



IP Creates Jobs for America

Executive Summary

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Recent research by the U.S. Department of Commerce has shown that innovation and creativity are key drivers for economic growth and prosperity, with intellectual property (IP)-intensive industries driving America's jobs and economic growth. But how important is IP to each state of the United States? Tasked with filling in the gaps and understanding the “spillover” benefits of IP and the broad impact on other sectors of the economy in the states, **ndp|consulting** completed an analysis of the total contributions of IP on the U.S. economy and 50 states plus the District of Columbia. These state-by-state fact sheets further demonstrate the economic benefits of IP-intensive industries to state economies, including employment, exports, output, and wages impacts.

“IP Creates Jobs for America” builds on the recently released report by the U.S. Department of Commerce, “Intellectual Property and the U.S. Economy: Industries in Focus.” The Commerce report provided an analysis of the contributions of IP-intensive industries, defined as industries that protect their innovations and creativity through patents, trademarks, and copyrights. However, the Commerce report only estimated direct and indirect contributions of IP along the supply chain, without taking into account the economic contributions of IP outside the supply chain and its broad impact on the U.S. economy. This report expands the “indirect” benefits to include another subset, the “spillover” benefits, on the broader economy.

Overall, each dollar spent in direct expenditure creates a chain reaction of indirect spending, with subsequent rounds of additional spending and “spillover” benefits to other sectors in the economy. For example, a consumer products company spends money on “direct” inputs such as R&D, personnel, operational costs, as well as goods and services to produce their products. The company “directly” purchases equipment and materials from suppliers and pays salaries to employees. These suppliers then buy materials from other vendors and hire workers to produce equipment to sell to the IP-intensive company. The company “indirectly” creates incomes for those other vendors and workers along the supply chain. Vendors and workers use additional incomes to purchase goods and services outside of that supply chain in the local economy. The jobs and income that result from the consumer purchases are considered employment and personal income impacts. The consumer products company essentially accounts for this “spillover” spending.

In this report, we measure IP-intensive companies by tangible inputs such as research and development (R&D) expenditures, the number of scientist and engineer (S&E) personnel, and by tangible outputs such as patents, trademarks, and copyrights across all 50 states and the District of Columbia. In this report, we define IP-intensive companies as those who reported positive R&D expenditures in manufacturing and non-manufacturing sectors, companies that apply registered trademarks to products such as consumer goods, and those in six copyright-concentrated industries (motion pictures, newspapers, performing arts, broadcasting, independent artists, and software). Here are the findings on key indicators from our analysis:

Employment

IP-intensive companies created more than 55.7 million direct and indirect jobs in 2008-09, including 19.1 million direct jobs and 36.6 million indirect jobs and account for nearly 16 % and over 30 % of private sector jobs, respectively. IP-intensive companies contribute to state employment in different channels from direct employment to indirect employment along the supply chain, as well as in “spillover” benefits to other sectors in the economy. The positive benefits of IP help support a broad range of other sectors outside the supply chain in the local economy.

Output

IP-intensive companies added more than \$2.8 trillion direct output, accounting for more than 23 % of total output in the private sector in 2008-09. In addition to direct output, IP-intensive companies create more than \$3 trillion indirect output along the supply chain. Altogether, IP-intensive companies created more than \$5.8 trillion direct and indirect output, accounting for 48.4 % of total private sector output in the United States. The high output per worker reflects high labor productivity in IP-intensive companies. Output per worker in IP-intensive companies averages \$136,556 per worker, nearly 72.5 % higher than the \$79,163 national-average.

Exports

IP-intensive companies exported more than \$1 trillion and approximately 74 % of total U.S. exports in 2011. Moreover, exports from IP-intensive companies support the jobs of 8.1 million workers and 70 % of total employment in tradable industries.

