

MEMO

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Study on Intellectual Property Rights intensive industries and economic performance and employment in the European Union: frequently asked questions

1. GENERAL QUESTIONS

1-1 Why was this study launched?

An efficient system of intellectual property rights (IPR) is undoubtedly considered as a major asset to encourage creativity and innovation in all its various forms, able to sustain a more competitive economy with higher employment in Europe. Industry and policy makers have long called for indicators to measure the impact of IP rights in the economy, fact-based evidence being instrumental to sustain the public debate on IPRs and their protection and ensure that this system of IPRs remains useful in implementing innovation policies able to deliver growth and employment.

1-2 Who conducted this study?

The Office for Harmonization in the Internal Market (OHIM), acting through the European Observatory on Infringements of Intellectual Property Rights, and the European Patent Office (EPO) therefore decided to join forces and carry out this study to provide evidence to support policy-making and serve as a basis for raising awareness of intellectual property among Europe's citizens.

The European Observatory on Infringements of Intellectual Property Rights was established in 2009 to support the protection and enforcement of intellectual property rights and help combat the growing threat of IPR infringements in Europe. It was transferred by Regulation 386/2012 on June 5, 2012, to the **Office for Harmonization in the Internal Market (OHIM)**, which is the European Union agency responsible for the registration of Community trademarks and designs, headquartered in Alicante, Spain since 1994.

One of the mandates of the European Observatory is to provide evidence-based data on the impact, role and public perception of intellectual property in the economy of the European Union. In order to meet that objective, the Observatory is conducting a programme of socio-economic studies.

The **European Patent Office (EPO)** is the executive body of the European Patent Organisation, an inter-governmental organisation set up pursuant to the European Patent Convention (EPC) which entered into force in 1977. At present, it has 38 member states while European patents currently protect technical inventions in up to 40 European countries.¹ The EPO is entrusted with administering the centralised procedure for granting European patents for the EPC contracting states.

Every year, the EPO receives some 250 000 patent applications filed by more than 30 000 applicants, and grants approximately 65 000 patents. Moreover, through its patent information tools and services, the EPO ensures the

¹ Two "extension states" (Bosnia-Herzegovina and Montenegro) recognise the effect of European patents on their territories upon request by the patentee.

effective dissemination of state of the art information contained in patent documents from all industrialised countries. Through its Espacenet database, more than 80 million patents are freely accessible and, with the help of the machine translation service Patent Translate, on the fly-translations from and into English for 22 languages, including Chinese, Japanese and Russian, can be requested.

The EPO has a mission that goes beyond the efficient processing of patents. It also aims to raise awareness about the economic and social importance of the industrial property system. To this end, and in addition to its Chief Economist unit, the EPO also set up the Economic and Scientific Advisory Board (ESAB), with the mandate to contribute to a comprehensive analysis of the patent system in its economic and social context.

1-3 How does this study compare with other existing studies?

There have already been several studies on specific IP rights, industrial sectors or EU countries, for example some research in Spain and UK² at industry or firm-level, but this study is the **first ever single study carried out on the value of IPR for EU as a whole, quantifying the overall contribution made by IPR intensive industries to the EU economy, in terms of gross domestic product, employment, remuneration and trade**, taking into account all the major IP rights (patents, trademarks, designs, copyrights, Geographical Indications) all together. An overview of all IP rights is provided in annex 1.

The European study mirrors the study undertaken in 2012 by the United States Patent and Trademark Office on "Intellectual property and the US economy: industries in focus³", and uses a methodology that allows the comparison of our results with the US study.

1-2-1 Does EU have similar shares of IP-intensive employment and GDP as the US?

Both the EU and the US economies have similar economic structures, as the respective studies show. However, the European study shows that the EU has higher shares of employment and GDP in IPR intensive industries than the US. On average during the period 2008-2010, **26% of workers in the EU were employed in IPR intensive industries** (compared to around 19% in the USA) and that **39% of EU GDP is generated in those industries** (compared to 35% in the US).

1-2-2 What explains the difference in results obtained for the US and the EU?

The **percentages attributable to IPR intensive industries are higher in the EU** for two main reasons. In addition to the IPRs covered by the USPTO study, the European study covers also designs and Geographical Indications which were not covered in the US study. However, even if these industries had been removed from the study for the sake of comparability, the employment share of IPR intensive industries would still be higher in the EU than in the US.

