Intellectual Property Information: A Comparative Analysis of Main Information Providers

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After modeling expert user needs with regard to intellectual property information, we analyze and compare the main providers in this specific information area (Thomson DIALOG, Esp@cenet by the European Patent Office, Questel-Orbit, and STN International) in terms of system content and system functionality. The key question is whether the main providers are able to satisfy these expert user needs. For patent information, some special retrieval features such as chemical structure search (including Markush search), patent family references and citations search, biosequence search, and basic informetric functionality such as ranking, mapping, and visualization of information flows are realized. Considering the results of information science research, the practice of patent information shows unexhausted improvement opportunities (e.g., the application of bibliographic patent coupling and co-patent-citation for mapping patents, patent assignees, and technology specialties). For trademark search, users need multiple truncated search (realized) as well as phonetic search and image retrieval (not realized yet).

Research Agenda

The area of intellectual property information, in which legal, scientific-technical, and economic aspects meet, comprises technical (e.g., patents and utility models) as well as nontechnical intellectual property rights (e.g., trademarks and designs). When exactly does one need intellectual property research with regard to legal, technical, and economic practice? In the following three cases, it is indispensable to deal with this matter:

- before doing research and developing (R&D) or before creating a trademark or industrial design to make sure that the idea is really new,
- after a successful application for a patent, a utility model, an industrial design, or a trademark to secure the protection (i.e., to make sure that no third party uses the protected idea),
- every time one does scanning and monitoring to gain knowledge about other companies: What kind of new patents do the known competitors hold? What new trademarks did they develop? Do new and still unknown competitors invade your market?

There are several providers in the field of intellectual property information. We will analyze and compare products by DIALOG (Derriks, 2005; Kulp, 1984; Stock & Stock 2003a, 2003b), Esp@cenet by the European Patent Office (EPO; McKierman, 2001; Melvin, 2002; Pilch, 2005), products by Questel-Orbit (Dickens, 2005; Gladden, 2002; Kulp, 1984; Stock & Stock, 2004b, 2005b) and STN International (Stock & Stock, 2003c, 2003d; for Chemical Abstracts Service [CAS], see Shively & Williams, 2004). How do these specialized information companies secure their success? Is it appropriate at all to run a commercial online supplier in view of the World Wide Web and various free offers provided by the patent offices (Georgy, 2002; Lambert, 1999)? Even some years ago, Schoch-Gruebler (1998) asked, "Patent information: Are the traditional suppliers as doomed as the dinosaurs?" (p. 2).

Some studies have compared the different patent information suppliers. Nancy Lambert (2004) compared Questel-Orbit's end-user service (QPat) with Delphion and MicroPatent. In 2001, she analyzed Questel-Orbit's service for information professionals (QWeb), Thomson DIALOG's DialogWeb, STNWeb, and STN Express. A study by Stock and Stock (2005a) compared the main suppliers of STM information (science, technology, medicine) on the German information market. Stock and Stock (2004a) discussed cooperation and competition of information suppliers.

We wanted to analyze patent information (including information about utility models) and trademark information. We do not consider information about industrial designs

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because there are very few design databases offered by the information industry.

Research and development in a company may represent an economic risk. On one hand, one is running the risk of developing and producing a product on which another inventor already holds a patent. On the other hand, it might occur that one produces an invention and does not protect it from being used by others. An innovative company should avoid inefficient research, patent infringement, and unprotected inventions since these could result in high expenses. One must seek protection for an invention in each country where patent protection is desired. All patent applications and publications for an invention can be detected by conducting a patent family search. Further questions might be: How do individual patents interrelate? Which patent cites (or is cited by) another patent? Citations and references are of paramount significance in the patent area. Here, we note that although online information of the European and American Patent Offices does include citations, most of the patent offices of other countries offer no options for searching citations. Furthermore, it is important to be familiar with the legal status of an invention. Key questions here are: Is it just an application or was the patent already granted? Have there been any oppositions so far? Has the ownership been transferred? Is the invention offered for licensing? Did the patent expire?

