

# Intellectual property right-intensive industries and economic performance in Latin American countries



# INTELLECTUAL PROPERTY RIGHT-INTENSIVE INDUSTRIES AND ECONOMIC PERFORMANCE IN LATIN AMERICAN COUNTRIES

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## Foreword

In August 2021, IP Key Latin America concluded its first phase with great success. During these 48 months of work, the EUIPO, following the lead of the European Commission, joined efforts with Intellectual Property (IP) experts, IP institutions, and EU and Latin American stakeholders to contribute to the improvement of IP systems in the region.

The undertaking has resulted in over a hundred activities, reaching a target audience in the thousands, and leaving us high-quality IP content embodied in studies, videos and e-learning modules. But more importantly, relying on this output, IP Key Latin America has been instrumental in reducing market barriers for EU companies operating in the Latin American region.

One of IP Key's main goals has been to raise awareness regarding IP's social and economic importance among the public, relevant institutions, and policymakers. This has been the case ever since evidence from Europe and other regions has shown that Intellectual Property Rights (IPRs) support enterprises, create jobs, and guarantee quality and safety when we buy goods and services.

The final days of the IP Key project saw the publication of a series of studies dedicated to measuring the economic contribution of IPRs in different countries of the region, including Mexico, Peru, Argentina, Uruguay and Chile. These studies follow the methodology of previous publications authored by the EUIPO and the European Patent Office (EPO) in the EU and the United States Patent and Trademark Office (USPTO) in the United States. IP Key carried them out with the invaluable technical support of our colleagues from the Observatory's Economics and Statistics Service.

The importance of these studies is paramount: thanks to them we now have access to previously unpublished figures, estimating the contribution of IPRs to Gross Domestic Product (GDP), employment, wages and international trade in Latin America. Furthermore, as the results attained confirm the importance of IPRs in the region, in line with what we already observed in the EU and the US, they provide the public and policymakers with a simple and straightforward account of the economic importance of IPRs in the different countries.

Moreover, the existence of these studies opens the door to new forms of analysis. Indeed, we now have an opportunity to analyse and understand similarities and differences among different countries.

For this reason, the comparative analysis presented by the Observatory in this paper entitled 'Intellectual Property Right-Intensive Industries and Economic Performance in Latin American countries' is necessary and very welcome. For example, it allows us to see the contributions of the specific IPRs studied (patents, trade marks, copyright, designs) and helps to begin building a greater understanding of the strengths of each country in terms of their intellectual capital.

Finally, I want to emphasise that at the Institutional and Cooperation Department we are delighted and very honoured to continue this cooperation with the European Commission for the implementation of the next phase of the IP Key project, due to begin in 2022. Moreover, I am convinced that this will allow us to continue applying the proven expertise and knowledge of our colleagues of the Observatory, as well as of other EUIPO departments, in the new feats to come in the quest to improve access and facilitate the use of IP systems worldwide for EU businesses.

Sandris Laganovskis  
Director of the Institutional and Cooperation Department  
EUIPO

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## Acknowledgements

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## Executive Summary

The European Union Intellectual Property Office (EUIPO) and the European Patent Office (EPO) have published several joint studies (OHIM<sup>(1)</sup>/EPO 2013; EUIPO/EPO 2016, 2019) on the contribution of Intellectual Property Right (IPR) intensive industries to the European Union (EU) economy and the Member States (MS) at an industry level, including trade marks, patents, designs, copyright, geographical indications (GIs) and plant variety rights (PVRs).

These reports identify IPR-intensive industries in the EU and estimate their contribution to Gross Domestic Product (GDP), employment, international trade and average wages paid. The methodology applied in these reports follows a previous report from the United States Patent and Trademark Office (USPTO 2012, 2016) and is based on the selection of industries that use more than the average number of IPRs for trade marks, patents, designs and PVRs. The selection of copyright-intensive industries is based on WIPO (2015), while the selection of GI-intensive industries is based on a previous analysis of the value of GI protected goods commissioned by the European Commission, DG Agriculture and Rural Development<sup>(2)</sup>.

Five EU-funded studies have applied comparable methods to estimate the contribution of IPR-intensive industries in five Latin American (LATAM) countries: Mexico, Argentina, Peru, Chile and Uruguay. The five studies cover trade mark-, patent- and design-intensive industries. Additionally, the data from Argentina, Chile and Uruguay includes copyright-intensive industries and some countries have also included PVRs<sup>(3)</sup>-, GIs<sup>(4)</sup>-, and/or utility model<sup>(5)</sup>- intensive industries. This paper is a compilation of the main findings of these five reports for trade mark-, patent-, design- and copyright-intensive industries, along with a comparison with the EU's main results. Results for PVRs, GIs and utility models are not presented here, but due to their overlap with other IPRs their economic importance is not significant to affect the totals.

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<sup>(1)</sup> The OHIM was renamed the EUIPO following the entry into force of the Regulation (EU) 2015/2424 on 23 March 2016.

<sup>(2)</sup> 'Value of production of agricultural products and foodstuffs, wines, aromatised wines and spirits protected by a geographical indication (GI)', October 2012.

<sup>(3)</sup> PVR are included in Argentina, Peru and Uruguay.

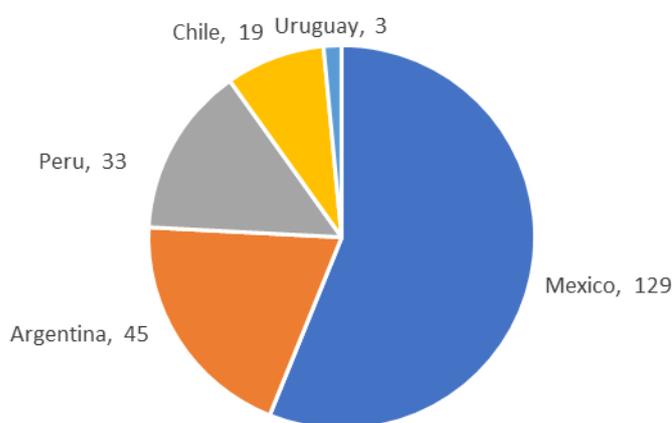
<sup>(4)</sup> GIs are included in all the countries except Chile.

<sup>(5)</sup> Utility models are only included in the Peruvian report.

The five countries have very different populations and their economies also differ in size and structure. Mexico is the largest country, with a population of more than 120 million inhabitants in 2019, which accounts for more than half of the total population of the five countries, while Uruguay has only 3 million inhabitants.

**Figure 1. Total population in the five LATAM countries in millions, 2019**

Population (in millions)



Source: The World Bank

One of the main findings of the five reports is the different number of applications for IPRs in each country. Considering the average number of trade marks, patents and designs per year and per million inhabitants, the ranking of countries coincides with the GDP per capita ranking.

Another interesting finding is the high percentage of IPR that is registered by non-residents in all countries except Mexico. Further findings show that in all countries but Chile the lowest ratio of domestic applications corresponds to patents, while the highest in all five countries corresponds to trade marks.

**Table 1. Share of resident applications for trade marks, patents and designs<sup>(6)</sup>**

(% resident applications)	Mexico	Argentina	Peru	Chile	Uruguay
Trade marks	94	77	51	64	39
Patents	75	12	3	12	3
Designs	86	NA	23	8	10

After selecting the industries that register above-average numbers of IPRs (this can be a different selection of industries depending on the country) the reports estimate their contribution to their economies based on official statistics.