Second, because of methodological issues, only manufacturing industries are considered when identifying patent-intensive industries in the USPTO study, whereas in the EU study, patent intensive industries were selected amongst all sectors of the economy. The share of manufacturing in the US economy, and therefore the share of patent-intensive industries, has in fact been declining due to outsourcing of production to countries such as China or Mexico. Within the EU, such outsourcing also takes place, but much of it remains within Europe, thus contributing to employment in IP-intensive industries.

² Country reports in Spain (*Impacto de las marcas en la economía y sociedad españolas*) and the United Kingdom (*Trade mark incentives*) focused on a quantitative industry-level and a firm-level analysis, respectively. These studies investigated the relationship between trade marking and business performance in terms of productivity, employment, wages and growth.

³ USPTO 2012 study, available at: http://www.uspto.gov/news/publications/IPR_Report_March_2012.pdf.

1-4 Who participated in this study?

This joint study of OHIM and EPO was undertaken with cooperation from the European Commission's services, in particular the Directorate General Internal Market and Services, but also the statistical office of the European Union (Eurostat) and the Directorate General for Agriculture and Rural Development (DG AGRI).

Useful inputs were also received from other IPR offices (notably the UK Intellectual Property Office (UKIPO)) and the United States Patent and Trademark Office (USPTO), as well as from international organisations such as the Organisation for Economic Cooperation and Development (OECD).

Peer reviews from; Lord John Mogg, Chair of the Advisory Board of the European Observatory on Infringements of Intellectual Property Rights; Ian Hargreaves, Professor of Digital Economy, Cardiff University; Tony Clayton, Chief Economist of the UK Intellectual Property Office, as well as Mariagrazia Squicciarini, senior economist and Head of Unit at the Directorate for Science, Technology and Industry at OECD, are also to be acknowledged.

2. METHODOLOGY AND APPROACH

2-1 How did you identify the IPR-intensive industries?

Following a similar methodology to that used in the USPTO study, an extensive variety of databases and other data sources were used to determine which industries are IPR intensive:

- For **patents, trade marks and designs**, we looked at **filings at the EPO PATSTAT and OHIM register databases** during the period 2004-2008 that had subsequently been granted, and matched these databases with the ORBIS commercial database at EU level (to assign IPR registrations to industries) and Eurostat data on employment per industry, in order to calculate the number of designs, patents and trade marks in each industry (absolute IPR intensity). Next, we looked at the number of IP rights per 1000 employees in each industry, in order to correct for the effect of industry size (relative IPR intensity). Those industries that had an above-average number of filings per 1000 employees were deemed to be IPR-intensive. The methodology defines IPR-intensive industries based on figures measured at the EU level, and subsequently the identified sectors are used for further analysis – be it on Member State level or otherwise.
- For **copyright**, **another approach had to be chosen as copyright is not registered** (some registries do exist in some Member States, though not mandatory, and there is no European registry). The approach used is based on the methodology produced by the World Intellectual Property Organization (WIPO) for identifying copyright-intensive industries as those which would not exist or would be significantly different without copyright. WIPO considers core copyright industries (e.g. press, literature, music, motion picture, photo etc), interdependent industries (e.g. manufacture of musical instruments), partial copyright industries (e.g. museum) and non-dedicated support industries (e.g. transportation). However to ensure comparability with the US study, we followed the USPTO's stricter approach of considering as copyright intensive industries, only those which are primarily responsible for the *creation* and *production* of copyrighted materials.
- For **Geographic Indications**, again another approach had to be chosen since these rights are not owned by private parties but applied for by regional producers' associations, it was not possible to match right holder information with economic information. Therefore the study relied **on the definition of a set of industries defined by regulations, coupled with information provided by DG AGRI** of the European Commission. Unlike for other IP rights, the definition of Geographic Indications (notably wine and agricultural products & foodstuffs), varies from one Member State to the other (one industry can be GI intensive in one country but not in another), therefore the specific quantification of GI-related employment and value added is made on a country basis.

GI is mainly a European phenomenon, despite some use in third countries but 80% of GI are registered in 6 Member States (Italy, France, Spain, Greece, Portugal and Germany).

