

Intellectual property rights-intensive industries and economic performance in Norway

Analysis performed by applying methodology and industry ranking developed for the European Union by the European Patent Office and the European Union Intellectual Property Office

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About this study

Two studies covering the EU countries have looked at the contributions to gross domestic product (GDP), salary levels and the number of employees in intellectual property rights (IPR)-intensive industries. The first study was completed in 2013 (EPO and OHIM, 2013) and the second one in 2016 (EPO and EUIPO, 2016). IPR-intensive industries are defined as those having an above-average use of IPR per employee, as compared with other IPR-using industries¹.

A substantial part of the EU studies deals with establishing a ranking of industries in terms of their relative use of IPR. This comprises *i.a.* assignment of organisation numbers to owners of patents, registered trademarks and designs, in order to determine the distribution of IP rights on various industries according to their NACE industry classification.

Norway, not being an EU member state, is therefore not included in the EU studies. However, as a natural approach which also finds support in the EU studies, we may assume that the IPR intensity of the various industries is likely to apply also to Norway as a neighbour and EEA state². The assessment in the present report has therefore been undertaken following the methods outlined in the 2016 study, assessing contributions to GDP, employed persons, trade and other parameters for IPR-intensive industries in Norway based on data provided by Eurostat and Statistics Norway, using the ranking of industries found for EU countries (EPO and EUIPO, 2016).

The parts of the EU-study for which adequate data was not provided for Norway in the Eurostat database or comparisons which require access to the actual IP right figures for Norway, have been omitted.

Acknowledgements

NIPO is grateful for valuable discussions and encouragement provided by EUIPO regarding this study. The present report has been organised in a sequence similar to the most recent EU study (EPO and EUIPO, 2016) for the readers' convenience.

¹ For copyright, being a non-registered right, industries are ranked following a methodology developed by the World Intellectual Property Organization (WIPO), as explained in the studies (cf. EPO and EUIPO, 2016, pp 48-50).

² See the Methods section for a discussion of this assumption.

Executive summary

Main findings

- IPR-intensive industries generated 25.9% of all jobs in Norway in the period 2011-2013 [EU: 27.8%³]. This corresponds to 655 thousand jobs.

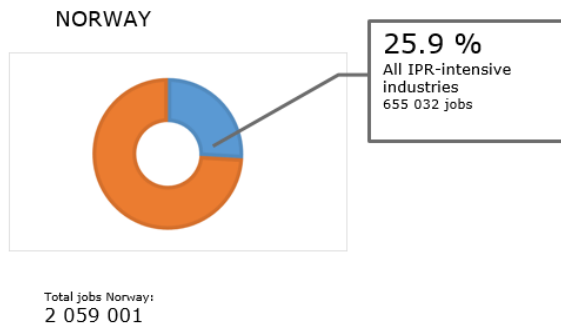


Figure 1: Contribution of IPR-intensive industries to employment

- The IPR-intensive industries generated on average more than 51% of total economic activity (GDP) in Norway in the same period, corresponding to € 196 billion. [EU: 42%, € 5 664 billion].

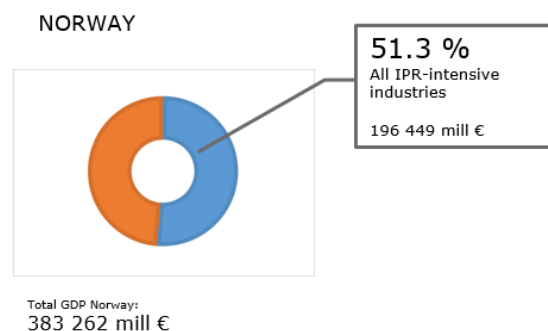


Figure 2: Contribution of IPR-intensive industries to GDP

- IPR-intensive industries paid much higher wages than other industries, with a wage premium of 53% over other industries (2013 figures). [EU: 46%].
- The share of the total GDP attributed to IPR-intensive industries related to oil and gas extraction amount to 23% alone.
- The share of jobs created in Norway by foreign companies outside the EU is 8.1% [EU: 8.7%], the share of jobs created by EU companies 16.9% [EU, non domestic EU-countries: 11.8%] and domestic companies 75% [EU: 79.5%].

IPR-intensive industries in the Norwegian economy

As outlined in the EU studies, IPR-intensive industries are those with an above-average use of IPR per employee, as compared with other IPR-using industries. These industries are concentrated in manufacturing, technology and business services sectors.

³ All figures for the European Union in the following are taken from the 2016 study [EPO and EUIPO, 2016]

The EU studies emphasise that most industries use IP rights to some extent, and that the studies therefore depict only the part of the industries to which IP rights contribute most.

The most important results are summarised in the following. More results are given in the results sections of the complete report, which also provides details regarding the methods.

IPR-intensive industries	Employment (direct) NO	%	Employment (direct) EU-28	%
Trademark	487 350	18.8	45 789 224	21.2
Design	193 319	7.5	25 662 683	11.9
Patent	252 421	9.7	22 268 215	10.3
Copyright	187 871	7.3	11 630 753	5.4
GI	8 137	0.3	n/a	n/a
PVR	3 864	0.1	1 018 754	0.5
All IPR-intensive	671 750	25.9	60 032 200	27.8

Table 1: Direct contribution of IPR-intensive industries to employment, 2011-2013 average

IPR-intensive industries in Norway are responsible for 25.9% of the employment in Norway (employed persons), a slightly lower figure than the EU average of 27.8%. Note that some industries are intensive in more than one IP right, and the sum of the figures for each IP right will therefore be higher than the figure for all IPR-intensive industries, for which industry contributions are counted only once.

Gross domestic product (GDP) is the most common measure of economic activity for a country or groups of countries, and is the total value of the goods and services produced during a given period.

An industry's contribution to the GDP is used to express its performance in this study. The table below sums up the GDP contributions for the various IP right-intensive industries as annual averages for the years 2011-2013.

IPR-intensive industries	Value added/GDP All industries (€ million) NO	Share of total GDP % NO	Value added/GDP (€ million) EU 28	Share of total GDP % EU 28
Trademark	172 072	44.9	4 812 310	35.9
Patent	126 454	33.0	2 035 478	15.2
Design	22 506	5.9	1 788 811	13.4
Copyright	23 765	6.2	914 612	6.8
GI	1 127	0.29	18 109	0.1
PVR	691	0.18	51 710	0.4
All IPR-intensive	196 449	51.3	5 664 168	42.3
Total	383 262		13 387 988	

Table 2: Contribution of IPR-intensive industries to GDP, 2011-2013 average.

A characteristic feature of the Norwegian economy is the high contribution of the oil and gas industries. The share of the total GDP attributed to IPR-intensive industries related to oil and gas extraction alone amount to 23.1%, or € 88.5 billion.

The table below shows average weekly wages for 2013 calculated from the annual personnel cost figures found in Eurostat's SBS database. The ratio between annual costs and weekly

average wages for the EU (all industries) has been used to determine average weekly wages for Norway as well, to ensure comparable figures.

The average personnel cost levels differ markedly between Norway and the EU average, with € 1 485 and € 629, respectively. However, the wages in the IPR-intensive industries are higher than in the non-IPR-intensive industries also in Norway, with € 1 930 as compared to € 1 260 for non-IPR-intensive industries (in EU € 776 and € 530, respectively).

IPR-intensive industries	Wages NO (weekly average €)	Premium (compared to non-IPR intensive industries) %	Wages EU-28 (weekly average €)	Premium (compared to non-IPR intensive industries) %
Trademark	1 990	58	783	48
Patent	2 383	89	895	69
Design	1 562	24	732	38
Copyright	1 772	41	871	64
GI	1 744	38	692	31
PVR	1 640	30	n/a	n/a
All IPR-intensive	1 930	53	776	46
Non-IPR-intensive	1 260		530	
All industries (included in SBS)	1 485		629	

Table 3: Average personell costs in IPR-intensive industries, 2013.

This report also includes a comparison, not given in the EU studies, of the average level of national wages for a selection of European countries and the EU average. The differences between countries are more pronounced than the differences between IPR-intensive and non-intensive industries for each country. This suggests that the national salary levels are strongly influenced also by other factors (see the Wages section in the report for details).

IPR-intensive industries contribute to a major part of the trade both in Norway and in the European Union. The IPR-intensive exporting industries in Norway, in particular the oil and gas extraction industries, contribute significantly to the export, as seen in Table 4 below.

	NO (2013 only)			EU (2013 only)		
	Exports (€ million)	Imports (€ million)	Net exports (€ million)	Exports (€ million)	Imports (€ million)	Net exports (€ million)
Total IPR-intensive	115 931	68 650	47 281	1 605 516	1 509 099	96 417
Non-IPR-intensive	26 884	24 039	2 845	117 561	256 047	-138 487
Total trade	142 815	92 688	50 126	1 723 077	1 765 147	-42 069

Table 4: External trade in IPR-intensive industries for Norway and EU (2013 figures only).

