U.S. Patent and Trademark Office
OFFICE OF THE CHIEF ECONOMIST
Economic Working Paper Series

Supplementary material

Intellectual property and the U.S. economy: Third edition

Andrew A. Toole, PhD, *Chief Economist*
Richard Miller, PhD, *Economist*
Nicholas Rada, PhD, *Deputy Chief Economist*

UNITED STATES
PATENT AND TRADEMARK OFFICE
uspto

1. Introduction

This supplement describes the data and methods used to generate the results reported in *Intellectual property and the U.S. economy: Third edition*. This report considers U.S. industries that have been intensive users of various forms of intellectual property (IP) protection and describes their contributions to national economic output and employment as of 2019. The supplemental material presented here is broken out into three main sections. First, we describe how we identified the IP-intensive industry clusters. Second, we describe our methods for estimating the total value-added output and indirect employment attributed to the IP-intensive industries. Third, we describe how we generated the results regarding job and worker characteristics.

2. Identifying the IP-Intensive Industries

2.1 Defining Industries

As in previous reports, we primarily use the North American Industry Classification System (NAICS) to define industries. NAICS is the standard system used by U.S. Federal agencies to classify business establishments for the purpose of publishing statistical data – such as employment and total output – at the industry level. It was developed jointly by the relevant statistical and classification agencies in the U.S., Canada, and Mexico. Adopted in 1997, it replaced the Standard Industry Classification (SIC) system. Industries can be identified using NAICS codes that vary from one to six digits. The 1-digit NAICS codes identify very broad industries, such as "all manufacturing" (NAICS code 3). Each additional digit in a NAICS code represents a greater level of specialization. For instance, the 3-digit NAICS code 336 includes "transportation equipment manufacturing," which represents a higher level of specialization than "all manufacturing," but a lower level than the 4-digit NAICS code 3363, which includes only "motor vehicle parts manufacturing." This 4-digit industry can in turn be broken out into several 5-digit industries such as "motor vehicle gasoline engine and engine parts manufacturing" (33631) and "motor vehicle steering and suspension components (except springs) manufacturing" (33633), among others.

The industry-level employment data from the Bureau of Labor Statistics (BLS) are reported using NAICS codes,[1] while the value-added data from the Bureau of Economic Analysis (BEA) have industry definitions that the BEA constructs based on NAICS codes. In keeping with earlier reports,[2] we define industries at the 4-digit NAICS level, except for certain cases where we require

[1] The BLS employment data is available at the 2-, 3-, 4-, 5-, and 6-digit NAICS levels, although the data are less complete at the 5- and 6-digit levels. The data are available from https://www.bls.gov/lpc/tables_by_sector_and_industry.htm.

[2] See ESA and USPTO (2012, 2016). The reports are available from https://www.uspto.gov/sites/default/files/news/publications/IP_Report_March_2012.pdf and https://www.uspto.gov/sites/default/files/documents/IPandtheUSEconomySept2016.pdf.

a broader industry characterization (generally at the 3-digit level) to align with BEA-defined industries. The BEA alignment facilitates generating gross domestic product (GDP) estimates. The 4-digit NAICS industries used in this study and for which we obtained employment data from the BLS are listed in Table 1.

Table 2 provides a concordance between 4-digit NAICS industries and less-specialized levels needed to match with BEA "detail" industries.[3] In some cases, we aggregate 4-digit industries to their 3-digit equivalents.[4] For instance, the following three 4-digit industries are aggregated to NAICS 445 (food and beverage stores) at the detail level: NAICS 4451 (grocery stores), NAICS 4452 (specialty food stores), and NAICS 4453 (beer, wine, and liquor stores).

Other cases are more complicated. In some cases, not all 4-digit industries are nested under a 3-digit industry aggregate. Consider the 3-digit industry for "merchant wholesalers, durable goods" (NAICS 423). The detailed BEA industries nested under this NAICS code are:

- Motor vehicle and motor vehicle parts and supplies (NAICS 4231)
- Professional and commercial equipment and supplies (NAICS 4234)
- Household appliances and electrical and electronic goods (NAICS 4236)
- Machinery, equipment, and supplies (NAICS 4238)
- Other durable goods merchant wholesalers (BEA code 423A) which combines
    - Furniture and home furnishings (NAICS 4232)
    - Lumber and other construction materials (NAICS 4233)
    - Metals and minerals (except petroleum) (NAICS 4235)
    - Hardware and plumbing and heating equipment (NAICS 4237)
    - Miscellaneous durable goods (NAICS 4239)

Note that, in this example, four of the 4-digit industries under "merchant wholesalers, durable goods" are detail-level industries as defined by the BEA. But the remaining five 4-digit industries are aggregated into one detail-level industry, BEA code 423A. This specific code does not exist in the NAICS nomenclature. So, although the BEA borrows and uses NAICS codes when its industry definitions match NAICS, it sometimes creates new industry classifications (and codes), which can almost always be constructed from NAICS sub-industries.

The most important exception to this general rule is the construction industry. The construction data published by BEA do not align with NAICS industries. In NAICS, industries are classified based on their production processes, whereas the BEA construction sub-industries are classified by type of structure. For example, production activity by the NAICS "roofing contractors" industry would

[3] Gross output and value-added information are available at the detail industry level every five years. At the time of writing, the most recent detail-level data were available for 2012. The BEA releases industrial output data annually for what it calls "sectors," "summary" industries, and "underlying summary" industries. We discuss methods for generating value-added estimates and related employment in section 3.1.

[4] Some of the 3-digit BEA industries, such as 211 (oil and gas extraction), include only one nested 4-digit NAICS sub-industry. We refer to these industries using the 3-digit variant for consistency with the BEA naming convention and to avoid confusion.

be split among many BEA construction categories because roofs are built on many types of structures. However, the 2012 and 2016 USPTO reports found only one construction industry – "land subdivision" (NAICS 2372) – to be IP-intensive (in 2014 only). In addition, "land subdivision" is a relatively small industry, with roughly 49,000 employees in 2019. Thus, this misalignment between NAICS and BEA should not impact our results.[5]

2.2 Identifying Utility Patent-, Design Patent-, and Trademark-Intensive Industries

As in the 2012 and 2016 USPTO reports, we define utility patent-, design patent-, and trademark-intensity for an industry as the count of utility patents, design patents, or trademarks relative to the industry's total employment.[6] We designate an industry as an intensive user of a particular form of IP if its IP count-to-employment ratio is higher than the average for all industries considered. Dividing IP counts by employment is one approach to adjust for differences in industry size, which makes the industries more comparable.

The method used to match utility patents to specific industries is different from methods used in previous reports. For trademarks, the new method improved our ability to link trademarks to industries. Note that we now include design patents, whereas previous reports excluded design patents. For clarity, we first describe the previous methods used to conduct the matches, and follow this with a description of the new methods.

2.2.1 Methods Used in the Previous USPTO Reports

Utility Patents

The previous approach used a USPTO-maintained concordance between U.S. Patent Classification (USPC) technology classes and 30 NAICS codes. Since the publication of the last report, the USPTO has stopped using the USPC scheme as a way of classifying patent technologies, and replaced it with the Cooperative Patent Classification (CPC) system. The most important limitation of the previous method was that it linked only utility patents to a subset of industries, specifically manufacturing industries, leaving out industry groups such as wireless telecommunications, data processing, software publishing, and scientific research and development services.

Trademarks

The previous approach identified trademark-intensive industries by combining three different methods, each with its own limitations. In the first method, analysts matched trademark registrants to a database consisting exclusively of publicly traded companies. Industry and employment information for matched companies was used to construct measures of trademark intensity, defined as the ratio of the number of trademarks per 1,000 employees.