The contributions of IPR-intensive industries to GDP ranges from 42 % in Argentina to 55 % in Peru. In the five countries, as well as in the EU and US, trade marks are the IPR with the highest contribution to GDP and employment.

**Table 2. Contribution of IPR-intensive industries to GDP**

GDP (%)	Mexico	Argentina	Peru	Chile	Uruguay	Five LATAM	EU*
Trade marks	44.7	26.8	46.0	45.4	43.3	41.4	37.4
Patents	23.0	13.5	23.0	8.4	22.8	19.3	17.0
Designs	19.2	15.1	10.0	2.9	0.6	14.8	16.9
Copyright		15.3		6.3	4.3	3.9	6.6
<b>All IPRs</b>	<b>47.8</b>	<b>41.9</b>	<b>55.0</b>	<b>49.9</b>	<b>48.9</b>	<b>47.7</b>	<b>45.3</b>

\*EU27: own calculations based on detailed country data from the 3rd edition of the report on IP contribution in the EU, EUIPO/EPO (2019)

<sup>(6)</sup> Unless otherwise indicated, all tables and figures in this paper are based on the information provided in the five mentioned reports, IP Key (2021).

The five countries have different prominent results.

- The contribution of Mexico's design-intensive industries to GDP and exports are the highest of the five countries. This is led by the manufacture of motor vehicles and components.
- Argentina shows the highest GDP and employment contribution from copyright-intensive industries.
- The contribution of mining to the GDP and exports of Peru and Chile is very noticeable. These industries are trade mark and patent-intensive in Peru but in Chile they are just trade mark-intensive. This is explained by the different selection of patent-intensive industries in Peru, including all applications regardless of their residence status.
- Uruguay shows the lowest contribution of IPR-intensive industries to exports of goods.

## 1. Introduction

This paper presents a comparison of the results of five studies from IP Key and IP offices in Latin America (IMPI, INAPI, INDECOPI, and DNPI). These studies follow a similar methodology to measure the contribution of IPR-intensive industries in a comparable way with the EUIPO/EPO and USPTO studies. Nevertheless, there are some data limitations that make employment and wages contributions less comparable. These limitations are explained in the appendix. Adjusted ratios of employment are presented when necessary and wages ratios are not compared among countries but are still useful for intra-country comparisons of different IPR-intensive industries.

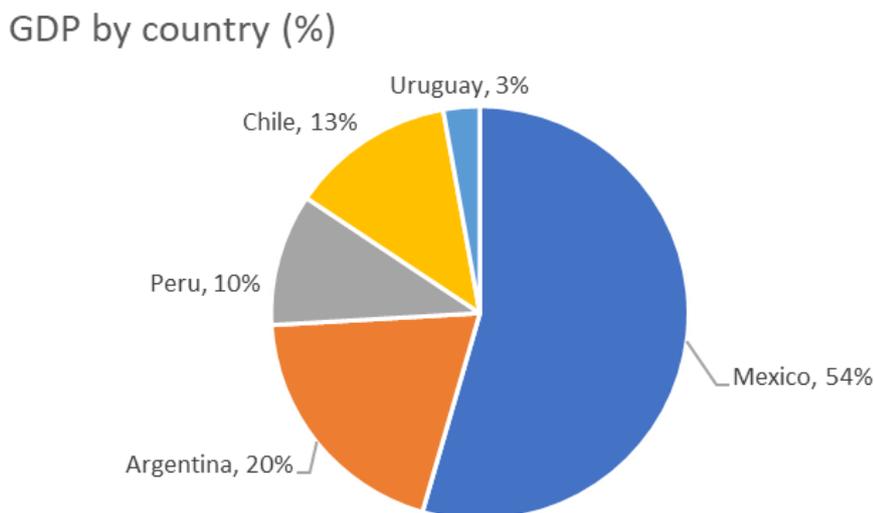
Unless otherwise indicated, all tables and figures in this paper are based on the information provided in the five reports of LATAM countries, as well as in the last EUIPO/EPO report included in the references section.

The reference periods are not always the same but they are close enough to compare all the results. For more detailed analysis, the five reports are included in the references section.

The five countries compared in this paper (Mexico, Argentina, Perú, Chile and Uruguay) have a population in excess of 200 million inhabitants and a GDP of almost 2 000 billion USD (half the EU population and a GDP similar to Italy).

Their economies are very different in both their size and structures. As a reference, Figure 2 shows the share of each country's GDP with respect to the total, with Mexico accounting for more than half of the population and GDP while Uruguay has the smallest economy.

**Figure 2. GDP share of the five LATAM countries, 2019**



Source: The World Bank

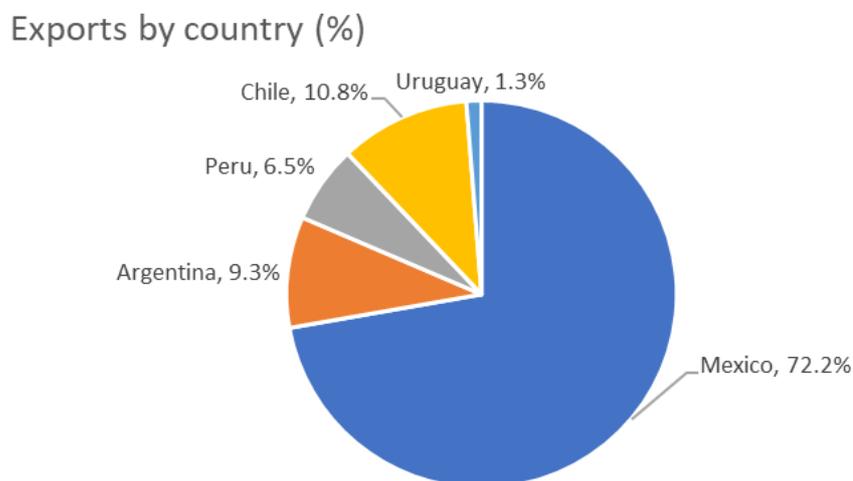
With regards to the GDP per capita, the highest value of this economic indicator corresponds to Uruguay with more than 16 000 USD in 2019 and the lowest corresponds to Peru with about 6 000 USD per inhabitant.

Mexico accounts for 54 % of the total GDP and 56 % of the population, but its contribution to international trade (with an openness rate<sup>(7)</sup> of 80 %, compared with 57 % in Chile, 40 % in Peru and 30 % in Uruguay and Argentina) is even higher, reaching almost three quarters of total exports of goods from the five LATAM countries.

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<sup>(7)</sup> Openness rate is the ratio between exports plus imports expressed as a percentage of the GDP.

**Figure 3. Share of total exports of goods by country, 2019**



Source: The World Bank

Section 2 gives a short description of the different situations regarding IPR registration in the five countries. Section 3 summarises the IPR databases used for the selection of IPR-intensive industries. In Section 4 the comparison of the contribution of IPR-intensive industries to employment, GDP, international trade and wages is limited to the comparable ratios and the most relevant indicators, with more details being presented in the reports. Section 5 includes a very short description of the most distinguishing aspects of the economic contribution of IPR in each country's IPR-intensive industries. Conclusions are presented in Section 6. Finally, the appendix presents some methodological notes affecting the comparability of the five studies.

