The overall EU average is 0.53 EUTMs, 0.35 PATs and 0.28 RCDs per 1 000 employees. Viewed in this light, the countries above the EU average overall in terms of IPR creation per employee in all three IPRs are Austria, Germany, Denmark, Finland, Luxembourg, Netherlands and Sweden.

Some countries have areas of particular strength. For example, Cyprus, Malta and Estonia are above the EU average for TMs, but below it for other IPRs.

6.2. Job creation in the single market

Chapter 4 of this report revealed that many of the more recent member states have relatively high proportions of IPR-intensive industries in employment and GDP. Section 6.1, however, shows that the IPRs being applied for at the EUIPO and EPO for the most part originate in the older member states. Thus, it appears that while many companies continue to develop their IPRs at home, the resulting production is often located in other member states, particularly those that joined the EU from 2004 onwards. Indeed, cross-border job creation can be considered a positive manifestation of the single market.

This pattern of job creation in the single market is further illustrated by the extent to which jobs in each member state are created by companies based in other member states or countries outside the EU.

Data on foreign ownership in each member state is available from Eurostat's foreign affiliates statistics (FATS).[59] In Table 39, this information has been combined with the matched database in order to determine how many jobs in IPR-intensive industries in each member state have been created by companies from outside that country. It should be noted that due to data limitations, it has not been possible to carry out this analysis for all 27 member states. Overall, 21.2% of jobs in IPR-intensive industries in the EU27 was generated by companies from other countries – 11.8% by companies from other EU member states, and 9.5% by companies from outside the EU. In general, the member states that joined the EU in 2004 and 2007 are recipients of many jobs created by companies beyond their borders.

59 For a detailed explanation, see https://ec.europa.eu/eurostat/cache/metadata/en/fats_sims.htm.

Thus, 40.8% of all IPR-intensive employment in Romania is in non-Romanian-owned firms. Of those jobs, 27.2% are in companies based in other EU countries, while 13.6% are in companies with their head offices outside the EU. Other member states in which more than 30% of IPR-intensive job creation originates beyond their borders are the Czech Republic, Estonia, Hungary, Ireland, Latvia, Malta, Poland and Slovakia.

The highest share of jobs in IPR-intensive industries generated by companies from outside the EU is to be found in Ireland, at 25.8%. Ireland, Cyprus, Germany and the Netherlands are the only current member states in which more jobs are created by companies from third countries than by companies based in other EU member states.

Table 39: Jobs in EU member states attributed to foreign companies in all IPR-intensive industries, 2021–2023 average

	Jobs attributed to companies based in:					
Country	Other EU member states	Non-EU countries	Total employment in IPR-intensive industries*	Other EU share	Non-EU share	Total non-domestic share
AT	224 168	102 375	1 468 095	15.3%	7.0%	22.2%
BE	180 836	125 669	1 662 574	10.9%	7.6%	18.4%
BG	136 634	124 893	984 470	13.1%	12.7%	26.6%
CY	5 412	5 995	133 007	4.1%	4.5%	8.6%
CZ	458 880	276 007	1 903 759	24.1%	14.5%	38.6%
DE	1 076 911	1 402 825	14 729 608	7.3%	9.5%	16.8%
DK	121 578	99 830	939 748	12.9%	10.6%	23.6%
EE	47 930	23 619	233 949	20.5%	10.1%	30.6%
ES	640 575	388 435	5 491 128	11.7%	7.1%	18.7%
FI	88 996	70 090	672 858	13.2%	10.4%	23.6%
FR	592 359	546 480	7 289 486	8.1%	7.5%	15.6%
GR	91 189	26 945	1 122 952	8.1%	2.4%	10.5%
HR	103 375	38 399	491 261	21.0%	7.8%	28.9%
HU	313 301	198 614	1 513 703	20.7%	13.1%	33.8%
IE	41 249	218 839	847 535	4.9%	25.8%	30.7%
IT	550 532	467 384	7 553 914	7.3%	6.2%	13.5%
LT	64 951	47 132	476 117	13.6%	9.9%	23.5%
LU	n/a	n/a	n/a	n/a	n/a	n/a
LV	59 438	19 628	262 727	22.6%	7.5%	30.1%
MT	16 050	14 095	96 625	16.6%	14.6%	31.2%

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NL	256 575	360 352	2 911 298	8.8%	12.4%	21.2%
PL	886 811	490 847	3 928 312	22.6%	12.5%	35.1%
PT	195 384	98 585	1 577 474	12.4%	6.2%	18.6%
RO	546 652	273 565	2 012 022	27.2%	13.6%	40.8%
SE	226 070	222 252	1 695 894	13.3%	13.1%	26.4%
SI	67 012	31 820	335 531	20.0%	9.5%	29.5%
SK	219 680	110 461	838 468	26.2%	13.2%	39.4%
EU	**7 212 549**	**5 785 134**	**61 172 514**	**11.8%**	**9.5%**	**21.2%**

*IPR-intensive industries included in FATS. Thus, there is a small difference compared with the main results in Chapters 3 and 4.

These figures show that there are significant flows of job creation between EU member states, and also to some degree between the EU and non-EU countries. However, to provide some perspective, even in Romania, the country with the highest share of non-domestic companies in IPR-intensive industries, the proportion of jobs in non-Romanian firms is 41%, so that almost 60% of such jobs are still generated by domestic companies. In the largest economies in the EU, the majority of jobs in IPR-intensive industries are generated domestically: 84% in France, 83% in Germany, 81% in Spain and 87% in Italy.

Table 40 indicates the share of jobs attributed to non-domestic companies in industries which are intensive in TMs, patents and designs. As compared with the overall EU average of 21.2% for industries intensive in any one of the six IPRs, industries which are intensive in patents and designs account for a higher proportion of jobs in subsidiaries of foreign companies. Hungary, Romania and Slovakia register non-domestic shares for patents of more than 50%.

Table 40: Jobs in IPR-intensive industries attributed to non-domestic companies by EU member states, 2021–2023 average, by IP right

	Patents			Trade marks			Designs		
Country	**Other EU share**	**Non-EU share**	**Total non-domestic share**	**Other EU share**	**Non-EU share**	**Total non-domestic share**	**Other EU share**	**Non-EU share**	**Total non-domestic share**
AT	15.7%	8.4%	24.1%	16.7%	6.6%	23.3%	16.4%	7.6%	24.0%
BE	13.2%	12.9%	26.0%	10.4%	7.5%	17.9%	11.8%	8.1%	19.9%
BG	16.1%	14.7%	30.8%	13.5%	11.6%	25.1%	13.5%	9.1%	22.6%
CY	2.2%	1.8%	4.0%	4.6%	5.2%	9.8%	3.0%	1.2%	4.2%
CZ	29.3%	18.5%	47.8%	21.4%	13.4%	34.8%	28.4%	16.5%	44.9%
DE	8.5%	12.0%	20.6%	6.8%	9.5%	16.4%	7.7%	10.7%	18.4%
DK	15.6%	12.1%	27.7%	13.2%	10.9%	24.1%	15.6%	10.6%	26.2%
EE	26.0%	10.2%	36.3%	20.2%	10.4%	30.7%	25.5%	7.7%	33.3%
ES	16.9%	8.9%	25.7%	10.6%	7.2%	17.8%	12.3%	6.4%	18.7%
FI	14.4%	13.1%	27.5%	12.7%	10.6%	23.4%	12.9%	10.5%	23.5%

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FR	11.2%	10.1%	21.3%	7.6%	7.9%	15.5%	10.3%	8.8%	19.1%
GR	8.3%	2.4%	10.7%	8.0%	2.6%	10.6%	6.6%	2.2%	8.7%
HR	17.7%	8.1%	25.8%	22.4%	8.3%	30.7%	21.4%	5.7%	27.2%
HU	31.0%	19.3%	50.2%	17.5%	12.0%	29.5%	27.2%	15.8%	43.1%
IE	3.6%	25.0%	28.6%	5.1%	28.7%	33.8%	4.9%	23.6%	28.5%
IT	9.2%	8.4%	17.6%	7.2%	6.2%	13.4%	7.3%	6.0%	13.4%
LT	14.6%	11.9%	26.5%	13.0%	9.9%	22.9%	12.6%	9.0%	21.5%
LU	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
LV	21.8%	6.7%	28.5%	22.4%	8.0%	30.4%	22.6%	6.1%	28.7%
MT	22.8%	16.4%	39.2%	17.2%	13.2%	30.4%	19.5%	7.7%	27.1%
NL	10.4%	17.5%	27.9%	8.9%	12.8%	21.7%	10.0%	13.3%	23.3%
PL	26.7%	15.3%	42.0%	20.5%	12.1%	32.6%	24.0%	12.4%	36.4%
PT	16.8%	9.0%	25.8%	12.1%	6.1%	18.2%	12.4%	4.7%	17.1%
RO	37.3%	18.2%	55.5%	23.9%	12.8%	36.7%	28.5%	11.8%	40.3%
SE	14.8%	18.9%	33.7%	13.9%	12.3%	26.1%	15.2%	15.1%	30.2%
SI	23.4%	12.3%	35.7%	19.3%	9.0%	28.2%	25.6%	11.0%	36.6%
SK	35.1%	20.3%	55.4%	23.4%	10.2%	33.7%	30.2%	16.0%	46.2%
EU	**14.7%**	**12.5%**	**27.2%**	**11.0%**	**9.4%**	**20.4%**	**13.1%**	**10.0%**	**23.1%**

Table 41 shows the cross-border flows of jobs within the single market from a different perspective, namely by looking at the origin of the more than five million jobs created in EU member states by companies from other member states. Thus, German companies have created 1.6 million jobs – about 30.6% of the total – in other member states. French companies have created 1.2 million jobs elsewhere in the EU, and so on. The top of the list is dominated by the large member states, although Austrian and Scandinavian companies also create significant numbers of jobs in other member states.

Table 41:
Jobs in EU member states attributed to companies from other member states (IPR-intensive industries, 2021–2023 average)

Member State	Jobs in the rest of EU attributed to companies based in the member state	Share of all EU cross-border jobs
AT	236 626	4.6%
BE	90 756	1.7%
BG	2 399	0.0%
CY	442	0.0%
CZ	20 231	0.4%
DE	1 587 380	30.6%
DK	206 456	4.0%
EE	n/a	n/a

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ES	144 661	2.8%
FI	140 187	2.7%
FR	1 209 364	23.3%
GR	12 296	0.2%
HR	4 817	0.1%
HU	20 544	0.4%
IE	143 119	2.8%
IT	457 325	8.8%
LT	19 325	0.4%
LU	n/a	n/a
LV	3 740	0.1%
MT	589	0.0%
NL	441 532	8.5%
PL	32 150	0.6%
PT	14 761	0.3%
RO	6 258	0.1%
SE	378 707	7.3%
SI	6 577	0.1%
SK	7 196	0.1%
EU	**5 187 438**	**100%**

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7. IPR intensity and access to venture finance

This chapter focuses on an area of critical importance for the EU's economic future: access to financing for firms active in IPR-intensive industries. Access to adequate financial resources is essential for scaling innovative ideas and bringing them to market. Since innovations ultimately translate into productivity advances at the firm level, the expansion of the most dynamic and innovative firms is a key driver of overall economic productivity and growth.

However, financing structures in Europe present a significant challenge for innovative enterprises. The European financial system is overwhelmingly reliant on traditional bank lending, which is often poorly suited to financing emergent firms with novel technologies but limited operating histories and scarce tangible assets that could serve as conventional collateral. For such high-risk, knowledge-intensive ventures, access to venture capital – which provides patient capital, strategic guidance, and business expertise – is crucial. Yet, Europe faces substantial deficits in venture capital availability compared to the United States, particularly for scale-up stage financing, limiting the growth prospects of promising European start-ups.

To overcome information asymmetries between innovators and investors, venture funds use a variety of information sources, mostly based on the quality of human capital, e.g. the founding team, to identify firms with the best future prospects. IP rights may be seen as one of the key indicators pointing to new products and services that can lead to better economic prospects. IPR also serves as important assets securing freedom to operate for the company and providing the flexibility to pivot and adjust business models during business development and growth. Higher IPR intensiveness in an industry may therefore be seen as a crucial piece of information bridging the gap between innovators and providers of financial resources necessary for commercialisation of innovative products and services.

This chapter uses data from Crunchbase and ORBIS to verify the hypothesis that IPR intensity is a useful indicator of business opportunities, and that providers of financial resources tend to provide more finance to firms active in industries with higher IPR intensity. The analysis focuses on financing events classified as seed, early stage or late stage announced between 2021 and 2023. The dataset comprises 10 005 distinct EU-based start-ups that participated in 13 241 distinct financial events (financial rounds). Information on the amount raised was unavailable for approximately 20% of the financial events.

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Crunchbase is the main source of data for venture and private capital activity in Europe. It classifies start-ups into 49 industry groups and over 800 subcategories, with company profiles often assigned to multiple industries. For instance, industry group “Sustainability” subdivides into ten subcategories: Sustainability, Waste Management, Organic, Recycling, Water Purification, GreenTech, CleanTech, Pollution Control, Carbon Capture, and Wildlife Conservation.

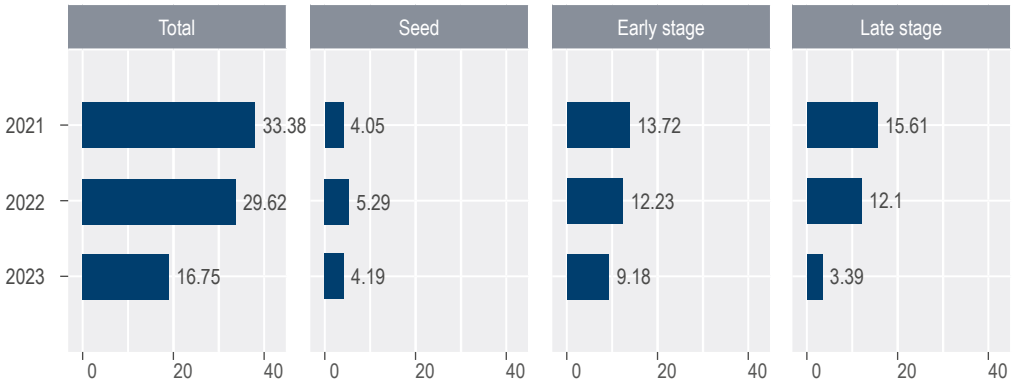
While this detailed classification enables precise identification and categorisation of start-up enterprises, its applicability for integrating external industry statistical datasets remains limited. Specifically, internal Crunchbase classification cannot be directly link to NACE, which was the main taxonomy used to determine the IPR intensity of industries.

Therefore, to ensure accurate classification of the industrial activities of each fund recipient, a methodology analogous to that employed for determination of industry information in the IPR registers was adopted. Using the same matching methodology as in case of applicants for IPRs, it was possible to assign a NACE code to approximately 88% of the start-ups available in Crunchbase database.

7.1. Trends in venture capital financing in the EU

Figure 6 presents the distribution of the private equity and venture capital funding received by start-ups in the European Union between 2021 and 2023 and documented in the Crunchbase data. Funding levels in 2021 and 2022 were exceptionally high and significantly exceeded the averages recorded in earlier years. By contrast, the transaction values observed in 2023 returned to levels more in line with those typical of the period prior to 2021. The low aggregate funding in 2023 was driven mainly by an unusually weak late-stage segment, which did not exceed €3.4 billion and fell well below the level recorded in the previous year, while seed and early-stage funding also declined, but less sharply than late-stage funding.

Figure 6:
Distribution of private equity and venture capital funds between different stages and years (in € billion)



Note: Own calculations based on the Crunchbase data

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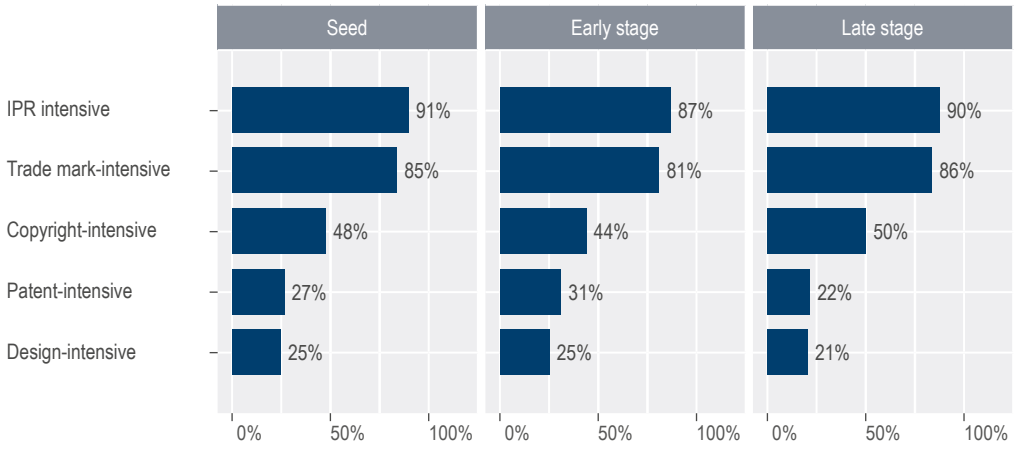
Figure 7:
Share of private equity and venture capital funds directed to IPR-intensive industries at different stages of financing



Note: Own calculations based on the Crunchbase data

88% of total funding, equivalent to €70.7 billion across all funding stages, mostly private equity and venture capital funding, targets firms operating in IPR-intensive industries. At all stages, more than 80% of funding goes to trade mark-intensive industries (Figure 7). Copyright-intensive industries also attract a substantial share of investment: in seed and late-stage rounds, they account for around 50% of total funding, and in earlier stages their share exceeds 40%, largely reflecting the strong presence of software-related activities within this group. Patent-intensive and design-intensive industries receive over a quarter of all seed and early-stage funding in the EU, and over 20% of late-stage funding.