There are at least two drawbacks to this approach. First, only trademarks held by public companies were included. Second, the employment measure used in the calculation only reflected the

[5] Preliminary analyses at the 4-digit NAICS level (thus including the various construction sub-industries) for this report found none of the other 4-digit construction sub-industries individually to be IP-intensive.
[6] Note that design patent-intensity was not included in earlier reports.

employment of the subset of public companies that registered at least one trademark. Thus, the measure did not reflect the trademarking activity of all companies across each industry.

To supplement this approach, the second method included trademark intensive industries that appeared on the USPTO's list of the top-50 trademark registering companies, which includes both public and private companies, as reported in USPTO's Performance and Accountability Reports for 2009–2013. Unfortunately, this measure reflected the number of registrations rather than the number of registrations per employee at the company level.

The third approach used a random sample of 300 registrations from the 194,326 trademark registrations in 2013 to expand coverage for privately held companies and for smaller and younger companies. Information on NAICS industry codes assigned to U.S. registrants in the sample allowed the calculation of industry shares of total registrations. Those with an above average share were trademark intensive. Unfortunately, this method suffered from the same problem as the second method by not accounting for the number of registrations per employee at the company level.

2.2.2 New Method for Matching Patents and Trademarks to Industries

In this report, a single method was used to determine which industries are utility patent-, design patent-, and trademark-intensive. Since the publication of the 2016 Report, we successfully matched the vast majority of patents and trademark registrations granted to U.S.-based companies to the National Establishment Time Series (NETS) database. NETS includes almost all U.S. business establishments, representing both public and private companies, as well as the primary NAICS (industry) code for each establishment. Thus, for 87 percent of all domestically-granted patents and 72 percent of all trademarks registered by U.S. companies between 2012 and 2016, we identified the industry of the company to which the patent or trademark was awarded. Using this company to industry match, we count the number of patents granted and trademarks registered each year at the 4-digit NAICS industry level, aggregate the numbers (and employment) to the 3- or 2-digit level when necessary, and calculate patent and trademark intensities at the industry level using annual industry employment data.

Due to the process of matching IP at the company level, the new methodology provides more comprehensive coverage of IP use in the U.S. economy. For determining trademark intensity, we now have a direct match of three-quarters of all domestic trademark registrations to the companies – both public and private – that own them. For patent intensity, we now have information on patents granted to companies outside of the manufacturing industries.

An essential step in identifying utility patent-, design patent-, and trademark-intensive industries is identifying the industry of the entity or entities to which each patent is assigned or trademark is registered. Although patents are granted to inventors or applicants, most are assigned by the inventors to other entities. Assignees include companies, government agencies, and other entities such as research institutes and universities. Companies and other entities also register trademarks as a form of IP protection.

The data on utility and design patent ownership come from the PatentsView database.[7] PatentsView links information on inventors and assignees at the time of patent grant, the location of inventors and assignees, as well as other data elements of patenting activity, using data derived from the USPTO bulk files on more than 6 million utility and design patents granted since 1976. The information on the patent owner in PatentsView is limited to what appears on the front of the patent document when granted. Prior or subsequent owners are not captured. Consequently, the analysis presented here only considers companies or other domestic entities to which the utility or design patent was originally assigned.

The data on trademark registrants comes from the Trademark Case Files Dataset (TCF), which contains detailed information on over 10 million trademark applications filed with or issued by the USPTO since 1970.[8] It is derived from the USPTO main database for administering trademarks and includes information on mark characteristics, numbers of classes covered, prosecution events, ownership, and renewal history.

As stated earlier, the company-level data come from NETS. The NETS database, which is constructed using yearly snapshots of U.S. establishments from Dun & Bradstreet (D&B), contains detailed information on over 64 million establishments covering the period 1989-2016. Among other things, the data contain establishment locations, headquarter linkages and corporate structure, years of business activity, industry classification, the number of employees, annual sales revenue, and D&B credit ratings information. Hughes et al. (2021) describe the matching process used to link patents and trademarks to NETS.[9]

2.2.3 Utility Patent- and Design Patent-Intensive Industries

In this section, we provide information on the calculations involved in generating the utility patent and design patent intensities for each industry and the resulting lists of patent- and design-intensive industries. As discussed in the report and above, we break out patents into two categories:

- Utility and plant patents, and
- Design patents.

After matching the patents to the NETS data, we separated the design patents from the other patents. Design patents are easy to identify, as they use a different nomenclature. All design patent "numbers" start with the letter D. We follow the same process to generate the intensity for each form of IP (utility and design patent). The process consists of the following steps.

---

[7] For more information on PatentsView, visit www.patentsview.org. The data are available from https://patentsview.org/download/data-download-tables.

[8] The data and documentation can be found at https://www.uspto.gov/learning-and-resources/electronic-data-products/trademark-case-files-dataset-0. Graham et al (2013) provides further description of the data.

[9] Hughes et al. (2021), Technical Documentation for Matching Patents and Trademarks to the 2017 National Establishment Time Series Database.

1. We limit the dataset to patents issued from 2012 through 2016.
2. For each patent-assignee pair, we determine the primary industry of the assignee at the 4-digit NAICS level. This information is provided in the NETS data and uses the 2017 NAICS definitions.
3. When necessary, we convert the 4-digit NAICS industry to the BEA detailed industry as described previously and in Table 2. For instance, if the NAICS industry code was 4411, 4412, or 4413, the industry was rolled up to 441, which is the BEA detailed industry code.
4. We then sum up across companies to get the number of utility or design patents assigned to each industry over the period from 2012 to 2016.
5. Using data from the Bureau of Labor Statistics' (BLS) Labor Productivity and Costs program, we repeat step 3 above and generated the average number of employees (measured in thousands) per industry for the period from 2012 through 2016.[10] When necessary, we convert the 4-digit NAICS industry to the BEA detailed industry.
6. To generate the utility and design patent intensities for each industry, we divided the total number of patents issued by the average employment level.
7. We define an industry to be utility patent- or design patent-intensive if its level of intensity for the 2012-2016 period was greater than the economy-wide average. See Tables 3 and 4 for the lists of utility patent- and design patent-intensive industries.

2.2.4 Trademark-Intensive Industries

The methodology for identifying the trademark-intensive industries is essentially the same as the one used for identifying patent-intensive industries. The main difference is that each trademark registration can involve protection of trademark rights in one or more Nice product classes and registrants pay additional fees for each class.[11] Thus, when generating the trademark counts we do not just count registrations, we count the total number of classes covered by the registrations. For instance, if a company registers a trademark that covers 5 different product classes, we count the registration as five separate trademarks. After making this adjustment, we follow the same steps 1-7 as described above for patents and designs. See Table 5 for the list of trademark-intensive industries.

2.3 Copyright-Intensive Industries

The World Intellectual Property Organization's (WIPO) Guide on Surveying the Economic Contribution of the Copyright-based industries provided the first definition of copyright intensive industries (WIPO, 2003). Siwek (2009) subsequently applied the approach to the U.S. Economy.

In the present report, we use a narrower definition of copyright-intensive industries than WIPO. We define copyright-intensive industries as those primarily responsible for the creation or production of copyrighted materials and we exclude several industries associated with the

[10] The BLS data can be found at https://www.bls.gov/lpc/tables_by_sector_and_industry.htm. The data include information on national employment at the industry level for the years 1986 through 2019 using the NAICS 2017 definitions. We used the data made available at the 4-digit NAICS level.

[11] https://www.wipo.int/classifications/nice/en/

distribution of copyrighted material. Our approach includes nearly all industries traditionally associated with the production of creative works.

For example, we did not count industries such as book, periodical, and music stores (NAICS 4512) or consumer goods rental (NAICS 5322), which includes video rentals, as copyright-intensive even though they are part of the "core" category in the WIPO guide. Our definition is narrower than WIPO's in order to be consistent with our treatment of patent-, design-, and trademark-intensive industries, where we focus on the industries that are most responsible for the "production" of protected IP.

