Revisiting the USPTO Concordance Between the U.S. Patent Classification and the Standard Industrial Classification Systems

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The United States Patent and Trademark Office (USPTO), with support from the National Science Foundation, has maintained and updated a concordance between the U.S. Patent Classification and Standard Industrial Classification Systems since 1974, when it was created. The high-level, general concordance is intended as a means to aggregate patent data by a standardized classification system for which a variety of economic and other statistics are routinely collected and made available.

The USPTO concordance relies on a manual review and mapping of USPC subclasses to selected, high-level SIC classifications that are generally at the two to three digit SIC level. This paper presents a view of the underlying methodology used to construct the concordance, compares it with some other recently used concordance methodologies, and discusses some of the considerations regarding the accuracy and relevance of the concordance.

1. Introduction

During the last twenty-five years, patent data have received increased attention and use, particularly as an indicator in research involving innovation and technological activity. Patent data are attractive for many reasons. They represent technological innovations that have met a defined standard as required for patentability; they are associated with a wide range of technologies; they are available for an extensive and continuing time period which, in the case of U.S. patent grants, spans over 200 years; they have been classified into detailed technological categories that facilitate aggregation of the data; each patent grant identifies the owner, inventor, geographic origin, technology, issue date, application date, and other information associated with the patent to assist in describing and characterizing the technological activity associated with that patent; time-series data are available in electronic format for patents granted in recent years which facilitates computer-aided quantitative research studies; U.S. patent grants, in addition to reflecting domestic technological activities, also reflect a wide range of foreign technological activities as a result of the importance of the U.S. market and the desire of applicants to obtain patent protection in that market.

There is, however, a fundamental difficulty in using patent data and economic data together in quantitative research studies, for example, studies that seek to define relationships between economic growth and technological activity. This difficulty stems from differences in the ways that patent data and widely available economic data are collected, classified, and made available.

Economic data tend to be collected, classified, and made available by categories based on industry classification systems such as the Standard Industrial Classification System (SIC), the more recent North American Industry Classification System (NAICS), and the International Standard Industrial Classification System (ISIC). By contrast, the United States Patent and Trademark Office (USPTO) primarily relies upon the U.S. Patent Classification System (USPC) to classify U.S. patent documents. Many other countries rely on classification systems that are based on the International Patent Classification System (IPC) to classify their patent grants. Unlike the classification systems used to collect and disseminate economic data, these patent classification systems, for the most part, are based on the function or structure (e.g., chemical formula, layered product, gear, etc.) of the patented technology and not on the associated industry of manufacture or sector of use.

One way to make industry-based classification information available for each issuing patent would be to review each patent and to associate it with its corresponding industry-based category or categories. Such a method would allow for patents to be classified according to industry of manufacture, sector of use, or any other appropriate industry categories.

However, perhaps for reasons such as budget and staffing constraints, this kind of individual patent review and classification by industry generally has not been adopted by national patent offices with the notable exception of the Canadian Patent Office, which included the classification of patents by industry for patents issued between 1976 and 1993 [1].

2. USPTO's USPC-SIC Concordance

Brief History and Overview
The original USPTO concordance between the U.S. Patent Classification System (USPC) and the Standard Industrial Classification System (SIC) was developed in 1974 with the support of the National Science Foundation (NSF) to attempt to bridge the gap between the industry and patent based classification systems associated, respectively, with economic and patent data. This concordance, often referred to as the "OTAF Concordance," was developed by manually reviewing classification categories in the USPC and associating them with a limited set of industry-based product fields based on the 1972 SIC. See Table 6 for a list of these industry-based product fields.

This USPC to SIC Concordance is maintained by USPTO's Patent Technology Monitoring Division. It is based on the industry of manufacture and is updated on a regular basis, generally annually, to accommodate changes and revisions that are made to the USPC each year. To update the concordance, changes (including additions, deletions, and modifications) to the USPC are manually reviewed, new entries added, outdated entries removed, and, where necessary, existing entries revised. The most recent update available for the USPC to SIC Concordance applies to the USPC as it existed as of December 31, 2001.

Substantial detail relating to the Concordance development process was published in a review that was initiated with NSF support. The review included an internal study of

the Concordance and a workshop that included Concordance users who were asked for feedback. The review and feedback results are available in *Review and Assessment of the OTAF Concordance Between the U.S. Patent Classification and the Standard Industrial Classification Systems: Final Report*, published in January 1985, and available from PTMD.