Figure 8 shows that the share of total funding attributable to IPR-intensive industries remains broadly stable over time. The main exception is 2023, which recorded the lowest overall funding in the period and a change in composition: the funding share of copyright-intensive industries declined, while the shares of patent- and design-intensive industries increased significantly. In 2023, the funding share of patent-intensive industries exceeded that of copyright-intensive sectors, and remained broadly stable in nominal terms.

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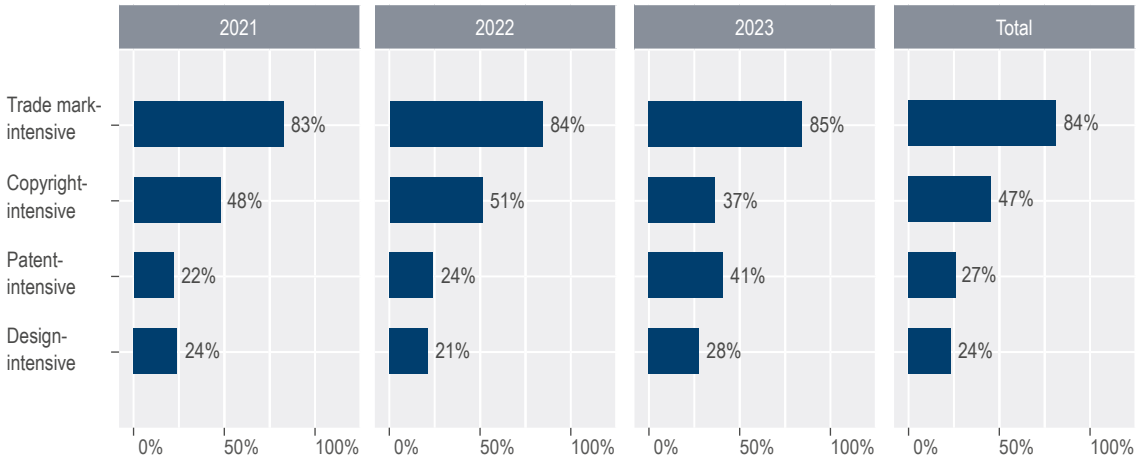
Figure 8:
Share of private equity and venture capital funds directed to IPR-intensive industries between 2021 and 2023



Note: Own calculations based on the Crunchbase data

Private capital and equity funding in the EU is concentrated in the few industries which register the bulk of overall funding. Financial rounds where the funding information is available in Crunchbase cover 374 different industries. While Crunchbase data records financial rounds across 374 distinct industries, the top 20 recipients captured nearly 75% of total funding between 2021 and 2023, as illustrated in Figure 9. “Computer programming activities” emerged as the dominant sector, securing approximately 24% of all private and venture capital during this period – a share equivalent to the combined funding of the next five largest industries in the ranking.

Among the top 20 industries in this ranking, only two are not IPR-intensive. Sixteen industries are trade mark-intensive, eight are patent-intensive, seven are copyright-intensive and four are design-intensive.

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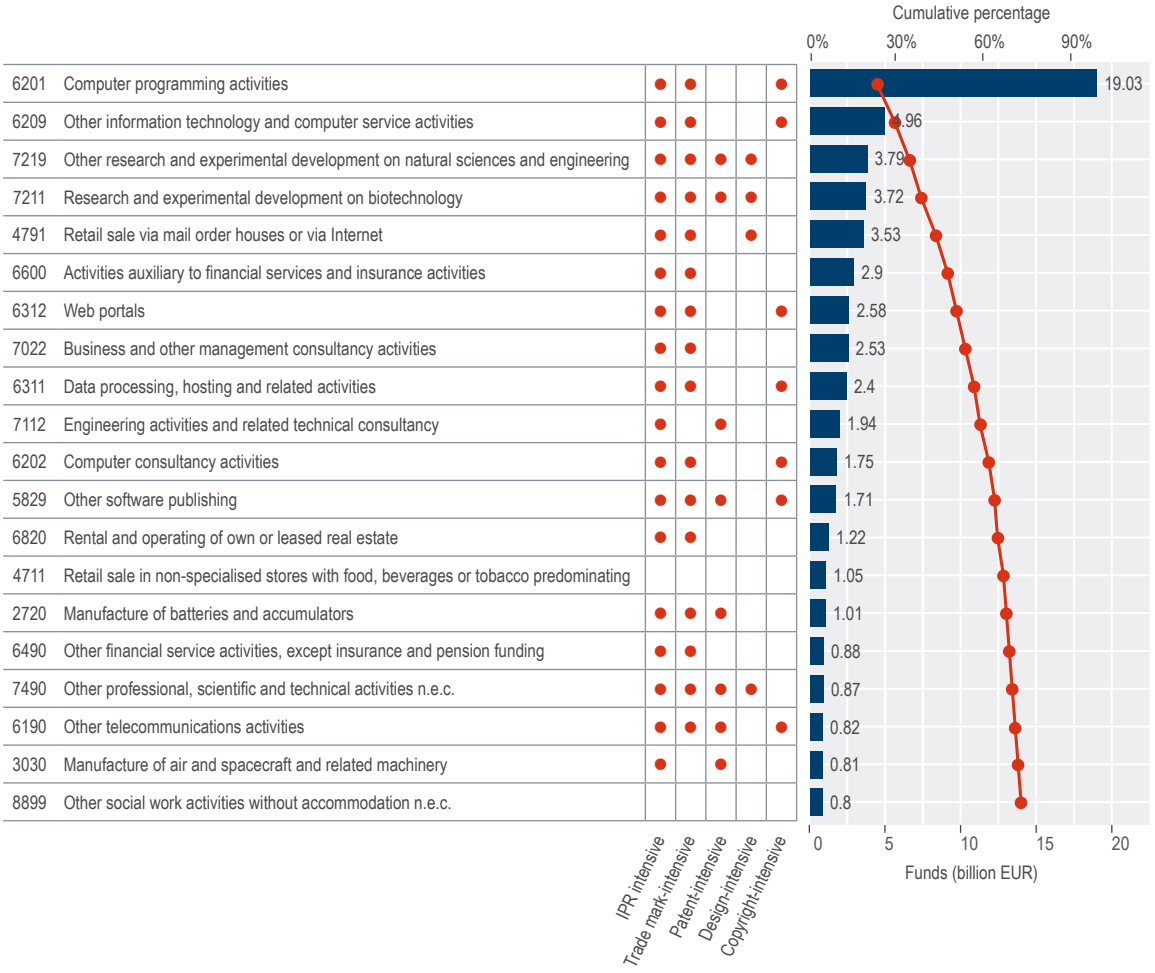
Figure 9:
Top 20 industries by total value of venture capital financing, 2021–2023



Note: Ranking of the top 20 industries with the highest overall value of financing from venture and private capital in the years 2021 to 2023. The table in the middle indicates whether the industry is IPR-intensive, and what type of IPR it is intensive in. Bar plot shows total amount of funding (in € billion). The red cumulative percentage line shows what share of total funding is concentrated in the top-ranked industries. Each point on the line indicates the combined percentage of total financing received by the industries ranked up to that position.

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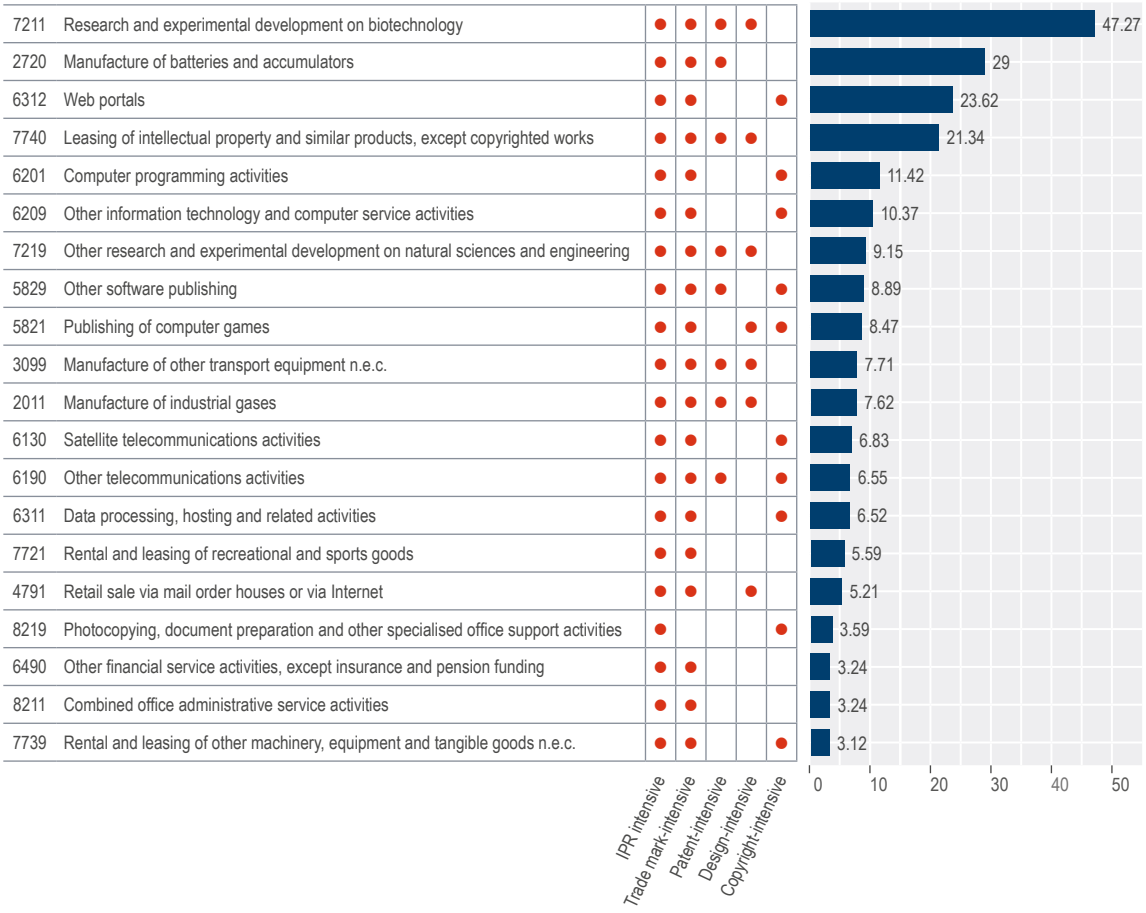
Similarly, Figure 10 shows the top 20 industries ranked by the relative intensity of investments from private equity and venture capital funds. For this analysis, the total investment value over 2021–2023 was divided by the average number of employees in each industry. The figure therefore reports investment values in € thousand per employee. In this case, IPR-intensive industries are also amply represented in the ranking. All industries among the top 20 are IPR-intensive, with 19 of them trade mark-intensive, eight patent-intensive, seven design-intensive and ten copyright-intensive.

Figure 10: Top 20 industries by venture and private capital funding per employee, 2021–2023



Note: Ranking of the top 20 industries with the highest value of funding (in € thousand) per employee in 2021–2023. The table in the middle indicates whether the particular industry is IP-intensive, and what type of IPR it is intensive in. Bar plot shows funding per employee.

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7.2. IPR and financing intensity in the EU

The following Figures 11 to 13 present the analysis of the correlation between IPR intensity and financing intensity across industries. Since private equity and venture capital investments are highly concentrated – the bottom quartile (25%) of industries represented in the Crunchbase data received only 0.1% of total investment value, while the top quartile (top 25%) of industries attracted almost 95% of investments – the correlation is tested separately in all four quartiles of the distribution of the total financing value per industry.

The positive correlation between IPR intensity and investment concentration is consistent across all quartiles and all three IPR types, with correlation coefficients particularly strong and statistically significant in the top two quartiles, which together account for over 99% of all funding. It is strongest for trade mark-intensive industries and somewhat lower for patent- and design-intensive industries.

These findings suggest that IPR intensity serves as a reliable indicator of industry attractiveness and elevated business opportunities to investors. The results confirm that investors actively finance start-ups in IPR-intensive sectors, accepting elevated risk in exchange for the potential of superior returns compared to traditional industries. The registration of IPRs signals and supports the introduction of novel technologies, products or services with the potential to disrupt markets by replacing existing production methods or better addressing consumer demands. This heightened innovation activity can enhance firm productivity and drive future revenue and profit growth across the industry.

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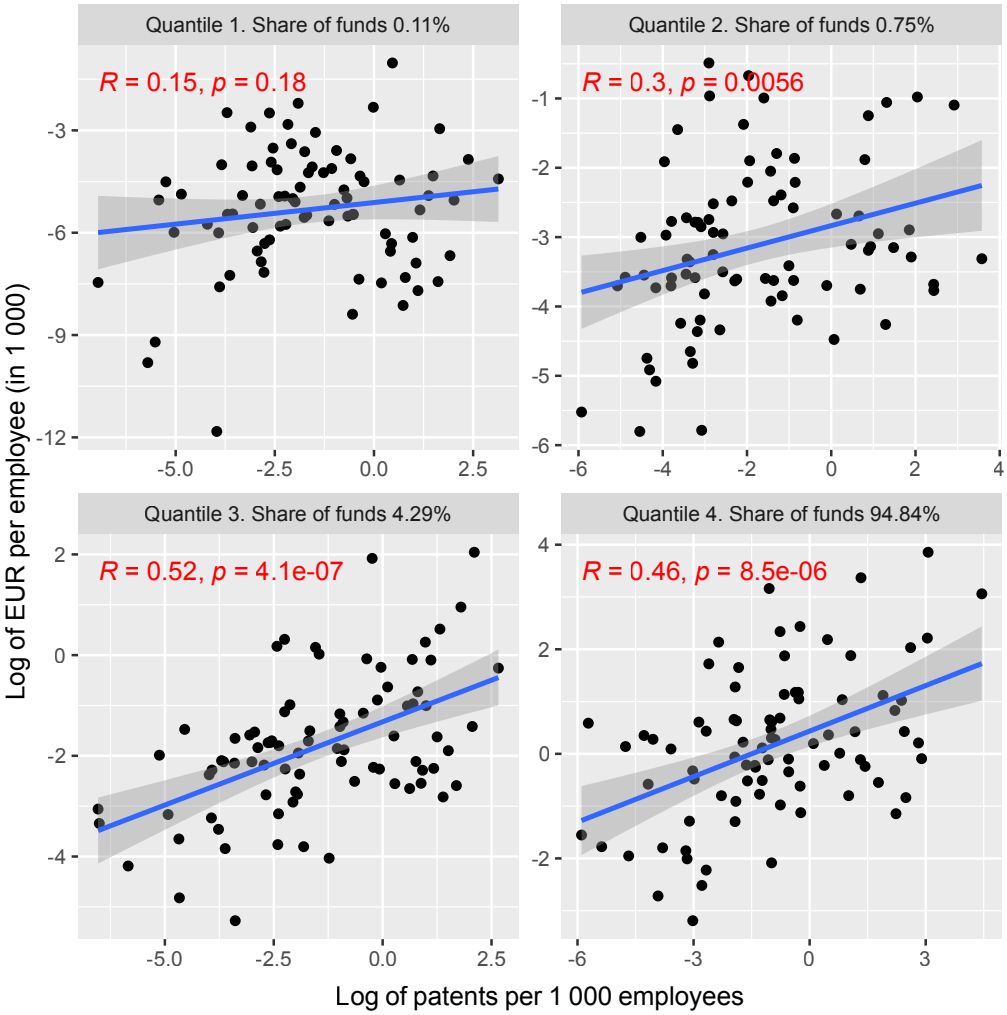
Figure 11:
Correlation between patent and financing intensities



Note: The plot presents the relationship between the log transformed value of patent intensity and log transformed value of financing intensity of industries (in € thousand per employee) in four quartiles of the distribution of total financing value per industry. Labels of each quartile identify the quartile and share of total financing received by the EU start-ups between 2021 and 2023. Only industries with patent filings between 2016 and 2020 are included in the graph. Each panel includes information about the Pearson correlation indicator calculated for all industries in the specific quartile, and its significance.

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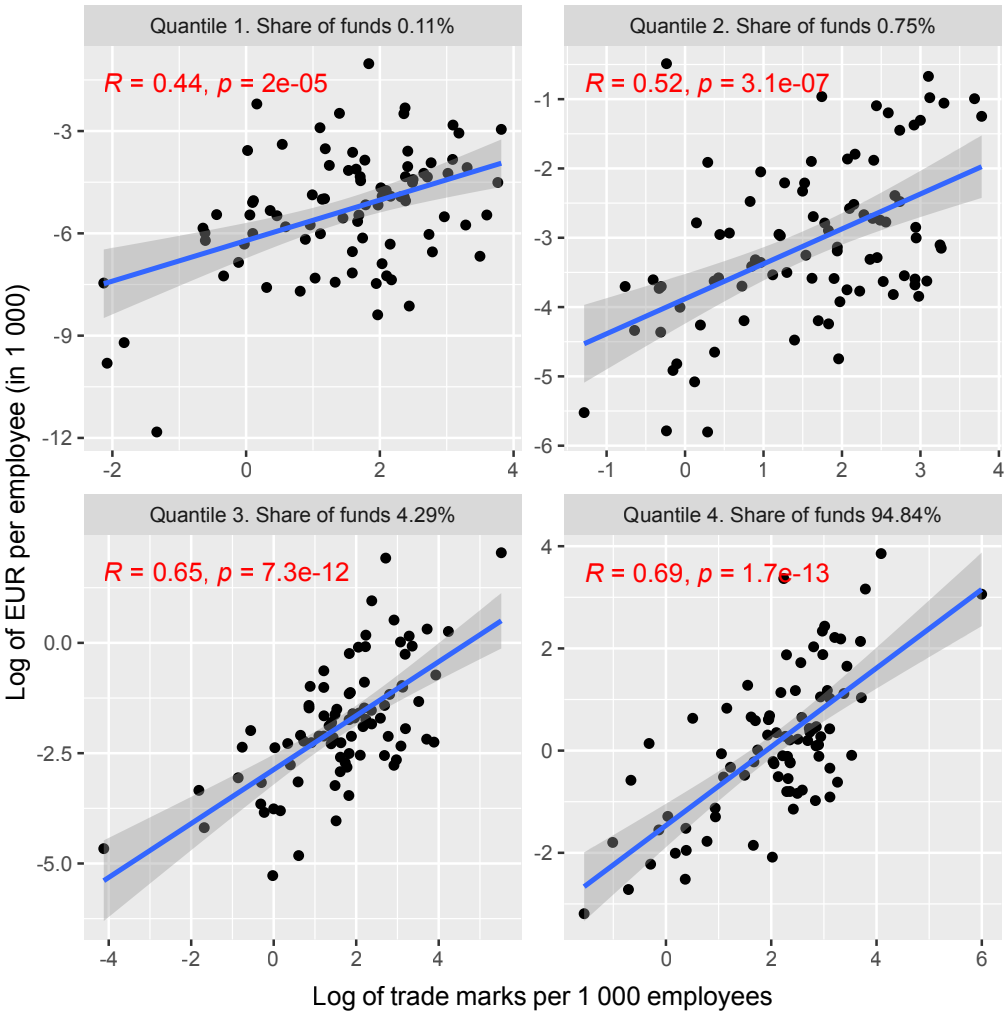
Figure 12:
Correlation between trade mark and financing intensities



Note: The plot presents the relationship between the log transformed value of trade mark intensity and log transformed value of financing intensity of industries (in € thousand per employee) in four quartiles of the distribution of total financing value per industry. Labels of each quartile identify the quartile and share of total financing received by the EU start-ups between 2021 and 2023. Only industries with trade mark filings between 2016 and 2020 are included in the graph. Each panel includes information about the Pearson correlation indicator calculated for all industries in the specific quartile, and its significance.