## 2. Applications for trade marks, patents and designs

The selection of IPR-intensive industries is based on the applications registered in the IP offices of the five countries for trade mark, patent and designs. For the three countries including copyright (Argentina, Chile and Uruguay) the selection of copyright-intensive industries is based on WIPO (2015). The total IPR-intensive industries are those industries that are intensive in at least one of the

IPRs considered in each report. Due to overlapping use of IPRs, the sum of the figures for individual IPR exceeds the total figure for all IPR-intensive industries.

This section compares some interesting characteristics of the applications for trade marks, patents and designs in the IP offices of the five countries. Further details are included in the five reports.

The reference periods used for the applications for IPRs and the economic indicators are: 2014-2019 for Argentina, Uruguay and Chile; 2015-2018 for Peru; and 2010-2019 for the IPRs applications but only 2019 for the economic indicators in Mexico.

The number of applications per year is very different in the five countries, as is the size of the different populations and economies. Table 3 shows the total applications for trade marks, patents and designs per year and per million inhabitants.

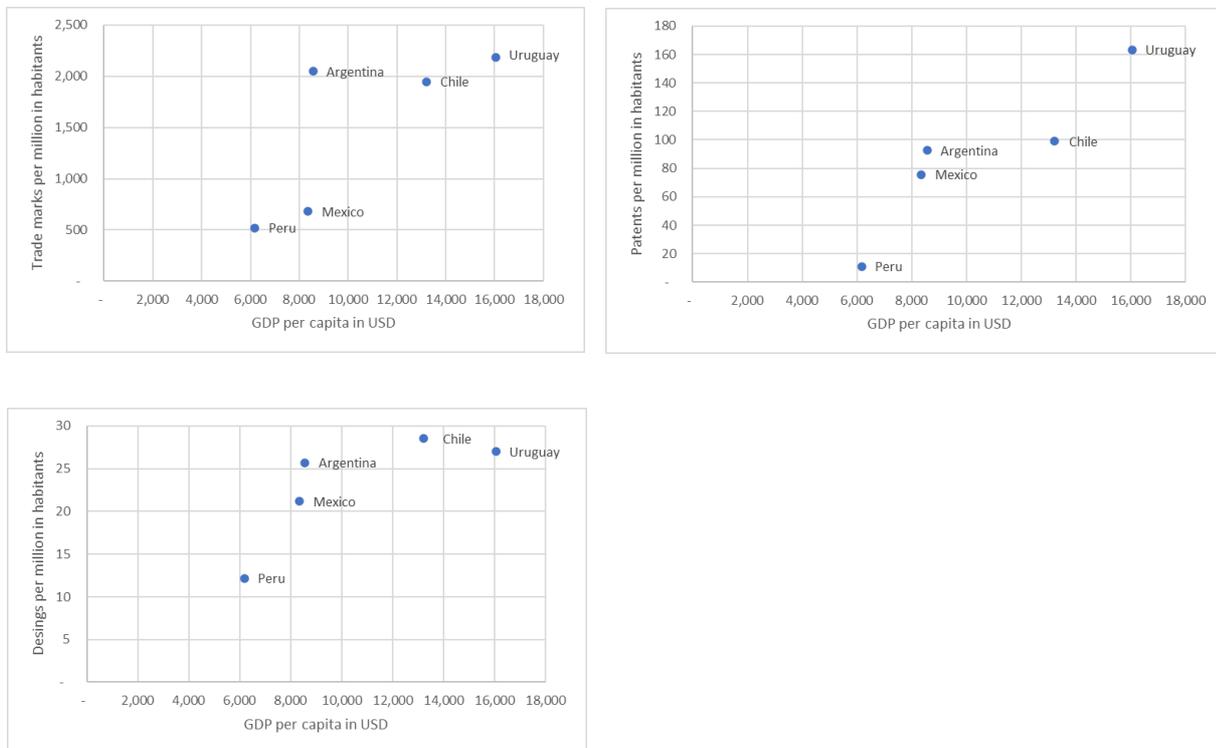
**Table 3. Number of IPR applications per million inhabitants**

Applications per million inhabitants	Mexico	Argentina	Peru	Chile	Uruguay
Trade marks	683	2,048	520	1,948	2,182
Patents	76	93	12	99	163
Designs	21	26	11	29	27

Source: Number of applications from the five reports, IP Key (2021); population from the World Bank.

Argentina, Chile and Uruguay have the highest number of applications for trade marks, patents and designs per inhabitant as a yearly average in the different periods considered in the studies. The ranking of countries by annual IPRs registered per inhabitant coincides with the ranking of GDP per capita: Uruguay, Chile, Argentina, Mexico and Peru as shown in Figure 4.

**Figure 4. Trade mark, patent and design applications per million inhabitants vs GDP per capita in USD**



Source: Number of applications from the five reports, IP Key (2021); population and GDP from the World Bank.

The highest number of applications in the five countries correspond to trade marks. The low number of applications for patents and designs in Peru is also very significant, as well as the high number of patent applications in Uruguay.

IPR-intensive industries are those registering more IPRs per thousand employees (relative intensity) than the average in each country. For the calculation of IPR intensity by industry only applications with at least one resident owner are selected, with the exception of Peru for all registered IPRs and design-intensive industries in Argentina where all applications are used regardless of the residence status of the owner.

The percentage of applications from resident owners differs by country and can explain some differences in the selection of IPR-intensive industries.



In the five countries, trade mark applications are the IPR with the highest presence of resident owners, with the minimum percentage in Uruguay (39 %) and the maximum in Mexico.

**Table 4. Share of applications from resident owners**

(% resident applications)	Mexico	Argentina	Peru	Chile	Uruguay
Trade marks	94	77	51	64	39
Patents	75	12	3	12	3
Designs	86	NA	23	7	10

The percentage of applications for patents and designs with resident owners is very different in the five countries. Only 3 % of patents registered in Peru and Uruguay are from resident owners, while the figure is 12 % in Argentina and Chile and 75 % in Mexico.

The percentage of patents with resident owners based on RICYT (Red de Indicadores de Ciencia y Tecnología, Interamericana e Iberoamericana) as an average for the period 2014-2019 shows that low percentages of patents registered by residents is usual in the region with an average in all LATAM countries of 18 % of patents registered by residents.

Only Peru includes all patents for the selection of patent-intensive industries. For the rest of the countries the analysis is limited to resident owners so that Peruvian and Uruguayan patent-intensive industries (two extreme cases) should be analysed and compared carefully. The Argentinian and Uruguayan reports include a clarifying appendix explaining the consequences of considering all patent applicants or only resident applicants for the selection of patent-intensive industries. In fact, some interesting results arise in Section 5 from the fact that patent-intensive industries, in particular related to mining activities, are defined based only on domestic applications in Chile while in Peru they are based on all applications,.

The share of designs owned by at least one resident applicant is very small in Chile (7 %) and Uruguay (12 %), resulting in very few industries selected as design-intensive.