Wages

Our study found a consistent pattern across 50 states and the District of Columbia that IP-intensive companies pay higher wages than their counterparts in the private sector. On average, IP-intensive companies pay \$50,576 per worker compared to \$38,768 per worker in the private sector in 2008-09. Thus, the wage differential (IP wage minus average wage) averages \$11,808 per worker and a 30.5 % difference. In addition to wages paid to direct IP workers, IP-intensive companies also indirectly pay wages to indirect IP workers in the local economy. IP-intensive companies indirectly create an additional \$57,753 in wages to support every IP worker.

Conclusion

State by state, our data consistently show that innovative and creative companies perform better and contribute more to the local economy than their counterparts. The direct and indirect economic impacts of innovation are overwhelming, accounting for more than 40 % of U.S. economic growth and employment. IP-intensive companies play a critical role in driving state and regional economies. These companies serve as our engines of growth, vehicles for innovation, and drivers of economic prosperity. The long-term vitality of these industries will rely on the support from Congress and the Administration to foster and protect the creativity and ingenuity of American IP-intensive companies.



Methodology

The research methodology of this study is built upon our previous two research projects -- The Impact of Innovation and the Role of Intellectual Property Rights on U.S. Productivity, Competitiveness, Jobs, Wages, and Exports (2010) and Employment and Gross Output of Intellectual Property Companies in the United States (2011).

Our previous reports found IP supports more than 19.1 million direct American jobs in IP-intensive companies across all industries. As described in our previous reports, the three common tangible IP products are patents, trademarks, and copyrights. Evidence from economic literature suggests research and development (R&D) expenditures are positively correlated with the number of patents and the number of trademarks in both large and small firms. Therefore, we use the R&D expenditure indicator to identify the IP-intensive companies that have IP products in the form of patents and trademarks. Since R&D expenditures are not correlated with copyright ownership, we use copyright claims to identify IP-intensive companies that have IP products in the form of copyrighted works.

Direct IP jobs are people who work in the IP-intensive companies that have patents, trademarks, or copyrights. For patents and trademarks, we identified IP-intensive companies as those companies who reported positive R&D spending in any sector. For this group of companies, we obtained R&D spending, employment, and sales data from the National Science Foundation and U.S. Census Bureau. For copyrights, we identified IP-intensive companies as those companies in six copyright-concentrated industries (motion pictures, newspapers, performing arts, broadcasting, independent artists, and software). For this group, we obtained copyrights, occupational, and employment data from the U.S. Bureau of Labor Statistics and Copyright Office.

Three main contributions of this report are: (1) To allocate 19.1 million direct IP jobs, output, and wages by industry across 50 states and the District of Columbia; (2) To estimate the indirect effects of IP on jobs, output, and wages; and, (3) To estimate IP-products and related jobs associated with U.S. exports.

First, we obtain the latest 2009 data of private sector employment, output, and wages by state and by industry published by government agencies.² We then apply our previous estimated shares of direct IP job by company to estimate the number of direct IP jobs by state and by industry. Our estimated direct IP jobs represent the number of workers employed by companies that are spending resources on R&D (i.e., IP-intensive companies). Next, we calculate a weighted-average of output produced by a worker in IP-intensive companies in each state (i.e., total output of IP-intensive companies divided by the total number of workers in IP-intensive companies in all industries within a state). Similarly, we calculate a weighted-average of wage paid to a worker in IP-intensive companies in each state (i.e., total wages paid to workers in IP-intensive companies divided by the number of workers in IP-intensive companies in all industries within a state).

¹ National Science Foundation; U.S. Bureau of Economic Analysis; U.S. Bureau of Labor Statistics.

Next, we use industry economic multipliers by state, produced by the U.S. Bureau Economic Analysis (BEA's RIMS II), to estimate the indirect jobs associated with the direct IP jobs, output, and wages. Our estimated indirect IP jobs, wages, and output represent additional jobs, output, and wages that are created to support those direct IP jobs along the supply chain. The BEA's RIMS II multipliers estimate the direct and indirect effects of an initial economic activity on the affected region. As defined by the BEA, direct effects are the dollar amount of inputs required by an industry to produce a dollar of the industry's output, while indirect effects are the dollar amount of inputs required by all other industries in the supply chain to meet the industry's initial demand for the dollar of its output.