One conceptual distinction is worth noting between the approach taken for utility patent, design patent, and trademark sections as compared with copyrights. Throughout this report, the focus is on industries that are assigned protected IP at grant or registration, whether utility patents, design patents, trademarks. In the case of utility patents, design patents, and trademarks, we define "intensive" industries as the subset of all industries that had high scores in various "intensity" measures. However, in the case of copyrights, we define intensive industries as all those traditionally associated with the production of copyrighted materials. The list of copyright-intensive industries is fixed over time while the industries for the other types of IP may change. The copyright industries included in the report are listed in Table 6.

3. Methods for Generating Selected Results

The reported results for value-added output and indirect employment are described in Sections 3.1 and 3.2 below. Section 3.3 describes the methods used for the results reported on job and employee characteristics using the Current Population Survey.

3.1 Gross Domestic Product (Output) Estimates

The gross domestic product (GDP) estimates in this report are based on data released by the BEA. However, a small portion of the 4-digit NACIS industry groups that are categorized as IP-intensive and non-IP-intensive required a procedure to estimate the 2019 GDP using historical shares. The procedure is described below.

BEA reports GDP from broadest to narrowest.

- The broadest industry level is the **sector**. There are 21 sectors as defined by BEA. These include industry groups such as durable goods manufacturing and professional and technical services, among others.
- The sectors are broken out into 71 industry groups at the **summary** level. For instance, the durable goods manufacturing sector is broken out into 11 summary level industry groups, including, but not limited to, wood products, fabricated metal products, and machinery. Not all sectors are broken out into summary-level industry groups. For instance, "utilities" serves as both a sector-level and summary-level industry group.
- The summary level industry groups are broken out into 138 industry groups at the **underlying summary** level. For instance, the machinery industry group is broken out in

to the following four underlying summary industry groups: agricultural implement manufacturing, construction machinery manufacturing, mining and oil and gas field machinery manufacturing, and other machinery. Not all of the summary-level industry groups are broken out into underlying summary-level industry groups. For example, "wood products" serves as both a summary-level industry group and an underlying summary-level industry group.

- The underlying summary industry groups are broken out into 405 industry groups at the **detail** level. Note that although the "wood products" summary-level industry group serves as an underlying-summary industry group, it does get broken out into four detail-level groups: (1) sawmills and wood preservation; (2) veneer, plywood, and engineered wood manufacturing; (3) millwork; and (4) all other wood product manufacturing.

Value-added GDP estimates are available from the BEA annually at the sector, summary, and underlying summary levels. Estimates at the detail level are available every five years, with the most recent estimates, at the time of writing, for 2012.

For this report, we label each detail level industry as being either IP-intensive or non-IP-intensive. However, BEA's detail level GDP estimates are only available for 2007 and 2012, and we want to estimate IP-intensive GDP share for 2019. The GDP estimates for the underlying summary industries are available for all years, but when we roll up the detail-level industries to the underlying summary level, we find that for some underlying summary industries we can't determine whether the entire industry is IP-intensive or non-IP-intensive.

For example, consider the "wood products" industry group. The detail-level industry groups and their IP-intensive status are the following.

- Sawmills and wood preservation: IP-intensive
- Veneer, plywood, and engineered wood product manufacturing: non-IP-intensive
- Millwork: IP-intensive
- All other wood product manufacturing: IP-intensive[12]

Our solution is to use the 2012 detail-level data to calculate the share of value-added GDP within an underlying summary-level industry group for each constituent detail-level industry. In the "wood products" example, we find that 79 percent of the total value-added in 2012 came from the three IP-intensive detail-level industries (i.e., sawmills, millwork, and all other wood product manufacturing). We applied this 79 percent share to the 2019 estimate of the value-added for the underlying summary-level industry group to generate IP-intensive portion of the value-added output for that industry group as a whole. We follow this procedure for all underlying summary-

[12] Of these detail-level groups, "sawmills and wood preservation" is patent-intensive, and "millwork" and "all other wood product manufacturing" are trademark-intensive. None of the four detail-level industries are design- or copyright-intensive.

industry groups to arrive at an estimate of the total 2019 value added that was attributable to IP-intensive industries.

As a check, we analyzed the stability of the relevant value-added shares of the detail-level industries between 2007 and 2012, which are the only two years for which detail-level data are reported. We found stable shares over this period. In addition, repeating the analysis using 2007 data to generate the relevant shares does not change the results in any significant way. Note that this procedure was not necessary for most of the industries included in the report. At least 88% of the underlying summary industries are either 100% IP-intensive or 100% non-IP-intensive.

3.2 Indirect Employment Estimates

The main sources of data used to generate the indirect employment estimates are the 2019 industry-specific employment data from BLS' Labor Productivity and Costs program and the 2012 input/output use table from the BEA.[13] Again, we use 2012 data because that is the most recent year that BEA reports use of commodities by industry at the detail level. The use table allows us to ascertain what percentage of one industry's total output was used as an input by companies in another industry.

We estimated the indirect employment supported by IP-intensive industries using the following steps.

1. As detailed in Section 2, the first step is to roll up BEA use table numbers so that we have input/output information at the correct industrial level.
2. Next, we identify the IP- and non-IP-intensive industries. For each non-IP-intensive industry, we determine the share of total output used by companies in the IP-intensive industries in 2012.
3. For each non-IP-intensive industry, we multiply its employment level in 2019 by the share calculated in step 2. This yields an estimate of the employment supported by the demand for commodities from IP-intensive industries for each non-IP-intensive industry.
4. Finally, we sum the employment figures calculated in step 3 to arrive at the final estimate across all non-IP-intensive industries.

3.3 Analysis of 2019 Current Population Survey Data

To generate results on the job and worker characteristics reported in Tables 2 and 3 of the report, we used the Annual Social and Economic Supplement (ASEC) of the 2019 Current Population Survey (CPS). In addition to the labor force data collected by the CPS on a monthly basis, the ASEC provides supplemental data on work experience, income, noncash benefits, and migration. The 2019 ASEC included information on 180,101 individuals of which 62,500 were working at the time of the survey in early 2019. The remaining were either unemployed, active duty military, or out of

[13] The BLS data can be found at https://www.bls.gov/lpc/tables_by_sector_and_industry.htm. The BEA detail-level use table for 2012 can be found at https://www.bea.gov/industry/input-output-accounts-data#supplemental-estimate-tables.

the labor force. For two of the job characteristics of interest – employer size and access to a job-related retirement plan – the questions in the survey reference the individual's primary job in the previous calendar year (2018). Of the 180,101 individuals in the ASEC, 63,536 reported having worked the previous year.

For the individuals that were either currently working or had worked in the previous year, industry of employment is coded using Census industry codes. Industry is included for both the current job and the job from 2018.[14] We use the crosswalk between the Census and NAICS codes to help identify which individuals worked in the various IP-intensive industries.[15] In cases where a Census industry is comprised of both IP-intensive and non-IP-intensive NAICS industries, we adjust the provided person-level weights that are included in the ASEC. For instance, suppose half of the workers (based on BLS employment data) in a given Census industry are from component IP-intensive NAICS industries. In this case we would down-weight all ASEC-participating individuals in this Census industry by two (or multiply the ASEC weight by one-half).

After identifying individuals working in the various IP-intensive industries, we use the following variables to classify jobs and workers into different categories.

- For employer size we use NOEMP.
- For self-employment we used A_CLSWKR.
- For full-time employment we used A_WKSTAT.
- For access to employer provided health insurance we used NOW_GRP.
- For access to a retirement plan we used PENPLAN.
- For gender we use A_SEX.
- For race and ethnicity we use PRDTRACE and PRDTHSP.
- For veteran status we use PEAFEVER.
- For education status we use A_HGA (limiting the sample to employed individuals age 25 or older).