<u>Basis for U.S. Patent Data By Industry - the U.S. Patent Classification System</u>

To ensure the reasonable and uniform classification of patent documents (unless otherwise noted, the terms "patents" and "patent documents" will refer to "utility patent grants," also known as "patents for inventions) into the USPC, a defined set of rules has been established. These rules were described in a comprehensive document that was published in 1966, *Development and Use of Patent Classification Systems.* Since that time, many of the details contained in the document have been updated. Selected details regarding updated classification rules and procedures may be viewed in *Examiner Handbook on the Use of the U.S. Patent Classification System*, available at the USPTO Web Site (see the References section for the link).

Significant aspects of the U.S. Patent Classification System that pertain to the USPC to SIC Concordance include the following:

- USPC classifications for patent grants are assigned directly by the issuing examiner according to a set of defined decision rules; the examiner is familiar with the USPC and works with it on a daily basis; the correct assignment of the primary USPC classification for an issuing patent, known as the "original" classification for that patent, is viewed as particularly important since that classification can affect the future subject matter of applications that will be directed to the examiner's area
- Examiners search and otherwise work in and are familiar with the USPC; as a result, USPC classifications assigned by patent examiners may tend to be more consistent than classifications assigned by those examiners within the generally less familiar IPC system; this is likely to be especially true for older patents having IPC classifications assigned by U.S. examiners
- Patent classifications contained in the USPC are assembled in a hierarchy according to a defined set of classification rules, primarily according to principles of the fundamental, direct, and necessary function of the claimed invention; in some cases, patent documents may be classified according to the structure of the claimed invention or according to the product produced (e.g., for chemical compounds and processes, respectively)
- Patent classifications within the USPC are subject to revision on a regular basis to better address and accommodate the technologies contained in newly issuing patents; classifications are intended to assist examiners in searches of issued patents and, more recently, published patent applications
- Classifications that are assigned to all issued U.S. patents reflect and include the most current revisions that have been made to the USPC
- One "primary" USPC classification is uniquely identified for each patent; each patent also may be assigned one or more cross-reference classifications within the USPC
- U.S. patent classifications, particularly the primary classification, are assigned primarily on the basis of the subject matter legally claimed by a patent document, as interpreted in light of the patent's total disclosure of information;
- The assignment of the primary patent classification is determined by a defined set of classification rules; in many cases, the most comprehensive patent claim will determine the primary patent classification
- The contents of each USPC classification generally can be more precisely determined by referencing the *U.S. Patent Classification System Manual of Classification* and the *Classification Definitions*

The USPC is composed of large categories of technology, called classes, each of which is divided into smaller categories of technologies, called subclasses. As of December 2001, 428 classes of technology and over 150,000 subclasses of technology existed for utility patents in the USPC. Primary patent classifications can be assigned in most, but not all, of these classes and subclasses.

Construction of the USPC-SIC Concordance
The following sections provide a brief overview of the construction of the USPC to SIC Concordance and list the general list decision rules that are referenced to associate a patent with one or more SIC-based product fields.

The assignment of a patent to a USPC subclass is determined by the USPC Manual of Patent Classification, the USPC Patent Classification Definitions, and the rules of patent classification. These documents and publications are used, along with the *Standard Industry Classification Manual*, to determine which SIC-based product fields to associate with each USPC classification.

During an update to the Concordance, USPTO analysts, skilled in the use and meaning of the USPC, refer to these documents and, when necessary, consult with experts in various technical disciplines to associate newly created USPC classifications with the defined set of product fields based on the SIC. While the analyst makes every effort to accurately associate new USPC classifications with appropriate product fields, this effort is not validated by an independent source. However, the analyst compares resultant patent counts with counts from the previous Concordance to ensure that no unexpected changes have been introduced.

The USPC to SIC Concordance associations are made at the subclass level of the U.S. Patent Classification System. There are over 124,000 subclasses in which patents, issued since 1963, have been assigned primary classification; for purposes of this paper, these are referred to as "active subclasses" (patents may have been assigned in other subclasses as well but in this paper, a subclass will not be considered "active" unless a patent that issued between 1963 and 2001 has been assigned primary classification in that subclass).

Decision Rules for Identifying SIC Areas For Each USPC Classification Subclass
The assignment of USPC classifications to SIC-based product fields is based on the industry of manufacture as implemented through a set of decision rules that allow a patent classification to be associated with one or more SIC-based product fields. A general summary of the decision rules used to assign USPC classifications to SIC-based product fields follows.