Based on the methodology used, and the data that are available, **half of all industries in the economy, namely 321 out of 615 industries are identified as IPR intensive.** It should be noted that on the one hand, many industries use more than one IP right intensively and on the other hand that practically all industries which have not been identified as IPR intensive in this study nevertheless make use of IP rights.

2-2 How did you measure economic performance, employment, trade, at EU and national level for these sectors?

Based on the elements explained above, the list of IPR intensive industries was matched with data from Eurostat and where necessary with data from other European or national sources, so that contribution of these industries to GDP, employment, external trade could be determined.

2-3 Why did you look at patent, trade mark and design filings for 2004-2008? Why not more recent ones?

Firstly, the study aimed to look at standard years, with a view to avoid business cycle effects such as economic crises. Secondly, because it can take several years before a patent application is granted, looking at patent filings from more recent years would have meant that most of those applications would still be in the process. Thirdly, the choice of this period enabled comparison with the US study, which used the same period.

It should be noted that the GDP, employment, trade and remuneration data are from 2010 (except for some minor exceptions). A multi-annual period has been chosen in order to level out short-term movements in the filing of IPRs.

2-4 How to be sure that these results are reliable?

The study used a very comprehensive data matching protocol, addressing all challenges linked with the absence of harmonised names (e.g same business registered under several different accounts) or lack of information about the applicants of the IP rights. The scope of the study, covering 27 Member States (Croatia was not part of the study) and several IP rights called however for the development of a new protocol name harmonisation and data, based to a large extent on the KUL Leuven/Eurostat methodology.

Some assumptions had to be made where data was not publicly available or was not sufficiently detailed. For example, the Input-Output Tables used to calculate indirect employment are only available in Europe on a rather aggregated level (65 industries compared to more than 400 industries in the US statistics). Specific efforts to disaggregate the data using reasonable assumptions were made, and whenever a decision had to be made, a conservative approach was chosen (downward bias when identifying IPR intensity). Subsequently, IPR intensities of the different industries and the associated employment were compared with computations made by Eurostat and the results were considered not to be materially different.

A detailed explanation of the methodology is provided in Appendix 9 of the study.

3. MAIN FINDINGS

About half of the EU industries are IPR-intensive (reflecting the omnipresence of IPRs in the EU economy, with engineering activities, real estate activities, financial and insurance activities, manufacture of motor vehicles, retail, computer and pharmaceutical activities among the 20 largest IPR-intensive industries in Europe.

- **patent-intensive industries are dominated by manufacturing activities**, with manufacture of power-driven hand tools, pharmaceutical & chemical products and optical and photographic equipment included in the 5 most IP-intensive industries
- **trade mark-intensive industries are also dominated by manufacturing activities**, with pharmaceutical products, wine, biotechnology, perfumes and toilet preparations, electro-medical equipment among the 5 most trade mark intensive industries,
- **design-intensive industries are also mostly in manufacturing**, including manufacture of watches and clocks, cutlery, ceramic household, and lighting equipment among the 5 most design intensive industries,
- **copyright-intensive industries cover essentially the services sector**, including the creation and or recording of copyright protected works, with the publishing sector, motion picture, computer services and advertising activities among the most important industries
- **Geographical indications belong to the manufacturing sector** and cover mainly dairies and cheese making, spirits, wine and beer production.

About a third of the industries is only intensive in **one IP right**:

- 22% of all IPR intensive industries are intensive only in trade marks,
- 4% of all IPR intensive industries only in patents (manufacturing, energy and technical services)
- 4% of all IPR intensive industries only in designs (manufacturing of kitchen furniture, retail of furniture, watches)
- 2% of all IPR intensive industries only in copyright (publishing, motion picture, photo activities, performing arts)

But many industries are intensive in **more than one IP right** and seem to combine the use of different IP rights:

- 85% of all IPR intensive industries use trade marks,
- 25% of all IPR intensive industries use patents, trade marks and design all together.
- close to 20% of the industries use both trade marks and designs, whereas
- 10% of IPR intensive industries use both trade marks and patents.

This "**IP bundle phenomenon**" reflects the increasing centrality of intellectual property in today's competitive markets, where companies increasingly utilise IPRs and combine them.

3- 1 How do IPR-intensive industries contribute to employment?