[14] We use the 2018 industry of employment (INDUSTRY) for the employer size and retirement plan calculations and the current industry for all others.

[15] The crosswalk can be found in Appendix A of the ASEC Supplement documentation which can be found at https://www2.census.gov/programs-surveys/cps/techdocs/cpsmar19.pdf.

References

ESA and USPTO (Economic and Statistics Administration and United States Patent and Trademark Office). 2012. "Intellectual Property and the U.S. Economy: Industries in Focus." U.S. Department of Commerce. https://www.uspto.gov/sites/default/files/news/publications/IP_Report_March_2012.pdf.

ESA and USPTO (Economic and Statistics Administration and United States Patent and Trademark Office). 2016. "Intellectual Property and the U.S. Economy: 2016 Update." https://www.uspto.gov/sites/default/files/documents/IPandtheUSEconomySept2016.pdf.

Siwek, Stephen E. 2009. Copyright Industries in the Economy: the 2003–2007 Report. Economists Incorporated. Prepared for the International Intellectual Property Alliance (IIPA). www.ei.com/downloadables/IIPASiwekReport2003-07.pdf.

WIPO (World Intellectual Property Organization). 2003. Guide on Surveying the Economic Contribution of the Copyright-Based Industries. Geneva: WIPO.

Table 1: Complete list of 4-Digit NAICS industries used in this study

4-Digit NAICS industry code and description	4-Digit NAICS industry code and description
1111 - Oilseed and grain farming	2211 - Electric power generation, transmission and distribution
1112 - Vegetable and melon farming	2212 - Natural gas distribution
1113 - Fruit and tree nut farming	2213 - Water, sewage and other systems
1114 - Greenhouse, nursery, and floriculture production	2361 - Residential building construction
1119 - Other crop farming	2362 - Nonresidential building construction
1121 - Cattle ranching and farming	2371 - Utility system construction
1122 - Hog and pig farming	2372 - Land subdivision
1123 - Poultry and egg production	2373 - Highway, street, and bridge construction
1124 - Sheep and goat farming	2379 - Other heavy and civil engineering construction
1125 - Aquaculture	2381 - Building foundation and exterior contractors
1129 - Other animal production	2382 - Building equipment contractors
1131 - Timber tract operations	2383 - Building finishing contractors
1132 - Forest nurseries and gathering of forest products	2389 - Other specialty trade contractors
1133 - Logging	3111 - Animal food manufacturing
1141 - Fishing	3112 - Grain and oilseed milling
1142 - Hunting and trapping	3113 - Sugar and confectionery product manufacturing
1151 - Support activities for crop production	3114 - Fruit and vegetable preserving and specialty food manufacturing
1152 - Support activities for animal production	3115 - Dairy product manufacturing
1153 - Support activities for forestry	3116 - Animal slaughtering and processing
2111 - Oil and gas extraction	3117 - Seafood product preparation and packaging
2121 - Coal mining	3118 - Bakeries and tortilla manufacturing
2122 - Metal ore mining	3119 - Other food manufacturing
2123 - Nonmetallic mineral mining and quarrying	3121 - Beverage manufacturing
2131 - Support activities for mining	3122 - Tobacco manufacturing

Table 1: Complete list of 4-Digit NAICS industries used in this study (continued)

4-Digit NAICS industry code and description	4-Digit NAICS industry code and description
3131 - Fiber, yarn, and thread mills	3254 - Pharmaceutical and medicine manufacturing
3132 - Fabric mills	3255 - Paint, coating, and adhesive manufacturing
3133 - Textile and fabric finishing and fabric coating mills	3256 - Soap, cleaning compound, and toilet preparation manufacturing
3141 - Textile furnishings mills	3259 - Other chemical product and preparation manufacturing
3149 - Other textile product mills	3261 - Plastics product manufacturing
3151 - Apparel knitting mills	3262 - Rubber product manufacturing
3152 - Cut and sew apparel manufacturing	3271 - Clay product and refractory manufacturing
3159 - Apparel accessories and other apparel manufacturing	3272 - Glass and glass product manufacturing
3161 - Leather and hide tanning and finishing	3273 - Cement and concrete product manufacturing
3162 - Footwear manufacturing	3274 - Lime and gypsum product manufacturing
3169 - Other leather and allied product manufacturing	3279 - Other nonmetallic mineral product manufacturing
3211 - Sawmills and wood preservation	3311 - Iron and steel mills and ferroalloy production
3212 - Veneer, plywood, and engineered wood product manufacturing	3312 - Steel product manufacturing from purchased steel
3219 - Other wood product manufacturing	3313 - Alumina and aluminum production and processing
3221 - Pulp, paper, and paperboard mills	3314 - Nonferrous metal (except aluminum) production and processing
3222 - Converted paper product manufacturing	3315 - Foundries
3231 - Printing and related support activities	3321 - Forging and stamping
3241 - Petroleum and coal products manufacturing	3322 - Cutlery and hand tool manufacturing
3251 - Basic chemical manufacturing	3323 - Architectural and structural metals manufacturing
3252 - Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	3324 - Boiler, tank, and shipping container manufacturing
3253 - Pesticide, fertilizer, and other agricultural chemical manufacturing	3325 - Hardware manufacturing

Table 1: Complete list of 4-Digit NAICS industries used in this study (continued)

4-Digit NAICS industry code and description	4-Digit NAICS industry code and description
3326 - Spring and wire product manufacturing	3353 - Electrical equipment manufacturing
3327 - Machine shops; turned product; and screw, nut, and bolt manufacturing	3359 - Other electrical equipment and component manufacturing
3328 - Coating, engraving, heat treating, and allied activities	3361 - Motor vehicle manufacturing
3329 - Other fabricated metal product manufacturing	3362 - Motor vehicle body and trailer manufacturing
3331 - Agriculture, construction, and mining machinery	3363 - Motor vehicle parts manufacturing
3332 - Industrial machinery	3364 - Aerospace product and parts manufacturing
3333 - Commercial and service industry machinery	3365 - Railroad rolling stock manufacturing
3334 - Ventilation, heating, air-conditioning, and commercial refrigeration equipment manufacturing	3366 - Ship and boat building
3335 - Metalworking machinery manufacturing	3369 - Other transportation equipment manufacturing
3336 - Engine, turbine, and power transmission equipment manufacturing	3371 - Household and institutional furniture and kitchen cabinet manufacturing
3339 - Other general purpose machinery manufacturing	3372 - Office furniture (including fixtures) manufacturing
3341 - Computer and peripheral equipment manufacturing	3379 - Other furniture related product manufacturing
3342 - Communications equipment manufacturing	3391 - Medical equipment and supplies manufacturing
3343 - Audio and video equipment manufacturing	3399 - Other miscellaneous manufacturing
3344 - Semiconductor and other electronic component manufacturing	4231 - Motor vehicle and motor vehicle parts and supplies merchant wholesalers
3345 - Navigational, measuring, electro-medical, and control instruments manufacturing	4232 - Furniture and home furnishing merchant wholesalers
3346 - Manufacturing and reproducing magnetic and optical media	4233 - Lumber and other construction materials merchant wholesalers
3351 - Electric lighting equipment manufacturing	4234 - Professional and commercial equipment and supplies merchant wholesalers
3352 - Household appliance manufacturing	4235 - Metal and mineral (except petroleum) merchant wholesalers

Table 1: Complete list of 4-Digit NAICS industries used in this study (continued)