Current Decision Rules:
1. Determine if the classification is characterized as "product," "apparatus," and/or "process."
2. For products, place the patent classification by determining "What type of establishment would be engaged in producing the products having the structural or functional features represented by that classification."
3. For apparatus, place the patent classification by determining "What type of establishment would be engaged in producing the apparatus having the structural or functional features represented by that classification."
4. If the patent classification is a process (i.e., method of use), determine whether the process is more closely related to the product of that process or to the apparatus used in

the process. If more closely related to the product, place in the relevant SIC-based product field. If more closely related to the apparatus, place in the relevant SIC-based machinery product field. Where substantial doubt exists as to which it is more closely related to, place the patent classification in both the relevant SIC-based product and apparatus product fields.

5. In cases where these questions cannot be answered clearly and ambiguity exists as to which of several SIC-based product fields to assign to a patent classification, the classification is placed in all possible SIC-based product fields *

* The number of SIC-based product fields should be limited by reasonable interpretation of the content of a classification.

Characteristics of the USPC to SIC Concordance as of December 2001
For utility patents (i.e., "patents for inventions") granted between 1963 and 2001, the USPC contains roughly 124,000 "active" classifications (subclasses) of technology into which those patents have been assigned, based on their primary classification. Those classifications have been matched to 41 unique product fields based on the 1972 SIC and one additional product field, defined as "All Others," for the non-matches.

In the December 2001 USPC to SIC Concordance, 71 percent of the active USPC subclasses, have been matched to a single SIC-based product field, 90 percent have been matched to two or fewer SIC-based product fields, and 97 percent have been matched to three or fewer SIC-based product fields (note, however, that in these percentages, the 'All Others' category is treated as an SIC category). When based on total matches from USPC subclasses to SIC-based product fields, the calculated shares are somewhat lower (see Table 1).

When calculated on a patent basis, for utility patents granted between 1963 and 2001, shares are similar with 70 percent of the patents matched to a single SIC-based product field, 91 percent matched to two or fewer SIC-based product fields, and 96 percent matched to three or fewer SIC-based product fields. When 2001 grants, alone, are considered, matched shares are slightly higher (see Table 2).

Table 3 displays the share of total active subclasses mapped to each SIC-based product field that are uniquely mapped to that product field. This share varies quite widely across the SIC-based product fields with a high share for "Food and Kindred Products" and a low share for "Engines and Turbines."

While most of the USPC classifications match well with the SIC-based product fields, there are some that clearly do not match up well. These tend to be general technologies that are associated with many industries of manufacture. Table 4 displays some of the USPC classes of technology that contain a substantial share of subclasses in the Concordance that do not match up well with a single or limited number of the SIC-based product fields.

The USPC to SIC Concordance contains an entry for "All Other SICs," that is intended to collect USPC classifications that do not match any of the 41 unique SIC-based product fields. Table 5a displays USPC classes mapped exclusively to the "All Others" category and Table 5b displays USPC classes that contain a large number of patents matched, at least in part, to the "All Others" category.

For utility patents granted between 1963 and 2001, this "All Others" category represents about 8 percent of the patents, based on using the fractionalized patent counting method with the Concordance (see the next section for a description of the fractionalized counting method). For 2001 patent grants, the share is slightly lower at 7 percent (see Table 6).

Some general characteristics relating to the USPC to SIC Concordance include the following:

- The Concordance is based on a manual review of USPC classification subclasses by professional staff familiar with the USPC; some subjective inconsistencies may occur
- The Concordance is limited to high level industry categories (2 to 3 digit SICs); therefore, a study focusing on a lower level industry is likely to obtain more reliable patent activity results if the patents can be identified directly using USPC classifications (subclasses)
- The Concordance is not subject to a systematic, regularly scheduled, independent review for accuracy by independent sources; however, the Concordance update process includes a comparison with the old Concordance to guard against the occurrence of unexpected Concordance changes
- Even if the Concordance is accurate, patents classified in a USPC classification may not always relate to the matched SIC-based product field(s)
- Some technologies of interest, particularly newer ones, may not be covered satisfactorily by the Concordance
- The Concordance is not currently updated to the North American Classification System (NAICS)
- The Concordance generally is based on the product or apparatus to which the invention relates (i.e., the industry of manufacture); for example, it does not provide information concerning sectors of use that may be related to the invention

Application of the USPC to SIC Concordance to Obtain Patent Counts- "Whole Counts" and "Fractional Counts" Approaches

The USPTO report that aggregates patent counts by SIC-based product fields (or industries), *Patenting Trends in the United States, 1963-2001*, applies the USPC to SIC Concordance to patent grants by using only the primary USPC classification assigned to each patent grant.