The EU studies have looked at the number of jobs in IPR-intensive industries that can be attributed to companies based in other EU countries and outside the EU. The number of employees in IPR-intensive industries for a country or region is estimated from the share of jobs created by companies with domestic and foreign ownership (EU and outside).

Norway as an EEA state also has strong industrial and commercial relations with the EU. The table below shows that the share of jobs in IPR-intensive industries attributable to companies based in EU member states is higher in Norway (16.9%) than for the EU member states on average (11.8% originating from other EU-member states). The figures show that the domestic share of job creation in IPR-intensive industries is quite high in Norway, 75%, but

lower than the nearly 80% EU average. The share of jobs created by companies based outside the EU for Norway and the EU differ only slightly, with 8.1% and 8.7%, respectively.

	Jobs attributable to companies based in:		Total employment IPR-intensive industries	EU-share %	Non-EU share %	Total non-domestic share %	Domestic share %
	EU member states	Non-EU countries					
NO	101 966	48 786	601 889	16.9	8.1	25.0	75.0
EU28				11.8	8.7	20.5	79.5

Table 5: Jobs attributed to foreign and domestic companies in IPR-intensive industries. 2011-2013 average figures for Norway and the EU.

An analysis comparing Norway and EU member states has also been included, with plots of the share of GDP versus the share of total employment in IPR-intensive industries for a selection of IP rights and the IPR-intensive industries in total. EU figures are taken from the 2016 report (EPO and EUIPO, 2016 p 58). For patents and design registrations a clear correlation is observed, less so for the other IP rights. Norway is an outlier both for patents and trademarks (see the section Analysis comparing Norway and EU member states for details).

This study looks at the contribution at the level of industries, and does not analyse the value of IPR for individual companies. Importantly, it does not allow for causal relationships between intellectual properties and the various economic variables studied, as underlined in the 2016 EU study. The effects of the different IP protection forms are not compared, as they serve different purposes, are used in different sectors of the economy and have different scope. Companies may also rely on trade secrets or unregistered intellectual properties that are not captured by this type of study (EPO and EUIPO, 2016, p 23). When interpreting the findings one should keep these points in mind.

Nevertheless, the results demonstrate that IPR-intensive industries have higher contributions to GDP and pay higher wages than the rest of the industries also in Norway.

Methodology and data

The methodology of this study is mainly based on the 2016-study of IPR-intensive industries in the EU (EPO and EUIPO, 2016), but is limited to the assessment of IPR-intensive industries in Norway and their contribution to employment, GDP and other economic indicators.

The ranking of IPR-intensive industries of the 2016-study is used also for Norway, as the EU-study lends support to this approach: «A fundamental assumption behind the methodology employed in the present study is that the degree to which an industry is IPR-intensive is an intrinsic characteristic of that industry, regardless of where it is located⁴» (EPO and EUIPO, 2016, p 13).

⁴ Geographical indications are analysed on a country-by-country basis

Eurostat is the most important data source, but also data from Statistics Norway has been used. More details on the sources to the data for the different variables are found in the Methods section, but essentially follows the 2016 EU study (EPO and EUIPO, 2016, pp 36-37 and pp 67-109).

The EPO/EUIPO study of IPR intensive industries and economic performance – adaptation of industry performance indicators to the Norwegian economy.

Background

Two studies covering the EU countries have looked at the economic performance, salary levels and number of employees in intellectual property rights (IPR)-intensive industries. The first was completed in 2013 (EPO and OHIM, 2013) and the second one in 2016 (EPO and EUIPO, 2016). IPR-intensive industries are defined as those having an above-average use of IPR per employee, as compared with other industries. The reader is referred to the EU-studies for details regarding the ranking of industries.

Both studies looked at a variety of IPR; EP-patents, EU design and trademark registrations, copyright, geographical indications and (for the 2016 study only) plant variety rights (PVRs). The 2016 study also included a chapter on climate mitigation technologies (CCMTs). The studies consider a variety of economic indicators, in particular gross domestic product (GDP), employment, external trade and wages. One of the intentions in the EU studies was to apply methods used for a study performed in the US, published in March 2012 (US Department of Commerce, USPTO, 2012), in order to obtain comparable results.

This study does not allow for causal relationships between intellectual properties and the various economic variables studied, as underlined in the EU studies. As further pointed out, the effects of the different IP protection forms are not compared, as they serve different purposes, are used in different sectors of the economy and have different scope. The study does not analyse the value of IPR for individual companies, but looks at the contribution at the level of industries. The use of IPR varies between companies in each industry, and strategies differ. Lastly, companies may also rely on trade secrets or unregistered intellectual properties that are not covered by this type of study (EPO and EUIPO, 2016, p 23). When interpreting the findings one should keep these points in mind.

The two studies performed in the EU demonstrate that the IPR-intensive industries accounted for around 42% of the EU's economic output (GDP) and around 28% of employment during the period 2008-2010⁵ and 2011-2013 (EPO and EUIPO, 2016). The latter study further showed that the IPR-intensive industries paid a wage premium of 46% over other industries.

Norway, not being an EU member state, is not included in the EU studies. However, as a natural approach, we may assume that the IPR intensity of the various industries is likely to apply also to Norway as a neighbour and EEA state. The EU-studies lend support to this approach: «A fundamental assumption behind the methodology employed in the present study is that the degree to which an industry is IPR-intensive is an intrinsic characteristic of that industry, regardless of where it is located⁶» (EPO and EUIPO, 2016, p 13).

It is likely that the roles of IPR in supporting innovation and as sources to competitive strength are common to the majority of enterprises in an IPR-intensive industry. This will, however, be dealt with in further detail in a separate study, but it seems reasonable to assume

⁵ The figures for 2008-2010 were recalculated in the 2016 study, see Table 3 on p 9 (EPO and EUIPO, 2016).

⁶ Geographical indications were analysed on a country-by-country basis in the EU study (EPO and EUIPO, 2016)

that industries found to be IPR-intensive in the EU also will be so in Norway. The present study has therefore been limited to analysing the economic performance, employment, wages and other indicators of the industrial environment in Norway, based on the EU-based findings regarding IPR-intensiveness of industries. With this basis, the majority of the indicators and approaches used in the EU studies could be applied to the economic performance of IPR-intensive industries of the Norwegian economy. In addition, a table showing wages in Norway and a selection of other European countries is included for comparison and background for discussion of findings. An analysis comparing Norway and EU member states has also been included, with plots of the share of GDP versus the share of total employment in IPR-intensive industries for a selection of IP rights and the IPR-intensive industries in total. EU figures are taken from the 2016 report (EPO and EUIPO, 2016 p 58).

The only parameters that are not provided in this study of Norwegian industries are those directly related to IPR-intensities like IP rights per employee and the number of EP and EU filings from Norwegian companies, and the number of patents related to climate change mitigation. The missing parts may be subject to follow-up studies or other assessments. The indirect contribution to employment could not be determined due to lack of suitable data for Norway. The import and export of IPR-intensive industries were based on data on industry divisions (NACE 2-digit level), as described in the Methods section.

Methods

The Statistical Classification of Economic Activities in the European Community, Rev. 2 (2008), NACE, is the current nomenclature system for economic activities. For the reader's convenience, a short overview is included here:

Industry section: characterised by a letter and a corresponding description, e.g. *C Manufacturing*

The next level, division, is characterised by a two-digit code and a description:

24 Manufacture of basic metals, and so on:

24.4 Manufacture of basic precious and other non-ferrous metals (group, three-digit level)

24.41 Precious metals production (class, four-digit level)

A table showing all NACE sections with the included divisions is found in Appendix 1.

Eurostat was one of the key sources for the economic indicators of the EU studies. Value added at factor cost (indicator V12150), personnel costs (V13310), number of persons employed (V16110) at 4-digit NACE and more aggregated levels were extracted from Eurostat's Structural Business Statistics data series for Norway, for the years 2011-2013. In Norway, Statistics Norway uses an industry classification system denoted SN2007. On the four-digit level, this essentially corresponds to NACE classes (4-digit level). The class level comprises in total 613 industry classes, but data available varied for the various parameters studied. Each section below gives a description of the dataset used if it deviates from a complete set of all classes. Gross value added (GVA) data (in basic prices) was extracted from the national accounts database of Eurostat.

In the EU study from 2016, 351 industry classes were found to be IPR-intensive in one or more of the IP right areas⁷. For some of the IPR-intensive industries the data on employment

⁷ For determination of IPR-intensive industries, public sector industries, for which the number of employees is high but the number of IP rights low, were omitted when determining the average for IPR-intensive industries on the basis of rights per 1000 employed persons for the patent, trademark and design areas, but included in the ranking. Note that in the EU-study, 342 industries were listed as IPR-intensive, but some of the classes were

was incomplete and obtained using different sources in the EU study. For Norway, the analysis of the share of employed persons was therefore based on national employment figures provided by Statistics Norway. These data can be found both on division and class levels (tables 8536-1 and 116060-1), ensuring that employment figures for all industries are comparable in terms of source and method. These are register-based figures that deviate somewhat from the SBS data, but have also been used for imputation of data on industry class level for GVA for some industries for which data was only provided on division level. (This regards in particular data for industries not found in the SBS).