4-Digit NAICS industry code and description	4-Digit NAICS industry code and description
4236 - Electrical and electronic goods merchant wholesalers	4412 - Other motor vehicle dealers
4237 - Hardware, and plumbing and heating equipment and supplies merchant wholesalers	4413 - Automotive parts, accessories, and tire stores
4238 - Machinery, equipment, and supplies merchant wholesalers	4421 - Furniture stores
4239 - Miscellaneous durable goods merchant wholesalers	4422 - Home furnishings stores
4241 - Paper and paper product merchant wholesalers	4431 - Electronics and appliance stores
4242 - Drugs and druggists' sundries merchant wholesalers	4441 - Building material and supplies dealers
4243 - Apparel, piece goods, and notions merchant wholesalers	4442 - Lawn and garden equipment and supplies stores
4244 - Grocery and related product wholesalers	4451 - Grocery stores
4245 - Farm product raw material merchant wholesalers	4452 - Specialty food stores
4246 - Chemical and allied products merchant wholesalers	4453 - Beer, wine, and liquor stores
4247 - Petroleum and petroleum products merchant wholesalers	4461 - Health and personal care stores
4248 - Beer, wine, and distilled alcoholic beverage merchant wholesalers	4471 - Gasoline stations
4249 - Miscellaneous nondurable goods merchant wholesalers	4481 - Clothing stores
4251 - Wholesale electronic markets and agents and brokers	4482 - Shoe stores
4411 - Automobile dealers	4483 - Jewelry, luggage, and leather goods stores

Table 1: Complete list of 4-Digit NAICS industries used in this study (continued)

4-Digit NAICS industry code and description	4-Digit NAICS industry code and description
4511 - Sporting goods, hobby, and musical instrument stores	4859 - Other transit and ground passenger transportation
4512 - Book stores and news dealers	4861 - Pipeline transportation of crude oil
4521 - Department stores	4862 - Pipeline transportation of natural gas
4529 - Other general merchandise stores	4869 - Other pipeline transportation
4531 – Florists	4871 - Scenic and sightseeing transportation, land
4532 - Office supplies, stationery, and gift stores	4872 - Scenic and sightseeing transportation, water
4533 - Used merchandise stores	4879 - Scenic and sightseeing transportation, other
4539 - Other miscellaneous store retailers	4881 - Support activities for air transportation
4541 - Electronic shopping and mail-order houses	4882 - Support activities for rail transportation
4542 - Vending machine operators	4883 - Support activities for water transportation
4543 - Direct selling establishments	4884 - Support activities for road transportation
4811 - Scheduled air transportation	4885 - Freight transportation arrangement
4812 - Nonscheduled air transportation	4889 - Other support activities for transportation
4821 - Rail transportation	4911 - Postal service
4831 - Deep sea, coastal, and Great Lakes water transportation	4921 - Couriers and express delivery services
4832 - Inland water transportation	4922 - Local messengers and local delivery
4841 - General freight trucking	4931 - Warehousing and storage
4842 - Specialized freight trucking	5111 - Newspaper, periodical, book, and directory publishers
4851 - Urban transit systems	5112 - Software publishers
4852 - Interurban and rural bus transportation	5121 - Motion picture and video industries
4853 - Taxi and limousine service	5122 - Sound recording industries
4854 - School and employee bus transportation	5151 - Radio and television broadcasting
4855 - Charter bus industry	5152 - Cable and other subscription programming

Table 1: Complete list of 4-Digit NAICS industries used in this study (continued)

4-Digit NAICS industry code and description	4-Digit NAICS industry code and description
5171 - Wired telecommunications carriers	5331 - Lessors of nonfinancial intangible assets (except copyrighted works)
5172 - Wireless telecommunications carriers (except satellite)	5411 - Legal services
5174 - Satellite telecommunications	5412 - Accounting, tax preparation, bookkeeping, and payroll services
5179 - Other telecommunications	5413 - Architectural and engineering services
5182 - Data processing, hosting, and related services	5414 - Specialized design services
5191 - Other information services	5415 - Computer systems design and related services
5211 - Monetary authorities-central bank	5416 - Management and technical consulting services
5221 - Depository credit intermediation	5417 - Scientific research and development services
5222 – Non-depository credit intermediation	5418 - Advertising and related services
5223 - Activities related to credit intermediation	5419 - Other professional and technical services
5231 - Securities and commodity contracts intermediation and brokerage	5511 - Management of companies and enterprises
5232 - Securities and commodity exchanges	5611 - Office administrative services
5239 - Other financial investment activities	5612 - Facilities support services
5241 - Insurance carriers	5613 - Employment services
5242 - Insurance agencies, brokerages, and related services	5614 - Business support services
5251 - Insurance and employee benefit funds	5615 - Travel arrangement and reservation services
5259 - Other investment pools and funds	5616 - Investigation and security services
5311 - Lessors of real estate	5617 - Services to buildings and dwellings
5312 - Offices of real estate agents and brokers	5619 - Other support services
5313 - Activities related to real estate	5621 - Waste collection
5321 - Automotive equipment rental and leasing	5622 - Waste treatment and disposal
5322 - Consumer goods rental	5629 - Remediation and other waste services
5323 - General rental centers	6111 - Elementary and secondary schools
5324 - Machinery and equipment rental and leasing	6112 - Junior colleges

Table 1: Complete list of 4-Digit NAICS industries used in this study (continued)

4-Digit NAICS industry code and description	4-Digit NAICS industry code and description
6113 - Colleges, universities, and professional schools	7111 - Performing arts companies
6114 - Business, computer, and management training	7112 - Spectator sports
6115 - Technical and trade schools	7113 - Arts and sports promoters and agents and managers for public figures
6116 - Other schools and instruction	7114 - Agents and managers for artists, athletes, entertainers, and other public figures
6117 - Educational support services	7115 - Independent artists, writers, and performers
6211 - Offices of physicians	7121 - Museums, historical sites, and similar institutions
6212 - Offices of dentists	7131 - Amusement parks and arcades
6213 - Offices of other health practitioners	7132 - Gambling industries
6214 - Outpatient care centers	7139 - Other amusement and recreation industries
6215 - Medical and diagnostic laboratories	7211 - Traveler accommodation
6216 - Home health care services	7212 - RV (recreational vehicle) parks and recreational camps
6219 - Other ambulatory health care services	7213 - Rooming and boarding houses
6221 - General medical and surgical hospitals	7223 - Special food services
6222 - Psychiatric and substance abuse hospitals	7224 - Drinking places (alcoholic beverages)
6223 - Specialty (except psychiatric and substance abuse) hospitals	7225 - Restaurants and other eating places
6231 - Nursing care facilities	8111 - Automotive repair and maintenance
6232 - Residential mental health facilities	8112 - Electronic and precision equipment repair and maintenance
6233 - Community care facilities for the elderly	8113 - Commercial machinery repair and maintenance
6239 - Other residential care facilities	8114 - Household goods repair and maintenance
6241 - Individual and family services	8121 - Personal care services
6242 - Emergency and other relief services	8122 - Death care services
6243 - Vocational rehabilitation services	8123 - Drycleaning and laundry services
6244 - Child day care services	8129 - Other personal services

Table 1: Complete list of 4-Digit NAICS industries used in this study (continued)

4-Digit NAICS industry code and description	4-Digit NAICS industry code and description
8131 - Religious organizations	8134 - Civic and social organizations
8132 – Grant-making and giving services	8139 - Professional and similar organizations
8133 - Social advocacy organizations	8141 - Private households