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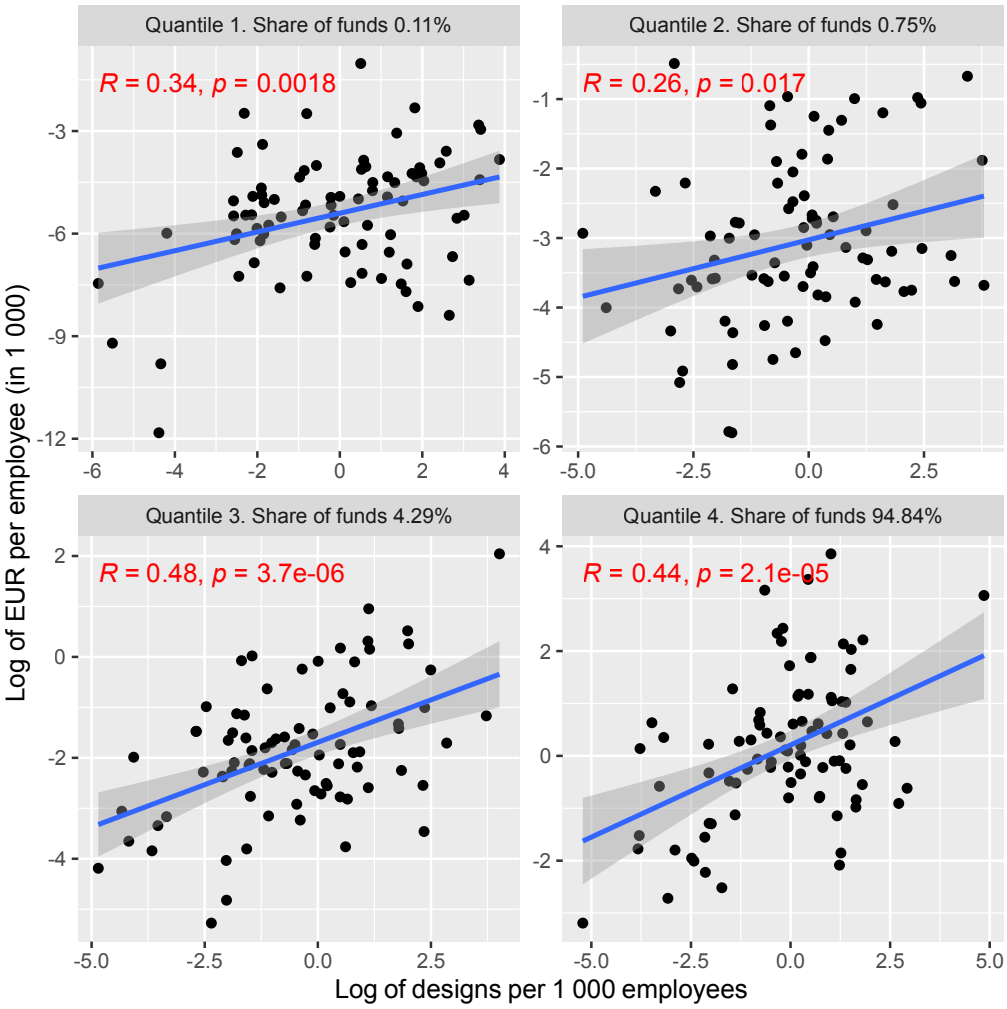
Figure 13:
Correlation between design and financing intensities



Note: The plot presents the relationship between the log transformed value of design intensity and log transformed value of financing intensity of industries (in € thousand per employee) in four quartiles of the distribution of total financing value per industry. Labels of each quartile identify the quartile and share of total financing received by the EU start-ups between 2021 and 2023. Only industries with design filings between 2016 and 2020 are included in the graph. Each panel includes information about the Pearson correlation indicator calculated for all industries in the specific quartile, and its significance.

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8. Appendix: List of all 361 IPR-intensive industries

Table 42:
List of all 361 IPR-intensive industries

NACE code	NACE description	TM	DES	PAT	CR	GI	PVR
01.00	Crop and animal production, hunting and related service activities						•
06.10	Extraction of crude petroleum	•	•	•			
07.29	Mining of other non-ferrous metal ores			•			
08.11	Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate	•		•			
08.91	Mining of chemical and fertiliser minerals	•					
08.92	Extraction of peat	•					
08.99	Other mining and quarrying n.e.c.	•					
09.10	Support activities for petroleum and natural gas extraction	•		•			
10.20	Processing and preserving of fish, crustaceans and molluscs	•					
10.31	Processing and preserving of potatoes	•	•				
10.32	Manufacture of fruit and vegetable juice	•	•				
10.39	Other processing and preserving of fruit and vegetables	•					
10.41	Manufacture of oils and fats	•	•				
10.42	Manufacture of margarine and similar edible fats	•	•	•			
10.51	Operation of dairies and cheese making	•	•			•	
10.52	Manufacture of ice cream	•					
10.61	Manufacture of grain mill products	•	•				•
10.62	Manufacture of starches and starch products	•		•			
10.72	Manufacture of rusks and biscuits; manufacture of preserved pastry goods and cakes	•	•				

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10.73	Manufacture of macaroni, noodles, couscous and similar farinaceous products	•	•				
10.81	Manufacture of sugar	•					
10.82	Manufacture of cocoa, chocolate and sugar confectionery	•	•				
10.83	Processing of tea and coffee	•	•	•			
10.84	Manufacture of condiments and seasonings	•					
10.85	Manufacture of prepared meals and dishes	•					
10.86	Manufacture of homogenised food preparations and dietetic food	•	•	•			
10.89	Manufacture of other food products n.e.c.	•	•	•			
10.91	Manufacture of prepared feeds for farm animals	•					
10.92	Manufacture of prepared pet foods	•	•				
11.01	Distilling, rectifying and blending of spirits	•	•			•	
11.02	Manufacture of wine from grape	•	•			•	
11.03	Manufacture of cider and other fruit wines	•	•				
11.04	Manufacture of other non-distilled fermented beverages	•	•				
11.05	Manufacture of beer	•				•	
11.06	Manufacture of malt	•					
11.07	Manufacture of soft drinks; production of mineral waters and other bottled waters	•	•				
12.00	Manufacture of tobacco products	•		•			
13.10	Preparation and spinning of textile fibres	•					
13.20	Weaving of textiles	•	•				
13.30	Finishing of textiles	•					
13.91	Manufacture of knitted and crocheted fabrics	•					
13.92	Manufacture of made-up textile articles, except apparel	•	•				
13.93	Manufacture of carpets and rugs	•	•				
13.94	Manufacture of cordage, rope, twine and netting	•		•			
13.95	Manufacture of non-wovens and articles made from non-wovens, except apparel	•	•	•			
13.96	Manufacture of other technical and industrial textiles	•	•	•			
13.99	Manufacture of other textiles n.e.c.	•	•	•			
14.11	Manufacture of leather clothes	•	•				
14.12	Manufacture of workwear	•	•				
14.13	Manufacture of other outerwear	•	•				
14.14	Manufacture of underwear		•				
14.19	Manufacture of other wearing apparel and accessories	•	•				

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14.31	Manufacture of knitted and crocheted hosiery	•	•				
14.39	Manufacture of other knitted and crocheted apparel	•	•				
15.12	Manufacture of luggage, handbags and the like, saddlery and harness	•	•				
15.20	Manufacture of footwear	•	•				
16.22	Manufacture of assembled parquet floors	•	•				
16.29	Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials		•				
17.11	Manufacture of pulp				•		
17.12	Manufacture of paper and paperboard	•	•	•	•		
17.21	Manufacture of corrugated paper and paperboard and of containers of paper and paperboard		•				
17.22	Manufacture of household and sanitary goods and of toilet requisites	•	•	•			
17.23	Manufacture of paper stationery	•	•				
17.24	Manufacture of wallpaper	•		•			
17.29	Manufacture of other articles of paper and paperboard	•	•				
18.11	Printing of newspapers	•			•		
18.12	Other printing				•		
18.13	Pre-press and pre-media services				•		
18.14	Binding and related services				•		
18.20	Reproduction of recorded media	•			•		
19.20	Manufacture of refined petroleum products	•					
20.11	Manufacture of industrial gases	•	•	•			
20.12	Manufacture of dyes and pigments	•		•			
20.13	Manufacture of other inorganic basic chemicals	•		•			
20.14	Manufacture of other organic basic chemicals			•			
20.15	Manufacture of fertilisers and nitrogen compounds	•					
20.16	Manufacture of plastics in primary forms	•		•			
20.17	Manufacture of synthetic rubber in primary forms	•		•			
20.20	Manufacture of pesticides and other agrochemical products	•		•			
20.30	Manufacture of paints, varnishes and similar coatings, printing ink and mastics	•		•			
20.41	Manufacture of soap and detergents, cleaning and polishing preparations	•	•	•			
20.42	Manufacture of perfumes and toilet preparations	•	•	•			
20.51	Manufacture of explosives	•	•	•			
20.52	Manufacture of glues	•	•	•			
20.53	Manufacture of essential oils	•	•				•

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20.59	Manufacture of other chemical products n.e.c.	•	•	•	•		
20.60	Manufacture of man-made fibres	•	•	•			
21.10	Manufacture of basic pharmaceutical products	•	•	•			
21.20	Manufacture of pharmaceutical preparations	•		•			
22.11	Manufacture of rubber tyres and tubes; retreading and rebuilding of rubber tyres	•	•	•			
22.19	Manufacture of other rubber products		•	•			
22.21	Manufacture of plastic plates, sheets, tubes and profiles	•	•	•			
22.22	Manufacture of plastic packing goods	•	•	•			
22.23	Manufacture of builders' ware of plastic	•	•	•			
22.29	Manufacture of other plastic products	•	•	•			
23.11	Manufacture of flat glass	•		•			
23.13	Manufacture of hollow glass		•				
23.14	Manufacture of glass fibres			•			
23.19	Manufacture and processing of other glass, including technical glassware	•	•	•			
23.20	Manufacture of refractory products	•		•			
23.31	Manufacture of ceramic tiles and flags	•	•	•			
23.32	Manufacture of bricks, tiles and construction products, in baked clay		•				
23.41	Manufacture of ceramic household and ornamental articles	•	•				
23.42	Manufacture of ceramic sanitary fixtures	•	•				
23.43	Manufacture of ceramic insulators and insulating fittings	•		•			
23.44	Manufacture of other technical ceramic products			•			
23.49	Manufacture of other ceramic products		•	•			
23.52	Manufacture of lime and plaster	•					
23.62	Manufacture of plaster products for construction purposes	•					
23.64	Manufacture of mortars	•	•				
23.65	Manufacture of fibre cement			•			
23.69	Manufacture of other articles of concrete, plaster and cement	•	•	•			
23.91	Production of abrasive products	•	•	•			
23.99	Manufacture of other non-metallic mineral products n.e.c.	•		•			
24.10	Manufacture of basic iron and steel and of ferro-alloys			•			
24.20	Manufacture of tubes, pipes, hollow profiles and related fittings, of steel			•			

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24.33	Cold forming or folding		•				
24.34	Cold drawing of wire	•		•			
24.41	Precious metals production	•		•			
24.42	Aluminium production		•	•			
24.45	Other non-ferrous metal production	•	•	•			
24.46	Processing of nuclear fuel			•			
24.52	Casting of steel			•			
24.54	Casting of other non-ferrous metals		•				
25.11	Manufacture of metal structures and parts of structures			•			
25.12	Manufacture of doors and windows of metal		•				
25.21	Manufacture of central heating radiators and boilers	•	•	•			
25.30	Manufacture of steam generators, except central heating hot water boilers			•			
25.40	Manufacture of weapons and ammunition	•	•	•			
25.71	Manufacture of cutlery	•	•	•			
25.72	Manufacture of locks and hinges	•	•	•			
25.73	Manufacture of tools	•	•	•			
25.92	Manufacture of light metal packaging		•	•			
25.93	Manufacture of wire products, chain and springs		•	•			
25.94	Manufacture of fasteners and screw machine products	•		•			
25.99	Manufacture of other fabricated metal products n.e.c.	•	•	•			
26.11	Manufacture of electronic components	•	•	•			
26.12	Manufacture of loaded electronic boards		•	•			
26.20	Manufacture of computers and peripheral equipment	•	•	•	•		
26.30	Manufacture of communication equipment	•	•	•	•		
26.40	Manufacture of consumer electronics	•	•	•	•		
26.51	Manufacture of instruments and appliances for measuring, testing and navigation	•	•	•			
26.52	Manufacture of watches and clocks	•	•				
26.60	Manufacture of irradiation, electromedical and electrotherapeutic equipment	•	•	•			
26.70	Manufacture of optical instruments and photographic equipment	•	•	•	•		
26.80	Manufacture of magnetic and optical media	•					
27.11	Manufacture of electric motors, generators and transformers			•			
27.12	Manufacture of electricity distribution and control apparatus		•	•			
27.20	Manufacture of batteries and accumulators	•		•			

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27.31	Manufacture of fibre optic cables	•		•	•		
27.32	Manufacture of other electronic and electric wires and cables			•			
27.33	Manufacture of wiring devices		•	•			
27.40	Manufacture of electric lighting equipment	•	•	•			
27.51	Manufacture of electric domestic appliances	•	•	•			
27.52	Manufacture of non-electric domestic appliances		•				
27.90	Manufacture of other electrical equipment	•	•	•			
28.11	Manufacture of engines and turbines, except aircraft, vehicle and cycle engines			•			
28.12	Manufacture of fluid power equipment			•			
28.13	Manufacture of other pumps and compressors	•	•	•			
28.14	Manufacture of other taps and valves	•	•	•			
28.15	Manufacture of bearings, gears, gearing and driving elements			•			
28.21	Manufacture of ovens, furnaces and furnace burners	•	•	•			
28.22	Manufacture of lifting and handling equipment	•	•	•			
28.23	Manufacture of office machinery and equipment (except computers and peripheral equipment)	•	•	•	•		
28.24	Manufacture of power-driven hand tools	•	•	•			
28.25	Manufacture of non-domestic cooling and ventilation equipment	•	•	•			
28.29	Manufacture of other general-purpose machinery n.e.c.	•	•	•			
28.30	Manufacture of agricultural and forestry machinery	•	•	•			
28.41	Manufacture of metal forming machinery		•	•			
28.49	Manufacture of other machine tools	•	•	•			
28.91	Manufacture of machinery for metallurgy	•		•			
28.92	Manufacture of machinery for mining, quarrying and construction	•	•	•			
28.93	Manufacture of machinery for food, beverage and tobacco processing	•	•	•			
28.94	Manufacture of machinery for textile, apparel and leather production	•	•	•			
28.95	Manufacture of machinery for paper and paper-board production	•		•			
28.96	Manufacture of plastics and rubber machinery			•			
28.99	Manufacture of other special-purpose machinery n.e.c.	•	•	•			
29.10	Manufacture of motor vehicles		•	•			

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29.20	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers			•			
29.31	Manufacture of electrical and electronic equipment for motor vehicles			•			
29.32	Manufacture of other parts and accessories for motor vehicles		•	•			
30.11	Building of ships and floating structures			•			
30.12	Building of pleasure and sporting boats	•	•				
30.20	Manufacture of railway locomotives and rolling stock			•			
30.30	Manufacture of air and spacecraft and related machinery			•			
30.40	Manufacture of military fighting vehicles	•	•	•			
30.91	Manufacture of motorcycles	•	•	•			
30.92	Manufacture of bicycles and invalid carriages	•	•	•			
30.99	Manufacture of other transport equipment n.e.c.	•	•	•			
31.01	Manufacture of office and shop furniture	•	•				
31.02	Manufacture of kitchen furniture		•				
31.03	Manufacture of mattresses	•	•	•			
31.09	Manufacture of other furniture		•				
32.11	Striking of coins	•	•		•		
32.12	Manufacture of jewellery and related articles	•	•	•	•		
32.13	Manufacture of imitation jewellery and related articles	•	•				
32.20	Manufacture of musical instruments	•	•	•	•		
32.30	Manufacture of sports goods	•	•	•			
32.40	Manufacture of games and toys	•	•		•		
32.50	Manufacture of medical and dental instruments and supplies	•	•	•			
32.91	Manufacture of brooms and brushes	•	•	•			
32.99	Other manufacturing n.e.c.	•	•	•			
33.16	Repair and maintenance of aircraft and spacecraft			•			
33.19	Repair of other equipment	•					
33.20	Installation of industrial machinery and equipment			•			
35.11	Production of electricity	•		•			
35.12	Transmission of electricity	•		•			
35.14	Trade of electricity	•					
35.21	Manufacture of gas	•		•			
35.22	Distribution of gaseous fuels through mains	•					
38.22	Treatment and disposal of hazardous waste			•			
41.10	Development of building projects	•					
42.91	Construction of water projects			•			