For 241 data cells out of a total of 1035 on the NACE class level (for the three years 2011-2013), imputation of missing data was necessary, i.e. figures from more aggregated NACE levels were used to establish value added and personnel costs, based on the share of the number of employed persons. For some NACE divisions, data for GVA and personnel costs was incomplete in SBS, lacking data on both division and class levels. For C19 and C21 the data on division level was therefore found by imputation, using data for industry group C as described above, and subsequently used for imputation of values on class level. For K66.11-66.30 (seven classes), K85.52, R90.01-90.04 (four classes), R91.01-R91.03 (three classes), R92.00, R93.21, R93.29, S94.12 and S94.99 GVA-data on class level was not available, but GVA-values in basic prices on division level were used for imputation instead. Some of the non-IPR-intensive industries had similar challenges, but as the GVA contributions for those could be calculated as the difference between total figures and figures for the IPR-intensive industries, this was not critical.

Having obtained GVA data at factor cost (the only available on NACE class level), the figures were «scaled» to GDP by a two-step conversion as described in the EU-study (see EUIPO and EPO, 2016, p 61⁸). First, the GVA at factor cost for each NACE class was divided by the ratio between the GVA at factor cost and the GVA in basic prices for the corresponding NACE division. Secondly, the resulting figures were multiplied with the ratio between the GDP and the GVA at basic prices for the whole industry. In this manner, the GVA for each industry class has been «scaled» to be consistent with the GDP. Note that for some of the classes, in particular for some non-IPR-intensive classes required for calculating the share of IPR-intensive industries in the primary, secondary and tertiary sectors, GVA data was only available in basic prices and therefore only required correction using the second correction factor described previously.

The industries considered IPR-intensive in this study are essentially the same as those listed in the 2016-study (EPO and EUIPO, 2016). Patent-intensive industries are those whose relative patent intensity is above the average of all the industries that have patents. Corresponding definitions apply to industries having trademark or design registrations. Some minor industry contributions have been omitted: Horticulture is only intensive within the area of plant variety rights and is not part of the official NACE classification (but has been assigned the division code 00 in the EU/EUIPO 2016 study), and economic data are therefore omitted for this division. In some cases, the NACE codes appear as classes but actually regard group or section levels (this goes for 51.2, 66.0 and 93, respectively). In those cases, it was inferred from the information provided which classes should be included as IPR-intensive: The

aggregated to group level or higher levels: 51.2 (group), 66 and 93 (division), meaning that on class level, 351 classes are IPR-intensive, see details below.

⁸ Industry-level value added is defined at *factor cost* and excludes taxes linked to production, whereas GDP is the sum of gross value added at *basic prices* in all industries, plus taxes less subsidies on *products*. The GVA at basic prices include other taxes less subsidies on *production*.

industry group 51.2 *Freight air transport and space transport* covers two classes that were both considered trademark-intensive. All classes of group 66.0 are trademark-intensive. For the classes of the industry group 93.1 *Sports activities*, all classes appear to be trademark-intensive from the information in the overview of all IPR-intensive classes (EPO and EUIPO, 2016, see page 109).

Copyright-intensive industries, for which there are no registers of actual use, are in the 2016 study split into sub-groups according to the role played by copyrights, core copyright-intensive industries and non-core copyright-intensive industries according to methodology developed by WIPO (see EPO and EUIPO, 2016, Appendix 12, p. 143). The latter subgroup is split in interdependent copyright-intensive industries, partial copyright-intensive industries and non-dedicated support industries. For the non-core industries, a factor expressing the portion of these industries' activities, which is copyright-related, has been assigned. However, only industries for which the contribution is 20% or higher have been included as copyright-intensive in the 2016 study (EPO and EUIPO, 2016, see page 146). It appears from the most recent EU-study that all industries are counted once, regardless of the actual percentage of that industry's activities that is copyright-related. Out of 65 industries for which data have been found on the NACE 4 digit level, only 5 appear solely as copyright-intensive, the remaining 60 are intensive also in other IP rights.

The EU-study gives results for both direct and indirect contributions of IPR-intensive industries to employment for EU as a whole. Indirect employment thus takes into account jobs created in other, non-IPR-intensive industries by enterprises in IPR-intensive industries. However, symmetric input-output data are not available on national level for Norway, and therefore only the direct contributions are included in the present study.

The source used for trade in the EU study, Eurostat's COMEXCT database, does not give data for EFTA countries using classification of products by activity (CPA 2008). Data on the value of import and export for Norway was not available from Statistics Norway on sufficiently detailed level to be used directly. The Statistics Norway database gives data for export and import of goods, but only on subgroup level, corresponding to NACE divisions (two-digit level). Data for export and import of services, however, is only given on NACE section (letter) level. Hence, import/export data are imputed using employment data from Statistics Norway (table 1606-1 referred to on page 8), provided on class (four-digit) level for all industry classes. However, this implies that import and export data sets represent approximations and for some industries may yield unprecise estimates for each class, as the number of employed persons on a national basis not necessarily reflects the export or import volumes. Nevertheless, the share of IPR-intensive industries in the various sections is often very low or zero (A, D, E and H) or very high or total (C, J). Furthermore, the import and export of services, available on section level only, appear either in sections dominated by products (B, C) or have fairly small contributions to the overall picture (F, G, H, and N). This reduces the errors in the overall share of IPR-intensive industries. As for the EU study, some industries are non-tradeable, and the I, K, O, P and Q NACE sections are missing in the Norwegian export and import data (see Appendix 1 for descriptions of the various NACE sections). Hence, the approach may give somewhat unprecise results but they are included nevertheless since the export and import data are used in relevant comparisons. For any interpretation of these data, however, one should keep in mind that they are approximations. Only 2013 export/import data are given, due to lack of consistent data sets for all the three years included otherwise in this study.

The EU-studies have also looked at the share of jobs in IPR-intensive industries that are generated by companies based outside the country in question. For this purpose, the authors used EUROSTAT SBS' statistics on the structure and activity of foreign affiliates (FATS) to assess the impact of foreign-controlled enterprises. Eurostat's Foreign Affiliates Statistics (FATS) database gives the number of employees in industries on two-digit NACE level (divisions) split according to country or region of control, for the total business economy; repair of computers, personal and household goods; except financial and insurance activities (sections B-N minus K, plus S95). The detailed enterprise statistics of the SBS database (see above) gives the number of jobs on each 4-digit and more aggregate NACE levels for the same industries. The number of jobs in each IPR-intensive industry class generated by companies based in a particular geographic area is determined from the number of IPR-intensive jobs of each 4-digit NACE industry class as the corresponding share of jobs in that area on the 2-digit NACE (division) level. This will be correct when all (or no) 4-digit NACE classes within a 2-digit NACE division are IPR-intensive, but an approximation if only some are IPR-intensive, cf. discussion above.

63% of the industry divisions are either 100% or 0% IPR-intensive, whereas for the remaining 37%, the divisions cover both IPR-intensive and non-intensive industry classes. Hence, for a little more than one third of the classes, the imputation of data results in approximate figures using this approach (cf. Appendix 2 for details).

In the overview table of the 2016 study (EPO and EUIPO, 2016, p 101), three trademark-intensive industries lacked in the overview table (Appendix 10), 23.64, 23.65 and 23.69, but as these could be found in the detailed list in table 45 (*ibid*, p 132), they are therefore included.

The analysis of wages based on personnel cost data was limited to private sector industries, as no information on wages in public sector was found in the Eurostat sources (cf. EPO and EPO, 2016, pp. 74-75). Data was, however, found for some of the industry classes that have been omitted in the EU study, and has therefore been included in this study (68.10 *Buying and selling of own real estate* and 82.19 *Photocopying, document preparation and other specialised office support activities*). Other classes omitted in the EU study are also omitted here (85.52, all classes of sections 90, 91, 92, 93, 94 and 95).

Employed persons – all industry classes

In order to avoid using a mix of various ways of expressing persons employed, data from Statistic Norway was used as source for employed persons (see the Methods section) in this section. The dataset used gives the number of employed persons for all industry classes (NACE 4-digit level). As can be seen below, the share of total employment in IPR-intensive industries is slightly below the EU average.

Employed persons Average 2011-2013	Employment (direct) NO	%	Employment (direct) EU-28	%
Total figure:	2 590 001	100	215 808 033	100
IPR-intensive industries:	671 750	25.9	60 032 200	27.8
Others:	1 918 251	74.1	155 775 833	72.2

Table 6: Employed persons in Norway and in the EU, in IPR-intensive and non-IPR-intensive industries. Direct employment, 2011-2013 average.