Due to an international agreement (Strasbourg Agreement), patent offices and all database producers consistently classify patent literature according to the International Patent Classification (IPC). Although the IPC lists more than 60,000 classes, a search within a much frequented class is seldom successful since such a search would retrieve—even on the lowest level of IPC hierarchy—thousands of matches. The European Classification (ECLA) system used by the European Patent Office represents a downward expansion of the IPC system by including over 70,000 subclasses. The power of the indexing and search language thus increases considerably. The ECLA codes are originally used in the databases of the European Patent Office. David T. Dickens (1994) summarized the merits of the ECLA system as follows: "ECLA is a powerful and valuable tool for online patent searching. Not only are there codes more specific than the IPC, but they are dynamic. The codes are continuously revised to reflect new technology with previously ECLA classified documents updated as well. With just one patent office classifying documents, inconsistencies in the nonstandardized applications of the IPC are overcome, and better retrieval can be achieved" (p. 32).

Whereas patents refer to the protection of particular inventions of a company or developer, trademarks aim at the protection of names and figures of products and services. A targeted mark strategy plays a major part in a company because marks reflect the company's acquired reputation and form a basis for further success in its respective markets. Well-established marks imply associations: either confidence (e.g., assumption of good quality) or dislike (e.g., branding as low-value product). Marks therefore affect the behavior of the consumer in a positive or a negative way. Hence, every company is concerned about detecting names that are easy to remember as well as establishing and protecting them against copying.

Specialized Information Needs in the Area of Intellectual Property Rights

What kind of content and what retrieval functionality does a user in the field of intellectual property need? We want to model an "ideal" intellectual property information system considering the specialized user needs. In modeling user needs, we will follow descriptions in the published literature. Next, we analyze whether DIALOG, Esp@cenet, Questel-Orbit, and STN International can satisfy these user needs.

Patent Information

An "ideal" patent information system would consist of all patent applications, granted patents, and utility models of all national and international patent offices. Comprehensive bibliographic data (Page 1 information), the full text, and the drawings would be available. Furthermore, thematic accesses would be possible with the help of various classifications systems such as IPC, ECLA, CAS indexing (for chemical patents), Derwent codes, and further indexing by national patent authorities (e.g., by the classification of the U.S. Patent and Trademark Office). For every patent, the legal status would be searchable. It would be useful for the researcher as well if technologically relevant nonpatent content (e.g., CAS, INSPEC, COMPENDEX) is offered.

Table 1 shows the offers of the analyzed information suppliers. In terms of international and national content, all four suppliers hold more or less the same amount of patent files—with one exception: the Plus-Pat database of Questel-Orbit, which consists of 51 million (mio.) records and is therefore the biggest patent database worldwide. All suppliers offer some legal status information, but this is by no means complete for all patent authorities. At first glance, DIALOG seems to have an advantage with 20.5 mio. legal status records in contrast to 10.5 mio. records offered by the other hosts, but this is not the case because DIALOG has not loaded an adjusted update. All commercial providers offer additional nonpatent content as well, but EPO does not. Regarding classifications, Questel-Orbit, DIALOG, and STN International give thematic access via different systems, and EPO uses IPC (including ECLA) only. The patent content of all suppliers allows for expansion. Several patent offices around the world offer at least the facsimiles of all their patents (i.e., from Patent Publication No. 1 onward). The online hosts restrict themselves to the period beginning around 1920.