### 3. IPR-intensive industries

The trade mark-, patent- and design-intensive industries are selected based on the average number of IPRs per 1 000 employees in each industry, so that the number of IPR-intensive industries in each country depends on the distribution of the relative intensity among the industries, and also the different classifications used.

For copyright-intensive industries the selection of intensive industries is the same (based on WIPO) but the effective number of industries depends on the classification and the detailed level of the data.

Due to overlapping use of IPRs, in all tables in this section the sum of the figures for the individual IPRs exceeds the total figure for IPR-intensive industries.

**Table 5 Number of IPR-intensive industries**

Number of industries	Mexico	Argentina	Peru	Chile	Uruguay	EU
Trade mark-intensive	389	123	68	203	124	280
Patent-intensive	176	84	33	57	33	148
Design-intensive	167	80	32	16	6	161
Copyright-intensive		43		61	58	79
<b>IPR-intensive</b>	<b>445</b>	<b>180</b>	<b>74</b>	<b>237</b>	<b>173</b>	<b>353</b>
All industries	822	291	101	408	411	615
% IPR-intensive over total	54%	62%	73%	58%	42%	57%

The number of industries included as IPR-intensive in Peru is 74 out of 101 of which 68 are trade mark-intensive and contribute the most to employment and GDP. The high number of industries selected as trade mark-intensive in Peru is explained by a more symmetric distribution<sup>(8)</sup> of trade mark-intensive industries compared with the other IPRs.

<sup>(8)</sup> When few industries register many IPRs, the distribution is more asymmetric and positive or right skewed resulting in the mean (or average) being higher than the median (in a symmetric distribution mean=median). As a result, in asymmetric distributions the threshold for IPR-intensive industries (based on the mean) will be higher and the number of selected

On the other hand, Uruguay has only 42 % of the industries registering more IPRs than the average. There is a very low number of industries registering patents or designs with at least one resident owner. For trade mark-intensive industries the top 20 industries with higher relative intensity include some industries in the financial services sector as well as other services such as leasing of IP except copyright and activities of holding companies. Data limitations prevented the identification of the main activity of the economic group in the headquarters and this explains the high number of IPRs assigned to these industries.

In Mexico, 54 % of all industries with economic data are considered IPR-intensive; Chile has 58 % of industries classified as IPR-intensive; and Argentina 62 %. These three LATAM countries are closer to the EU with 57 % of industries considered IPR-intensive.

In general, trade mark-intensive industries are balanced between the service and manufacturing sectors, with services more dominant in Argentina and manufacturing more dominant in Uruguay. Patent- and design-intensive industries are mainly in the manufacturing sector. The only exception to this is Uruguay where patent-intensive industries are dominated by service and commerce activities that also includes two agricultural activities<sup>(9)</sup>.

Overlapping of IPR-intensive industries refers to industries that are intensive in the use of more than one IPR and this differs significantly by country. In Peru (with the selection of IPR-intensive industries based on all applicants and not only residents), two thirds of the industries are intensive in more than one IPR (the same percentage as in the EU). Argentina is second with more industries intensive in several IPRs, with 57 %. Mexico has 44 % of its industries intensive in more than one IPR, while in Chile and Uruguay the figures for industries that are intensive in more than one IPR are 37 % and 31 % respectively.

With regards to GIs (included in all countries except Chile) and utility models (included only in Peru), all industries intensive in these two IPRs are also intensive in trade marks, designs and/or patents. Therefore, their addition does not increase the economic contribution of IPR-intensive industries. PVRs (included in Argentina, Peru and Uruguay) are usually also intensive in other IPRs and a

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industries lower. This probably explains the high number of trade mark-intensive industries in Peru and their higher economic contribution.

<sup>(9)</sup> These are activities related to viticulture and growing of aromatic, drug, and pharmaceutical crops.

maximum of two industries (in Uruguay) are intensive only in PVRs. Therefore, their addition to the list of IPR-intensive industries has a negligible economic contribution compared with all IPR-intensive industries.

## 4. Contribution of IPR-intensive industries to the economies

The ratios of employment generated by IPR-intensive industries should be analysed with care due to data limitations affecting the comparability of results as explained in the appendix. Due to some data issues, the total employment of each country is not comparable and only percentages of total employment are commented.

**Table 6 Contribution of IPR-intensive industries to employment**

Employment (%)	Mexico	Argentina*	Peru	Chile*	Uruguay*	EU**
Trade mark-intensive	16.7	25.3	30.8	31.0	27.4	21.7
Patent-intensive	7.1	14.6	6.9	7.3	11.8	11.3
Design-intensive	7.5	16.7	5.5	2.5	0.8	14.8
Copyright-intensive		18.4		5.3	6.7	5.5
<b>IPR-intensive</b>	<b>20.5</b>	<b>45.2</b>	<b>33.2</b>	<b>33.7</b>	<b>35.9</b>	<b>29.4</b>

\*some caveats for the use of employment ratios in Argentina, Chile and Uruguay are explained in the appendix.

\*\*EU27: own calculations based on detailed country data from 3rd edition report on IP contribution in the EU, EUIPO/EPO (2019).

The low ratios seen for Mexico could be explained by the high occupation in non-IPR-intensive sectors such as agriculture (12 %), construction (8 %) and social and personal services (20 %)<sup>(10)</sup> that add to more than double the employment generated by IPR-intensive industries.

<sup>(10)</sup> Data from INEGI (Instituto Nacional de Estadística y Geografía).

The employment in IPR-intensive industries in Argentina is compared in the report with private, formal economy employees (not including public, informal economy and self-employment). Therefore, the percentages presented in the table are not comparable. When comparable ratios are recalculated based on total employment in Argentina, the IPR-intensive industries contribute 24.5 % of the total employment in the country, a figure which is more in line with other LATAM countries and with the contribution to GDP.

In the same way, Uruguay was also missing data on some public employees and Chile does not include informal economy employment, so that the estimated total contribution of IPR-intensive industries to total employment by the INE (Instituto Nacional de Estadística) in Uruguay and Chile was 23.5 % and 27.5 % respectively.

Table 7 shows the adjusted ratios of employment for better comparison. More details about these adjusted ratios are included in the appendix.

**Table 7 Contribution of IPR-intensive industries to employment (adjusted ratios)**

Employment (%)	Mexico	Argentina	Peru	Chile	Uruguay	EU*
Trade mark-intensive	16.7	13.7	30.8	25.3	17.9	21.7
Patent-intensive	7.1	7.9	6.9	5.9	7.8	11.3
Design-intensive	7.5	9.1	5.5	2.0	0.5	14.8
Copyright-intensive		10.0		4.3	4.4	5.5
<b>IPR-intensive</b>	<b>20.5</b>	<b>24.5</b>	<b>33.2</b>	<b>27.5</b>	<b>23.5</b>	<b>29.4</b>

\*EU27: own calculations based on detailed country data from 3rd edition report on IP contribution in the EU, EUIPO/EPO (2019).

Finally, the two countries with the highest contribution of IPR-intensive industries to employment, based on total employment, are Peru and Chile, which are also the two countries with the highest contribution to GDP as explained below.

GDP statistics are calculated following the System of National Accounts (SNA) and are therefore quite comparable in spite of differences in quality of official statistics and the application of rules.