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43.21	Electrical installation		•				
45.19	Sale of other motor vehicles	•	•				
45.31	Wholesale trade of motor vehicle parts and accessories	•	•	•			
45.40	Sale, maintenance and repair of motorcycles and related parts and accessories	•					
46.11	Agents involved in the sale of agricultural raw materials, live animals, textile raw materials and semi-finished goods	•	•				•
46.12	Agents involved in the sale of fuels, ores, metals and industrial chemicals	•	•				
46.13	Agents involved in the sale of timber and building materials	•					
46.14	Agents involved in the sale of machinery, industrial equipment, ships and aircraft	•	•	•			
46.15	Agents involved in the sale of furniture, household goods, hardware and ironmongery	•	•				
46.16	Agents involved in the sale of textiles, clothing, fur, footwear and leather goods	•	•				
46.17	Agents involved in the sale of food, beverages and tobacco	•					
46.18	Agents specialised in the sale of other particular products	•	•				
46.19	Agents involved in the sale of a variety of goods	•	•				
46.21	Wholesale of grain, unmanufactured tobacco, seeds and animal feeds	•					•
46.22	Wholesale of flowers and plants	•					•
46.23	Wholesale of live animals	•	•	•			
46.24	Wholesale of hides, skins and leather	•	•				
46.31	Wholesale of fruit and vegetables	•					
46.32	Wholesale of meat and meat products	•					
46.33	Wholesale of dairy products, eggs and edible oils and fats	•					
46.34	Wholesale of beverages	•					
46.35	Wholesale of tobacco products	•					
46.36	Wholesale of sugar and chocolate and sugar confectionery	•	•				
46.37	Wholesale of coffee, tea, cocoa and spices	•	•				
46.38	Wholesale of other food, including fish, crustaceans and molluscs	•					
46.39	Non-specialised wholesale of food, beverages and tobacco	•					
46.41	Wholesale of textiles	•	•				
46.42	Wholesale of clothing and footwear	•	•				

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46.43	Wholesale of electrical household appliances	•	•	•	•		
46.44	Wholesale of china and glassware and cleaning materials	•	•				
46.45	Wholesale of perfume and cosmetics	•	•				
46.46	Wholesale of pharmaceutical goods	•		•			
46.47	Wholesale of furniture, carpets and lighting equipment	•	•				
46.48	Wholesale of watches and jewellery	•	•				
46.49	Wholesale of other household goods	•	•				
46.51	Wholesale of computers, computer peripheral equipment and software	•			•		
46.52	Wholesale of electronic and telecommunications equipment and parts	•	•	•	•		
46.62	Wholesale of machine tools	•					
46.64	Wholesale of machinery for the textile industry and of sewing and knitting machines	•		•			
46.65	Wholesale of office furniture	•	•				
46.66	Wholesale of other office machinery and equipment	•			•		
46.69	Wholesale of other machinery and equipment	•	•	•			
46.71	Wholesale of solid, liquid and gaseous fuels and related products	•					
46.73	Wholesale of wood, construction materials and sanitary equipment	•	•				
46.74	Wholesale of hardware, plumbing and heating equipment and supplies	•	•				
46.75	Wholesale of chemical products	•		•			
46.76	Wholesale of other intermediate products	•	•		•		
46.90	Non-specialised wholesale trade	•	•				
47.25	Retail sale of beverages in specialised stores	•					
47.29	Other retail sale of food in specialised stores	•					
47.41	Retail sale of computers, peripheral units and software in specialised stores	•			•		
47.43	Retail sale of audio and video equipment in specialised stores	•			•		
47.51	Retail sale of textiles in specialised stores	•					
47.59	Retail sale of furniture, lighting equipment and other household articles in specialised stores		•				
47.61	Retail sale of books in specialised stores				•		
47.62	Retail sale of newspapers and stationery in specialised stores				•		
47.63	Retail sale of music and video recordings in specialised stores	•			•		

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47.64	Retail sale of sporting equipment in specialised stores	•					
47.65	Retail sale of games and toys in specialised stores	•	•				
47.74	Retail sale of medical and orthopaedic goods in specialised stores	•					
47.75	Retail sale of cosmetic and toilet articles in specialised stores	•					
47.77	Retail sale of watches and jewellery in specialised stores	•	•				
47.78	Other retail sale of new goods in specialised stores				•		
47.91	Retail sale via mail order houses or via Internet	•	•				
50.10	Sea and coastal passenger water transport	•					
58.11	Book publishing	•			•		
58.12	Publishing of directories and mailing lists	•			•		
58.13	Publishing of newspapers				•		
58.14	Publishing of journals and periodicals	•			•		
58.19	Other publishing activities	•	•		•		
58.21	Publishing of computer games	•	•		•		
58.29	Other software publishing	•		•	•		
59.11	Motion picture, video and television programme production activities	•			•		
59.12	Motion picture, video and television programme post-production activities	•			•		
59.13	Motion picture, video and television programme distribution activities	•	•		•		
59.14	Motion picture projection activities				•		
59.20	Sound recording and music publishing activities	•	•		•		
60.00	Activities auxiliary to financial services and insurance activities	•					
60.10	Radio broadcasting	•			•		
60.20	Television programming and broadcasting activities	•			•		
61.10	Wired telecommunications activities				•		
61.20	Wireless telecommunications activities				•		
61.30	Satellite telecommunications activities	•			•		
61.90	Other telecommunications activities	•		•	•		
62.01	Computer programming activities	•			•		
62.02	Computer consultancy activities	•			•		
62.03	Computer facilities management activities	•		•	•		
62.09	Other information technology and computer service activities	•			•		
63.11	Data processing, hosting and related activities	•			•		

63.12	Web portals	•			•		
63.91	News agency activities	•			•		
63.99	Other information service activities n.e.c.	•			•		
64.20	Activities of holding companies	•					
64.30	Trusts, funds and similar financial entities	•	•	•			
64.49	Other financial service activities, except insurance and pension funding	•					
64.90	Other financial service activities, except insurance and pension funding	•					
65.20	Reinsurance	•	•				
66.00	Activities auxiliary to financial services and insurance activities	•					
68.10	Buying and selling of own real estate	•					
68.20	Renting and operating of own or leased real estate	•					
70.10	Activities of head offices	•					
70.21	Public relations and communication activities	•			•		
70.22	Business and other management consultancy activities	•					
71.12	Engineering activities and related technical consultancy			•			
72.11	Research and experimental development on biotechnology	•	•	•			•
72.19	Other research and experimental development on natural sciences and engineering	•	•	•			•
72.20	Research and experimental development on social sciences and humanities	•		•			
73.11	Advertising agencies	•			•		
73.12	Media representation	•			•		
73.20	Market research and public opinion polling	•					
74.10	Specialised design activities	•	•		•		
74.20	Photographic activities				•		
74.30	Translation and interpretation activities				•		
74.9	Other professional, scientific and technical activities n.e.c.	•	•	•			
77.12	Renting and leasing of trucks	•					
77.21	Renting and leasing of recreational and sports goods	•					
77.22	Renting of video tapes and disks				•		
77.29	Renting and leasing of other personal and household goods				•		
77.31	Renting and leasing of agricultural machinery and equipment						•

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77.33	Renting and leasing of office machinery and equipment (including computers)				•		
77.35	Renting and leasing of air transport equipment	•					
77.39	Renting and leasing of other machinery, equipment and tangible goods n.e.c.	•			•		
77.40	Leasing of intellectual property and similar products, except copyrighted works	•	•	•			•
79.11	Travel agency activities	•					
79.12	Tour operator activities	•					
79.90	Other reservation service and related activities	•			•		
80.30	Investigation activities		•				
82.11	Combined office administrative service activities	•					
82.19	Photocopying, document preparation and other specialised office support activities				•		
82.30	Organisation of conventions and trade shows	•					
85.41	Post-secondary non-tertiary education	•		•			
85.42	Tertiary education	•	•	•			
85.52	Cultural education				•		
85.60	Educational support activities	•					
90.01	Performing arts				•		
90.02	Support activities to performing arts	•			•		
90.03	Artistic creation		•		•		
90.04	Operation of arts facilities	•			•		
91.01	Library and archives activities	•			•		
91.02	Museums activities	•			•		
91.03	Operation of historical sites and buildings and similar visitor attractions	•			•		
92.00	Gambling and betting activities	•					
93.11	Operation of sports facilities	•					
93.12	Activities of sport clubs	•					
93.19	Other sports activities	•					
93.21	Activities of amusement parks and theme parks				•		
93.29	Other amusement and recreation activities	•			•		
94.12	Activities of professional membership organisations				•		
94.99	Activities of other membership organisations n.e.c.				•		
96.09	Other personal service activities n.e.c.	•		•			

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9. Appendix: Data matching methodology: detailed description

IP property registers are valuable sources of data for analysing individual companies, industries or countries. However, researchers using such data face many challenges. The two main ones are:

Lack of harmonised names

IP registers tend to have many double or multiple entries for the same applicant, as filers do not always use their existing identification numbers but rather create a new ID with the same or slightly changed applicant data on each subsequent filing. In these circumstances, it is very difficult to tabulate the list of the biggest filers, as the filings of one company could be distributed over many different IDs in the registers. Duplicates can also arise as a result of the different registration routes. At the EUIPO, for example, applicants can choose between direct applications and the international route (Madrid Protocol).

Lack of comprehensive information about applicants

The ownership data stored in the IP registers is very limited and usually consists of name, address and contact details. It does not include information that would allow IP-related economic research.

In recent years, efforts have been made to harmonise names in IP registers (mostly patent registers) and to match them with company register data.[60] The present study has benefited from the experience and knowledge gained by researchers and organisations involved in these efforts. However, due to the extended geographical reach of the study (EU) and the scope of the IPRs it covers (patents, TMs, designs and PVRs), the results of previous harmonisation and matching projects could not be directly applied, and a new methodology of name harmonisation and data matching had to be developed and implemented.

The algorithms used in the first phase – name harmonisation – were based to a large extent on the KUL Leuven/Eurostat methodology.[61]

60 Examples include the KUL Leuven/Eurostat methodology for harmonising names in the PATSTAT database, the OECD's HAN database, the UK IPO's OFLIP database, Ribeiro et al. 2010 and Dorner and Harhoff (2018)

61 Data Production Methods for Harmonised Patent Statistics: Patentee Name Harmonisation, Eurostat 2006.

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The second phase consisted of matching cleaned and harmonised EUIPO, CPVO and PATSTAT data (IPR owners' datasets) with the ORBIS database. ORBIS is a source of comprehensive demographic and financial data gathered from national company registers. It is commonly used to analyse the economic performance of business entities. The information available in ORBIS is sourced in each country from various information providers which deliver data collected by national or local public institutions to meet legal or administrative requirements.

The name harmonisation and matching process consisted of the following stages:

- capitalisation and cleaning of names (double spaces, non-printable characters)
- normalisation of special characters using NFKD[62] and transliteration equivalence (Greek)
- extraction of national legal information
- cleaning of national non-distinctive and weak words
- correction of postcodes

These processes were applied to IPR owners in the ORBIS, EUIPO, PATSTAT and CPVO databases.

9.1. Data pre-processing

Before name harmonisation and data matching could be carried out, the data first had to be pre-processed, i.e. problems relating to the use of different cases in names (upper, lower or title case) had to be eliminated. Even if the content of the name string in the various datasets was the same, it would not be treated as such if two different case conventions were used. To deal with this problem, applicant names in the EUIPO, EPO, CPVO and ORBIS datasets were converted to upper case.

By default, IP registers can record applicant names using the alphabets of their official country languages, such as Latin, Greek and Bulgarian Cyrillic. In the case of the Latin alphabet, several specific extensions are used to represent national characters, letters with tone and other diacritics. Nevertheless, applicants or their legal representatives sometimes file new applications with the name already converted into its basic Latin equivalent, without any specific national characters. In such cases, automatic algorithms cannot recognise this basic Latin form of the name as equivalent to the original one. This problem was dealt with by applying the Unicode normalisation transformation procedure. This enabled automatic conversion of names into normalised basic Unicode forms.

Greek names had to be treated specifically in order to ensure that names that may have been transliterated differently in the different registers were represented identically. For example, "αυ" (alpha-upsilon) may have been transliterated as "av", "af", "au" or "ay".

In a further pre-processing step, all characters other than a-zA-Z0-9&@$+ were replaced with a space, and full stops were removed. Leading and trailing whitespaces were also removed, and multiple whitespaces reduced to one space.

62 Normalization Form Compatibility Composition, a specification of Unicode Equivalence.

9.2. Legal form cleaning

After the initial data pre-processing, proper name cleaning was carried out in order to eliminate any non-distinctive information that could impede the correct grouping of individual IDs and the subsequent matching with the external data source. The key part of the name cleaning was the standardisation and division of the name field into base and legal form denominations. Due to the specific challenge of processing owner data from 28 different countries, it was essential to avoid a situation in which character strings that indicate legal forms in some countries but are a distinctive part of the names in others were erroneously deleted. That is why it was decided to deal with legal form denominations on a country-by-country basis. A dictionary was created, containing regular expressions (regex) allowing identification and removal of legal forms typical in each EU member state.[63] Regex is a very powerful way to capture in one line several variations of a string describing the same legal form. Thus, with limited lines of code, it was possible to capture, remove and assign to a separate column the standardised versions of almost all the legal form denominations used in every EU member state.

Legal form cleaning was done by filtering only the regex legal form relevant for the given country and looping the names of applicants having their seat in that same country over each regex.

For some countries (BE, DE and PL), an additional step was needed. In the case of Belgium, the purpose was mainly to look for cases where the legal form was indicated in both French and Dutch. Cleaning only one legal form denomination was not effective in those cases as the same legal form could be indicated in the second official language and still be part of the name field after cleaning. For Germany and Poland, the second cleaning loop was designed to deal with composite legal forms such as *GMBH CO KG* or *Spółka z ograniczoną odpowiedzialnością spółka komandytowo-akcyjna*, which are composed of two or more legal forms that are also used in the legal context as separate stand-alone legal forms. In some countries, legal form descriptions are separated by other words which are distinctive to the companies. In such cases, as a first step before the legal form cleaning, the legal form was standardised as the final part of the string, leaving all other words as an integral part of the normalised name.

The legal form cleaning procedure was conducted on the four datasets (EUIPO, EPO, CPVO and ORBIS) separately.

After completion of this step, there were separate tables (four tables for each country, corresponding to the four data sources) containing the normalised name field, without legal form denominations, for each company present in the original EUIPO, EPO, CPVO and ORBIS datasets. A further column was then added, containing the standardised legal forms derived from the information present in the original name field and deleted from the normalised name field during the cleaning process.

63 In cases of bilingual countries such as Belgium, legal forms specific to the Flemish and Walloon regions were included, and each name was processed twice, checking for the presence of Flemish-specific and Walloon-specific legal forms.

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9.3. Preparing data for matching algorithm

As with legal form cleaning, the direct preparation for matching and the matching phases were carried out on a country-by-country basis. For each country, the tables containing the results from the previous step (legal form cleaning) were the starting point.

As a first step, each country was assigned a code specific to that country/language, and non-distinctive words were removed from the normalised names. The list of non-distinctive words was based on a calculation of the presence of words within company names, e.g. the words "the", "of" or "Irish" in the case of Ireland.

In the next step, the "trading as" denominations within each of three datasets were examined. "Trading as" indications are also country/language-specific. If a name contained the "trading as" type of denomination, two additional fields were created, NormCompany_short being the part preceding the "trading as" string, and TradingAs being the part after the trading as expression. For example, the name "European Union Intellectual Property Office trading as EUIPO" would be converted into three fields: the normalised field EUROPEAN UNION INTELLECTUAL PROPERTY OFFICE TRADING AS EUIPO, the NormCompany_short field EUROPEAN UNION INTELLECTUAL PROPERTY OFFICE and the TradingAs field EUIPO. After creating these two additional fields, a check was carried out to determine whether companies that could not be matched/grouped on the basis of the normalised name had a match with other IDs based on the NormCompany/NormCompany_short comparison.

A substantial number of applicants in the IP registers are natural persons. It was decided not to filter them out of the respective datasets to allow for matching if there was a corresponding ID in ORBIS. However, there is no separate field in PATSTAT for indicating whether or not an applicant is a natural person. In addition, natural persons' names are formatted differently in IPR repositories than in ORBIS. To resolve this problem, the separate words in the applicant name and entity name in all data repositories were ordered alphabetically before matching.

After this step, all the spaces between the words were removed, forming a normalised name, thus creating one string composed of all the words left from the name after the processing in the previous stages.

The last step in the process of data preparation for the final match consisted of grouping each of the datasets from the EPO, EUIPO, CPVO and ORBIS by normalised name. In doing so, the individual record ID numbers, address and legal form information were retained in the concatenated format.

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9.4. Matching EUIPO, PATSTAT and CPVO datasets with ORBIS

The aim of the procedure was to match IPR owners' datasets with ORBIS. In the first iteration, possible matches were checked using NormCompany IPR owners' datasets and the NormCompany field from ORBIS. All the matches were assigned to a separate dataset, and subsequent search iterations were performed for matches using the TradingAs and NormCompany_short fields originally stemming from each of the four datasets. This was done by first taking the NormCompany_short field from the ORBIS dataset and checking for matches with the NormCompany IPR owners' datasets. In the case of a match, the matched records were assigned to a matched dataset. Then, a match between TradingAs fields with the NormCompany in the IPR owners' datasets was carried out for those records that had not been matched in the preceding stages.