Sole use of the primary USPC patent classification in determining the SIC-based product field(s) associated with a patent document simplifies the use of the Concordance and the counting of patents in each of the SIC-based product fields. The primary classification is assigned according to a defined set of rules based on the claimed invention and very precisely reflects the invention that is receiving patent protection. In the report, other patent classifications, known as "cross-reference classifications," are ignored.

In the USPTO report, patent activity by SIC-based product field is determined using the USPC to SIC Concordance in two different ways resulting in two sets of output tables. Separate sets of tables are provided that count patents first, according to a "whole counts" approach and second, according to a "fractional counts" approach.

Using the "whole counts" approach, a patent is fully counted in an SIC-based product field if the patent's primary classification (subclass) is matched with the product field in the Concordance. Because a subclass can be matched to multiple product fields, a patent having an assigned primary classification in a subclass that is matched to multiple SIC-based product fields would be counted multiple times, once for each

product field matched with the subclass via the Concordance. This "whole counts" methodology has been found to provide misleading results in several cases. For example, data presented in several industry categories may not be substantially independent of one another if a large set of patents from a group of subclasses has multiple matches to those several industry categories. Also, counts may be overly high in some SIC-based product field categories simply because they are included as one of many categories matched to a group of USPC classifications. These issues are discussed in greater detail in the published 1985 review of the Concordance.

As a result of the difficulties experienced with patent activity determined by the "whole counts" approach, a "fractional counts" approach was proposed and adopted as another way of counting patents by SIC-based product field. Under the "fractional counts" approach, multiple counting of patents across the product fields is eliminated by dividing each patent equally among the SIC-based product fields to which the patent's primary classification or subclass has been matched, via the Concordance. Thus for each patent in a subclass that has been matched to three different SIC-based product fields, one-third of a patent count would be added to each of the three product fields (instead of a full patent count being added to each of the product fields, as would occur using the "full counts" approach).

The review of the Concordance, conducted in 1985, recommended usage of the "fractional counts" approach as one way of reducing potential distortions that could result from multiple SIC-based product fields that are matched to some USPC subclasses in the Concordance. Weighting schemes that improve on the simple proportional distribution between matched SIC-based product fields as well as other approaches could be explored to possibly provide improvements to concordance results.

Application of Additional Information to Enhance the Contents of the USPC to SIC Concordance
The 1985 review of the Concordance suggested several possibilities for enhancing the results available from the USPC to SIC Concordance. Among those suggestions were the possibility of enhancement by using information such as cross-reference classifications assigned to each issued patent, using the International Patent Classifications (IPC) assigned to each patent, and using other classification system information that may be associated with each patent, for example, Derwent classifications.

3. Other Concordances

USPC-SIC Concordances
One high level concordance from U.S. patent class to two-digit SIC is mentioned in a discussion concerning the NBER Patent Citations Data File [2]. It is likely that other such concordances also have been constructed. Concordances applied at the USPC class level, however, may not be sufficiently detailed to accurately reflect associated industry categories since some classes contain different subclass areas that match to different industry categories.

Other USPC to SIC concordance efforts have been undertaken such as efforts to match patent and industry classifications using company data; however, USPTO investigative efforts documented in 1985 suggested that associations developed along these lines were not likely to be "fruitful." Most recent activity associated with the development of patent concordances appears to be in association with the International Patent Classification System.

IPC-Based Concordances

In recent years, assigned International Patent Classification System (IPC) classifications and developed concordances have become popular as a means for associating patents with industry-based categories. Concordances between the IPC and industry-based classifications such as the SIC and ISIC may be attractive, in part, because they have the potential to enable a researcher to obtain patent data from many different patent offices and to aggregate those data by industry using a potentially uniform and consistent methodology.

Several IPC-based concordances have been developed using statistical routines to match IPC patent classification information to industry information and apply probabilities by using classification information obtained from the Canadian Patent Office that identified IPC as well as industry-of-manufacture and sector-of-use classifications for Canadian patents issued from 1976 to 1993. The Yale Technology Concordance and a concordance developed by Professor Silverman of the University of Toronto are two examples of such concordances. A more recent concordance effort is supplementing Canadian Patent Office classification information with a manual review while incorporating a further translation in an effort to develop an IPC to ISIC Concordance [3].