The GDP contribution for the five LATAM countries is presented in Table 8 as well as the total of the five countries calculated as a weighted sum and the EU average, with all caveats about differences in the selection of IPR-intensive industries and possible differences in economic indicators in the countries.

**Table 8 Contribution of IPR-intensive industries to GDP**

GDP (%)	Mexico	Argentina	Peru	Chile	Uruguay	TOTAL	EU*
Trade mark-intensive	44.7	26.8	46.0	45.4	43.3	41.4	37.4
Patent-intensive	23.0	13.5	23.0	8.4	22.8	19.3	17.0
Design-intensive	19.2	15.1	10.0	2.9	0.6	14.8	16.9
Copyright-intensive		15.3		6.3	4.3	3.9	6.6
<b>IPR-intensive</b>	<b>47.8</b>	<b>41.9</b>	<b>55.0</b>	<b>49.9</b>	<b>48.9</b>	<b>47.7</b>	<b>45.3</b>

\*EU27: own calculations based on detailed country data from 3<sup>rd</sup> edition report on IP contribution in the EU, EUIPO/EPO (2019).

The contribution of IPR-intensive industries to GDP ranges from 42 % in Argentina to 55 % in Peru. The contribution of Argentina is the lowest and this is explained by the low level of contribution of trade mark-intensive industries to GDP. Peru shows the highest contribution of IPR-, trade mark- and patent-intensive industries to GDP, even though copyright is not included in the Peruvian report.

When individual IPRs are considered, trade marks are always the IPR with the highest contribution, across all countries, with similar ratios of between 43 % in Uruguay and 46 % in Peru, except Argentina (27 %). The second highest contribution is patent-intensive industries, except for Argentina. Argentina’s second highest contribution is from copyright-intensive industries, with a figure that is more than three times higher than the average of the three LATAM countries and more than double the EU average. This is partially explained by education services (see the appendix) but the ratio of contribution of copyright-intensive industries to GDP excluding education services is still 9 % and higher than any other LATAM country and the EU average.

The ratio of the contributions of IPR-intensive industries to GDP and employment is usually higher than 1 (contribution to GDP higher than that to employment) due to the highest value added (VA) per employee in IPR-intensive industries. The only exception is Argentina (explained in the appendix)

but when the comparison is based on adjusted employment data (presented in Table 7) it is more in line with the other studies.

Finally, the contribution of IPR-intensive industries to exports of goods is more diverse among the countries, ranging from 44 % of total exports of goods from IPR-intensive industries in Uruguay to 84 % in Peru.

Peru’s higher contribution to exports of goods is explained by patent-intensive industries (which also contribute highly to GDP). The contribution of trade mark-intensive industries to exports in Chile is also above 70 %. The contribution of Mexican design-intensive industries is also very high in comparison with the other countries while copyright is always very small due to the limitation to exports of goods not including services, as shown in Table 9. These higher contributions of Peru, Chile and Mexico are explained in more detail in Section 5.

The contribution of Argentinian IPR-intensive industries refers to exports of goods and services and this prevents the ratios shown in Table 9 from being compared.

**Table 9 Contribution of IPR-intensive industries to exports of goods**

Exports of goods (%)	Mexico	Argentina*	Peru	Chile	Uruguay
Trade mark-intensive	54.6	37.4	49.0	71.3	40.4
Patent-intensive	63.8	30.1	75.0	37.8	4.0
Design-intensive	56.3	23.9	14.0	2.8	3.8
Copyright-intensive		1.0		1.5	0.3
<b>IPR-intensive</b>	<b>74.7</b>	<b>56.4</b>	<b>84.0</b>	<b>73.3</b>	<b>44.0</b>

\*Contribution to exports of goods and services

## 5. Distinguishing features of IPR-intensive industries in the five LATAM countries

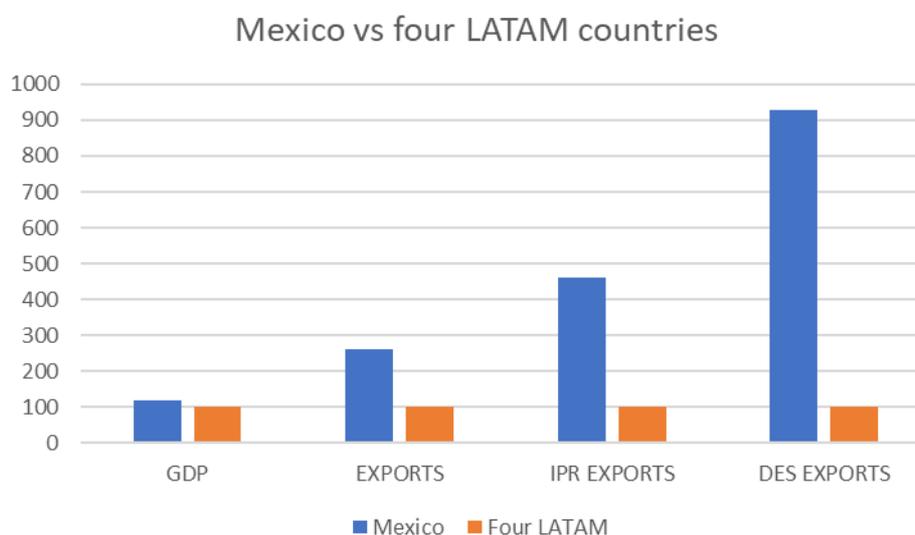
### 5.1. Mexico: high contribution of design-intensive industries to GDP and exports

The contribution of IPR-intensive industries to GDP in Mexico is very close to the average of the five LATAM countries even though the contribution to employment is lower. Due to the lack of data for several industries (as explained in the appendix), there are some caveats on the economic statistics used in the Mexican report, although the contribution to employment is calculated based on total employment and is comparable with other studies.

The contribution of patent- and design-intensive industries to GDP is the highest of the five LATAM countries (equalling the contribution of patent-intensive industries in Peru). The contribution of design-intensive industries to Mexican exports of goods is the highest and more than double the second country, Argentina, while the contribution of patent-intensive industries to exports of goods are only surpassed by Peru.

Figure 5 reflects the magnitude of some Mexican economic indicators in comparison with the sum of the other four LATAM countries. The bar 'four LATAM' is always 100 and the Mexican bar is rescaled for comparison purposes. For instance, the four LATAM GDP value of 100 corresponds to 120 for Mexico, indicating that this country's GDP is 20 % higher than the sum of the four LATAM countries included in this paper. Total exports of goods in Mexico are then 2.6 times higher in value than the aggregated exports of goods of the other four LATAM countries. When we limit the comparison to the exports of goods from IPR-intensive industries, Mexican exports are 4.6 times higher, and almost 10 times higher than the sum of the other four LATAM countries when the comparison is based on exports of goods from design-intensive industries.

**Figure 5 Mexican economic indicators compared with four LATAM countries**



Source: Exports from IP Key (2021); GDP from the World Bank.

Design applications from residents are well distributed in Mexico among 339 industries registering at least one design in the period 2010-2019, of which practically half of them (167) are above the threshold. Among the design-intensive industries only 25 (15 %) are intensive only in designs; 89 (half) are simultaneously intensive in designs, patents and trade marks; 56 are intensive in patents and designs; 38 in trade marks and designs and 1 industry is intensive in trade marks, GIs and designs.