Taken all together, in 2010 IPR-intensive industries are shown to account directly for almost **26% of all jobs** in the EU. When considering the different IPRs separately, we see that from all jobs in the EU in 2010 almost:

- 21% are in trade mark-intensive industries,
- 12% are in design-intensive industries,
- 10% are in patent-intensive industries, and
- smaller proportions are in copyright-intensive and GI-intensive industries.

In 2010, 56.5 million Europeans were employed by IPR-intensive industries, out of a total employment of approximately 218 million people in Europe.

In addition, another 20 million jobs were generated in industries that supply goods and services to the IPR-intensive industries.

Taking these indirect jobs into account, the total number of IPR-dependent jobs rises to just under 77 million, accounting for **35% of all EU jobs**.

3-2 How IPR-intensive industries contribute to GDP at EU level?

Taken all together, in 2010 IPR-intensive industries generated almost 39% of total economic activity (GDP) in the EU, and as such were worth € 4.7 trillion.

When considering the different IPRs separately, we see that the out of the EU's total GDP in 2010:

- 34% was generated in trade mark intensive industries,
- 14% was generated in patent intensive
- 13% was generated in design intensive industries,
- Smaller proportions are generated in copyright-intensive and GI-intensive industries.

3-3 How do IPR-intensive industries contribute to the national economies and employment of the different Member States?

Identification of IPR-intensive industries was done at the EU level not at the level of each Member States. This means that, for registered rights, they are identified on the basis of the average EU27 situation and as such only identify registered IPR-intensive industries at the level of individual countries to the extent that the patterns of IPR registration and employment within those individual countries match the European average. For Copyrights and GIs the identification of IP intensive industries is by construction done at the national level, and as such covers those industries which are intensive in the usage of these IPRs at the level of individual countries.

On that basis the study concludes that:

- **Patent-intensive industries**, contributing 10% of employment and 14% of GDP EU, average level contribute higher shares of employment in the Czech Republic, Finland, Germany, Slovakia and Sweden and contribute higher shares of GDP in Austria, Bulgaria, Hungary and Ireland.
In 12 Member States a high share of employment and GDP in patent-intensive industries could be related to the high share of manufacturing in their economies
- **Trade marks-intensive industries** contribute over 20% of employment and 34% of GDP at EU average level with above average shares of employment in the Czech Republic, Estonia, Finland, Germany, Hungary, Italy, Slovakia, Sweden and the UK. Above average shares in GDP are noted in Germany, Hungary and Ireland.
- **Design intensive-industries** contribute 12% of employment and close to 13% of GDP at EU average level. For both employment and GDP, Austria, Bulgaria, the Czech Republic, Estonia, Finland, Germany, Hungary, Italy, Poland, Portugal, Slovakia and Sweden have shares above EU average
- **Copyright-intensive industries** contribute 3% of the employment and 4% of the GDP at EU average level with above average contribution to employment in Sweden, Netherlands, United Kingdom, Ireland, Estonia, France, Germany and Luxembourg. The highest GDP share is found in Ireland, followed by the UK, Sweden, Finland, Bulgaria, France, the Czech Republic, Greece, Hungary and Estonia. The findings for Ireland could be explained by the presence of several computer and copyright related companies headquartered in that country.
- **Geographic indications-intensive industries** have a limited contribution to GDP and employment at EU average level, and make a limited contribution to employment and GDP in most member states, although these industries employ a significant number of people in France, Italy, Spain, Portugal, Germany and the United Kingdom... Because of the concentration of activities in some specific regions, these industries constitute an important part of the economy.

Consolidating the contribution of all IPR-intensive industries, they account for an above EU average share of:

- Employment in Austria, the Czech Republic, Estonia, Finland, Germany, Hungary, Italy, Slovakia, Slovenia, Sweden and the United Kingdom,
- GDP in Austria, Bulgaria, Germany, Hungary, Ireland, Italy, Romania, Slovenia, and Sweden.

3-4 How do IPR intensive industries contribute to the trading position of the EU?

The large majority of EU imports and EU exports are in IPR-intensive industries:

- 88% of EU imports consist of products of IPR-intensive industries, with energy related imports accounting for more than half of IPR intensive imports.
- 90% of EU exports are accounted for by IPR intensive industries, essentially in manufacturing sector, motor, chemical & pharmaceuticals and various types of advanced technology.