Such concordances are subject to some potential problems that may require consideration. For example, classification categories can change when the IPC is updated so that the most appropriate classification categories corresponding to a technology may depend, to some degree, on the date of publication and the IPC edition used for classifying the patent documents (currently, the IPC classification categories assigned at patent grant are not updated when the IPC is changed, for example when the next IPC edition is adopted). One example of how this can adversely impact data is that a published U.S. patent application may be classified in an IPC category that has been abolished and its corresponding patent may be classified, later, in a newer category based on different criteria. This situation may become less of a problem when existing patent documents are reclassified to reflect updates to the IPC classification system. Also, when patent documents are published in different countries based upon the same patent application (i.e., an international patent family), those patent documents may receive different IPC classifications and, in such cases, a decision must be made as to which country's classification assignment(s) to use with a concordance. This same issue is present when a single patent office assigns more than one classification to a patent if only a single classification or a subset of all assigned classifications gets selected for use with a concordance; in such cases, a decision must be made as to which classification(s) to select for use. As an additional consideration, statistical information obtained from the Canadian Patent Office effort may not be fully appropriate when applied to patents that have issued in years subsequent to 1993 since technology and patent activity

characteristics reflected in recent patent grants may differ from characteristics present in patents issued between 1976 and 1993.

4. Notes Concerning the Use of IPC Classifications That Are Listed on U.S. Patents

While the use of IPC classifications and an IPC to industry concordance is attractive as a means for obtaining patent activity by industry, the use of IPC classifications, as listed on U.S. patent grants, with such concordances should be performed with care and consideration. A few considerations that relate to the use of IPC classifications that are listed on issuing U.S. patents follow:

- U.S. examiners are generally less familiar with the IPC system and, as a result, IPC classifications listed on issuing U.S. patents may tend to be less consistent than classifications assigned by those examiners within the more familiar USPC system; this is likely to be especially true for older patents having IPC classifications assigned by U.S. examiners
- The assigned IPC for a patent in a technology may differ depending on when the patent issued and which IPC Classification Edition is referenced since appropriate classifications can change between IPC Classification editions
- When more than one IPC is assigned on a U.S. patent, the listed IPC classifications are not listed according to a particular relevance rule and may simply be listed alphabetically; roughly 13 percent of U.S. patents list multiple IPC classifications with different IPC classes and roughly 16 percent of U.S. patents list multiple IPC classifications with different IPC subclasses (see Tables 7a and 7b); for these patent documents having multiple IPC classifications, the assigned industry category may be somewhat dependent on which IPC is selected if only one IPC classification is selected for use with a concordance (this assumes that IPCs in different classes or subclasses may tend to correspond to different industry categories); overall, for patents granted between 1963 and 2001, about 21 percent had more than one IPC assigned by U.S. examiners

IPC classification data for U.S. patents may be available from other sources as well (e.g., EPO). Regardless of which IPC data are applied against an IPC to industry concordance, however, the detailed principles and procedures used to determine the assignments of IPC classification(s) to patents should be well understood to ensure the consistent assignment of associated industry categories to those patents through the concordance methodology.

Conclusion

The U.S. Patent and Trademark Office's USPC to SIC Concordance can be used to produce patent information at a broad level of industry detail. It is generally based on the industry of manufacture and it differs from many recent concordance efforts in that it relies solely on a manual matching of USPC subclasses to SIC-based product fields by experienced analysts. The Concordance allows for the use of USPC classifications that have been assigned to patents by U.S. patent examiners who are familiar with the USPC classification system and who have strong incentives to ensure the accuracy of such USPC classifications. While other concordances and methodologies continue to be developed to match patents with industry categories, nevertheless, the USPC to SIC Concordance contains information that should be useful to efforts to facilitate the production of accurate patent activity information by industry category.

Footnotes

(1) "Johnson and Evenson Patent Set (JEPS)," web page at http://www.wellesley.edu/Economics/johnson/jeps.html.

(2) Hall, B.H., Jaffe, A.B., Trajtenberg, M., "The NBER Patent Citations Data File: Lessons, Insights, and Methodological Tools," National Bureau of Economic Research Working Paper 8498, pages 12-13

(3) Johnson, D.K.N., "The OECD Technology Concordance (OTC): Patents By Industry of Manufacture and Sector of Use," Organization for Economic Co-operation and Development (2002) STI Working Papers 2002/5, pages 6-7

References

Office of Patent Classification, U.S. Patent and Trademark Office, "Examiner Handbook on the Use of the U.S. Patent Classification System," http://www.uspto.gov/web/offices/pac/dapp/sir/co/examhbk/index.html