The list of the top industries by relative intensity of designs is dominated by manufacturing with 13 out of 20 design-intensive industries in this sector. The threshold for design-intensive industries is less than one design per 1 000 employees and three industries register more than 100 designs per 1 000 employees: ‘Software edition’, ‘Renting of agricultural and manufacturing machinery’ and ‘Manufacture of rum and other distilled beverages’.

Mexican design-intensive industries contribute 19 % to the GDP, compared with 15 % in Argentina, 10 % in Peru and lower ratios in Chile and Uruguay. The contribution of design-intensive industries to GDP in the EU in the period 2014-2016 is lower than in Mexico (16.9 %) and ranges in the MS from 25.5 % in the Czech Republic to 6.2 % in Cyprus while the countries with GDP contributions

closest to the Mexican value are Poland (19.8 %) and Slovenia (19.5 %), as well as, albeit outside the EU, Switzerland (19.6 %).

It is interesting to verify that the high contribution of design-intensive industries is not explained by a few industries, with only 8 out of 20 of the IPR-intensive industries contributing the most to GDP being intensive in designs.

Another remarkable economic indicator of design-intensive industries is their contribution to exports of goods. In Mexico this is more than half of the exports with an important surplus of 64 billion USD, double the trade mark- and patent-intensive industries' surpluses and almost identical to the surplus in just one trade mark-, patents- and designs-intensive industry in: 'Manufacture of motor vehicles'. In fact, 9 out of 10 of the IPR-intensive industries with higher trade surpluses are design-intensive industries with the only exception being the extraction of crude petroleum. Among these nine industries with higher trade surpluses, four of them are related to the manufacture of automobiles, components and bodies and account for more than 30 % of all exports of goods of IPR-intensive industries.

The contribution of design-intensive industries to exports of goods in the EU in 2016 is slightly higher than in Mexico in 2019, with a 59 % of extra-EU exports.

The contribution to employment is much lower. However, almost 4 million workers are in design-intensive industries and a further 3 million jobs are generated in industries indirectly providing inputs for design-intensive industries.

In Mexico, the contribution to GDP of all IPR-intensive industries is more than double the contribution to employment and it has the highest ratio of GDP and employment contributions of the five LATAM countries, resulting in high VA per job in Mexican IPR-intensive industries.

The contribution of patent-intensive industries to GDP in Mexico and Peru is more than three times the contribution to employment. Therefore, patent-intensive industries in the two countries have the

highest VA per job. A higher VA per job is usually reflected in higher wages<sup>(11)</sup>, and patent-intensive industries pay the highest wages of all IPR-intensive industries across all the relevant LATAM countries except Argentina. Nevertheless, the premium wages are not comparable among countries and in the case of Mexico includes data from 280 industries in the manufacturing sector out of 822 industries with economic data and more than 400 IPR-intensive industries.

## 5.2. Argentina: the highest GDP and employment contributions of copyright-intensive industries

Argentina shows the highest contribution to employment by IPR-intensive industries lead by design- and copyright-intensive industries. As explained in the appendix, there are some employment data limitations and the adjusted contribution of IPR-intensive industries to total employment is presented in Table 7. The employment generated in Argentina by IPR-intensive industries represents 24.5 % of total employment (median contribution of the five LATAM countries) and 9 % and 10 % of total employment is generated by design- and copyright-intensive industries, which are the highest contributions among the five LATAM countries.

Copyright-intensive industries are the second IPR by employment and GDP after trade mark-intensive industries, with design-intensive industries very close behind in third place.

Another data limitation is the aggregated level of the economic data for some industries, and specifically that 'Education' is not disaggregated so it has been included as core copyright-intensive (instead of 'Cultural education' as was the case in the copyright-intensive industries of the EU, Chile and Uruguay).

The two industries with the highest contribution to employment of all IPR-intensive are only copyright-intensive: 'Education' (almost half a million employed persons) and 'Activities of other membership associations n.e.c.' (200 000 employed persons). 'Education' is also the industry with the highest VA among IPR-intensive industries, contributing 6.2 % of total GDP. The contribution of copyright-

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<sup>(11)</sup> The GDP income approach is calculated as the sum of the income from labour (wages), profits of businesses (operating surplus) and rents income. A high VA per job in IPR-intensive industries that does not correspond with high wages would imply high profits or rents different from labour income.

intensive industries without 'Education' is still the highest with 11 % of employment (6 % of total employment) and 9 % of GDP.

As a reference, four out of five of the top IPR-intensive industries with higher employment and GDP are copyright-intensive in Argentina<sup>(12)</sup> (a total of nine are included in the top 20 by employment and eight are included in the top 20 by GDP). However, none of the top 20 IPR-intensive industries by employment or GDP in Chile are copyright-intensive and in Uruguay five industries in the top 20 by employment and two in the top 20 by GDP are copyright-intensive.

Another immediate consequence of including 'Education' as a part of the copyright-intensive industry, as explained in the Argentinian report, are the lower average wages of copyright-intensive industries in Argentina, that are 5 % lower than non-IPR-intensive industries.

The EU contribution of copyright-intensive industries to GDP is smaller than in Argentina with 6.9 % of the EU GDP in 2014-2016 generated by these industries, with the highest contributions in Malta (17.3 %) and Ireland (13 %) while Sweden (9.2 %) was the closest to Argentina.

The lowest contribution of trade mark-intensive industries among the five LATAM countries compared in this report, corresponds to Argentina with 13.7 % of total employment (ratio recalculated with total employment) and 26.8 % of GDP.

Trade mark-intensive industries also show the lower contribution of exports among the five LATAM countries. This is partly explained by the importance of agricultural products, which account for almost half of the value of exports from Argentina, but also by the fact that the ratios include goods and services and usually the contribution of IPR-intensive industries to exports and imports of services is smaller than for goods<sup>(13)</sup>.

It is worthwhile highlighting that Argentina registers the highest number of trade mark applications per year and the second highest number of per capita trade mark applications, very close to Uruguay

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<sup>(12)</sup> The four copyright-intensive industries included in the top 5 by employment and GDP among all IPR-intensive industries in Argentina are: 'Education', 'Activities of other membership organizations n.e.c.', 'Other business activities n.e.c.' and 'Telecommunication'.

<sup>(13)</sup> See EUIPO/EPO (2019).

and Chile. Additionally, the percentage of trade marks with at least one resident owner is 77 %, which is only surpassed by Mexican trade marks with 94 % of resident owners of trade mark applications. In the matching exercise, 79 % of the applications have been identified, including not only firms (a limitation of the Mexican matching exercise) but also individuals, so it is probably the IPR with the most complete set of data to determine the intensive industries. As a result, 289 out of 291 of the industries analysed have registered trade marks in Argentina but only 123 (43 %) are considered trade mark-intensive (those with more than 56 trade mark applications per 1 000 employees). This high threshold could be explained by an asymmetric distribution of trade marks resulting in lower contributions of these industries to GDP, employment and trade.

### **5.3. Peru: very high contribution of patent-intensive industries to GDP and exports explained by mining of metal ore**

In Peru, the pharmaceutical industry registers the most patents and trade marks but the high contribution of patent-intensive industries to GDP and exports is explained by the mining of metal ore. This is due to a selection of IPR-intensive industries based on all applicants, including domestic and foreign owners, and because only 3 % of patent applicants and 51 % of trade mark applicants are resident in Peru.