To retrieve patents, a specialized functionality is necessary. The search for patent families (i.e., patents with the same priorities or linked by priorities) is essential. The same holds true for the search for references (i.e., documents which a patent cites) and of citations (i.e., documents in which a patent is cited) for both single patents and patent families. In chemistry (Gasteiger & Engel, 2003; Kochev, Monev, & Bangov, 2003), there are specialized information needs

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TABLE 1. Specialized user needs on patent information and the offers of Questel-Orbit, DIALOG, STN International, and the European Patent Office.[a]

Patents	Questel-Orbit	DIALOG	STN International	EPO / Esp@cenet
1. Content				
international content	PlusPat (51 mio. records) Documentation FamPat (37 mio. records) Inpadoc (41 mio. records)	Inpadoc (20.5 mio. family records)	Inpadoc (41 mio. records)	PCT Minimum (50 mio. records) Inpadoc (41 mio. records)
	Derwent (13.5 mio. family records) WIPO/PCT (0.9 mio. records)	Derwent (13.5 mio. family records) WIPO/PCT (0.9 mio. records)	Derwent (13.5 mio. family records) WIPO/PCT (0.9 mio. records)	WIPO/PCT (0.9 mio. records)
regional and national content	full text: DE, EP, FR, GB, JP, PCT, US FR; GB; US; PCT	full text: DE, EP, US, PCT	full text: DE, EP, FR, GB, US, PCT	full text: CH, DE, EP;
	bibliographic: 75 countries (incl. Inpadoc)	bibliographic: China, JP, FR (and Inpadoc)	bibliographic: GDR, JP, Korea, Russia (and Inpadoc)	bibliographic: 72 authorities
legal status	10.5 mio. records (Inpadoc) CLAIMS legal status LitAlert US P&TM litigation	20.5 mio. records (Inpadoc)[b] CLAIMS legal status US Patents Fulltext	10.5 mio. records (Inpadoc) DE, EP, US (IFI CLAIMS), FR, Russia	42 authorities
nonpatent content	yes	yes	yes	no
2. Content representation				
IPC	yes	yes	yes	yes
ECLA	yes	no	yes	yes
USPC	yes (for US)	yes (for US)	yes (for US)	no
CAS indexing	yes	yes	yes	no
Derwent indexing	yes	yes	yes	no

3. Patent retrieval functionality				
family search	yes	predefined (Inpadoc)	yes	yes
references search	yes	via IFI CLAIMS and Derwent Patents Citation Index	via IFI CLAIMS and Derwent Patents Citation Index	yes (EP, PCT) DE, EP, FR
citations search	yes	via IFI CLAIMS and Derwent Patents Citation Index	via IFI CLAIMS and Derwent Patents Citation Index	no
family citations search	yes	no	no	no
family references search	yes	no	no	no
chemical structure search	see MMS	yes (DialogLink)	yes (structure query)	no
Markush structure search	yes (MMS)	no	yes (MARPAT)	no
biosequence search	no	no	yes (BLAST and FASTA with DGENE and PCTGEN, BLAST with CAS Registry)	no
natural language processing	no	yes (Target)	no	no
within document retrieval	yes (PatReader)	no	no	no
4. Patent-informetric functionality				
ranking	yes	yes	yes	no
mapping	yes	yes	yes	no
tables	no	no	yes (ANALYZE, TABULATE)	no
time series	no (not directly)	no (not directly)	yes (with TABULATE)	no
visualization of information flow	yes (Anacubis)	no	yes (STN AnaVist)	no
co-citations	no	no	no	no
bibliographic coupling	no	no	no	no
5. Display, print, further processing				
full text (ASCII)	yes	yes	yes	yes
drawings in graphic format	yes	yes (WIPO/PCT; US Patents Fulltext)	integrated in text, TIFF	yes
full text facsimile	yes (PDF for 30 patent authorities)	yes (Thomson Patent Store)	yes	yes
portfolio management	yes (PatentExaminer)	no	no	no
6. Prices				
access	fee	fee	fee	free

Note. IPC = International Patent Classification; ECLA = European Classification; USPC = US Patent Classification; CAS = Chemical Abstracts Service; mio. = million.