After the initial matching phase described above, one-to-one matches (where one IPR owner's dataset record matched with one ORBIS record) were filtered out, and one-to-many matches (where one IPR owner's dataset record matched several ORBIS records) were selected for further processing. At this stage, additional information (such as original name, address or legal form) was used. This information was either available in the original four datasets or had been created in the process of legal form cleaning.

9.5. Preparing the final concordance tables

After finalising the disambiguation process and the manual check, various concordance tables were created, serving as a bridge between the data stored in the various data repositories needed for economic analysis of the IPRs. The link between IP register and ORBIS records in the concordance tables is one-to-one.

There are three main concordance tables:

- The ORBIS-EPO concordance table: the primary key was the person_id number from the tls206_person table of PATSTAT and the BvD ID number from the ORBIS dataset. This table was used to link the patent information in PATSTAT to the demographic and financial data on the European companies in the ORBIS dataset.
- The ORBIS-EUIPO concordance table: the primary key was the owner_code from the dim_owner table of the EUIPO's data warehouse and the BvD ID number from the ORBIS dataset. This table was used to link trade mark and design information in the EUIPO register to demographic and financial data on European companies in the ORBIS dataset.
- The ORBIS-CPVO concordance table: a primary key for the CPVO (created ad hoc) and the BvD ID number from the ORBIS dataset. This table was used to link plant varieties registered at the CPVO with demographic and financial data on European companies in the ORBIS dataset.

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10. Appendix: Identification of IPR-intensive industries

10.1. Identification of patent-intensive industries

This section explains how the patent-intensive industries were identified. Intensity was determined at EU level in two steps. First, the total number of patents protected under the EPC for each industry was calculated. This is known as **absolute patent intensity**. Second, for each industry, the total number of patents was divided by the number of persons employed in that industry at EU level, as reported by Eurostat in its SBS series. The result is the **relative patent intensity** of that industry. Finally, the overall employment-weighted average of relative patent intensities was calculated for all the industries that have patents. Those industries whose relative patent intensities were above this average value were considered to be patent-intensive.

When calculating the absolute intensity for patents, TMs, designs and PVRs, two important issues had to be dealt with. The first was the head offices, i.e. the presence of general, non-specific industry codes in the ORBIS data: 64.20 *Activities of holding companies*, 70.10 *Activities of head offices* and 82.99 *Other business support services*. This phenomenon reflects the common business practice among large companies of concentrating IP portfolios at their head offices. In order to avoid distorting the absolute intensity calculations, the procedure described in Appendix 9 was applied in order to allocate those IPRs to *bona fide* industry codes.

Another data limitation also common to patents, TMs, designs and PVRs is the assignment in ORBIS of NACE codes at a higher level of aggregation than the four-digit level used in the analysis. As in the case with the head office issue, this problem was solved by re allocating the IPRs within the division (two-digit level) or group (three-digit level).

10.1.1. Absolute patent intensity

- The starting point for the calculation of absolute patent intensities was the PATSTAT database (2024 spring edition). The dataset was limited to published applications filed at the EPO between 1 January 2016 and 31 December 2020 by at least one applicant having its domicile in an EU member state, yielding a total of 285 225 patent applications.
- The dataset was then filtered to include only applications that were ultimately successful, leaving only the applications granted between 2016 and 2024. That reduced the number of applications in the dataset to 141 511.

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- Next, patent applications were merged with concordance tables linking patent applicants' data to company information in ORBIS. A match was found for 133 187 unique patent applications, i.e. 94.1% of all relevant applications.
- Where a patent had multiple owners of which one or more had their seat outside of the EU, the fraction of patents associated with third-country owners was discounted. The total sum of the patent fractions corresponding to the subset of patents matched with ORBIS data amounted to 131 406.5.
- For some companies, ORBIS provides no information on the NACE industry of their activity. In such cases, this information was inferred based on the concordance table between NACE and IPC classes built upon the matched dataset. Patent applicants were assigned a NACE class with the highest probability, given a particular IPC class composition within the company's patent portfolio.

10.1.2. Relative patent intensity

To calculate relative patent intensity, Eurostat employment data were matched with the data on absolute intensities. Relative patent intensity is defined as the total number of granted patents assigned to an industry divided by the total employment figure for that industry (in thousands), leading to an indicator of patent numbers per 1 000 employees. Patent-intensive industries are defined as those industries where the value of this indicator is higher than the employment-weighted mean of patents per 1 000 employees, which amounts to 0.95 patents per 1 000 employees. Two industries from Division 85 Education, for which previously employment data were available only on 2-digit level: 85.41 Post-secondary non-tertiary education, and 85.42 Tertiary education proved to be patent-intensive.

10.2. Identification of trade mark-intensive industries

10.2.1. Absolute TM intensity

- The starting point for the calculation of absolute TM intensities was the EUIPO TM register. The EUIPO dataset was limited to EUIPO TM applications filed between 1 January 2013 and 31 December 2017 with at least one applicant having its domicile in an EU member state, yielding a total of 445 572 TM applications (1 231 841 NICE classes).
- The dataset was then filtered to include only applications that were ultimately successful, leaving only the applications that were granted between 2016 and 2025. That reduced the number of applications in the dataset to 393 922 (1 104 638 classes).
- Next, TM applications were merged with concordance tables linking TM applicants' data to company information in ORBIS. A match was found for 307 887 unique TM applications (865 293 classes), i.e. 78.16% of all relevant applications.

- For the subset of TM owners that were matched with ORBIS data but for which a NACE code was not available in ORBIS, the relevant information was inferred from patent data in cases where they had also filed for patent protection. In total, NACE codes were unavailable for 7 000 TM applications for which a match with ORBIS was found. Those applications were discarded from further analysis. A total of 299 096 TM applications were considered for the analysis (839 666 classes).
- In order to assign proper industry codes to companies linked in ORBIS with head office status, NACE industry codes of companies linked with head offices within the same economic groups were used. For a given head office, the NACE codes were assigned proportionally to the number of companies representing various NACE industries within the head office economic group.
- For companies associated with head office codes for which ORBIS provided no information on group structure, if they filed for a patent, the NACE code was inferred from patent data based on the IPC classes structure in their patent portfolios.
- The remaining TMs associated initially with head offices' NACE codes were redistributed to other NACE codes in proportion to the distribution of valid NACE codes associated with head offices in the subset of data for which the assignment was possible, based on the two steps described above.
- Finally, for some companies, ORBIS assigns NACE codes at a higher level of aggregation than the four-digit level used in the analysis. This problem was solved by reallocating TMs linked with those companies to the lower level of NACE based on the distribution of TMs within the division or group resulting from the calculation performed on the subset of companies correctly associated with the lowest NACE industry level.

10.2.2. Relative TM intensity

To calculate relative TM intensity, Eurostat employment data were matched with the data on absolute intensities. Relative TM intensity is defined as the total number of granted TMs assigned to an industry, divided by the total employment figure for that industry (in thousands). TM-intensive industries are defined as those industries where the value of this indicator is higher than the employment-weighted mean of TMs per 1 000 employees, which amounts to 5.8 TMs per 1 000 employees.

Three industries from Division 85 Education, for which previously employment data were available only on two-digit level: 85.41 Post-secondary non-tertiary education, and 85.42 Tertiary education and 85.60 Educational support activities as well as 66.00 Activities auxiliary to financial services and insurance activities, for which employment is still available at two-digit level, proved to be trade mark-intensive.

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10.3. Identification of design-intensive industries

The methodology for identifying design-intensive industries was very similar to that used for TMs described above.

10.3.1. Absolute design intensity

- The starting point for the calculation of absolute design intensities was the EUIPO design register. The dataset was limited to RCD applications filed between 1 January 2016 and 31 December 2020 with at least one applicant having its domicile in an EU member state, yielding a total of 287 323 design applications.
- The dataset was subsequently filtered to include only applications that were ultimately successful, leaving only the applications granted between 2016 and 2025. That reduced the number of applications in the dataset to 280 363.
- Next, design applications were merged with concordance tables linking design applicants' data to company information in ORBIS. A match was found for 238 262 unique design applications, i.e. 85% of the initial dataset.
- Where a design had multiple owners of which one or more have their seat outside of the EU, the fraction of designs associated with third-country owners was discounted. The total number of design fractions corresponding to the subset of designs matched with ORBIS data amounted to 249 731.
- For the subset of design owners that were matched with ORBIS data but for which no NACE code was available in ORBIS, the relevant information was inferred from patent data in cases where patent protection had also been applied for. In total, NACE codes were unavailable for 4 000 applications, which were discarded from further analysis, leaving a final sample of 234 186 design applications.
- In order to assign proper industry codes to companies linked in ORBIS with head office status, ORBIS information on the structure of an economic group of companies associated with head offices was used. For a given head office, NACE codes were assigned in proportion to the number of companies representing various NACE industries within the head office economic group. For those companies associated with head office codes for which ORBIS provided no information on group structure, if they had filed for patent protection, the NACE code was inferred from patent data based on the IPC classes structure within their patent portfolios. The remainder of the designs associated initially with head office NACE codes were redistributed to other NACE codes in proportion to the distribution of valid NACE codes associated with head offices in the subset of data for which the assignment was possible, based on the two steps described above.
- Finally, for some companies, ORBIS assigns NACE codes at a higher level of aggregation than the four-digit level used in the analysis. This problem was solved by reallocating design applications linked with those companies to the lower level of NACE based on the distribution of designs within the division or group resulting from the calculation performed on the subset of companies correctly associated with the lowest NACE industry level.

10.3.2. Relative design intensity

The methodology used to calculate relative intensity was the same as for patents and TMs.

To calculate relative design intensity, Eurostat employment data were matched with the data on absolute intensities. Relative design intensity is defined as a number of granted design rights assigned to an industry divided by the total employment figure for that industry (in thousands). Design-intensive industries are defined as those for which the value of this indicator exceeds the employment-weighted mean of design per 1 000 employees, which amounts to 1.71. One industry from Division 85 Education for which previously employment data were available only on two-digit level – 85.42 Tertiary education – proved to be design-intensive.

10.4. Identification of copyright-intensive industries

IPR intensity (number of rights per 1 000 employees) cannot be calculated for copyright in the same way as for TMs, patents, design rights and PVRs because copyright is not registered. Copyright registries do exist in some EU member states, but their use is not mandatory and there is no EU-level registry. The approach taken to overcome this difficulty was to adapt a methodology developed by WIPO and documented in its *Guide on Surveying the Economic Contribution of the Copyright-based Industries*, published in 2015.[64]

The WIPO guidelines group industries into four categories according to the degree to which their activity depends on copyright. These four categories are: core copyright industries, inter-dependent industries, partial copyright industries and non-dedicated support industries.

Core copyright industries, as defined by WIPO, include:

- press and literature
- music, theatrical productions, operas
- motion picture and video
- radio and television
- photography
- software and databases
- visual and graphic arts
- advertising services
- copyright collecting societies

Examples of inter-dependent industries include the manufacture, wholesale and retail of TV sets or musical instruments. Partial copyright industries include furniture, toys and games and museums, while non-dedicated support industries include, for example, general wholesale and transportation.

64 See wipo.int/publications/en/details.jsp?id=259. This methodology is referred to in the following as the "WIPO methodology".

WIPO defines **core copyright industries** as "wholly engaged in creation, production and manufacturing, performance, broadcast, communication and exhibition, or distribution and sales of works and other protected subject-matter". The underlying idea is that core copyright industries as a category would not exist or would be significantly different without copyright in works.

Inter-dependent copyright industries are industries that are engaged in the production, manufacture and sale of equipment whose function is wholly or primarily to facilitate the creation, production or use of works and other protected subject-matter.

Partial copyright industries are industries in which some activities are related to works and other protected subject-matter and may involve creation, production and manufacturing, performance, broadcasting, communication and exhibition or distribution and sales.

Non-dedicated support industries are those in which some activities are related to facilitating the broadcasting, communication, distribution or sales of works and other protected subject-matter, but whose activities have not been included in the core copyright industries.

To industries in these three groups, WIPO assigns factors that represent the proportion of the activity of each industry that can be attributed to copyright-intensive activities.

Non-dedicated support industries have been excluded from this study, as they all have a factor of 6%. Appendix 9 shows the complete list of copyright-intensive industries and the associated factors.

Therefore, the following industries identified by WIPO are included in this study:

- ➔ core copyright industries
- ➔ inter-dependent copyright industries
- ➔ partial copyright industries with factors above 20%

EU-level employment and GVA data for copyright-intensive industries were obtained from Eurostat's SBS dataset. However, for 12 industries, SBS provides no data on either employment or value added. These industries include 85.52 *Cultural education*, 90.01 *Performing arts*, 90.02 *Support activities to performing arts*, 90.03 *Artistic creation*, 90.04 *Operation of arts facilities*, 91.01 *Library and recreation activities*, 91.02 *Museums activities*, 91.03 *Operation of historical sites and buildings and similar visitors attractions*, *93.21 Activities of amusement parks and theme parks*, 93.29 *Other amusement and recreation activities*, 94.12 *Activities of professional membership organisations* and 94.99 *Activities of other membership organisations n.e.c.*

In order to include these activities in the study, data for those sectors were obtained from the national statistics offices of the Czech Republic, Denmark, France, Italy, Spain and Sweden. By comparing the employment and value added for the sectors in question in those six countries with total employment and value added in the relevant divisions in the EU, ratios were obtained which can reasonably be assumed to be representative of the EU as a whole. Those ratios were then used to impute EU-level employment and GVA data for those industries.

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10.4.1. Copyright-intensive industries according to the WIPO methodology

The copyright-intensive industries presented there were selected on the basis of the WIPO methodology. This appendix sets out the standard WIPO methodology as outlined by WIPO (2015) in more detail.

WIPO divides copyright-intensive industries into four main categories:

- core
- inter-dependent
- partial
- non-dedicated support

Core copyright industries

Core copyright-intensive industries as defined by WIPO are industries that are wholly engaged in the creation, production, manufacture, performance, broadcast, communication, exhibition, distribution or sale of works and other protected subject-matter.

According to WIPO, core copyright industries "as a category would not exist or would be significantly different without copyright in works or other subject-matter". Therefore, all of the value added and employment generated in these industries should be considered to be copyright's contribution to the economy.

Thus, in all, the 49 industries listed below are defined as core copyright-intensive by WIPO.

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Table 43:
List of core copyright-intensive industries according to WIPO

NACE code	NACE description
58.11	Book publishing
58.13	Publishing of newspapers
58.14	Publishing of journals and periodicals
58.19	Other publishing activities
58.21	Publishing of computer games
58.29	Other software publishing
59.11	Motion picture, video and television programme production activities
59.12	Motion picture, video and television programme post-production activities
59.13	Motion picture, video and television programme distribution activities
59.14	Motion picture projection activities
59.20	Sound recording and music publishing activities
60.10	Radio broadcasting
60.20	Television programming and broadcasting activities
61.20	Wireless telecommunications activities
62.01	Computer programming activities
62.02	Computer consultancy activities
62.03	Computer facilities management activities
62.09	Other information technology and computer service activities
63.12	Web portals
63.91	News agency activities
63.99	Other information service activities n.e.c.
73.11	Advertising agencies
73.12	Media representation
74.10	Specialised design activities
74.20	Photographic activities
74.30	Translation and interpretation activities
90.01	Performing arts
90.02	Support activities to performing arts
90.03	Artistic creation
91.01	Library and archives activities
93.29	Other amusement and recreation activities
18.11	Printing of newspapers
18.12	Other printing
18.13	Pre-press and pre-media services
18.14	Binding and related services

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18.20	Reproduction of recorded media
47.61	Retail sale of books in specialised stores
47.62	Retail sale of newspapers and stationery in specialised stores
47.63	Retail sale of music and video recordings in specialised stores
61.10	Wired telecommunications activities
61.30	Satellite telecommunications activities
61.90	Other telecommunications activities
63.11	Data processing, hosting and related activities
79.90	Other reservation service and related activities
82.19	Photocopying, document preparation and other specialised office support activities
85.52	Cultural education
90.04	Operation of arts facilities
93.21	Activities of amusement parks and theme parks
94.12	Activities of professional membership organisations

Non-core copyright industries

In addition to the core copyright industries, WIPO also defines three groups of industries whose activity is related to copyright industries to some degree: inter-dependent, partial and non-dedicated support industries. Because these industries are only partly engaged in copyright-related activities, only part of their employment and value added should be considered copyright-intensive. The definitions of the three groups are as follows:

- **Inter-dependent copyright industries** are industries that are engaged in the production, manufacture and sale of equipment whose function is wholly or primarily to facilitate the creation, production or use of works and other protected subject-matter.
- **Partial copyright industries** are industries in which some activities are related to works and other protected subject-matter and may involve creation, production and manufacturing, performance, broadcast, communication and exhibition or distribution and sale.
- **Non-dedicated support industries** are industries in which some activities are related to facilitating the broadcast, communication, distribution or sale of works and other protected subject-matter, and whose activities have not been included in the core copyright industries.

In order to capture the fact that only a portion of each non-core industry's activities can be related to copyright, each industry is assigned a factor. This factor is used to scale that industry's employment and value added when tabulating the total contribution of the non-core copyright industries to the economy. The copyright factors assigned to each industry in inter-dependent, partial and non-dedicated support industries have been adopted from a Dutch study entitled "The Economic Contribution of Copyright-Based Industries in the Netherlands"[65] and a Finnish study entitled "Economic Contribution of Copyright-Based Industries in Finland 2005–2008",[66] both published in 2011. These studies are considered authoritative by many authors and are available from WIPO.

65 wipo.int/export/sites/www/copyright/en/performance/pdf/econ_contribution_cr_nl.pdf.
66 wipo.int/export/sites/www/copyright/en/performance/pdf/econ_contribution_cr_fi.pdf.

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Table 44 shows the inter-dependent industries and the factors assigned to each.