The pharmaceutical industry registered 600 patents and more than 8 000 trade marks and is the industry with the highest relative intensity in both IPRs. Nevertheless, the patent-intensive industries that contribute the most to the Peruvian economy are in the mining sector: extraction of metal ore represents one third of total GDP generated by patent-intensive industries.

The mining sector is not labour intensive. Therefore, the contribution of patent-intensive industries to employment is much smaller (7 %) and focused on the service sector: professional, scientific and technical services (230 000 jobs), telecommunication (130 000 jobs), and the mining of metal ore (117 000 jobs). This uneven contribution of patent-intensive industries to employment and GDP results in the highest ratio between GDP and employment contributions of all IPR-intensive industries in the five LATAM countries and a very high VA per job. This is also reflected in the high wages paid by these industries with a premium wage of almost 200 %, so that wages paid by patent-intensive industries are, on average, three times the wages for the non-IPR-intensive industries in Peru. Among the patent-intensive industries that pay wages more than 10 times the average wages for

non-IPR-intensive industries in Peru are: 'Petroleum refining and extraction', 'Manufacture of malt and beer' and 'Pensions services'.

Patent-intensive industries contribute to the international trade of Peru with 75 % of total exports and 78 % of imports of goods, with the most important industries in the mining of metal ore (half the patent-intensive industries exports) and precious and non-ferrous metal industries (exports valued as one third of patent-intensive industries).

In the EU, the contribution of patent-intensive industries to GDP (16.1 %) is lower than in Peru and its contribution to exports of goods is slightly higher (76 %). The maximum ratio of contribution of patent-intensive industries to GDP is registered in Czech Republic (26 %) and Norway (28.4 %) and the country with the closest ratio to Peru is Germany (23.6 %). Nevertheless, mining is not among the industries contributing the most to GDP in any country but Bulgaria, with NACE class 0729 (mining of other non-ferrous metal ores) representing 11.4 % of GDP generated by patent-intensive industries.

Another interesting characteristic of Peruvian IPR-intensive industries is the high overlap with only two patent-intensive and one design-intensive industries that are intensive in only one IPR.

#### **5.4. Chile: high contribution of trade mark-intensive industries to exports explained by mining of metal ore**

The contribution of trade mark-intensive industries to exports of goods in Chile is by far the largest, generating a positive trade balance of 30 billion USD (in a total positive trade balance of 21 billion USD). The top exporter industries are: mining, food industry and beverages and chemical. The two top exporters are the manufacture of primary products from precious metals and non-ferrous metal ores (trade mark- and patent-intensive) and the mining of non-ferrous metal ores (only trade mark-intensive) representing 52 % of total exports from Chile.

In Chile the mining of metal ores (except copper, which is included in a separated industry) is only intensive in trade marks, while in Peru (with the IPR-intensive industries selected including resident and non-resident owners) it is patent- and trade mark-intensive. This explains the higher contribution

of Chilean trade mark-intensive industries to exports, which is almost double the contribution of patent-intensive industries.

Only 12 % of the patents are registered by residents in Chile and the first industry by relative intensity has 15 times the number of patents per employees than the second one ('Leasing of intellectual property products except copyrighted works') resulting in a very asymmetric distribution and explaining why it has the lowest contribution to GDP of patent-intensive industries among the five LATAM countries.

However, even though the same industry ('Leasing of intellectual property products except copyright') is also the most trade mark-intensive, its relative intensity is only 10 % higher than the second and third top trade mark-intensive industries, showing a less asymmetric distribution and resulting in more than 200 industries selected (almost four times the number of patent-intensive industries) and a contribution to GDP that is five times higher.

Half of the IPR-intensive industries are only trade mark-intensive and the overlapping of industries intensive in any IPR is very low (as in Uruguay), with only 37 % of all IPR-intensive industries intensive in more than one IPR.

### **5.5. Uruguay: low contribution of IPR-intensive industries to exports of goods**

Uruguay has the highest number of trade mark and patent applications per inhabitant among the five LATAM countries. Nevertheless, the percentage of trade marks, patents and designs registered by residents in Uruguay is the lowest, with only 39 % of trade marks, 10 % of designs and 3 % of patents with at least one owner resident in the country. This is not surprising due to the small size of the Uruguayan economy, whose GDP represents only 3 % of the total GDP of the five LATAM countries and one fourth the GDP of Peru or 5 % of the Mexican GDP. With only three million inhabitants and the highest GDP per capita, population in Uruguay represents only 2 % of the total population of the five countries. Furthermore, Uruguay represents only 1 % of the total exports of goods of the five countries.

The low percentage of residents among applicants of patents and designs results in very few industries registering these two IPRs (49 and 15 respectively) and consequently very few industries

intensive in both IPRs (33 and 6 industries respectively). Additionally, among the 173 industries intensive in IPRs, 72 are only intensive in trade marks, 30 are only intensive in copyright and 25 are intensive in both IPRs. Only 31 % of all IPR-intensive industries are intensive in more than one IPR, the lowest percentage in the five LATAM countries.

Real estate and construction are trade mark- and patent-intensive industries contributing the most to GDP (17 %) in Uruguay. Other trade mark only intensive industries contributing to GDP are 'General public administration activities' (not included in the top 20 trade mark-intensive industries by relative intensity), 'Manufacture of tobacco products' and 'Telecommunication'. Of these industries, only manufacture of tobacco is an exporter of goods industry.

Comparing with the EU IPR-intensive industries, public administration is non-IPR-intensive and only one NACE class in construction is trade mark-intensive ('Development of building projects'). 'Rental and operating of own or leased estate' is the only NACE class in real estate considered IPR-intensive in the EU including the VA generated by imputed rents from owner-occupied dwellings. The contribution of real estate activities (on a fee or contract basis and with own or leased property) to the GDP generated by IPR-intensive industries in Uruguay is 24.7 %, construction contributes 9.8 % and public administration 4.9 %, so that the three industries generate 39.4 % of the GDP of IPR-intensive industries in Uruguay.

Manufacturing industries are dominant among trade mark-intensive industries while commerce and service activities dominate the list of the 33 patent-intensive industries. This is the opposite to the usual distribution of IPR-intensive industries by sectors.

The contribution of IPR-intensive industries to exports of goods is the lowest, at only 44 %, but these same industries contribute to 75 % of exports of services. The IPR-intensive industries have an international trade deficit of 1.3 billion USD while the total trade deficit of the Uruguayan economy is estimated at less than 1 billion USD. Nevertheless, the largest relative trade imbalance is registered in the patent-intensive industries with imports valued at 1.2 billion USD and exports valued at 0.3 billion USD.

This export-oriented country is one of the largest exporters of beef, vegetables and dairy products which are usually non-IPR-intensive and jointly account for almost half of the total value of exports of goods.