At the overall EU level there is a trade deficit (174 billion Euro). Also for IPR-intensive industries there is a trade deficit (126 billion Euro), which is a consequence of the high shares in overall EU imports and EU exports. However, in relative terms the trade deficit for IPR-intensive industries is smaller than the overall EU trade deficit (10.3% compared to 12.8% as share of exports). In this sense IPR-intensive industries make indeed a positive contribution to the EU trade position.

Looking at individual IP rights, a trade surplus at the EU level is noted in design intensive, copyright intensive and GI intensive industries.

3-4 Do IPR-intensive industries pay higher remuneration than the rest of the economy?

IPR-intensive industries also pay significantly higher remunerations than other industries, with a remuneration premium of more than 40% over the rest of the economy in 2010. The average weekly labour cost in IPR-intensive industries in 2010 was € 715, compared with € 507 in non-IPR-intensive industries.

In 2010, this remuneration premium over the rest of the economy was:

- 31% in design intensive industries,
- 42% in trade mark intensive industries
- 46% in GI intensive industries
- 64% in patent intensive industries
- 69% in copyright intensive industries

3-5 Could we say that IPR intensive industries are everywhere, in all sectors?

Yes, IPR intensive industries are present in all sectors of the economy.

Within the IPR-intensive industries, the primary sector contributes the smallest share of employment and GDP at the EU level. The secondary sector contributes around 24 million of jobs (EUR 1,5 trillion in GDP), while the tertiary sector contributes a further 32 million of jobs (EUR 3,1 trillion in GDP). The tertiary sector's share in GDP is particularly high, reflecting the well-known fact that services account for around 2/3 of modern economies.

3-6 Could we conclude from the study that some Member States are more innovative than others?

The study is not identifying IPR intensive industries on a national basis (i.e. on the basis of registrations and employment at the national level), but at the EU level. As such the study is not designed to identify national patterns of IPR creation. While the New Member States turn out to have a high share of employment in those industries identified as IPR-intensive at the EU level, they may not generate that much IPR themselves. In fact these jobs in the sectors identified as

IPR-intensive at the EU level may be created in these Member States by companies from other Member States (and from outside the EU) which have located manufacturing facilities in those countries, taking advantage of lower production costs and other favourable factors. The study looks at where the jobs are, and not at where the IPR was generated. In Chapter 7 of the study, however, we provide an initial look at the origins of IPR in the EU and find that a high proportion of EU's IPR is generated in the EU15 Member States. The complementary contributions of the New Member States (in terms of manufacturing facilities) and the EU15 Member States (in terms of IP generation), are an asset for the EU economy and help to create a more innovative EU economy.

4. NEXT STEPS

4-1 Could we conclude from the study that IPRs contributes to economic growth and job creation?

The study intends to give a descriptive snapshot at a certain point in time; it does not account for evolution over time and it is premature to conclude in that sense. It does not also make a case for causality between IPR usage and economic growth or job creation and as such it remains neutral as to whether or not jobs in a particular industry exist because of IPRs. However, the contribution of industries which make intensive use of IP rights provides important new insights on the performance of the EU economy and how it compares with the US.

In principle, the calculation of the employment and GDP contribution of IPR-intensive industries can be re-done regularly, with the same selection of IPR intensive industries, which could provide for a time perspective and progression rate.

There is the intention to regularly update this study in order to better assess the contribution of IPR intensive industries to economic performance and employment over time.

4-2 This study gives a picture at industry level, but what is the situation between different companies in the same industry?

The current study is indeed at the industry level, but a second phase of the study will be carried out at firm-level and is to be completed by the first quarter of 2014. The objective of this follow-up study, again a joint EPO and OHM effort, is to compare IPR-intensive companies with non-IPR-intensive companies. The objective is to get further insights into the impact of IP rights on company performance.

4-3 What about trade secrets and unregistered designs?

Other important types of intellectual property such as trade secrets and unregistered designs were not included in this study, mainly for reasons of data availability. The current study focused on the main registered rights: patents, trade marks, registered designs, Geographical Indications, and on copyright (which is not always registered but where the relevant industries have already been identified by WIPO).

It is envisaged to expand the current study to other types of IP, in particular trade secrets, in the coming years.