Table 2: BEA / NAICS concordance

BEA Code	BEA Industry	4-Digit NAICS Codes Included
112A	Animal production, except cattle and poultry and eggs	1122, 1124-5, 1129
113	Forestry and logging	1131-3
114	Fishing, hunting and trapping	1141-2
115	Support activities for agriculture and forestry	1151-3
211	Oil and gas extraction	2111
23	Construction	2361, 2362, 2371-3, 2379, 2381-3, 2389
315	Apparel manufacturing	3151-2, 3159
316	Leather and allied product manufacturing	3161-2, 3169
423A	Other durable goods merchant wholesalers	4232, 4233, 4235, 4237, 4239
424A	Other nondurable goods merchant wholesalers	4241, 4243, 4245, 4246, 4248, 4249
425	Wholesale electronic markets and agents and brokers	4251
441	Motor Vehicle and parts dealers	4411-3
445	Food and beverage stores	4451-3
452	General merchandise stores	4521, 4529
444	Building material and garden equipment and supplies dealers	4441-2
446	Health and personal care stores	4461
447	Gasoline stations	4471
448	Clothing and clothing accessories stores	4481-3
454	Non-store retailers	4541-3
4B0	All other retail	442,443,451,453
481	Air transportation	4811-2
482	Rail transportation	4821
483	Water transportation	4831-2
484	Truck transportation	4841-2
485	Transit and ground passenger transportation	4851-5, 4859

Table 2: BEA / NAICS concordance (continued)

BEA Code	BEA Industry	4-Digit NAICS Codes Included
486	Pipeline transportation	4861-2, 4869
48A	Scenic and sightseeing transportation and support activities	487, 488
492	Couriers and messengers	4921-2
493	Warehousing and storage	4931
517A	Satellite, telecommunications resellers, and all other telecommunications	5174-9
52A	Monetary authorities and depository credit intermediation	521, 5221
522A	Non-depository credit intermediation and related activities	5222-3
523A	Securities and commodity contracts intermediation and brokerage	5231-2
525	Funds, trusts, and other financial vehicles	5251, 5259
531	Housing and other real estate	531-3
532A	General and consumer goods rental	5322-3
533	Lessors of nonfinancial intangible assets	5331
55	Management of companies and enterprises	5511
562	Waste management and remediation services	5621-2, 5629
611A00	Junior colleges, colleges, universities, and professional schools	6112-3
611B00	Other educational services	6114-7
622	Hospitals	6221-3
623A	Nursing and community care facilities	6231, 6233
623B	Residential mental health, substance abuse, and other residential care facilities	6232, 6239
624A	Community food, housing, and other relief services, including vocational rehabilitation services	6242-3
711A	Promoters of performing arts and sports and agents for public figures	7113-4
712	Museums, historical sites, zoos, and parks	7121
721	Accommodation	7211-3
722	Food services and drinking places	7223-5
813A	Grant-making, giving, and social advocacy organizations	8132, 8133
813B	Civic, social, professional, and similar organizations	8134, 8139

Table 3: Utility patent-intensive industries

Industry	Utility Patent Count	Average Employment (Thousands)	Utility Patent Intensity
525 - Funds, trusts, and other financial vehicles	1791	6.0	299.498
3341 - Computer and peripheral equipment manufacturing	30654	160.2	191.348
3344 - Semiconductor and other electronic component manufacturing	69029	375.0	184.077
3253 - Pesticide, fertilizer, and other agricultural chemical manufacturing	6655	37.2	178.706
3342 - Communications equipment manufacturing	17071	96.0	177.786
5112 - Software publishers	30912	319.8	96.654
3343 - Audio and video equipment manufacturing	1596	20.1	79.245
3391 - Medical equipment and supplies manufacturing	22782	318.4	71.543
3254 - Pharmaceutical and medicine manufacturing	18983	280.1	67.767
3346 - Manufacturing and reproducing magnetic and optical media	1199	18.5	64.881
3345 - Navigational, measuring, electro-medical, and control instruments manufacturing	23861	397.7	60.001
3361 - Motor vehicle manufacturing	10334	191.4	53.997
316 - Leather and allied product manufacturing	1741	32.9	52.854
3252 - Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	4918	93.4	52.633
3333 - Commercial and service industry machinery	4495	88.9	50.540
3332 - Industrial machinery	5141	110.8	46.407
533 - Lessors of nonfinancial intangible assets	1023	24.0	42.554
3272 - Glass and glass product manufacturing	3302	89.0	37.093
3256 - Soap, cleaning compound, and toilet preparation manufacturing	3908	109.3	35.755
3331 - Agriculture, construction, and mining machinery	8305	241.1	34.441
3325 - Hardware manufacturing	841	24.5	34.299
3352 - Household appliance manufacturing	2041	59.8	34.142
3122 - Tobacco manufacturing	450	13.9	32.328
3334 - Ventilation, heating, air-conditioning, and commercial refrigeration equipment manufacturing	4127	129.0	31.997
3351 - Electric lighting equipment manufacturing	1517	47.6	31.870
5417 - Scientific research and development services	20774	660.9	31.433
3241 - Petroleum and coal products manufacturing	3342	112.7	29.643
5415 - Computer systems design and related services	55229	1950.3	28.318
3364 - Aerospace product and parts manufacturing	13972	496.0	28.170

Table 3: Utility patent-intensive industries (continued)

Industry	Utility Patent Count	Average Employment (Thousands)	Utility Patent Intensity
3251 - Basic chemical manufacturing	4101	146.5	27.993
3259 - Other chemical product and preparation manufacturing	2272	83.7	27.151
3336 - Engine, turbine, and power transmission equipment manufacturing	2665	100.4	26.544
3359 - Other electrical equipment and component manufacturing	3055	129.4	23.605
5152 - Cable and other subscription programming	1517	65.1	23.295
3222 - Converted paper product manufacturing	6259	271.4	23.059
3353 - Electrical equipment manufacturing	3058	143.8	21.269
3255 - Paint, coating, and adhesive manufacturing	1179	60.3	19.565
5619 - Other support services	5696	307.8	18.503
3399 - Other miscellaneous manufacturing	5815	324.0	17.946
5182 - Data processing, hosting, and related services	4809	285.7	16.835
2131 - Support activities for mining	6315	387.3	16.304
5173 - Wired and wireless telecommunications carriers (except satellite)	11457	745.8	15.362
3365 - Railroad rolling stock manufacturing	405	26.5	15.283
3274 - Lime and gypsum product manufacturing	202	14.3	14.086
3339 - Other general purpose machinery manufacturing	3528	262.3	13.451
3369 - Other transportation equipment manufacturing	447	33.8	13.217
7132 - Gambling industries	1579	137.4	11.494
517A - Satellite, telecommunications resellers, and all other telecommunications	1089	104.0	10.475
522A – Non-depository credit intermediation and related activities	8728	867.4	10.062
5191 - Other information services	2211	227.9	9.700
3379 - Other furniture related product manufacturing	344	36.1	9.519
3221 - Pulp, paper, and paperboard mills	924	105.1	8.795
3363 - Motor vehicle parts manufacturing	4697	538.0	8.731
4236 - Electrical and electronic goods merchant wholesalers	3008	348.6	8.630
3262 - Rubber product manufacturing	1126	132.9	8.470
3329 - Other fabricated metal product manufacturing	2079	278.7	7.459
4234 - Professional and commercial equipment and supplies merchant wholesalers	5085	688.6	7.385

Table 3: Utility patent-intensive industries (continued)

Industry	Utility Patent Count	Average Employment (Thousands)	Utility Patent Intensity
5151 - Radio and television broadcasting	1449	223.0	6.499
3314 - Nonferrous metal (except aluminum) production and processing	394	62.3	6.322
3261 - Plastics product manufacturing	3426	544.5	6.292
3335 - Metalworking machinery manufacturing	1137	184.5	6.163
611A - Junior colleges, colleges, universities, and professional schools	11061	1796.0	6.159
3322 - Cutlery and hand tool manufacturing	244	40.6	6.010
3326 - Spring and wire product manufacturing	260	43.4	5.996
3132 - Fabric mills	333	59.6	5.585
3119 - Other food manufacturing	944	192.1	4.914
3372 - Office furniture (including fixtures) manufacturing	511	107.4	4.757
4242 - Drugs and druggists' sundries merchant wholesalers	1020	230.2	4.431
3313 - Alumina and aluminum production and processing	262	59.2	4.426
3324 - Boiler, tank, and shipping container manufacturing	417	97.1	4.294