The share of the IPR-intensive industries in the employment in Norway is given in the table below for each of the six IP rights studied. For comparison, the shares in the EU are given. Note that some industries appear intensive in more than one IP right, implying that the sum of the employment for the various rights is higher than the figure for all IPR-intensive industries (for which each IPR-intensive industry is counted only once).

IPR-intensive industries	Employment (direct) NO	%	Employment (direct) EU-28	%
Trademark	487 350	18.8	45 789 224	21.2
Design	193 319	7.5	25 662 683	11.9
Patent	252 421	9.7	22 268 215	10.3
Copyright	187 871	7.3	11 630 753	5.4
GI	8 137	0.3	n/a	n/a
PVR	3 864	0.1	1 018 754	0.5
All IPR-intensive	671 750	25.9	60 032 200	27.8

Table 7: Employment in IPR-intensive industries according to IP right for Norway and EU. Average 2011-2013 values.

The share of the employment is lower for trademark-, design- and patent-intensive industries in Norway than in the EU, but for copyrights, the share is higher in Norway (7.3%) than in the EU (5.4%).

For plant varieties, figures for horticulture have not been included as these were not readily available (no industry class is defined), and the figures found for other PVR-intensive industries may be slightly uncertain, the same goes for geographical indications (see also comment to GDP contribution for GI below), but they have nevertheless been included in the study for comparison. Uncertainties for PVR-intensive industries do not affect overall results, as all are intensive also in trademarks.

GDP

Gross domestic product (GDP) is the most common measure of economic activity for a country or groups of countries, and is the total value of the goods and services produced during a given period.

By expressing an industry's contribution to the GDP, one can compare the performance of the various industries. For this purpose, the Structural Business Statistics (SBS) data series for Norway was used as source for data on 4-digit NACE level (industry class), for the years 2011-2013. As described in the Methods section, figures missing on the class level were imputed from data on more aggregate levels, based on the share of the number of employed persons. Data for classes not included in the SBS, was taken from Eurostat's national accounts data (see Methods for details).

As can be seen in table 8 below, the IPR-intensive industries contribute to 51.3% of the total GDP in Norway. However, as 23.1% of the total GDP comes from industries related to extraction of oil and gas, it is relevant also to look at the shares of the value added for the remaining industries when the oil and gas industries⁹ are omitted. As shown in the table below, 28.2% of the GDP results from the remaining IPR-intensive industries. This figure is below the overall EU average of 42.3%. The contributions of GI- and PVR-intensive industries captured by the available data are both small in this context. Note that the EU-study has applied a country-by-country approach to the assessment of GI. However, the GDP

⁹ Three industry classes are considered directly related to the exploitation of oil and gas in this study: 06.10 *Extraction of crude petroleum*, 06.20 *Extraction of natural gas*, and 09.10 *Support activities for petroleum and natural gas extraction*. All three are IPR-intensive in one or two IP areas.

contributions of the four industries appearing as GI-intensive are included in their entirety in the table below. This may result in an overestimation of the GI contribution to GDP in Norway, but does not affect the total IPR-intensive industries' contribution, as GI-intensive industries are also intensive in at least one of the other IP rights.

IPR-intensive industries	Value added/GDP All industries (€ million) NO	Share of total GDP % NO	Value added/GDP ex. oil and gas (€ million) NO	Share of total GDP (ex O&G) % NO	Value added/GDP Oil and gas (€ mill.) [%] NO	Value added/GDP (€ million) EU 28	Share of total GDP % EU 28
Trademark	172 072	44.9	87 902	22.9	84 008 [21.9]	4 812 310	35.9
Patent	126 454	33.0	37 988	9.9	88 466 [23.1]	2 035 478	15.2
Design	22 506	5.9	22 506	5.9		1 788 811	13.4
Copyright	23 765	6.2	23 765	6.2		914 612	6.8
GI	1 127	0.29	1 127	0.29		18 109	0.1
PVR	691	0.18	691	0.18		51 710	0.4
All IPR-intensive	196 449	51.3	115 854	28.2	88 466 [23.1]	5 664 168	42.3
Total	383 262		294 796	76.9	88 466	13 387 988	

Table 8: Value added as GDP contribution for industries intensive in the various IP rights for Norway and the EU. The figures for Norway are total figures, figures excluding industries related to extraction of oil and gas, and figures for the oil and gas industries only

Wages

The studies of the economic performance of the EU member states have also examined the average wages paid in the IPR-intensive industries in the private sector. Since approximately 42% of the GDP and 28% of employment in the EU is generated in IPR-intensive industries, the value added per employee is higher than in the rest of the industry, and it is therefore of interest to see if the wages to any degree reflect the higher value added.

IPR-intensive industries	Wages NO (weekly average €)	Premium (compared to non-IPR intensive industries) %	Average weekly wages NO ex oil and gas (€), [premium %]	Average weekly wages - oil and gas (€), [premium %]	Wages EU-28 (weekly average €)	Premium (compared to non-IPR intensive industries) %
Trademark	1 990	58	1 773 [41]	3 355 [166]	783	48
Patent	2 383	89	2 042 [62]	3 395 [169]	895	69
Design	1 562	24			732	38
Copyright	1 772	41			871	64
GI	1 744	38			692	31
PVR	1 640	30			n/a	n/a
All IPR-intensive	1 930	53	1 754 [39]	3 395 [169]	776	46
Non-IPR-intensive	1 260		1 260		530	
All industries (included in SBS)	1 485				629	

Table 9: Average weekly wages in 2013 for IPR-intensive industries in the private sector, and payment premium over non-IPR-intensive industries for Norway and EU. The figures for Norway are total figures, figures excluding oil and gas, and figures for the oil and gas industries only

In table 9 above, average weekly wages for 2013 have been calculated from the annual personnel cost figures found in Eurostat’s SBS database (see the Methods section), and are given for the industries that are intensive in the various IPR-rights of the EU study. The ratio between annual costs and weekly average wages for the EU (all industries) has been used to determine average weekly wages for Norway as well, to ensure comparable figures. Evidently, the average personnel cost levels differ markedly between Norway and the EU average, with € 1 485 and € 629, respectively. However, the wages in the IPR-intensive industries are higher than in the non-IPR-intensive industries also in Norway, with € 1 930 as compared to € 1 260 for non-IPR-intensive industries (in EU € 776 and € 530, respectively).

As indicated under the GDP section above, the three industries related to extraction of oil and gas together represent a large proportion of the value added, and the wages are indeed markedly higher, € 3 395. The resulting personnel cost premium as compared to non-IPR-intensive industries thus amounts to 169%. The premium for the IPR-intensive industries are 53%, but drop to 39% when omitting the oil and gas industries. However, the actual figure, € 1 754, is still markedly higher than the EU average (€ 776).

Hence, although the IPR-intensive industries pay a premium as compared to others both in Norway and the EU, it is evident that the average level of national wages differ substantially as can be seen in the table below. It shows annual wages for the EFTA countries Switzerland and Norway together with a selection of EU countries.

Country	Annual wages (1000 €) 2013	Country	Annual wages (1000 €) 2013
Switzerland	68.8	Netherlands	33.1
Norway	66.7	United Kingdom	30.0
Sweden	48.1	European Union	28.3
Denmark	46.0	Spain	24.7
France	43.5	Portugal	14.1
Finland	39.3	Greece	13.0
Germany	34.1		

Table 10: Annual wages (1000 €) for a selection of EFTA- and EU-countries for 2013.

Table 10 demonstrates that the differences in salary levels between the countries are much higher than the average differences between the IPR-intensive and other industries of each country, suggesting that other factors also influence the national economies markedly.

[Jobs in Norway attributed to foreign and domestic companies in all IPR-intensive industries](#)

The EU studies have looked at the number of jobs in IPR-intensive industries that can be attributed to companies based in other EU countries and outside the EU. The data used are based on Eurostat’s Foreign Affiliates Statistics (FATS) of the number of employees in industries on two-digit NACE level split according to country or region of control, combined with the corresponding total number of employees from the Structural Business Statistics data series for Norway, on four-digit NACE level. The industries covered are those contained in NACE sections B-N minus K plus division S95. Average figures for the period 2011-2013 are used, and the number of employees in IPR-intensive industries for a country or region is estimated from the share of jobs created by companies with domestic and foreign ownership (EU and outside).