## 6. Conclusions

- The reports on the economic contribution of IPR-intensive industries to the economies of the five Latin American countries have demonstrated the importance of IPR in the region in line with previous studies in the EU and the US.
- The five Latin American countries are very different in terms of size and the structure of their economies and have particularly significant contributions of specific IPRs: design-intensive industries in Mexico; copyright-intensive industries in Argentina; patent-intensive industries in Peru and trade mark-intensive industries in Chile.
- The contribution to exports of goods of some IPR-intensive industries are significant and could be an important drive for economic development in Mexico, Peru and Chile.
- The ratio of patent and design applications with at least one resident owner is very low and suggests the need for further analysis in Argentina, Chile, Peru and Uruguay.

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## Acronyms and Abbreviations

COMTRADE	International Trade Statistics Database
CONICET	Consejo Nacional de Investigaciones Científicas y Técnicas de la República Argentina
CR	Copyright
DES	Design
DNPI	Dirección Nacional de la Propiedad Intelectual de Uruguay
EU	European Union
EPO	European Patent Office
EUIPO	European Union Intellectual Property Office
GDP	Gross Domestic Product
GI	Geographical Indications
IMPI	Instituto Mexicano de la Propiedad Intelectual
INAPI	Instituto Nacional de Propiedad Industrial de Chile
INDEC	Instituto Nacional de Estadística y Censos de la República Argentina
INDECOPI	Instituto Nacional de Defensa de la Competencia y de la Protección de la Propiedad Intelectual de Perú
INE	Instituto Nacional de Estadística
IP	Intellectual Property
IPR	Intellectual Property Right
n.e.c.	Not elsewhere classified
OHIM	Office for Harmonization of Internal Market
PT	Patent
PVR	Plant Variety Right
RICYT	Red de Indicadores de Ciencia y Tecnología, Interamericana e Iberoamericana
SNA	System of National Accounts
TM	Trade mark
UN	United Nations
USD	United States Dollar
USPTO	United States Patent and Trademark Office
WIPO	World Intellectual Property Organization

## Appendix: Methodological notes affecting comparability

This appendix summarises some methodological aspects affecting the comparability of the five studies on economic impact of IPR-intensive industries in LATAM countries. For more details see the mentioned studies included in references section.

- The reference periods for the selection of trade mark, patent and design applications as well as for the economic indicators used in the five studies are different:
  - 2014-2019 for Argentina, Chile and Uruguay;
  - 2015-2018 for Peru;
  - 2019 for economic indicators in Mexico and 2010-2019 for the applications for the different IPRs.
- Due to data limitations, the selection of IPR-intensive industries is based on applications with at least one resident owner, except in Peru where all applications are used regardless of the residence status of the owner. For Argentina it was not possible to distinguish the residence of the design applications so the design-intensive industries selection is based on all applications (resident in Argentina and foreign owners) while trade mark- and patent-intensive industries are selected based on resident applications.
- The methods are comparable, but there are some data limitations in employment statistics (official statistics with limited scope) that can affect the comparability. This appendix includes a specific sub-section with detailed explanations of the Argentinian employment statistics limitations.
- Employment ratios are calculated for Argentina based on private formal employees. This data limitation affects the comparability of employment ratios which have been recalculated based on official figures of total employment.
- Employment figures used for the calculation of employment contributions in Uruguay and Chile are limited to persons formally employed thereby overvaluing these ratios. Adjusted ratios are also presented in Section 4.
- In Mexico, 262 industries out of 1 084 do not provide economic data. Although there are no detail of these industries in the report to evaluate the possible bias of this lack of information,

the missing industries are aggregated in with other industries and the impact should not be significant.

- International trade figures are based on UN COMTRADE (UN International Trade Statistics Database) for Argentina, Chile and Uruguay. For Mexico and Peru the national statistics are used. The difference with COMTRADE totals are, for Mexico, 1 % for exports and 4 % for imports, and for Peru 0.1 % for exports and 1 % for imports. The comparison of these ratios is then quite homogenous although Mexican import details should be taken with caution.
- Only Argentina and Uruguay present contributions to international trade including imports and exports of goods and services. For the benefit of comparison, the Uruguayan flows of trade in goods are included here but there is no data on exports and imports of goods in the Argentinian report so that the comparison of trade in this country should be taken with caution.
- The premium wages are estimated based on different definitions of employment and limited data that prevent us from comparing among countries. As a reference, and as explained in the different reports: Mexico compares data from 285 manufacturing industries (out of 822 industries with economic data); Argentina has very limited data on employment resulting in only partial comparison and a possible bias on average wages; Chile and Uruguay estimate average wages based on total employment instead of employees, so that the different share of self-employment by sector will result in biased estimations of premium rates. Due to these limitations, the premium wages are not compared among countries and only comparisons of wages between different IPRs in the same country are considered.

## Employment data limitations in Argentina

### ○ PUBLIC SERVICES EMPLOYMENT

Argentina does not publish detailed employment data in some activities, including for instance 'General public service activities' which registered in the reference period more than 100 patents and almost 4 000 trade marks (5 % of all patent applications made by residents and 1 % of resident trade mark applications were filed by the National Scientific and Technical Research Council (CONICET)).

Nevertheless, based on data from INDEC (Instituto Nacional de Estadística y Censos de la República Argentina), the employment in public services is about half a million and consequently the

relative intensity would be lower than the patents and trade marks thresholds for IPR-intensive industries.

It also has to be considered that in the EUIPO/EPO reports public administration as well as other public services have been discarded for the calculation of the threshold for IPR-intensive industries in order to avoid lower thresholds for IPR-intensive industries. Additionally, it is not clear whether CONICET should be classified in public administration or in R&D activities.

- **OTHER DATA CLASSIFICATION LIMITATIONS**

Two economic classifications are used in the Argentinian report for employment and economic indicators and no detailed employment data is available for some services. For instance, 'Education' is not disaggregated. This means that all types of education have been included as core copyright-intensive industry. The employment ratios are then adjusted discarding education with the purpose of improving the comparability of copyright-intensive industries' contributions with other countries (Chile and Uruguay).

- **CONTRIBUTION OF IPR-INTENSIVE INDUSTRIES TO EMPLOYMENT**

The share of employment generated by IPR-intensive industries in Argentina is estimated based on the total private and formal employees (54 % of total employment in 'Aglomerados Urbanos' ('Urban Conglomerates') and about 40 % of total employment in the country). This definition of employment also excludes public and self-employment. Based on INDEC, total employment in Argentina is about 12 million in the 'Aglomerados Urbanos' and 16 million for the entire country, so that the contribution of IPR-intensive industries is adjusted to total employment.

If the missing jobs were allocated in the IPR-intensive industries, then the adjusted ratios of contribution to employment would be downward biased. Nevertheless, public services are not IPR-intensive and informal as well as self-employment are mainly located in some non-IPR-intensive industries such as activities of households as employers, personal services, retail trade, accommodation, restaurants, or construction.

Patent-, design- and copyright-intensive industries' contribution to employment based on published ratios is higher than their contribution to GDP. This is counterintuitive and differs from the results seen in all the other countries. Nevertheless, when adjusted employment contributions are used (based on total employment), the share of employment is always lower than GDP contributions meaning that VA per worker is higher in the IPR-intensive industries than in the rest of the economy.

The ratios of employment contribution of IPR-intensive industries for Chile and Uruguay is also calculated based on formal employment. Although the differences with total employment are not as important as for the Argentinian ratios, adjusted ratios are also included in Section 4 for the benefit of better comparison.

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