Table 4: Design patent-intensive industries

Industry	Design Patent Count	Average Employment (Thousands)	Design Patent Intensity
316 - Leather and allied product manufacturing	1466	32.9	44.51
525 - Funds, trusts, and other financial vehicles	179	6.0	29.93
3343 - Audio and video equipment manufacturing	583	20.1	28.95
3352 - Household appliance manufacturing	977	59.8	16.34
3351 - Electric lighting equipment manufacturing	737	47.6	15.48
3325 - Hardware manufacturing	363	24.5	14.80
3342 - Communications equipment manufacturing	1330	96.0	13.85
3256 - Soap, cleaning compound, and toilet preparation manufacturing	1167	109.3	10.68
3379 - Other furniture related product manufacturing	274	36.1	7.58
3122 - Tobacco manufacturing	95	13.9	6.82
3341 - Computer and peripheral equipment manufacturing	1037	160.2	6.47
5112 - Software publishers	2061	319.8	6.44
3391 - Medical equipment and supplies manufacturing	1841	318.4	5.78
3361 - Motor vehicle manufacturing	1089	191.4	5.69
533 - Lessors of nonfinancial intangible assets	125	24.0	5.20
3399 - Other miscellaneous manufacturing	1647	324.0	5.08
3333 - Commercial and service industry machinery	404	88.9	4.54
3322 - Cutlery and hand tool manufacturing	183	40.6	4.51
3372 - Office furniture (including fixtures) manufacturing	441	107.4	4.11
3359 - Other electrical equipment and component manufacturing	527	129.4	4.07
3262 - Rubber product manufacturing	535	132.9	4.02
3222 - Converted paper product manufacturing	960	271.4	3.54
3329 - Other fabricated metal product manufacturing	981	278.7	3.52
5619 - Other support services	1042	307.8	3.38
3369 - Other transportation equipment manufacturing	114	33.8	3.37
3371 - Household and institutional furniture and kitchen cabinet manufacturing	847	252.9	3.35
3119 - Other food manufacturing	600	192.1	3.12
3261 - Plastics product manufacturing	1614	544.5	2.96
3345 - Navigational, measuring, electro-medical, and control instruments manufacturing	1031	397.7	2.59
3272 - Glass and glass product manufacturing	225	89.0	2.53

Table 4: Design patent-intensive industries (continued)

Industry	Design Patent Count	Average Employment (Thousands)	Design Patent Intensity
315 - Apparel manufacturing	395	159.7	2.47
3331 - Agriculture, construction, and mining machinery	583	241.1	2.42
3353 - Electrical equipment manufacturing	347	143.8	2.41
423A - Other durable goods merchant wholesalers	2010	1037.9	1.94
3339 - Other general purpose machinery manufacturing	478	262.3	1.82
3111 - Animal food manufacturing	103	57.6	1.79
3344 - Semiconductor and other electronic component manufacturing	638	375.0	1.70
3324 - Boiler, tank, and shipping container manufacturing	162	97.1	1.67
4236 - Electrical and electronic goods merchant wholesalers	571	348.6	1.64
3314 - Nonferrous metal (except aluminum) production and processing	97	62.3	1.56
3332 - Industrial machinery	151	110.8	1.36
3334 - Ventilation, heating, air-conditioning, and commercial refrigeration equipment manufacturing	170	129.0	1.32
3336 - Engine, turbine, and power transmission equipment manufacturing	124	100.4	1.24
3326 - Spring and wire product manufacturing	53	43.4	1.22
3132 - Fabric mills	69	59.6	1.16
424A - Other nondurable goods merchant wholesalers	1212	1063.2	1.14
3274 - Lime and gypsum product manufacturing	16	14.3	1.12
3254 - Pharmaceutical and medicine manufacturing	287	280.1	1.02
3133 - Textile and fabric finishing and fabric coating mills	36	35.5	1.02
3112 - Grain and oilseed milling	56	60.1	0.93
4234 - Professional and commercial equipment and supplies merchant wholesalers	628	688.6	0.91
3255 - Paint, coating, and adhesive manufacturing	54	60.3	0.90
5414 - Specialized design services	233	264.3	0.88
3219 - Other wood product manufacturing	196	224.3	0.87
3363 - Motor vehicle parts manufacturing	456	538.0	0.85
3221 - Pulp, paper, and paperboard mills	89	105.1	0.85
5152 - Cable and other subscription programming	52	65.1	0.80
3259 - Other chemical product and preparation manufacturing	62	83.7	0.74
3149 - Other textile product mills	53	71.9	0.74
3141 - Textile furnishings mills	38	56.1	0.68

Table 4: Design patent-intensive industries (continued)

Industry	Design Patent Count	Average Employment (Thousands)	Design Patent Intensity
3252 - Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	63	93.4	0.67
4238 - Machinery, equipment, and supplies merchant wholesalers	471	704.6	0.67
3253 - Pesticide, fertilizer, and other agricultural chemical manufacturing	24	37.2	0.64
3346 - Manufacturing and reproducing magnetic and optical media	11	18.5	0.60
5182 - Data processing, hosting, and related services	169	285.7	0.59
4231 - Motor vehicle and motor vehicle parts and supplies merchant wholesalers	197	341.6	0.58
3364 - Aerospace product and parts manufacturing	279	496.0	0.56
3321 - Forging and stamping	55	99.3	0.55
454 – Non-store retailers	385	695.3	0.55
3365 - Railroad rolling stock manufacturing	14	26.5	0.53
5417 - Scientific research and development services	332	660.9	0.50
3335 - Metalworking machinery manufacturing	92	184.5	0.50
3313 - Alumina and aluminum production and processing	27	59.2	0.46
3273 - Cement and concrete product manufacturing	79	178.6	0.44
3366 - Ship and boat building	59	135.3	0.44
3323 - Architectural and structural metals manufacturing	158	364.1	0.43
517A - Satellite, telecommunications resellers, and all other telecommunications	44	104.0	0.42
5239 - Other financial investment activities	203	507.1	0.40
3241 - Petroleum and coal products manufacturing	45	112.7	0.40
3271 - Clay product and refractory manufacturing	19	48.5	0.39
8112 - Electronic and precision equipment repair and maintenance	51	134.2	0.38
4247 - Petroleum and petroleum products merchant wholesalers	39	104.3	0.37
4B0 - All other retail	993	2680.2	0.37
5324 - Machinery and equipment rental and leasing	52	142.3	0.37
5418 - Advertising and related services	187	521.9	0.36
3251 - Basic chemical manufacturing	52	146.5	0.35
3279 - Other nonmetallic mineral product manufacturing	26	73.5	0.35