Norway as an EEA state also has strong industrial and commercial relations with the EU. It is therefore relevant to see how enterprise ownership is reflected in jobs within IPR-intensive industries. The table below shows the number of jobs in IPR-intensive industries attributable to companies based in EU member states and in non-EU-countries. Figures for Nordic EU member states are included for comparison. The figures show that the domestic share of job creation in IPR-intensive industries is quite high in Norway, 75% (EU states of a similar share are UK with 74.7% and LV with 74.6%). For Finland and the EU average, nearly 80% of the jobs are found in domestic companies. The share of IPR-intensive jobs created by EU-based countries is, however, higher in Norway (16.9%) than in the Nordic countries that are EU members (12 to 16%). The other Nordic countries all have a somewhat higher share of jobs created by companies based outside the EU (between 9 and 11%) than Norway (ca. 8%).

	Jobs attributable to companies based in:		Total employment IPR-intensive industries	EU-share %	Non-EU share %	Total non-domestic share %	Domestic share %
	EU member states*	Non-EU countries					
NO	101 966	48 786	601 889	16.9	8.1	25.0	75.0
SE	212 394	154 513	1 332 389	15.9	10.8	27.5	72.5
DK	119 642	80 620	767 232	15.6	10.5	26.1	73.9
FI	73 401	51 611	603 283	12.2	8.6	20.7	79.3
EU28				11.8	8.7	20.5	79.5
*For DK, FI and SE; in other EU-countries							

Table 11: Jobs attributed to foreign and domestic companies in IPR-intensive industries. Figures for Norway, Sweden, Denmark, Finland and the EU.

The figure below shows how the jobs in companies with domestic and non-domestic ownership are distributed on various industry sections in Norway. The percentage of jobs created by companies in industries related to extraction of oil and gas (dominating mining and quarrying) is higher for companies with non-EU ownership than for those with EU-based ownership, whereas for jobs within wholesale and retail trade, the percentage is higher for jobs in EU-based companies than in non-EU companies.

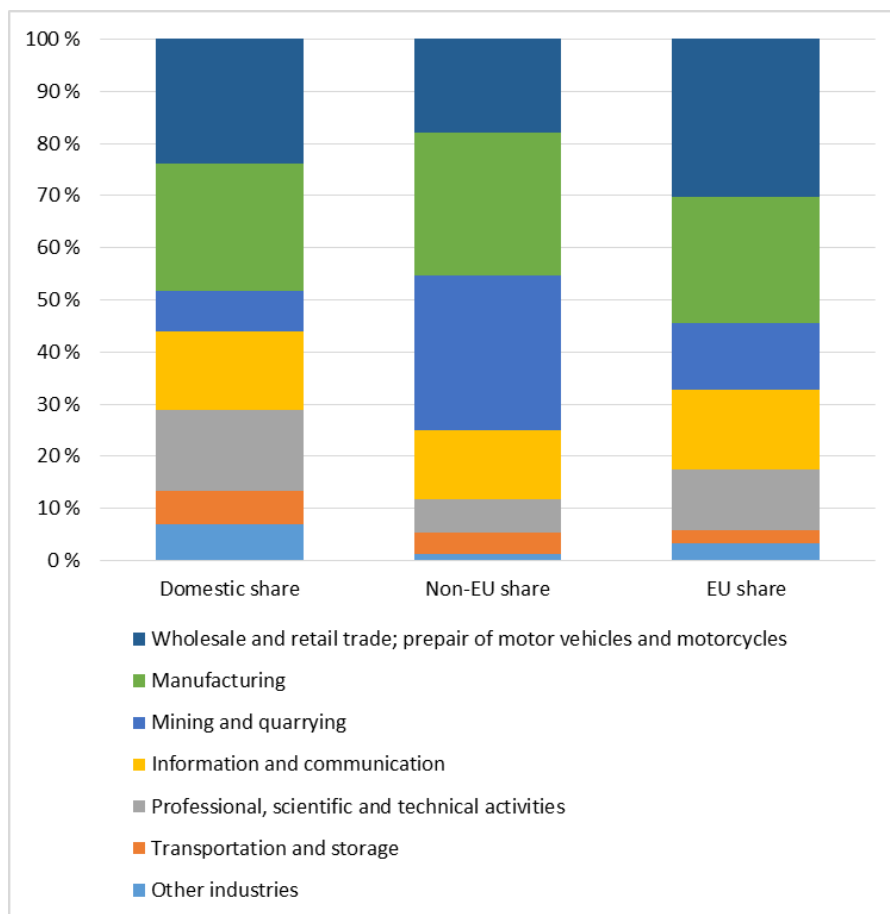


Figure 3: The distribution of jobs in Norway on NACE divisions for domestic and non-domestic companies (2011-2013 average)

In absolute terms, the highest number of IPR-intensive jobs in this comparison is found within manufacturing, with a total of 24.6% of the jobs (with 6.3% in non-domestically owned companies), followed by wholesale and retail trade with 24.4% (with 6.6% in non-domestic companies).

Trade

Statistics Norway's public statistics database gives export and import data for Norway only on NACE section (2-digit) level for goods. For services, only section-level data are available. In order to split the trade on the various NACE 4-digit classes, employment data on four-digit level was utilised. This represents an approximation, in particular for trade with services, as the extent of international trade not necessarily is reflected in the national employment. However, in order to allow comparison with the EU study also on trade parameters, the approach was chosen despite inherent uncertainties (cf. Methods for further details).

The export and import figures for the various IPR-areas also for these parameters add up to more than the total figures for the IPR-intensive industries due to overlap between the IPR-rights.

As discussed in the EU studies, the IPR-intensive industries contribute to a major part of both export and import. Although this may seem surprising at first glance, as explained in the 2016 report, many of the industries producing commodities such as energy are IPR-intensive, whereas many of the non-IPR-intensive activities are also non-tradeable (EUIPO and EPO,

2016, p 72). Since the reporting principles were changed in 2012, a consistent average for the period 2011-2013 could not be established, and only 2013 figures are given (as for the EU).

	NO (2013 only)			EU (2013 only)		
	Exports (€ million)	Imports (€ million)	Net exports (€ million)	Exports (€ million)	Imports (€ million)	Net exports (€ million)
IPR-intensive industries						
Trademark-intensive	102 570	51 043	51 527	1 275 472	1 261 002	14 470
Design-intensive	17 019	37 309	-20 290	945 084	701 752	243 332
Patent-intensive	95 127	49 078	46 050	1 231 966	1 157 909	74 057
Copyright-intensive	4 670	6 203	-1 533	119 554	102 389	17 165
GI-intensive	640	995	-355	11 588	1 335	10 253 ¹⁰
PVR-intensive	36	37	-1	5 065	5 369	-304
Total IPR-intensive	115 931	68 650	47 281	1 605 516	1 509 099	96 417
Non-IPR-intensive	26 884	24 039	2 845	117 561	256 047	-138 487
Total trade	142 815	92 688	50 126	1 723 077	1 765 147	-42 069

Table 12: Export, import, and net export for IPR-intensive industries for Norway and EU (2013 figures only).

As seen in the table above, Norway has a formidable trade surplus of € 50.1 billion, with € 47.3 billion from IPR-intensive industries. As mentioned elsewhere, the oil and gas extraction industries contribute significantly to the Norwegian GDP, and also to the export. The contributions are reflected particularly in the net patent- and trademark-intensive industries (the three NACE classes included in the oil and gas industries are all considered IPR intensive). For EU, the IPR-intensive industries contribute to a net export of € 96 billion, with positive trade balance for nearly all IPR-intensive industries.

For the individual IP rights, the trademark- and patent-intensive industries in Norway have a trade surplus of nearly € 52 billion and € 46 billion, respectively. The other IP rights show trade deficit (design, copyright, GI, PVR).

Tables 13 and 14 below show the top ten IPR-intensive industries involved in external trade, for Norway and EU. Among the Norwegian IPR-intensive exporting industries, the top ten account for 78% of the exports. Note that for Norway, the top two alone represent 65%, underlining again the importance of the oil and gas and derived industries.

The top ten IPR-intensive importing industries in Norway account for 41% of the IPR-intensive import. Interestingly, the top two IPR-intensive import industries of the EU are also the top two IPR-intensive export industries of Norway, 06.10 *Extraction of crude petroleum* and 19.20 *Manufacture of refined petroleum products*. Likewise, several of the top ten IPR-intensive import industries for Norway are among the top ten EU export industries, underlining that the Norwegian industry basis differs somewhat from that of the EU, although there are some overlapping industries as well.

¹⁰ The figure given in the 2016 report (EPO and EUIPO, 2016 p 72, table 22) is incorrect for the GI-intensive industries' net exports figure, which has therefore been corrected in table 12.