Table 44: Inter-dependent copyright-intensive industries

NACE code	NACE description	Factor
17.11	Manufacture of pulp	25.0%
17.12	Manufacture of paper and paperboard	25.0%
20.59	Manufacture of other chemical products n.e.c.	25.0%
28.23	Manufacture of office machinery and equipment (except computers and peripheral equipment)	30.0%
26.20	Manufacture of computers and peripheral equipment	30.0%
26.30	Manufacture of communication equipment	30.0%
26.40	Manufacture of consumer electronics	30.0%
26.70	Manufacture of optical instruments and photographic equipment	30.0%
27.31	Manufacture of fibre optic cables	30.0%
32.20	Manufacture of musical instruments	35.0%
46.43	Wholesale of electrical household appliances	19.0%
46.76	Wholesale of other intermediate products	25.0%
46.51	Wholesale of computers, computer peripheral equipment and software	30.0%
46.52	Wholesale of electronic and telecommunications equipment and parts	25.0%
46.66	Wholesale of other office machinery and equipment	30.0%
47.43	Retail sale of audio and video equipment in specialised stores	33.3%
47.41	Retail sale of computers, peripheral units and software in specialised stores	33.3%
47.78	Other retail sale of new goods in specialised stores	33.3%
77.33	Renting and leasing of office machinery and equipment (including computers)	35.0%
77.39	Renting and leasing of other machinery, equipment and tangible goods n.e.c.	20.0%
77.22	Renting of video tapes and disks	20.0%
77.29	Renting and leasing of other personal and household goods	20.0%

Based on the average of these 22 industries' factors, it can be concluded that 28% of their employment and value added can be considered copyright-related.

Table 45 shows the 42 industries classified by WIPO as partially copyright-intensive industries and their factors.

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Table 45:
Partial copyright-intensive industries

NACE code	NACE description	Factor
1391	Manufacture of knitted and crocheted fabrics	0.55%
14.31	Manufacture of knitted and crocheted hosiery	0.55%
14.39	Manufacture of other knitted and crocheted apparel	0.55%
16.29	Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials	0.55%
23.11	Manufacture of flat glass	0.55%
2313	Manufacture of hollow glass	0.55%
23.19	Manufacture and processing of other glass, including technical glassware	0.55%
25.71	Manufacture of cutlery	0.55%
25.99	Manufacture of other fabricated metal products n.e.c.	0.55%
47.53	Retail sale of carpets, rugs, wall and floor coverings in specialised stores	0.55%
47.59	Retail sale of furniture, lighting equipment and other household articles in specialised stores	0.55%
13.93	Manufacture of carpets and rugs	1.9%
1723	Manufacture of paper stationery	1.9%
1724	Manufacture of wallpaper	1.9%
13.92	Manufacture of made-up textile articles, except apparel	2.7%
14.11	Manufacture of leather clothes	2.7%
14.12	Manufacture of workwear	2.7%
14.13	Manufacture of other outerwear	2.7%
14.14	Manufacture of underwear	2.7%
14.19	Manufacture of other wearing apparel and accessories	2.7%
15.20	Manufacture of footwear	2.7%
46.41	Wholesale of textiles	2.7%
46.42	Wholesale of clothing and footwear	2.7%
47.51	Retail sale of textiles in specialised stores	2.7%
47.71	Retail sale of clothing in specialised stores	2.7%
47.72	Retail sale of footwear and leather goods in specialised stores	2.7%
4644	Wholesale of china and glassware and cleaning materials	5.0%
4647	Wholesale of furniture, carpets and lighting equipment	5.0%
4648	Wholesale of watches and jewellery	5.0%
4649	Wholesale of other household goods	5.0%
31.01	Manufacture of office and shop furniture	6.7%
31.02	Manufacture of kitchen furniture	6.7%
31.03	Manufacture of mattresses	6.7%

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3109	Manufacture of other furniture	6.7%
71.11	Architectural activities	9.0%
71.12	Engineering activities and related technical consultancy	9.0%
32.11	Striking of coins	33.5%
32.12	Manufacture of jewellery and related articles	33.5%
94.99	Activities of other membership organisations n.e.c.	41.0%
32.40	Manufacture of games and toys	46.0%
91.02	Museums activities	50.0%
91.03	Operation of historical sites and buildings and similar visitor attractions	50.0%

Only the portion of these industries' activities which is attributable to copyrighted works and other protected subject-matter, ranging from 0.55% to 50%, should be included in their employment and value added contributions. For example, museums activities and the manufacture of games and toys have a significant copyright component, whereas only a very small portion of employment and value added in industries such as the manufacture of carpets or wholesale of furniture is directly related to copyright activities or copyrighted materials.

Finally, the non-dedicated support industries are shown in Table 46.

Table 46: Non-dedicated copyright-intensive support industries

NACE code	NACE description	Factor
46.1	Wholesale on a fee or contract basis	6%
46.4	Wholesale of household goods	6%
46.6	Wholesale of other machinery, equipment and supplies	6%
46.9	Non-specialised wholesale trade	6%
47.1	Retail sale in non-specialised stores	6%
47.4	Retail sale of information and communication equipment in specialised stores	6%
47.5	Retail sale of other household equipment in specialised stores	6%
47.7	Retail sale of other goods in specialised stores	6%
47.8	Retail sale via stalls and markets	6%
47.9	Retail trade not in stores, stalls or markets	6%
49.1	Passenger rail transport, interurban	6%
49.2	Freight rail transport	6%
49.3	Other passenger land transport	6%
49.4	Freight transport by road and removal services	6%
50.1	Sea and coastal passenger water transport	6%
50.2	Sea and coastal freight water transport	6%
50.3	Inland passenger water transport	6%

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50.4	Inland freight water transport	6%
51.1	Passenger air transport	6%
51.2	Freight air transport and space transport	6%
52.1	Warehousing and storage	6%
52.2	Support activities for transportation	6%
53.1	Postal activities under universal service obligation	6%
53.2	Other postal and courier activities	6%
79.1	Travel agency and tour operator activities	6%
79.9	Other reservation service and related activities	6%

The inclusion of the above industries is attributable to backward linkages, generally business services and delivery modes. For example, it is estimated that 6% of employment and value added in postal and courier services is generated by deliveries of copyrighted materials, such as magazines, manuscripts and audiovisual recordings.

In this study, only core and non-core industries with a factor of at least 20% are included as copyright-intensive.

10.5. Identification of GI-intensive industries

The methodology for the identification of GI-intensive industries is similar to that used in previous studies, but updated information has been used, for the year 2017, for the sale of GI products.[67]

GIs (geographical indications) have two important characteristics which had to be considered when devising the methodology:

- GIs are not owned by private parties; they are usually applied for by regional producer associations. This means that there are no comparable databases that could be used for matching right-holder information with economic information. In this respect, there is a certain similarity between GIs and copyright for which the approach likewise entails applying a pre-defined set of industries (defined by WIPO in the case of copyright). The set of industries to be considered in the context of GIs is determined by the relevant EU regulations and sources of information provided by the regulator, in this case the European Commission (DG AGRI).
- The proportion of a given NACE class corresponding to GIs varies significantly from one member state to another.[68] This means that the same industry can be GI-intensive in one member state but not in another. This is in contrast to the other IPRs included in this study, for which the intensity in any given industry is a function of the inherent characteristics of that industry; it can therefore be safely assumed that if a particular industry is, say, patent-intensive in one country, it will also be patent-intensive in others. This assumption cannot, however, be made for GIs, and GI-related employment and value added must be quantified on a country-by-country basis.

67 Study on economic value of EU quality schemes, geographical indications (GIs) and traditional specialities guaranteed (TSGs). October 2019, AND-International and European Commission. Available at data.europa.eu/doi/10.2762/396490.

68 For example, about 47% of German beer sales are protected by GIs, while virtually no Belgian beer manufacturer uses this IPR.

Furthermore, GI industries are often vertically integrated. For example, GI wine designation (by far the most important GI sector) is based on the grapes grown and processed in a particular area. This means that input-output tables are unsuitable for calculating indirect employment generated by GI industries. In fact, due to gaps in the statistics on agricultural employment, the contribution of GI-intensive industries to employment could not be calculated.

There were 3 153 registered GIs in the EU in 2017:

- 50.0% related to wines[69]
- 41.6% related to agricultural products and foodstuffs[70]
- 8.2% related to spirits[71]
- 0.2% related to aromatised wines[72]

Nearly 90% of GI products are produced in five EU member states: France, Germany, Italy, Portugal and Spain. GIs are mainly a European phenomenon, although their use in countries outside the EU is increasing.

The GI-intensive industries were identified, and their value added subsequently calculated on the basis of the DG AGRI study referred to above, coupled with data from Eurostat and other sources, as described below.

The DG AGRI study calculates the volume and sales of GI products by product and member state. For the EU as a whole, GI products account for 7.1% of all food and drink sales, with significant variation among member states, as shown in Table 47.

In order to estimate the value added attributable to GIs in each member state, a factor for each industry and member state was calculated, showing the percentage of industry sales accounted for by GIs. Since the DG AGRI study does not include data on total sales by industry, turnover data from Eurostat were used to calculate this sales ratio. In other words, the factor by country and product was computed by dividing the **sales of GIs** from the DG AGRI report by the **turnover for total product (GI+non-GI)** from Eurostat SBS. This ratio was then applied to value added data from SBS in order to calculate the value added generated by GIs.[73]

69 Reg. (EC) No 1308/2013.
70 Reg. (EC) No 1151/2012.
71 Reg. (EC) No 110/2008.
72 Reg. (EC) No 251/2014.
73 The underlying assumption is that the value added ratios between GI and non-GI products are the same as the ratio between GI and non-GI in sales. This may not be accurate, given that GI products usually command a price premium over non-GI products. On the other hand, GI products may also cost more to produce, which would, at least partially, offset this error.

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Table 47:
GI sales by member state, 2017

Country	Production value 2017 (€ million)	% of value from agro-food products	% of value from wine	% of value from spirits	GI % of food and drinks sector	GI % of trade (intra- + extra-EU)
FR	26 819	15%	72%	13%	14.9%	43%
IT	15 758	44%	55%	1%	11.8%	47%
DE	8 672	61%	37%	2%	5.1%	13%
ES	6 166	26%	72%	2%	6.4%	32%
PT	1 847	9%	91%	0%	11.8%	41%
NL	1 577	99%	1%	0%	2.1%	48%
GR	1 195	77%	17%	5%	8.4%	42%
IE	991	1%	0%	99%	4.2%	96%
CZ	937	83%	17%	0%	7.1%	26%
AT	935	21%	71%	8%	4.1%	23%
PL	433	25%	0%	75%	0.8%	38%
HU	397	20%	76%	5%	3.4%	24%
SE	226	22%	0%	78%	1.2%	76%
SI	218	12%	88%	0%	10.4%	6%
RO	218	0%	99%	1%	1.8%	5%
DK	133	100%	0%	0%	0.5%	72%
HR	124	5%	86%	9%	2.3%	10%
SK	94	15%	85%	1%	2.2%	1%
BG	83	12%	80%	8%	1.5%	35%
BE	57	49%	10%	41%	0.1%	16%
LU	49	20%	80%	0%	6.4%	31%
FI	29	99%	0%	1%	0.3%	19%
CY	22	2%	79%	19%	1.5%	7%
LT	20	32%	0%	68%	0.5%	5%
MT	13	0%	100%	0%	n/a	0%
EE	s*	s	s	s	s	s
LV	s	s	s	s	s	s
EU	**67 017**	**33%**	**59%**	**8%**	**7.1%**	**39%**

* Not published for reasons of confidentiality.
Source: DG AGRI (2019)

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The most important GI industry – wine – required special treatment, because Eurostat does not publish SBS statistics for primary sectors such as agriculture. Therefore, data for value added for NACE 01.21 *(Growing of grapes)* had to be obtained from other sources. Production data were taken from another Eurostat data series: economic accounts for agriculture (EAA). Subsequently, the value added/turnover ratio for NACE 11.02 *(Manufacture of wine)* from SBS was applied to the sum of 01.21 and 11.02 production to arrive at an estimate of value added related to wine production.[74]

10.6. Identification of PVR-intensive industries

For the identification of PVR-intensive industries, this study relies on calculations performed for the previous edition. A total of 8 351 PVR applications filed between 1 January 2013 and 31 December 2017 with at least one applicant domiciled in an EU member state in "registered" status.

- Further, the CPVR applications dataset was matched with concordance tables linking CPVR applicant data with information available in ORBIS. A match was found for 7 730 applications, i.e. 92.6% of all relevant CPVR applications.
- In total, NACE codes were unavailable for 198 applications for which a match with ORBIS was found. For 2 applications, NACE could be inferred on the basis of patent applications associated with their owners; the remaining 196 applications were discarded from the subsequent analysis. Ultimately, data of 7 534 CPVR applications were used for the analysis of the distribution of CPVRs among industries.
- In order to assign a proper industry code to companies linked in ORBIS with head office status, NACE industry codes of companies linked with head offices within the same economic groups were used. For a given head office, the NACE codes were assigned proportionally to the number of companies representing various NACE industries within the head office economic group. The remaining CPVRs associated initially with head offices' NACE codes were redistributed to other NACE codes proportionally to the distribution of valid NACE codes associated with head offices in the subset of data for which the assignment was possible based on the procedure described above.
- Finally, for some companies, ORBIS assigns NACE codes at a higher level of aggregation than the four-digit level used in the analysis. This problem was solved by reallocating CPVR applications linked with those companies to the lower level of NACE based on the distribution of PVRs within the division or group resulting from the calculation performed on the subset of companies correctly associated with the lowest NACE industry level.

Table 48 shows the industries with the greatest number of filings during the 2013–2017 period, along with the number of countries from which the filings in each NACE code originated.

74 Here again, it is assumed that the turnover/production ratio for the wine industry is the same in economic accounts for agriculture (EAA) as in SBS.

Table 48:
Top filing industries at the CPVO, 2013–2017

NACE code	NACE description	Filings	Countries
01.30	Plant propagation	923	10
01.19	Growing of other non-perennial crops	905	8
46.21	Wholesale of grain, unmanufactured tobacco, seeds and animal feeds	830	9
01.11	Growing of cereals (except rice), leguminous crops and oil seeds	788	10
72.19	Other research and experimental development on natural sciences and engineering	657	14
01.64	Seed processing for propagation	584	6
01.13	Growing of vegetables and melons, roots and tubers	554	10
46.22	Wholesale of flowers and plants	458	7
72.11	Research and experimental development on biotechnology	432	7
77.40	Leasing of intellectual property and similar products, except copyrighted works	291	5

As can be seen in Table 48, agricultural and horticultural sectors are the main users of the CPVO registration system. However, the employment data available for those sectors from Eurostat are not sufficiently detailed. Data are available at division level (two-digit NACE) only, and LFS is the source of employment data. In order to determine which sector of agriculture is the most PVR-intensive, data from the CPVO register were classified into groups of species corresponding to the Eurostat economic accounts for agriculture (EAA) statistics. EEA contains detailed data on the value of output measured in basic prices. Table 49 contains detailed information on the intensity of registration of CPVRs by crop types.

This analysis confirms that horticulture, comprising flowers and ornamental plants, vegetables and nurseries, is the main user of the CPVR system in the EU.

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Table 49:
Intensity of CPVR applications by crop type

Eurostat output code	Species name	Number of registered applications	Share in total applications	Production value at basic price (€ million)	Applications per €10 million in production value
04220	Ornamental plants and flowers (including Christmas trees)	3 086	38.5%	8 523	3.62
04190	Other fresh vegetables	1 189	14.8%	24 459	0.49
01500	Grain maize	880	11.0%	10 600	0.83
01100	Wheat and spelt	436	5.4%	24 890	0.18
04120	Tomatoes	337	4.2%	6 770	0.50
02200	Protein crops (including seeds)	308	3.8%	1 279	2.41
05000	Potatoes (including seeds)	255	3.2%	11 524	0.22
02110	Rape and turnip rape seed	213	2.7%	7 738	0.28
06190	Other fresh fruit	198	2.5%	8 657	0.23
01300	Barley	170	2.1%	8 942	0.19
02120	Sunflower	155	1.9%	3 061	0.51
06130	Peaches	151	1.9%	1 575	0.96
01200	Rye and meslin	143	1.8%	1 044	1.37
01900	Other cereals	64	0.8%	1 978	0.32
06110	Dessert apples	61	0.8%	4 259	0.14
01600	Rice	53	0.7%	739	0.72
02900	Other industrial crops	51	0.6%	4 034	0.13
01400	Oats and summer cereal mixtures	49	0.6%	1 406	0.35
03000	Forage plants	41	0.5%	23 735	0.02
06400	Grapes	38	0.5%	2 958	0.13

For the remainder of the NACE industries for which information was available at class level (four digits), the standard procedure involving calculation of employment-weighted average of CPVRs per 1 000 employees was used to determine their CPVR intensity.

CPVR-intensive industries were defined as those having a CPVRs-per-1 000-employees value higher than the employment-weighted mean of CPVRs per 1 000 employees, which amounted to 0.16 CPVRs per 1 000 employees.

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10.7. Limitations of data and methodology

Due to the size of the dataset, data limitations and the scope of analysis, the method of selecting IPR-intensive industries was necessarily based on a number of simplifying assumptions.

IPR-intensive industries were identified at EU level. This method may conceal important heterogeneities between countries regarding innovation level, propensity to register IPRs at European level, and national industry structures.

To qualify as IPR-intensive, an industry has to intensively use at least one of the IPRs covered in the present study. However, the protected subject-matter, legal strength and other aspects differ across different IPRs. Therefore, IPR intensity has a different meaning for different IPRs.

The method of determining the IPR intensity of industries does not take into account the fact that the distribution of the economic value of individual IPRs is highly skewed. All the IPRs applied for are simply aggregated by industry and their individual values are not evaluated. As a result, some industries with few IPRs, which may nevertheless be very valuable for the operation of those industries, may not be regarded as IPR-intensive. In addition, due to the specificity of the protected subject-matter, some industries may prefer other forms of IP protection which are not included in the present study, such as trade secrets.