Table 5: Trademark-intensive industries

Industry	Trademark Count	Average Employment (Thousands)	Trademark Intensity
525 - Funds, trusts, and other financial vehicles	2641	6.0	441.6
5619 - Other support services	53403	307.8	173.5
533 - Lessors of nonfinancial intangible assets	1558	24.0	64.8
3343 - Audio and video equipment manufacturing	1251	20.1	62.1
3256 - Soap, cleaning compound, and toilet preparation manufacturing	6198	109.3	56.7
316 - Leather and allied product manufacturing	1641	32.9	49.8
3122 - Tobacco manufacturing	659	13.9	47.3
3399 - Other miscellaneous manufacturing	14985	324.0	46.2
5152 - Cable and other subscription programming	2915	65.1	44.8
517A - Satellite, telecommunications resellers, and all other telecommunications	3867	104.0	37.2
3121 - Beverage manufacturing	7577	206.3	36.7
315 - Apparel manufacturing	5804	159.7	36.4
5112 - Software publishers	10133	319.8	31.7
3253 - Pesticide, fertilizer, and other agricultural chemical manufacturing	1144	37.2	30.7
3255 - Paint, coating, and adhesive manufacturing	1850	60.3	30.7
3351 - Electric lighting equipment manufacturing	1383	47.6	29.1
5414 - Specialized design services	7579	264.3	28.7
3352 - Household appliance manufacturing	1681	59.8	28.1
5122 - Sound recording industries	787	29.1	27.1
3254 - Pharmaceutical and medicine manufacturing	7380	280.1	26.3
3111 - Animal food manufacturing	1508	57.6	26.2
3346 - Manufacturing and reproducing magnetic and optical media	483	18.5	26.1
3342 - Communications equipment manufacturing	2489	96.0	25.9
3119 - Other food manufacturing	4955	192.1	25.8
3333 - Commercial and service industry machinery	2267	88.9	25.5
3322 - Cutlery and hand tool manufacturing	1006	40.6	24.8
5111 - Newspaper, periodical, book, and directory publishers	10893	446.5	24.4
3325 - Hardware manufacturing	570	24.5	23.2
5416 - Management and technical consulting services	33965	1547.7	21.9
3141 - Textile furnishings mills	1217	56.1	21.7

Table 5: Trademark-intensive industries (continued)

Industry	Trademark Count	Average Employment (Thousands)	Trademark Intensity
424A - Other nondurable goods merchant wholesalers	22789	1063.2	21.4
4242 - Drugs and druggists' sundries merchant wholesalers	4872	230.2	21.2
3379 - Other furniture related product manufacturing	762	36.1	21.1
3391 - Medical equipment and supplies manufacturing	6626	318.4	20.8
5239 - Other financial investment activities	10430	507.1	20.6
813A – Grant-making, giving, and social advocacy organizations	7593	384.4	19.8
3341 - Computer and peripheral equipment manufacturing	3066	160.2	19.1
813B - Civic, social, professional, and similar organizations	15809	862.5	18.3
3112 - Grain and oilseed milling	1100	60.1	18.3
7111 - Performing arts companies	2663	146.1	18.2
3369 - Other transportation equipment manufacturing	613	33.8	18.1
5182 - Data processing, hosting, and related services	5106	285.7	17.9
423A - Other durable goods merchant wholesalers	18532	1037.9	17.9
3274 - Lime and gypsum product manufacturing	255	14.3	17.8
3359 - Other electrical equipment and component manufacturing	2149	129.4	16.6
5415 - Computer systems design and related services	31601	1950.3	16.2
3345 - Navigational, measuring, electro-medical, and control instruments manufacturing	6391	397.7	16.1
5151 - Radio and television broadcasting	3555	223.0	15.9
3251 - Basic chemical manufacturing	2319	146.5	15.8
5611 - Office administrative services	7476	473.6	15.8
3132 - Fabric mills	936	59.6	15.7
5418 - Advertising and related services	8097	521.9	15.5
711A - Promoters of performing arts and sports and agents for public figures	2619	173.4	15.1
3259 - Other chemical product and preparation manufacturing	1238	83.7	14.8
5121 - Motion picture and video industries	6209	435.7	14.3
4244 - Grocery and related product wholesalers	11094	786.3	14.1
3115 - Dairy product manufacturing	1867	136.9	13.6
3149 - Other textile product mills	973	71.9	13.5
7132 - Gambling industries	1842	137.4	13.4
3113 - Sugar and confectionery product manufacturing	959	73.2	13.1

Table 5: Trademark-intensive industries (continued)

Industry	Trademark Count	Average Employment (Thousands)	Trademark Intensity
4234 - Professional and commercial equipment and supplies merchant wholesalers	8933	688.6	13.0
5417 - Scientific research and development services	8312	660.9	12.6
3222 - Converted paper product manufacturing	3380	271.4	12.5
4236 - Electrical and electronic goods merchant wholesalers	4285	348.6	12.3
3332 - Industrial machinery	1309	110.8	11.8
5614 - Business support services	11178	951.6	11.7
3241 - Petroleum and coal products manufacturing	1313	112.7	11.6
114 - Fishing, hunting, and trapping	300	26.1	11.5
3252 - Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	1064	93.4	11.4
7112 - Spectator sports	2116	196.5	10.8
3334 - Ventilation, heating, air-conditioning, and commercial refrigeration equipment manufacturing	1366	129.0	10.6
5615 - Travel arrangement and reservation services	2225	223.5	10.0
3339 - Other general purpose machinery manufacturing	2563	262.3	9.8
3326 - Spring and wire product manufacturing	419	43.4	9.7
3114 - Fruit and vegetable preserving and specialty food manufacturing	1660	172.1	9.6
4247 - Petroleum and petroleum products merchant wholesalers	992	104.3	9.5
454 – Non-store retailers	6607	695.3	9.5
5419 - Other professional and technical services	7524	793.2	9.5
712 - Museums, historical sites, zoos, and parks	1415	152.2	9.3
5324 - Machinery and equipment rental and leasing	1322	142.3	9.3
7115 - Independent artists, writers, and performers	2984	323.9	9.2
3329 - Other fabricated metal product manufacturing	2539	278.7	9.1
3133 - Textile and fabric finishing and fabric coating mills	319	35.5	9.0
8112 - Electronic and precision equipment repair and maintenance	1194	134.2	8.9
611B - Other educational services	8432	958.1	8.8
3353 - Electrical equipment manufacturing	1251	143.8	8.7
3261 - Plastics product manufacturing	4638	544.5	8.5
4238 - Machinery, equipment, and supplies merchant wholesalers	6000	704.6	8.5
8129 - Other personal services	3187	374.6	8.5
448 - Clothing and clothing accessories stores	12451	1463.8	8.5

Table 5: Trademark-intensive industries (continued)

Industry	Trademark Count	Average Employment (Thousands)	Trademark Intensity
6213 - Offices of other health practitioners	7916	930.8	8.5
3314 - Nonferrous metal (except aluminum) production and processing	525	62.3	8.4
5173 - Wired and Wireless Telecommunications Carriers	6130	745.8	8.2
3344 - Semiconductor and other electronic component manufacturing	3010	375.0	8.0
3331 - Agriculture, construction, and mining machinery	1933	241.1	8.0
4B0 - All other retail	21062	2680.2	7.9
3262 - Rubber product manufacturing	1021	132.9	7.7
3372 - Office furniture (including fixtures) manufacturing	815	107.4	7.6
3131 - Fiber, yarn, and thread mills	218	29.0	7.5
3271 - Clay product and refractory manufacturing	363	48.5	7.5
3371 - Household and institutional furniture and kitchen cabinet manufacturing	1875	252.9	7.4
3272 - Glass and glass product manufacturing	646	89.0	7.3
523A - Securities and commodity contracts intermediation and brokerage	3270	458.2	7.1
522A – Non-depository credit intermediation and related activities	6083	867.4	7.0
531 - Housing and other real estate	13566	1948.4	7.0
5411 - Legal services	9161	1317.1	7.0
3221 - Pulp, paper, and paperboard mills	692	105.1	6.6
4231 - Motor vehicle and motor vehicle parts and supplies merchant wholesalers	2246	341.6	6.6
446 - Health and personal care stores	6471	1065.6	6.1
3117 - Seafood product preparation and packaging	232	38.3	6.1

Table 6: Copyright-intensive industries

Industry Code	Industry Title
5111	Newspaper, periodical, book, and directory publishers
5112	Software publishers
5121	Motion picture and video industries
5122	Sound Recording Industries
5151	Radio and television broadcasting
5152	Cable and other subscription programming
5191	Other information services (news syndicates and internet sites)
5414	Specialized design services (visual and graphic arts)
5415	Computer systems design and related services (software and databases)
5418	Advertising and related services
5419	Other professional and technical services
7111	Performing arts companies
7115	Independent artists, writers, and performers