Rank NO	NACE code	NACE description	Export (€ mill) NO	Share IPR-intensive exports NO	Intensive IPR	Rank EU	NACE code	NACE description	Export (€ mill) EU	Share IPR-intensive exports EU	Intensive IPR
1	06.10	Extraction of crude petroleum	65 233	56%	TM, PAT	1	29.10	Manufacture of motor vehicles	143 398	9%	TM, DES, PAT
2	19.20	Manufacture of refined petroleum products	10 161	9%	TM	2	21.20	Manufacture of pharmaceutical preparations	100 5429	6%	TM, PAT
3	06.20	Extraction of natural gas	4 320	3.7%	PAT	3	19.20	Manufacture of refined petroleum products	98 108	6%	TM
4	24.42	Aluminium production	3 438	3.0%	DES, PAT	4	30.30	Manufacture of air and spacecraft and related machinery	82 809	5%	PAT
5	26.51	Manufacture of instruments and appliances for measuring, testing and navigation	1 461	1.3%	TM, DES, PAT	5	24.41	Precious metals production	75 085	5%	TM, PAT
6	28.92	Manufacture of machinery for mining, quarrying and construction	1 379	1.2%	TM, PAT	6	29.32	Manufacture of other parts and accessories for motor vehicles	39 496	2%	DES, PAT
7	09.10	Support activities for petroleum and natural gas extraction	1 323	1.1%	TM, PAT	7	26.51	Manufacture of instruments and appliances for measuring, testing and navigation	36 136	2%	TM, DES, PAT
8	71.12	Engineering activities and related technical consultancy	1 156	1.0%	PAT	8	20.14	Manufacture of other organic basic chemicals	35 306	2%	TM, PAT
9	50.20	Sea and coastal freight water transport	1 080	0.93%	TM	9	32.50	Manufacture of medical and dental instruments and supplies	26 895	2%	TM, DES, PAT
10	20.13	Manufacture of other inorganic basic chemicals	1 010	0.87%	TM, PAT	10	28.29	Manufacture of other general-purpose machinery n.e.c.	26 137	2%	TM, DES, PAT
Top 10 NO			90 599	78%		Top 10 EU			664 413	41%	
All IPR-intensive			115 931	100%		All IPR-intensive			1 605 516	100%	

Table 13: Top ten IPR-intensive exporting industries, for Norway (left) and EU (right), 2013 figures

Rank NO	NACE code	NACE description	Import (€ mill) NO	Share IPR-intensive imports NO	Intensive IPR	Rank EU	NACE code	NACE description	Import (€ mill) EU	Share IPR-intensive imports EU	Intensive IPR
1	29.32	Manufacture of other parts and accessories for motor vehicles	4 850	7.1%	DES, PAT	1	06.10	Extraction of crude petroleum	302 653	20%	TM, PAT
2	09.10*	Support activities for petroleum and natural gas extraction	3 898	5.7%	TM, PAT	2	19.20*	Manufacture of refined petroleum products	93 328	6%	TM, PAT
3	06.10*	Extraction of crude petroleum	3 635	5.3%	TM, PAT	3	26.20	Manufacture of computers and peripheral equipment	65 297	4%	TM, PAT, DES, CR
4	26.51*	Manufacture of instruments and appliances for measuring, testing and navigation	3 572	5.2%	TM, DES, PAT	4	26.30	Manufacture of communication equipment	57 348	4%	TM, PAT, DES, CR
5	19.20*	Manufacture of refined petroleum products	3 359	4.9%	TM	5	06.20	Extraction of natural gas	55 816	4%	PAT
6	24.42*	Aluminium production	2 534	3.7%	DES, PAT	6	30.30*	Manufacture of air and spacecraft and related machinery	48 713	3%	PAT
7	28.92*	Manufacture of machinery for mining, quarrying and construction	2 018	2.9%	TM, PAT	7	21.20*	Manufacture of pharmaceutical preparations	46 076	3%	TM, PAT
8	29.20	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	1 899	2.8%	DES, PAT	8	20.14*	Manufacture of other organic basic chemicals	33 045	2%	TM, PAT
9	28.22*	Manufacture of lifting and handling equipment	1 476	2.1%	TM, PAT	9	29.10*	Manufacture of motor vehicles	30 021	2%	TM, DES, PAT
10	21.20*	Manufacture of pharmaceutical preparations	1 223	1.8%	TM, PAT	10	14.13	Manufacture of other outer ware	27 000	2%	TM, DES
Top 10 NO			28 464	41%		Top 10 EU			759 297	50%	
All IPR-intensive			68 650	100%		All IPR-intensive			1 509 099	100%	
*These industries are also in the corresponding top ten export list											

Table 14: Top ten IPR-intensive importing industries, for Norway (left) and EU (right), 2013 figures

Primary, secondary and tertiary sectors

The EU studies also applied the traditional taxonomy of primary, secondary and tertiary sectors¹¹ to the results. The primary sector then includes NACE sections A and B, *i.e.* agriculture, forestry and fishing, and mining and quarrying, respectively. B also covers extraction of oil and gas. The secondary sector includes manufacturing activities in the NACE sections C-F, while the tertiary sector includes the sections G-U. This grouping gives additional insight into the role of IPR-intensive industries in the various sectors, in terms of employment, contributions to the GDP as well as trade.

NORWAY					
Sector	Employment	GDP (mill €)	Export 2013 (mill €)	Import 2013 (mill €)	Net export 2013 (mill €)
Primary	57 914	95 222	71 033	8 069	62 963
% of primary that are IPR-intensive	45.7%	94.5%	93%	76%	
Secondary	155 711	22 313	36 673	53 738	-17 064
% of secondary that are IPR-intensive	33.8%	35.9%	81%	82%	
Tertiary	458 125	78 914	8 224	6 842	1 382
% of tertiary that are IPR-intensive	23.0%	35.6%	40%	44%	
Total IPR intensive	671 750	196 449	115 931	68 650	47 281
% IPR-intensive	25.9%	51.3%	81%	74%	
EU					
Sector	Employment	GDP (mill €)	Export 2013 (mill €)	Import 2013 (mill €)	Net export 2013 (mill €)
Primary	893 770	100 746	27 648	389 120	-361 472
% of primary that are IPR-intensive	8.1%	29.9%	54.0%	83.8%	
Secondary	23 731 083	1 784 338	1 496 257	1 080 174	416 083
% of secondary that are IPR-intensive	48.5%	54.3%	92.9%	93.2%	
Tertiary	35 407 347	3 779 083	81 612	39 805	41 806
% of tertiary that are IPR-intensive	22.8%	38.8%	99.9%	99.9%	
Total IPR intensive	60 032 200	5 664 168	1 605 516	1 509 099	96 417
% IPR-intensive	27.8%	42.3%	93.2%	85.5%	

Table 15: Employment, GDP and external trade for IPR-intensive industries, Norway (top) and EU (bottom).

The IPR-intensive industries of the primary sector have 45.7% of the employees of the sector, but contribute with 94.5% of its total GDP. This clearly visualizes the strong role played by the oil and gas extraction industries in the economy of Norway.

Compared to the EU, for which the primary sector contributes the smallest share of employment in IPR-intensive industries with 1.5% (corresponding to 894 thousand jobs), the primary sector in Norway contributes a higher share, 8.6% of jobs (about 58 thousand jobs) in IPR-intensive industries. The 2016 report commented that services comprise around 2/3 of modern economies (EPO and EUIPO, 2016, p. 79). For Norway, the share of IPR intensive

¹¹ The primary sector includes agriculture, fisheries and the extractive industries (NACE sections A and B), the secondary sector includes manufacturing activities (sections C-F) and the tertiary sector includes services (sections G-U)

industries in the tertiary sector is 68% (458 thousand of the 672 thousand jobs in IPR-intensive industries), and the corresponding share in the EU is 59%.

Whereas the EU is a large net importer of primary sector products, mainly oil and gas (EPO and EUIPO, 2016, p. 79), it is likewise evident from the figures provided in this study that Norway is a large exporter of the same primary sector products. Furthermore, the share of IPR-intensive industries in the secondary sector in Norway is rather low, compared to the EU (23% and 40%, respectively). This may provide an explanation for a less patent-intensive behaviour of Norwegian industry on average: the majority of patent-intensive industry classes are found in the secondary sector, and primary and tertiary industries have fewer classes among the most patent-intensive (cf. the list of 20 most patent-intensive industries of the EU study, EPO and EUIPO, 2016 p 58). Only two of the top ten IPR-intensive export industries of Norway are among the top 20 patent-intensive industries of the EU study (06.20 *Extraction of natural gas* and 26.51 *Manufacture of instruments and appliances for measuring, testing and navigation*).

Anlysis comparing Norway and EU member states

The EU study also includes a section presenting the contribution of IPR-intensive industries to employment and GDP of each Member State (EPO and EUIPO, 2016, section 7.4 p 80). Although the data for each nation is considered less robust than the EU average figures due to lack of data, it is nevertheless interesting to see how the contributions vary between member states and how the contributions for Norway compare with those of the EU states.

In order to compare small and large nations, the share of total employment and share of GDP of IPR-intensive industries are used in the following for a selection of IP rights and the IPR-intensive industries in total. Geographical indications and plant variety rights have very small contributions to employment and GDP in Norway and are therefore omitted in the following comparison.