Mary Streitwieser of the Industry Benchmark Division at the BEA, illustrates this concept by using the example of motor vehicles to demonstrate the direct and indirect effects associated with the final outputs. The direct effects are the input production requirements such as the paint, steel, and plastic for the motor vehicles industry to provide additional motor vehicle outputs. The indirect effects are those "trickle down" production requirements for all other industries necessary in the supply chain to support the additional demand for intermediate inputs from the motor vehicles industry, such as the additional requirement for tire cord and synthetic rubber by the plastics and rubber industry to provide the additional tires required by the motor vehicles industry. A subset of indirect effects, called the "induced effects," are the impacts of household expenditures on goods and services from the income earned by all direct and indirect employees.²

Lastly, we use the latest 2011 export receipts by state and by industry published by the U.S. Census Bureau and the U.S. International Trade Commission. We then divide exports by our estimated output shares of IP-intensive companies and output per capita by state and by industry to estimate exports and associated employment of IP-intensive companies.

Selection of industries

Our dataset covers all manufacturing and non-manufacturing industries in the private sector in the U.S. economy. Manufacturing industries and their corresponding North American Industry Classification System (NAICS) code (inside the parentheses) include food, beverage and tobacco products (311, 312), textiles, apparel, and leather (313-316), wood products (321), paper and printing (322, 323), petroleum and coal products (324), chemicals (325), plastics and rubber products (326), nonmetallic mineral products (327), primary metals (331), fabricated metal products (332), machinery (333), computer and electronic products (334), electrical equipment and appliances (335), transportation equipment (336), furniture (337), and miscellaneous manufacturing (339). Non-manufacturing industries and their corresponding NAICS codes (inside the parentheses) include mining (21), utilities (22), construction (23), wholesales (42), retails (44, 45), transportation and warehousing (48, 49), publishing (511), telecommunications (517, 518), motion picture and sound recording (512), broadcasting (515), finance, insurance, and real estate (52, 53), and professional, scientific, and technical services (54).

² Streitwieser, Mary L. 2010, "Measuring the Nation's Economy: An Industry Perspective - A Primer on BEA's Industry Accounts," Bureau of Economic Analysis.



We identified IP-intensive companies are those companies that have patents, trademarks, and copyrights in manufacturing and non-manufacturing industries in the private sector. For patents and trademarks, IP-intensive companies are those who reported positive R&D spending in any manufacturing and non-manufacturing industry in the private sector. For this group of companies, we obtain R&D spending, employment, and sales data from the National Science Foundation and U.S Census Bureau. The National Science Foundation and the U.S. Census Bureau aggregate R&D data by state and by industry. However, they do not release information of individual reporting companies to avoid disclosure of confidential information. For copyrights, IP-intensive companies are those companies in six copyright-concentrated industries (motion pictures, newspapers, performing arts, broadcasting, independent artists, and software). For this group, we obtain copyrights, occupational, and employment data from the U.S. Bureau of Labor Statistics and Copyright Office.

We identified IP-intensive industries are those industries that have R&D spending per capita above the national average R&D spending per capita and those industries that copyright claims are concentrated. These industries and their corresponding NAICS are petroleum and coal products (324), chemicals (325), computer and electronic products (334), transportation equipment (336), miscellaneous medical equipment (3391), print publishing (5111), software (5112), telecommunications (517, 518), motion picture and sound recording (512), and broadcasting (515). Note that IP-intensive companies are those companies in both IP-intensive industries and non-IP-intensive industries.

Our research captures the broad impact of IP-intensive companies on the overall U.S. economy and the success of these companies on the state level. Using U.S. government data, our research illustrates the crucial role that IP-intensive companies play in driving national and state economies. These companies serve as our engines of growth, vehicles for innovation, and drivers of economic prosperity.