

Korea Institute of Intellectual Property (KIIP) Analysis on Economic Contribution of IP-Intensive Industries Summary

The 4th industrial revolution is the main focus of the Korean government's policy, even two years after the concept was first raised at the 2016 World Economic Forum in Switzerland. In the era of the 4th industrial revolution, intellectual property rights (IPRs) have become important among convergence technologies such as artificial intelligence, internet of things and big data.

Major countries, such as the US and those in the EU, have conducted quantitative analyses of IPRs' importance and their impacts on national economies by conducting continuous research on IP-intensive industries. Of particular relevance are the methodologies of the US Department of Commerce (2012) and European Patent Office (EPO) and EU Intellectual Property Office (EUIPO) (2013) regarding the economic contribution of IP-intensive industries.

KIIP's study classifies IP-intensive industries in Korea and analyzes their economic contribution. IP-intensive industries in Korea are defined as "industries that have high intensity of intellectual activities, protect and utilize them as IPRs in value creation". In the EU's report (2016), IP-intensive industries are indicated as "those having an above-average use of IPR per employee, as compared with other IPR-using industries".

Three aspects of economic contributions are analyzed: i) empirical analysis of firms' IP activities on job creation (contribution in employment, wage premium), profits, value added in GDP, R&D and spending in advertisement, ii) trends comparing 2010 to 2015, and ii) comparative regional state analysis of Korean 17 administrative districts.

The main findings are as follows:

- **GDP contribution:** IP-intensive industries added a total value of 560 trillion won (EUR 436 billion) to the GDP, which accounts for 43.1% of Korea's total GDP. More specifically, patents contributed 27.3%, followed by trademarks (16.9%) and design (15.7%). While Korea's economy is different in set-up from others, it is noteworthy that IP intensive industries' contribution to GDP is 42.3% in the EU, 38.2% in the US and 32.1% in China.
- **Employment contribution:** IP-intensive industries have employed 6.07 million people in 2015, which accounts for 29.1% of the whole workforce. This is an increase from 2010, when the industries supported 4.63 million jobs, 26.2% of the total workforce. In Europe and the US IP-intensive industries account for 27.8%, respectively 18.2% of employment.
- **Wages:** Employees working in IP-intensive industries received a wage premium of 51.1% compared to non-IP-intensive industries employees in 2015 (receiving a weekly wage of KRW 821,000/EUR 640).
- **R&D investment:** IP-intensive industries have invested a significant amount in R&D to foster innovation. The amount increased from KRW 16.7 trillion (EUR 13 billion; 72.8% of total R&D in Korea) in 2010 to KRW 24 trillion (EUR 18 billion; 77.9% of total R&D) in 2015.
- **Spending in Advertisement:** IP-intensive industries' spending in advertisement and promotion accounts for 52.3% of all sectors. Trademark-intensive industries (KRW 11.5 trillion/EUR 8.9 billion; 42% of total) spent the most on advertisement, followed by patent-intensive (KRW 5.8 trillion/EUR 4.5 billion; 21%) and design rights-intensive (KRW 5.5 trillion/EUR 4.2 billion; 20.2%) industries.

Economic indicators	Patent		Design		Trademark		Copyright		Total	
	2010	2015	2010	2015	2010	2015	2010	2015	2010	2015
Employment (100,000)	24.0	32.7	22.7	24.8	17.0	22.7	3.9	5.1	46.3	60.7
Employment proportion (%)	13.6	15.7	12.9	11.9	9.6	10.9	2.2	2.5	26.2	29.1
Wage (weekly) (KRW10,000)	79.7	96.8	62.6	72.7	66.0	72.4	78.0	83.6	67.3	82.1
Wage premium (%)	85.1	78.1	46.1	33.7	54.1	33.2	65.1	53.8	57.1	51.1
GDP Contribution (KRW trillion)	255.7	354.6	179.2	203.9	185.2	219.7	24.4	34.9	439.0	560.0
GDP contribution (%)	25.4	27.3	17.8	15.7	18.4	16.9	2.4	2.7	43.5	43.1
R&D (KRW trillion)	14.0	20.4	7.2	7.0	5.6	6.1	1.1	1.7	16.7	24.0
R&D proportion (%)	61.0	66.1	31.5	22.7	24.3	19.9	4.8	5.5	72.8	77.9
Advertisement (KRW trillion)		5.8		5.5		11.5		1.8		14.3
Advertisement proportion (%)		21.0		20.2		42.0		6.7		52.3

* Figures may not add up due to overlap in the types of IP intensively utilized (e.g. trademark-intensive companies may also qualify as design-intensive companies)

The results show that investment in R&D is a critical factor for the quantitative and qualitative performance of companies and job creation. A higher IP-intensity in a particular industry is correlated to better performance in terms of revenue and GDP contribution.

This study provides a quantitative confirmation of the importance of IPRs in boosting economic performance, supporting job creation and innovation at industry level.