Patent-intensive industries

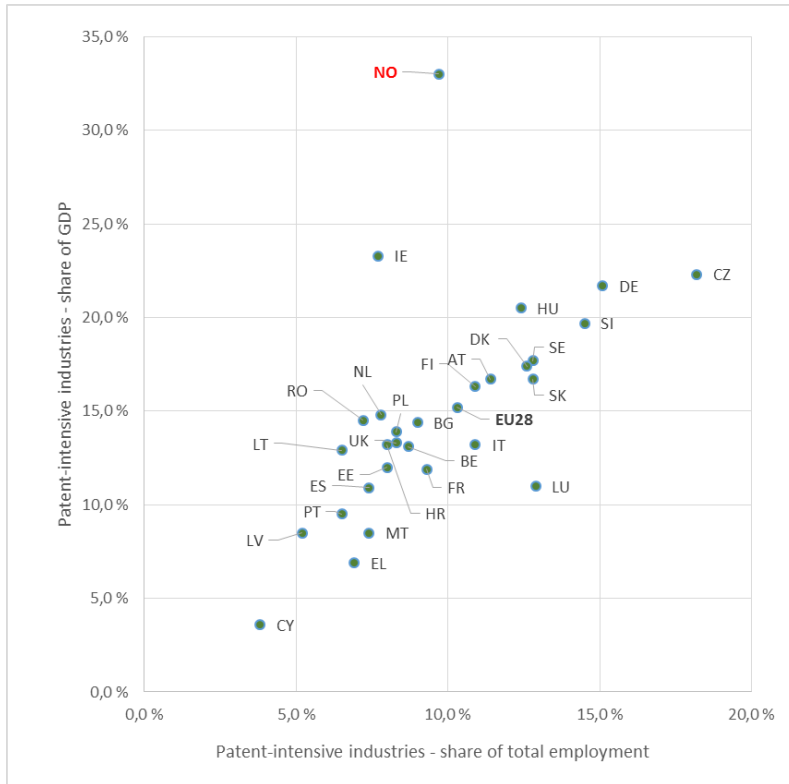


Figure 4: Plot of the share of GDP versus the share of total employment of patent-intensive industries in EU and Norway

Interestingly, the scatter plot shows a fair degree of correlation between GDP shares and the share of employment for the patent-intensive industries. Norway and to a lesser degree Ireland are outliers with a much higher share of GDP from patent-intensive industries than the other EU countries. Evidently, the oil and gas industries provide an explanation for the high GDP compared to the share of employment in the case of Norway, as discussed previously (cf. page 14 and 15 above).

Trademark-intensive industries

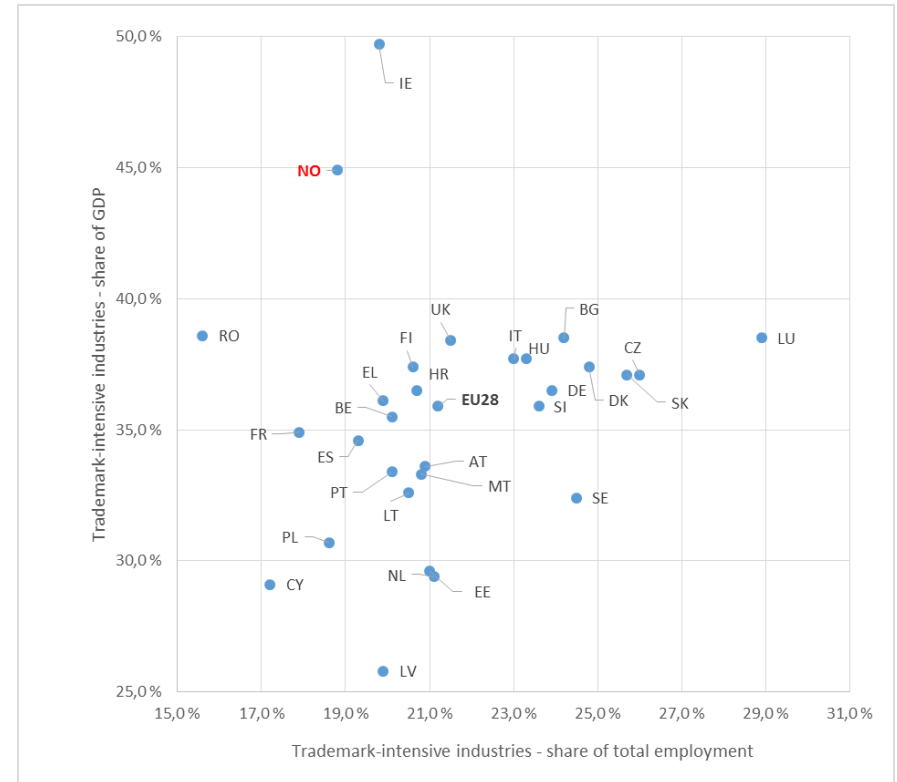


Figure 5: Plot of the share of GDP versus the share of total employment of trademark-intensive industries in EU and Norway

The scatter plot for the trademark-intensive industries shows a less pronounced correlation between GDP shares and the share of employment than for the patent-intensive industries. Again, Ireland and Norway are above the other nations, and also Romania shows a high GDP share compared to the share of employment. Also in the case of trademark-intensive industries in Norway the oil and gas industries contribute significantly, with slightly more than half of the GDP share (see Table 8).

Design-intensive industries

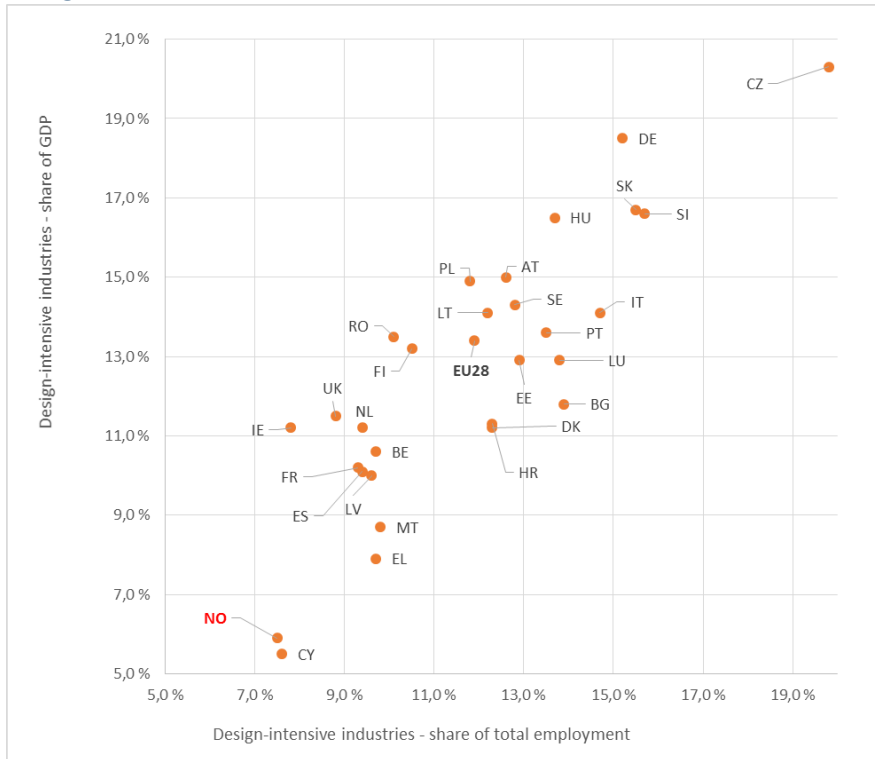


Figure 6: Plot of the share of GDP versus the share of total employment of design-intensive industries in EU and Norway

The scatter plot for the design-intensive industries also shows some degree of correlation between GDP shares and the share of employment. In this plot, however, there are no marked outliers, and the position for Norway reflects the low share of employment and GDP in design-intensive industries, both in the lowest part of the plot. The Czech Republic has the highest share of GDP, in line with the highest share of employment in the design-intensive industries.