Office of Patent Classification, U.S. Patent and Trademark Office, "Manual of Patent Classification," web pages may be accessed from http://www.uspto.gov/web/patents/classification/

Office of Patent Classification, U.S. Patent and Trademark Office, "Classification Definitions," web pages may be accessed from http://www.uspto.gov/web/patents/classification/

Information Products Division - TAF Branch, U.S. Patent and Trademark Office, U.S. Department of Commerce (December 2002) "Patenting Trends in the United States, State/Country Report" 12/31/2002

Office of Technology Assessment and Forecast, Patent and Trademark Office, U.S. Department of Commerce (January 1985) "Review and Assessment of the OTAF Concordance Between the U.S. Patent Classification and the Standard Industrial Classification Systems: Final Report"

"Brian S. Silverman's Research and Data Page," web page at http://www.rotman.utoronto.ca/~silverman/research.htm

> "Documentation for International Patent Classification - U.S. SIC concordance," web page at http://www.rotman.utoronto.ca/~silverman/ipcsic/documentation_IPC-SIC_concordance.htm

Hall, B.H., Jaffe, A.B., Trajtenberg, M., "The NBER Patent Citations Data File: Lessons, Insights, and Methodological Tools," National Bureau of Economic Research Working Paper 8498

"Johnson and Evenson Patent Set (JEPS)," web page at http://www.wellesley.edu/Economics/johnson/jeps.html.

Johnson, D.K.N., "The OECD Technology Concordance (OTC): Patents By Industry of Manufacture and Sector of Use," Organization for Economic Co-operation and Development (2002) STI Working Papers 2002/5

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Revisiting the USPTO Concordance Between the U.S. Patent Classification and the Standard Industrial Classification Systems

- The USPC-SIC Concordance

- USPC Classifications, Basis of the Concordance

- Use of the USPC to Determine Industry Categories of U.S. Patents

- Reports Produced Using the USPC-SIC Concordance

- Other Concordances (e.g., IPC-based)

Revisiting the USPTO Concordance Between the U.S. Patent Classification and the Standard Industrial Classification Systems

The USPC-SIC Concordance

– Matches U.S. Patent Classification System (USPC) classifications to product fields based on the 1972 Standard Industrial Classification System (SIC)

– High level SIC-based categories at the 2 to 3 digit level

– Based on manual review of USPC classifications with defined decision rules for placement and multiple matches permitted

– Based on industry of manufacture

– Created in 1974 and updated on a regular basis with support from the National Science Foundation

Revisiting the USPTO Concordance Between the U.S. Patent Classification and the Standard Industrial Classification Systems

USPC-SIC Concordance (continued)

– 124,000 USPC classifications with recent patent activity reviewed and matched to 41 unique SIC-based fields

– Of 1963-2001 patents,
  • 70% match to 1 SIC-based field *
  • 91% match to 2 or fewer SIC-based fields *
  • 96% match to 3 or fewer SIC-based fields *

   * includes 'All Others' as an SIC-based field

– 8% of 1963-2001 patents match 'All Others' category

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USPC Classifications, Basis of the Concordance

– Composed of a hierarchical classification system with decision rules that clearly define proper placement

– Classifications assigned by the issuing examiner

– Classifications assigned based on a patent's claimed disclosure

– One "primary" classification is assigned to each patent

– Patents and classifications are updated and kept current

Revisiting the USPTO Concordance Between the U.S. Patent Classification and the Standard Industrial Classification Systems

Use of USPC to Determine Industry Categories of U.S. Patents

– Examiners work in and are familiar with the USPC

– USPC patent classifications may tend to be more consistent than other assigned classifications

– Primary patent classifications are readily identified and assigned according to determined rules

– There is a strong incentive to ensure correct assignment of classification, particularly of the primary classification

– Other classifications such as IPC classifications listed on existing U.S. patents may not distinguish a primary classification

Reports Produced Using the USPC-SIC Concordance

– Only the "primary" USPC patent classification is used

– "Whole" and "Fractional" patent counts are both calculated in USPTO reports

- Whole counts fully count patents in each matching SIC field

- Fractional counts,
  – divide patents equally among matching SIC fields
  – reduce problems with double counting of patents

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Other Concordances

– USPC-SIC concordances, e.g., high level

– IPC-based
  - E.g., use of Canadian Patent Office classifications, 1976-1993 and use of statistically determined associations and weightings

    (note that IPC classifications listed on existing U.S. patents may not be listed according to any particular relevance rule)

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    For additional details, please refer to the associated paper

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