Future research, taking into account national IPRs, national patterns of IPR intensity of industries or other, richer datasets including non-registered IPRs, may lead to different conclusions as regards the set of IPR-intensive industries and their importance in the economies of the EU and the four non-EU countries included in this study.

Despite these caveats, this report offers a thorough and systematic analysis of the differences between industries making intensive use of IPRs and those in which IPRs play a less important role.

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11. Appendix: IPR-intensity measures

11.1. Patent-intensive industries

Table 50:
Patent-intensive industries

NACE code	NACE description	Patents per 1 000 employees
7740	Leasing of intellectual property and similar products, except copyrighted works	85.73
2824	Manufacture of power-driven hand tools	72.78
2630	Manufacture of communication equipment	35.70
2751	Manufacture of electric domestic appliances	23.02
7211	Research and experimental development on biotechnology	21.39
7219	Other research and experimental development on natural sciences and engineering	20.97
8541	Post-secondary non-tertiary education	18.49
2059	Manufacture of other chemical products n.e.c.	18.08
2891	Manufacture of machinery for metallurgy	16.91
2611	Manufacture of electronic components	16.68
2311	Manufacture of flat glass	15.78
2211	Manufacture of rubber tyres and tubes; retreading and rebuilding of rubber tyres	14.60
2670	Manufacture of optical instruments and photographic equipment	14.26
2011	Manufacture of industrial gases	13.60
2651	Manufacture of instruments and appliances for measuring, testing and navigation	12.03
2620	Manufacture of computers and peripheral equipment	11.57
2830	Manufacture of agricultural and forestry machinery	11.42
2740	Manufacture of electric lighting equipment	11.38
2894	Manufacture of machinery for textile, apparel and leather production	10.79
2660	Manufacture of irradiation, electromedical and electrotherapeutic equipment	10.75
2895	Manufacture of machinery for paper and paperboard production	10.53
2343	Manufacture of ceramic insulators and insulating fittings	10.06

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2899	Manufacture of other special-purpose machinery n.e.c.	9.32
3030	Manufacture of air and spacecraft and related machinery	9.05
3099	Manufacture of other transport equipment n.e.c.	8.20
2893	Manufacture of machinery for food, beverage and tobacco processing	7.83
2446	Processing of nuclear fuel	7.78
3091	Manufacture of motorcycles	7.73
8542	Tertiary education	7.52
2572	Manufacture of locks and hinges	6.96
2041	Manufacture of soap and detergents, cleaning and polishing preparations	6.79
2849	Manufacture of other machine tools	6.68
2110	Manufacture of basic pharmaceutical products	6.66
2892	Manufacture of machinery for mining, quarrying and construction	6.38
1724	Manufacture of wallpaper	6.31
0910	Support activities for petroleum and natural gas extraction	6.05
2445	Other non-ferrous metal production	6.03
2434	Cold drawing of wire	5.93
2790	Manufacture of other electrical equipment	5.92
2052	Manufacture of glues	5.88
2051	Manufacture of explosives	5.64
2319	Manufacture and processing of other glass, including technical glassware	5.46
2910	Manufacture of motor vehicles	5.44
3230	Manufacture of sports goods	5.24
2814	Manufacture of other taps and valves	5.22
2813	Manufacture of other pumps and compressors	5.05
2815	Manufacture of bearings, gears, gearing and driving elements	5.03
2829	Manufacture of other general-purpose machinery n.e.c.	4.52
2841	Manufacture of metal forming machinery	4.43
2017	Manufacture of synthetic rubber in primary forms	4.42
4643	Wholesale of electrical household appliances	4.39
3040	Manufacture of military fighting vehicles	4.23
3250	Manufacture of medical and dental instruments and supplies	4.19
2822	Manufacture of lifting and handling equipment	4.01
2016	Manufacture of plastics in primary forms	3.96
1062	Manufacture of starches and starch products	3.84
2720	Manufacture of batteries and accumulators	3.77
3092	Manufacture of bicycles and invalid carriages	3.73
2640	Manufacture of consumer electronics	3.72

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2120	Manufacture of pharmaceutical preparations	3.72
2896	Manufacture of plastics and rubber machinery	3.72
2931	Manufacture of electrical and electronic equipment for motor vehicles	3.64
2732	Manufacture of other electronic and electric wires and cables	3.50
7490	Other professional, scientific and technical activities n.e.c.	3.23
2042	Manufacture of perfumes and toilet preparations	3.23
2811	Manufacture of engines and turbines, except aircraft, vehicle and cycle engines	3.19
2060	Manufacture of man-made fibres	3.12
0610	Extraction of crude petroleum	3.11
2812	Manufacture of fluid power equipment	3.06
2821	Manufacture of ovens, furnaces and furnace burners	3.03
2932	Manufacture of other parts and accessories for motor vehicles	3.03
2823	Manufacture of office machinery and equipment (except computers and peripheral equipment)	2.98
2540	Manufacture of weapons and ammunition	2.97
6190	Other telecommunications activities	2.90
2573	Manufacture of tools	2.89
2593	Manufacture of wire products, chain and springs	2.82
2013	Manufacture of other inorganic basic chemicals	2.81
2530	Manufacture of steam generators, except central heating hot water boilers	2.76
4669	Wholesale of other machinery and equipment	2.74
3299	Other manufacturing n.e.c.	2.72
2012	Manufacture of dyes and pigments	2.69
6430	Trusts, funds and similar financial entities	2.67
2344	Manufacture of other technical ceramic products	2.65
2825	Manufacture of non-domestic cooling and ventilation equipment	2.54
2014	Manufacture of other organic basic chemicals	2.50
2229	Manufacture of other plastic products	2.42
2222	Manufacture of plastic packing goods	2.42
2020	Manufacture of pesticides and other agrochemical products	2.41
1089	Manufacture of other food products n.e.c.	2.32
1086	Manufacture of homogenised food preparations and dietetic food	2.24
3020	Manufacture of railway locomotives and rolling stock	2.24
3212	Manufacture of jewellery and related articles	2.22
2712	Manufacture of electricity distribution and control apparatus	2.20
2314	Manufacture of glass fibres	2.18
7112	Engineering activities and related technical consultancy	2.18
3320	Installation of industrial machinery and equipment	2.15

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1395	Manufacture of non-wovens and articles made from non-wovens, except apparel	2.14
2391	Production of abrasive products	2.11
1722	Manufacture of household and sanitary goods and of toilet requisites	2.08
1394	Manufacture of cordage, rope, twine and netting	2.06
2369	Manufacture of other articles of concrete, plaster and cement	2.05
2410	Manufacture of basic iron and steel and of ferro-alloys	2.03
4664	Wholesale of machinery for the textile industry and of sewing and knitting machines	2.03
4614	Agents involved in the sale of machinery, industrial equipment, ships and aircraft	2.01
2599	Manufacture of other fabricated metal products n.e.c.	1.99
2594	Manufacture of fasteners and screw machine products	1.99
2452	Casting of steel	1.98
7220	Research and experimental development on social sciences and humanities	1.97
2920	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	1.93
2219	Manufacture of other rubber products	1.91
4675	Wholesale of chemical products	1.86
1712	Manufacture of paper and paperboard	1.86
3822	Treatment and disposal of hazardous waste	1.85
2711	Manufacture of electric motors, generators and transformers	1.76
2612	Manufacture of loaded electronic boards	1.73
4623	Wholesale of live animals	1.65
3511	Production of electricity	1.63
2030	Manufacture of paints, varnishes and similar coatings, printing ink and mastics	1.61
2731	Manufacture of fibre optic cables	1.59
5829	Other software publishing	1.59
4531	Wholesale trade of motor vehicle parts and accessories	1.56
2221	Manufacture of plastic plates, sheets, tubes and profiles	1.55
2331	Manufacture of ceramic tiles and flags	1.53
1399	Manufacture of other textiles n.e.c.	1.51
4652	Wholesale of electronic and telecommunications equipment and parts	1.46
3316	Repair and maintenance of aircraft and spacecraft	1.43
2521	Manufacture of central heating radiators and boilers	1.42
1042	Manufacture of margarine and similar edible fats	1.40
2399	Manufacture of other non-metallic mineral products n.e.c.	1.38
2592	Manufacture of light metal packaging	1.37
3103	Manufacture of mattresses	1.33

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4646	Wholesale of pharmaceutical goods	1.32
6203	Computer facilities management activities	1.30
1083	Processing of tea and coffee	1.26
1396	Manufacture of other technical and industrial textiles	1.26
2442	Aluminium production	1.22
2223	Manufacture of builders? ware of plastic	1.21
2733	Manufacture of wiring devices	1.18
2420	Manufacture of tubes, pipes, hollow profiles and related fittings, of steel	1.15
3512	Transmission of electricity	1.13
2349	Manufacture of other ceramic products	1.13
1200	Manufacture of tobacco products	1.13
3011	Building of ships and floating structures	1.12
729	Mining of other non-ferrous metal ores	1.12
9609	Other personal service activities n.e.c.	1.10
3291	Manufacture of brooms and brushes	1.09
3521	Manufacture of gas	1.08
2365	Manufacture of fibre cement	1.07
2511	Manufacture of metal structures and parts of structures	1.07
2571	Manufacture of cutlery	1.06
0811	Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate	1.04
2441	Precious metals production	1.04
4291	Construction of water projects	1.02
3220	Manufacture of musical instruments	0.98
2320	Manufacture of refractory products	0.96

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11.2. TM-intensive industries

Table 51:
TM-intensive industries

NACE code	NACE description	EUTMs per 1 000 employees
7740	Leasing of intellectual property and similar products, except copyrighted works	402.16
3099	Manufacture of other transport equipment n.e.c.	248.91
1104	Manufacture of other non-distilled fermented beverages	95.12
6430	Trusts, funds and similar financial entities	69.10
6420	Activities of holding companies	65.40
0610	Extraction of crude petroleum	64.62
7211	Research and experimental development on biotechnology	59.59
1086	Manufacture of homogenised food preparations and dietetic food	50.87
2042	Manufacture of perfumes and toilet preparations	48.71
3230	Manufacture of sports goods	45.42
6312	Web portals	44.17
2020	Manufacture of pesticides and other agrochemical products	43.81
1101	Distilling, rectifying and blending of spirits	43.12
5920	Sound recording and music publishing activities	41.22
1089	Manufacture of other food products n.e.c.	40.95
1102	Manufacture of wine from grape	40.77
5821	Publishing of computer games	40.26
5913	Motion picture, video and television programme distribution activities	40.02
3240	Manufacture of games and toys	36.58
2652	Manufacture of watches and clocks	34.72
2059	Manufacture of other chemical products n.e.c.	34.04
4645	Wholesale of perfume and cosmetics	33.63
2041	Manufacture of soap and detergents, cleaning and polishing preparations	33.02
1103	Manufacture of cider and other fruit wines	31.72
4791	Retail sale via mail order houses or via Internet	31.12
2052	Manufacture of glues	30.18
2110	Manufacture of basic pharmaceutical products	29.38
9102	Museums activities	28.70
5829	Other software publishing	27.65
4641	Wholesale of textiles	27.25
3092	Manufacture of bicycles and invalid carriages	27.10
4637	Wholesale of coffee, tea, cocoa and spices	26.68

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1092	Manufacture of prepared pet foods	26.67
4643	Wholesale of electrical household appliances	26.18
1083	Processing of tea and coffee	26.04
4649	Wholesale of other household goods	26.02
2030	Manufacture of paints, varnishes and similar coatings, printing ink and mastics	25.79
7219	Other research and experimental development on natural sciences and engineering	24.68
4638	Wholesale of other food, including fish, crustaceans and molluscs	24.39
2670	Manufacture of optical instruments and photographic equipment	24.19
4611	Agents involved in the sale of agricultural raw materials, live animals, textile raw materials and semi-finished goods	24.10
3299	Other manufacturing n.e.c.	22.79
0891	Mining of chemical and fertiliser minerals	22.77
3091	Manufacture of motorcycles	22.62
4642	Wholesale of clothing and footwear	22.53
2660	Manufacture of irradiation, electromedical and electrotherapeutic equipment	22.50
6810	Buying and selling of own real estate	22.49
2620	Manufacture of computers and peripheral equipment	22.41
4614	Agents involved in the sale of machinery, industrial equipment, ships and aircraft	22.40
1411	Manufacture of leather clothes	22.23
4648	Wholesale of watches and jewellery	22.06
4647	Wholesale of furniture, carpets and lighting equipment	21.93
8230	Organisation of conventions and trade shows	21.85
1419	Manufacture of other wearing apparel and accessories	21.78
6399	Other information service activities n.e.c.	21.61
6490	Other financial service activities, except insurance and pension funding	21.45
7735	Rental and leasing of air transport equipment	21.41
2571	Manufacture of cutlery	20.66
4616	Agents involved in the sale of textiles, clothing, fur, footwear and leather goods	20.46
6201	Computer programming activities	20.38
4763	Retail sale of music and video recordings in specialised stores	20.19
2343	Manufacture of ceramic insulators and insulating fittings	20.18
5819	Other publishing activities	20.07
6190	Other telecommunications activities	19.67
1105	Manufacture of beer	19.65
4675	Wholesale of chemical products	19.57

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6209	Other information technology and computer service activities	19.51
0910	Support activities for petroleum and natural gas extraction	19.46
2015	Manufacture of fertilisers and nitrogen compounds	19.38
1042	Manufacture of margarine and similar edible fats	19.25
2017	Manufacture of synthetic rubber in primary forms	19.19
1724	Manufacture of wallpaper	19.08
9312	Activities of sports clubs	19.02
7410	Specialised design activities	18.92
5811	Book publishing	18.91
4618	Agents specialised in the sale of other particular products	18.83
3291	Manufacture of brooms and brushes	18.83
1107	Manufacture of soft drinks; production of mineral waters and other bottled waters	18.74
2740	Manufacture of electric lighting equipment	18.72
1820	Reproduction of recorded media	18.51
2640	Manufacture of consumer electronics	18.48
4634	Wholesale of beverages	18.45
2120	Manufacture of pharmaceutical preparations	18.28
7021	Public relations and communication activities	18.16
1106	Manufacture of malt	17.85
1395	Manufacture of non-wovens and articles made from non-wovens, except apparel	17.40
7022	Business and other management consultancy activities	17.39
5911	Motion picture, video and television programme production activities	17.30
4690	Non-specialised wholesale trade	17.10
2441	Precious metals production	16.92
2369	Manufacture of other articles of concrete, plaster and cement	16.88
4615	Agents involved in the sale of furniture, household goods, hardware and ironmongery	16.61
2011	Manufacture of industrial gases	16.53
2060	Manufacture of man-made fibres	16.51
2680	Manufacture of magnetic and optical media	16.37
5814	Publishing of journals and periodicals	16.35
7490	Other professional, scientific and technical activities n.e.c.	16.30
1399	Manufacture of other textiles n.e.c.	16.21
9103	Operation of historical sites and buildings and similar visitor attractions	16.14
4729	Other retail sale of food in specialised stores	16.06
1032	Manufacture of fruit and vegetable juice	15.90

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2319	Manufacture and processing of other glass, including technical glassware	15.83
4617	Agents involved in the sale of food, beverages and tobacco	15.44
5912	Motion picture, video and television programme post-production activities	15.43
3103	Manufacture of mattresses	15.40
3511	Production of electricity	15.39
4622	Wholesale of flowers and plants	15.22
6130	Satellite telecommunications activities	15.11
1073	Manufacture of macaroni, noodles, couscous and similar farinaceous products	15.06
9004	Operation of arts facilities	15.05
9609	Other personal service activities n.e.c.	14.77
2893	Manufacture of machinery for food, beverage and tobacco processing	14.71
4646	Wholesale of pharmaceutical goods	14.65
1091	Manufacture of prepared feeds for farm animals	14.50
1041	Manufacture of oils and fats	14.26
9200	Gambling and betting activities	14.21
1412	Manufacture of workwear	13.95
4619	Agents involved in the sale of a variety of goods	13.33
6520	Reinsurance	13.33
4644	Wholesale of china and glassware and cleaning materials	13.28
4676	Wholesale of other intermediate products	13.20
2814	Manufacture of other taps and valves	13.07
4624	Wholesale of hides, skins and leather	12.99
7721	Rental and leasing of recreational and sports goods	12.96
9319	Other sports activities	12.92
1200	Manufacture of tobacco products	12.72
1082	Manufacture of cocoa, chocolate and sugar confectionery	12.49
1396	Manufacture of other technical and industrial textiles	12.29
7990	Other reservation service and related activities	12.25
2751	Manufacture of electric domestic appliances	12.14
2651	Manufacture of instruments and appliances for measuring, testing and navigation	12.14
3213	Manufacture of imitation jewellery and related articles	12.06
2053	Manufacture of essential oils	12.04
1039	Other processing and preserving of fruit and vegetables	12.01
4633	Wholesale of dairy products, eggs and edible oils and fats	11.86
8211	Combined office administrative service activities	11.69
1431	Manufacture of knitted and crocheted hosiery	11.56

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2849	Manufacture of other machine tools	11.56
1722	Manufacture of household and sanitary goods and of toilet requisites	11.47
8541	Post-secondary non-tertiary education	11.46
4636	Wholesale of sugar and chocolate and sugar confectionery	11.40
1320	Weaving of textiles	11.30
2899	Manufacture of other special-purpose machinery n.e.c.	11.24
4665	Wholesale of office furniture	11.22
1061	Manufacture of grain mill products	11.21
3212	Manufacture of jewellery and related articles	11.08
2311	Manufacture of flat glass	11.06
6010	Radio broadcasting	10.99
1084	Manufacture of condiments and seasonings	10.93
8542	Tertiary education	10.86
1392	Manufacture of made-up textile articles, except apparel	10.83
1393	Manufacture of carpets and rugs	10.81
2445	Other non-ferrous metal production	10.77
3220	Manufacture of musical instruments	10.77
4639	Non-specialised wholesale of food, beverages and tobacco	10.74
4775	Retail sale of cosmetic and toilet articles in specialised stores	10.67
4621	Wholesale of grain, unmanufactured tobacco, seeds and animal feeds	10.65
3250	Manufacture of medical and dental instruments and supplies	10.60
6391	News agency activities	10.59
2630	Manufacture of communication equipment	10.56
4669	Wholesale of other machinery and equipment	10.54
4652	Wholesale of electronic and telecommunications equipment and parts	10.54
1723	Manufacture of paper stationery	10.51
3521	Manufacture of gas	10.51
2611	Manufacture of electronic components	10.51
2362	Manufacture of plaster products for construction purposes	10.48
1622	Manufacture of assembled parquet floors	10.25
1052	Manufacture of ice cream	10.21
2790	Manufacture of other electrical equipment	10.18
1072	Manufacture of rusks and biscuits; manufacture of preserved pastry goods and cakes	10.12
4741	Retail sale of computers, peripheral units and software in specialised stores	10.06
4635	Wholesale of tobacco products	10.01
2341	Manufacture of ceramic household and ornamental articles	9.95
2521	Manufacture of central heating radiators and boilers	9.91