Copyright-intensive industries

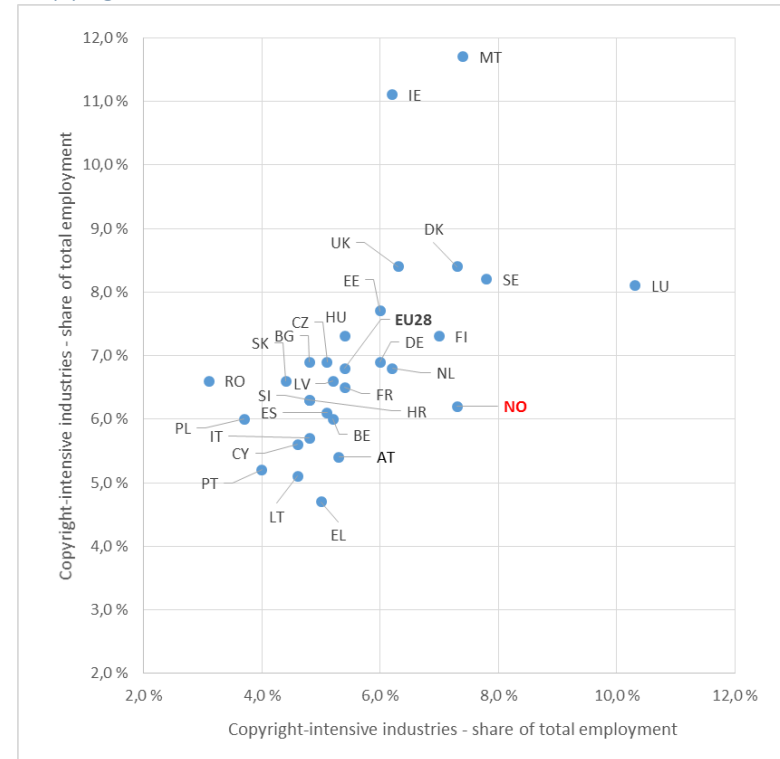


Figure 7: Plot of the share of GDP versus the share of total employment of copyright-intensive industries in EU and Norway

For the copyright-intensive industries some degree of correlation is seen, but two nations, Montenegro and Ireland, have a higher share of GDP than other nations with comparable share of employment. The position for Norway shows a higher share of employment than the EU average, but the GDP share is slightly lower. The other Nordic countries have employment shares close to that of Norway, but with higher GDP shares.

All IPR-intensive industries



Figur 8: Plot of the share of GDP versus the share of total employment for all IPR-intensive industries in EU and Norway

When looking at all the IP rights of the study and eliminating overlaps, the shares of GDP versus the shares of total employment found are as seen in Figure 8. Evidently, the trademark-intensive industries are reflected also in the overall plot, due to their high shares of both GDP and employment.

Appendix 1 – Overview of NACE sections with included divisions

NACE Section	Divisions included	Description
A	01 - 03	AGRICULTURE, FORESTRY AND FISHING
B	05 - 09	MINING AND QUARRYING
C	10 - 33	MANUFACTURING
D	35	ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY
E	36-39	WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES
F	41-43	CONSTRUCTION
G	45 - 47	WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES
H	49 - 53	TRANSPORTATION AND STORAGE
I	55 -56	ACCOMMODATION AND FOOD SERVICE ACTIVITIES
J	58 - 63	INFORMATION AND COMMUNICATION
K	64-66	FINANCIAL AND INSURANCE ACTIVITIES
L	68	REAL ESTATE ACTIVITIES
M	69 75	PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES
N	77 - 82	ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES
O	84	PUBLIC ADMINISTRATION AND DEFENCE; COMPULSORY SOCIAL SECURITY
P	85	EDUCATION
Q	86 - 88	HUMAN HEALTH AND SOCIAL WORK ACTIVITIES
R	90 - 93	ARTS, ENTERTAINMENT AND RECREATION
S	94 - 96	OTHER SERVICE ACTIVITIES
T	97	ACTIVITIES OF HOUSEHOLDS AS EMPLOYERS; UNDIFFERENTIATED GOODS- AND SERVICES-PRODUCING ACTIVITIES OF HOUSEHOLDS FOR OWN USE
U	99	ACTIVITIES OF EXTRATERRITORIAL ORGANISATIONS AND BODIES

Appendix 2 – Precision aspects of industry assignment of foreign affiliates statistics

Eurostat’s Foreign Affiliates Statistics (FATS) database gives the number of employees in industries on two-digit NACE level (divisions) split according to country or region of control, for the total business economy; repair of computers, personal and household goods; except financial and insurance activities (sections B-N minus K, plus S95). The detailed enterprise statistics of the SBS database (see above) gives the number of jobs on each 4-digit and more aggregate NACE levels for the same industries. The number of jobs in each IPR-intensive industry class generated by companies based in a particular geographic area is determined from the number of IPR-intensive jobs of each 4-digit NACE industry class as the corresponding share of jobs in that area on the 2-digit NACE (division) level. This will be correct when all (or none) of the 4-digit NACE classes within a 2-digit NACE division are IPR-intensive, but an approximation if only some are IPR-intensive, cf. discussion above.

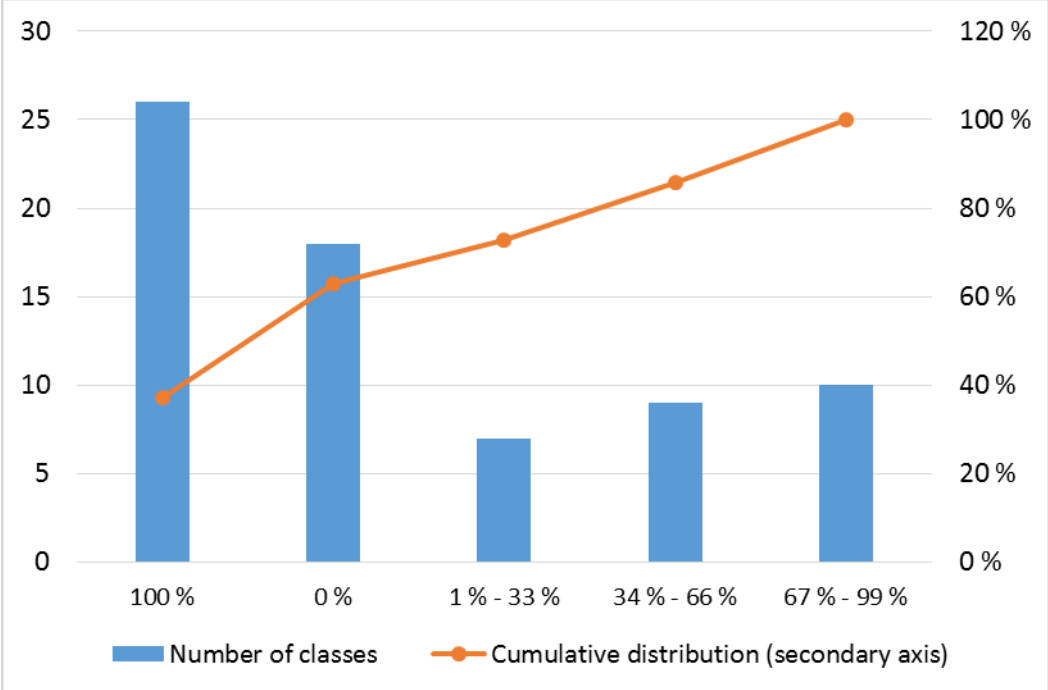


Figure 3: Frequency plot showing the distribution of share of IPR-intensive industry classes per division. The columns show the number of divisions within each percentage range of IPR-intensiveness, and the cumulative curve (secondary axis) shows how the number of classes in each category add up.

The figure above shows the number of classes in different categories of IPR-intensiveness (columns), and the cumulative curve shows that 63% of the industry divisions are either 100% or 0% IPR-intensive, whereas for the remaining 37%, the divisions cover both IPR-intensive and non-intensive industry classes.

Literature

Intellectual property rights intensive industries: contribution to economic performance and employment in the European Union. Industry-Level Analysis Report, September 2013; EPO and OHIM, 2013.

Intellectual property rights intensive industries and economic performance in the European Union. Industry-Level Analysis Report, October 2016, Second edition; EPO and EUIPO, 2016.

Intellectual Property and the U.S. Economy: Industries in Focus. U.S. Department of Commerce, 2012.

Database links

EUROSTAT [Structural Business Statistics](#)

- Annual enterprise statistics for special aggregates of activities (NACE Rev. 2) (sbs_na_sca_r2)
- Annual detailed enterprise statistics for industry (NACE Rev. 2, B-E) (sbs_na_ind_r2)
- Annual detailed enterprise statistics for construction (NACE Rev. 2, F) (sbs_na_con_r2)
- Annual detailed enterprise statistics for trade (NACE Rev. 2 G) (sbs_na_dt_r2)
- Annual detailed enterprise statistics for services (NACE Rev. 2 H-N and S95) (sbs_na_1a_se_r2)
- Foreign control of enterprises by economic activity and a selection of controlling countries (from 2008 onwards) (fats_g1a_08)

EUROSTAT [Annual National Accounts](#)

- Gross value added and income by A*10 industry breakdowns (nama_10_a10)

Statistics Norway

- NACE two-digit (division) employment: Tabell [08536](#): Sysselsatte per 4. kvartal, etter bosted, arbeidssted, kjønn og næring (88 grupper, SN2007) (K)
- NACE 4-digit (class) level employment: Tabell [11606](#): Sysselsatte per 4. kvartal, etter bosted, arbeidssted, alder og næring (5-siffernivå, SN2007) (F)
- Foreign trade: Tabell [09297](#): Utenrikshandel med varer, etter produktgruppe (CPA) (mill. kr)