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7311	Advertising agencies	9.91
6311	Data processing, hosting and related activities	9.87
3512	Transmission of electricity	9.77
2824	Manufacture of power-driven hand tools	9.69
4612	Agents involved in the sale of fuels, ores, metals and industrial chemicals	9.69
9002	Support activities to performing arts	9.64
0899	Other mining and quarrying n.e.c.	9.61
3040	Manufacture of military fighting vehicles	9.60
2364	Manufacture of mortars	9.51
2013	Manufacture of other inorganic basic chemicals	9.45
2720	Manufacture of batteries and accumulators	9.38
4540	Sale, maintenance and repair of motorcycles and related parts and accessories	9.34
1081	Manufacture of sugar	9.33
7712	Rental and leasing of trucks	9.33
9101	Library and archives activities	9.32
1394	Manufacture of cordage, rope, twine and netting	9.31
4664	Wholesale of machinery for the textile industry and of sewing and knitting machines	9.28
2830	Manufacture of agricultural and forestry machinery	9.26
7220	Research and experimental development on social sciences and humanities	9.25
4674	Wholesale of hardware, plumbing and heating equipment and supplies	9.22
6820	Rental and operating of own or leased real estate	9.17
5812	Publishing of directories and mailing lists	9.11
3522	Distribution of gaseous fuels through mains	9.08
2895	Manufacture of machinery for paper and paperboard production	9.05
1729	Manufacture of other articles of paper and paperboard	9.02
5010	Sea and coastal passenger water transport	9.01
7912	Tour operator activities	8.99
2391	Production of abrasive products	8.91
7739	Rental and leasing of other machinery, equipment and tangible goods n.e.c.	8.87
2891	Manufacture of machinery for metallurgy	8.84
1520	Manufacture of footwear	8.79
1310	Preparation and spinning of textile fibres	8.73
2829	Manufacture of other general-purpose machinery n.e.c.	8.72
2016	Manufacture of plastics in primary forms	8.67
4531	Wholesale trade of motor vehicle parts and accessories	8.62

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2051	Manufacture of explosives	8.60
4765	Retail sale of games and toys in specialised stores	8.59
2012	Manufacture of dyes and pigments	8.55
4651	Wholesale of computers, computer peripheral equipment and software	8.44
0892	Extraction of peat	8.35
2342	Manufacture of ceramic sanitary fixtures	8.33
2594	Manufacture of fasteners and screw machine products	8.23
1391	Manufacture of knitted and crocheted fabrics	8.19
4632	Wholesale of meat and meat products	8.17
7911	Travel agency activities	8.15
2229	Manufacture of other plastic products	8.15
4666	Wholesale of other office machinery and equipment	8.13
4519	Sale of other motor vehicles	8.12
1085	Manufacture of prepared meals and dishes	7.99
4613	Agents involved in the sale of timber and building materials	7.93
2599	Manufacture of other fabricated metal products n.e.c.	7.87
2823	Manufacture of office machinery and equipment (except computers and peripheral equipment)	7.86
2821	Manufacture of ovens, furnaces and furnace burners	7.79
7320	Market research and public opinion polling	7.79
2813	Manufacture of other pumps and compressors	7.76
6020	Television programming and broadcasting activities	7.65
4764	Retail sale of sporting equipment in specialised stores	7.64
2573	Manufacture of tools	7.64
7010	Activities of head offices	7.63
1062	Manufacture of starches and starch products	7.62
2221	Manufacture of plastic plates, sheets, tubes and profiles	7.57
4673	Wholesale of wood, construction materials and sanitary equipment	7.55
1712	Manufacture of paper and paperboard	7.51
4725	Retail sale of beverages in specialised stores	7.50
2434	Cold drawing of wire	7.38
4671	Wholesale of solid, liquid and gaseous fuels and related products	7.37
2211	Manufacture of rubber tyres and tubes; retreading and rebuilding of rubber tyres	7.34
4662	Wholesale of machine tools	7.32
1051	Operation of dairies and cheese making	7.19
1330	Finishing of textiles	7.19
6600	Activities auxiliary to financial services and insurance activities	7.16
3101	Manufacture of office and shop furniture	7.15

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1031	Processing and preserving of potatoes	7.10
4110	Development of building projects	7.08
4631	Wholesale of fruit and vegetables	7.08
3211	Striking of coins	7.05
3012	Building of pleasure and sporting boats	7.05
1512	Manufacture of luggage, handbags and the like, saddlery and harness	7.02
2223	Manufacture of builders? ware of plastic	7.00
8560	Educational support activities	7.00
2540	Manufacture of weapons and ammunition	6.97
2825	Manufacture of non-domestic cooling and ventilation equipment	6.96
2222	Manufacture of plastic packing goods	6.96
2331	Manufacture of ceramic tiles and flags	6.95
4751	Retail sale of textiles in specialised stores	6.94
2572	Manufacture of locks and hinges	6.93
6202	Computer consultancy activities	6.89
6203	Computer facilities management activities	6.80
9311	Operation of sports facilities	6.68
3319	Repair of other equipment	6.66
9329	Other amusement and recreation activities	6.58
2399	Manufacture of other non-metallic mineral products n.e.c.	6.57
3514	Trade of electricity	6.42
2352	Manufacture of lime and plaster	6.40
2731	Manufacture of fibre optic cables	6.26
2320	Manufacture of refractory products	6.25
4777	Retail sale of watches and jewellery in specialised stores	6.23
1920	Manufacture of refined petroleum products	6.23
4743	Retail sale of audio and video equipment in specialised stores	6.22
4774	Retail sale of medical and orthopaedic goods in specialised stores	6.22
2892	Manufacture of machinery for mining, quarrying and construction	6.22
1413	Manufacture of other outerwear	6.18
1439	Manufacture of other knitted and crocheted apparel	6.14
1020	Processing and preserving of fish, crustaceans and molluscs	5.97
7312	Media representation	5.93
1811	Printing of newspapers	5.92
2822	Manufacture of lifting and handling equipment	5.91
2894	Manufacture of machinery for textile, apparel and leather production	5.90
4623	Wholesale of live animals	5.83
0811	Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate	5.82

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11.3. Design-intensive industries

Table 52:
Design-intensive industries

NACE code	NACE description	RCDs per 1 000 employees
7740	Leasing of intellectual property and similar products, except copyrighted works	128.44
3099	Manufacture of other transport equipment n.e.c.	55.38
4647	Wholesale of furniture, carpets and lighting equipment	48.00
2740	Manufacture of electric lighting equipment	44.72
3212	Manufacture of jewellery and related articles	43.06
4615	Agents involved in the sale of furniture, household goods, hardware and ironmongery	41.39
2571	Manufacture of cutlery	35.48
1411	Manufacture of leather clothes	31.25
3230	Manufacture of sports goods	30.44
2751	Manufacture of electric domestic appliances	29.79
1104	Manufacture of other non-distilled fermented beverages	29.23
4648	Wholesale of watches and jewellery	28.99
2342	Manufacture of ceramic sanitary fixtures	26.87
3211	Striking of coins	25.21
1439	Manufacture of other knitted and crocheted apparel	24.72
2341	Manufacture of ceramic household and ornamental articles	23.88
1419	Manufacture of other wearing apparel and accessories	23.65
1520	Manufacture of footwear	23.00
1414	Manufacture of underwear	21.90
2814	Manufacture of other taps and valves	20.74
3240	Manufacture of games and toys	20.37
2652	Manufacture of watches and clocks	19.99
4649	Wholesale of other household goods	18.65
4644	Wholesale of china and glassware and cleaning materials	17.24
3109	Manufacture of other furniture	17.12
4623	Wholesale of live animals	16.55
2041	Manufacture of soap and detergents, cleaning and polishing preparations	15.38
4642	Wholesale of clothing and footwear	15.13
3101	Manufacture of office and shop furniture	14.21
1431	Manufacture of knitted and crocheted hosiery	14.06
7410	Specialised design activities	13.78

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3291	Manufacture of brooms and brushes	13.65
4665	Wholesale of office furniture	13.21
2572	Manufacture of locks and hinges	12.13
2670	Manufacture of optical instruments and photographic equipment	12.13
4643	Wholesale of electrical household appliances	11.66
3092	Manufacture of bicycles and invalid carriages	11.41
1032	Manufacture of fruit and vegetable juice	11.30
3091	Manufacture of motorcycles	10.62
3299	Other manufacturing n.e.c.	10.61
2369	Manufacture of other articles of concrete, plaster and cement	10.49
2319	Manufacture and processing of other glass, including technical glassware	10.47
1413	Manufacture of other outerwear	10.46
2229	Manufacture of other plastic products	10.21
2051	Manufacture of explosives	10.06
2521	Manufacture of central heating radiators and boilers	9.83
2599	Manufacture of other fabricated metal products n.e.c.	9.31
1512	Manufacture of luggage, handbags and the like, saddlery and harness	8.74
2830	Manufacture of agricultural and forestry machinery	7.89
2331	Manufacture of ceramic tiles and flags	7.78
2219	Manufacture of other rubber products	7.67
6430	Trusts, funds and similar financial entities	7.43
2313	Manufacture of hollow glass	7.30
1041	Manufacture of oils and fats	7.29
2640	Manufacture of consumer electronics	7.28
1412	Manufacture of workwear	7.02
2824	Manufacture of power-driven hand tools	7.01
2752	Manufacture of non-electric domestic appliances	7.00
4641	Wholesale of textiles	6.95
4676	Wholesale of other intermediate products	6.89
1722	Manufacture of household and sanitary goods and of toilet requisites	6.66
3102	Manufacture of kitchen furniture	6.58
1392	Manufacture of made-up textile articles, except apparel	6.41
2042	Manufacture of perfumes and toilet preparations	6.35
4765	Retail sale of games and toys in specialised stores	6.22
3220	Manufacture of musical instruments	6.16
7219	Other research and experimental development on natural sciences and engineering	6.15
2790	Manufacture of other electrical equipment	6.06

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2222	Manufacture of plastic packing goods	6.05
2893	Manufacture of machinery for food, beverage and tobacco processing	5.99
4645	Wholesale of perfume and cosmetics	5.93
1622	Manufacture of assembled parquet floors	5.90
1393	Manufacture of carpets and rugs	5.82
4616	Agents involved in the sale of textiles, clothing, fur, footwear and leather goods	5.76
2442	Aluminium production	5.76
2211	Manufacture of rubber tyres and tubes; retreading and rebuilding of rubber tyres	5.65
2391	Production of abrasive products	5.45
3213	Manufacture of imitation jewellery and related articles	5.44
1082	Manufacture of cocoa, chocolate and sugar confectionery	5.27
2651	Manufacture of instruments and appliances for measuring, testing and navigation	5.19
4690	Non-specialised wholesale trade	5.15
2573	Manufacture of tools	5.10
3040	Manufacture of military fighting vehicles	5.02
2823	Manufacture of office machinery and equipment (except computers and peripheral equipment)	5.00
6520	Reinsurance	4.99
2932	Manufacture of other parts and accessories for motor vehicles	4.98
1712	Manufacture of paper and paperboard	4.74
8542	Tertiary education	4.61
2011	Manufacture of industrial gases	4.59
4791	Retail sale via mail order houses or via Internet	4.54
2611	Manufacture of electronic components	4.45
2223	Manufacture of builders? ware of plastic	4.43
4777	Retail sale of watches and jewellery in specialised stores	4.42
2454	Casting of other non-ferrous metals	4.37
1107	Manufacture of soft drinks; production of mineral waters and other bottled waters	4.33
4674	Wholesale of hardware, plumbing and heating equipment and supplies	4.31
2060	Manufacture of man-made fibres	4.20
1083	Processing of tea and coffee	4.14
8030	Investigation activities	4.10
4612	Agents involved in the sale of fuels, ores, metals and industrial chemicals	4.03
3250	Manufacture of medical and dental instruments and supplies	4.02

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2660	Manufacture of irradiation, electromedical and electrotherapeutic equipment	4.00
4611	Agents involved in the sale of agricultural raw materials, live animals, textile raw materials and semi-finished goods	3.97
1101	Distilling, rectifying and blending of spirits	3.79
2349	Manufacture of other ceramic products	3.78
1395	Manufacture of non-wovens and articles made from non-wovens, except apparel	3.78
5821	Publishing of computer games	3.77
2620	Manufacture of computers and peripheral equipment	3.71
2221	Manufacture of plastic plates, sheets, tubes and profiles	3.69
1089	Manufacture of other food products n.e.c.	3.63
1629	Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials	3.60
2630	Manufacture of communication equipment	3.58
4759	Retail sale of furniture, lighting equipment and other household articles in specialised stores	3.54
1073	Manufacture of macaroni, noodles, couscous and similar farinaceous products	3.49
2332	Manufacture of bricks, tiles and construction products, in baked clay	3.48
2892	Manufacture of machinery for mining, quarrying and construction	3.47
3103	Manufacture of mattresses	3.42
2059	Manufacture of other chemical products n.e.c.	3.42
4673	Wholesale of wood, construction materials and sanitary equipment	3.42
1320	Weaving of textiles	3.41
1399	Manufacture of other textiles n.e.c.	3.32
4614	Agents involved in the sale of machinery, industrial equipment, ships and aircraft	3.27
2433	Cold forming or folding	3.26
2849	Manufacture of other machine tools	3.24
2899	Manufacture of other special-purpose machinery n.e.c.	3.22
2841	Manufacture of metal forming machinery	3.19
1072	Manufacture of rusks and biscuits; manufacture of preserved pastry goods and cakes	3.17
610	Extraction of crude petroleum	3.15
1092	Manufacture of prepared pet foods	3.14
2445	Other non-ferrous metal production	3.08
2910	Manufacture of motor vehicles	3.05
1723	Manufacture of paper stationery	3.05
5920	Sound recording and music publishing activities	3.03
2512	Manufacture of doors and windows of metal	3.02

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2733	Manufacture of wiring devices	2.93
4618	Agents specialised in the sale of other particular products	2.84
2110	Manufacture of basic pharmaceutical products	2.77
7211	Research and experimental development on biotechnology	2.76
2712	Manufacture of electricity distribution and control apparatus	2.75
1051	Operation of dairies and cheese making	2.74
5913	Motion picture, video and television programme distribution activities	2.70
1042	Manufacture of margarine and similar edible fats	2.67
1031	Processing and preserving of potatoes	2.55
1721	Manufacture of corrugated paper and paperboard and of containers of paper and paperboard	2.53
7490	Other professional, scientific and technical activities n.e.c.	2.49
2052	Manufacture of glues	2.46
4624	Wholesale of hides, skins and leather	2.46
2593	Manufacture of wire products, chain and springs	2.42
1102	Manufacture of wine from grape	2.39
2540	Manufacture of weapons and ammunition	2.30
2821	Manufacture of ovens, furnaces and furnace burners	2.26
4652	Wholesale of electronic and telecommunications equipment and parts	2.25
2825	Manufacture of non-domestic cooling and ventilation equipment	2.24
2053	Manufacture of essential oils	2.22
4519	Sale of other motor vehicles	2.21
2829	Manufacture of other general-purpose machinery n.e.c.	2.19
2813	Manufacture of other pumps and compressors	2.15
2592	Manufacture of light metal packaging	2.09
4619	Agents involved in the sale of a variety of goods	2.08
2364	Manufacture of mortars	2.07
4669	Wholesale of other machinery and equipment	2.06
5819	Other publishing activities	2.04
1729	Manufacture of other articles of paper and paperboard	2.03
1396	Manufacture of other technical and industrial textiles	2.02
3012	Building of pleasure and sporting boats	2.00
4637	Wholesale of coffee, tea, cocoa and spices	1.95
2822	Manufacture of lifting and handling equipment	1.92
1103	Manufacture of cider and other fruit wines	1.91
1061	Manufacture of grain mill products	1.88
4321	Electrical installation	1.85
2894	Manufacture of machinery for textile, apparel and leather production	1.78

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4636	Wholesale of sugar and chocolate and sugar confectionery	1.75
1086	Manufacture of homogenised food preparations and dietetic food	1.74
2612	Manufacture of loaded electronic boards	1.72
4531	Wholesale trade of motor vehicle parts and accessories	1.71
9003	Artistic creation	1.71

11.4. PVR-intensive industries

Table 53:
PVR-intensive industries

NACE code	NACE description	PVRs per 1 000 employees
77.40	Leasing of intellectual property and similar products, except copyrighted works	10.76
46.22	Wholesale of flowers and plants	5.86
72.11	Research and experimental development on biotechnology	5.31
46.21	Wholesale of grain, unmanufactured tobacco, seeds and animal feeds	3.84
72.19	Other research and experimental development on natural sciences and engineering	1.27
46.11	Agents involved in the sale of agricultural raw materials, live animals, textile raw materials and semi-finished goods	1.16
01.00 (p)	Horticulture	0.53
77.31	Renting and leasing of agricultural machinery and equipment	0.41
10.61	Manufacture of grain mill products	0.24
20.53	Manufacture of essential oils	0.22
13.10	Preparation and spinning of textile fibres	0.17

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