[a]*Sources:* Questel-Orbit: Stock & Stock, 2004b; Pierre Buffet (personal communication, June 2005); information from the company's homepage (www.questel.orbit.com). DIALOG: Stock & Stock, 2003a; Derriks, 2005; information from the company's homepage (www.dialog.com). STN International: Stock & Stock, 2003d; Armin A. Foerderer (personal communication, June 2005); information from the company's homepage (www.stn-international.de and www.cas.org/stn.html). European Patent Office (EPO): information from the institution's homepage (ep.espacenet.com). All figures are from June 2005.

[b]DIALOG has not loaded an adjusted update.

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such as searching for chemical compounds including three-dimensional structures (Engel, 2003) and similarity searching (Willett, Barnard, & Downs, 1998), searching for chemical reactions (Gasteiger, 2003), and "prophetic" Markush structures (Berks, 2001; Simmons, 2003). In biochemistry, genetics, and biotechnology, one needs a functionality to search for biosequences both exactly and in a fuzzy mode (Dufresne, Takäcs, Heus, Codani, & Duval, 2002; Xu, Webster, & Doran, 2002; Yoo, Ramanathan, & Barcelon-Yang, 2005). For nonexpert users, natural language processing may be helpful. Especially for long patents, within-document retrieval (Kaszkiel & Zobel, 1997) seems to be important.

DIALOG, EPO, Questel-Orbit, and STN satisfy the need for family and references search. All commercial suppliers offer citations search, but EPO does not. Searching for citations and references for whole patent families is possible only in Questel-Orbit databases. Chemical structure searching (including reactions) is possible on all commercial suppliers; searching Markush structures is possible only on Questel-Orbit (Borne, O'Hara, Roesch, & Skippon, 2003) and STN International (Ebe, Sanderson, & Wilson, 1991; Fisanick, 1990). DIALOG, EPO, and Questel-Orbit lack a database with gene sequences such as Derwent's GENESEQ, GenBank, or the sequence information in the Registry File of CAS and fuzzy search options, as presented within the context of STN International by, for example, Derwent's gene sequence database and the search programs BLAST and FASTA (Stock & Stock, 2003d, pp. 17–18). DIALOG, with its Target software, offers a function for natural language retrieval; Questel-Orbit with its PatReader allows for passage retrieval.

Patent informetrics has numerous fields of application (Breitzman & Mogee, 2002; Dou, 2004; Fattori, Pedrazzi, & Turra, 2003) and offers a set of indicators of innovation (Leydesdorff, 2001). Hall, Jaffe, and Trajtenberg (2005) were able to show that the number of patents and the number of patent citations significantly affect the market value of the company. So searchers need a functionality to analyze patent numbers and patent citation numbers per patent assignee. Narin (e.g., 1994) has used patent informetrics for decades to analyze the company's or region's strengths resp. weaknesses. Thus, a user expects diverse patent-informetric functionality.

EPO supplies no single patent-informetric functionality. All commercial suppliers offer at least a ranking and a mapping command. Visualization of informetric research results is possible on STN International (with STN AnaVist) and Questel-Orbit (with Anacubis; see Figure 1). STN exclusively enables the user to create tables and time series with its ANALYZE and TABULATE commands. No online information supplier offers advanced informetric analysis such as cocitations and bibliographic coupling in a single command.

For further processing, displaying, or printing, the user needs the full text in ASCII format, the drawings in a graphic format, and the whole patent publication as facsimile (usually PDF). To manage patent information in-house, it would be useful to rely on a portfolio management system. All systems allow display of the full text (Page 1 information and sometimes full text of the patent), drawings, and sometimes the facsimile. Questel-Orbit exclusively offers a system, PatentExaminer, for patent portfolio management.

In comparison with informetric research results, the massive expansion of informetric functionality in an end-user-oriented interface seems to be important. The informetric analysis "at the touch of a button" can practically be combined with an adequate visualization. The following types of informetric fields have been discussed in information science literature (e.g., Stock, 1991, 1992, 2000, pp. 137 ff., 353 ff.): rankings, time series, semantic nets, and information flow graphs.

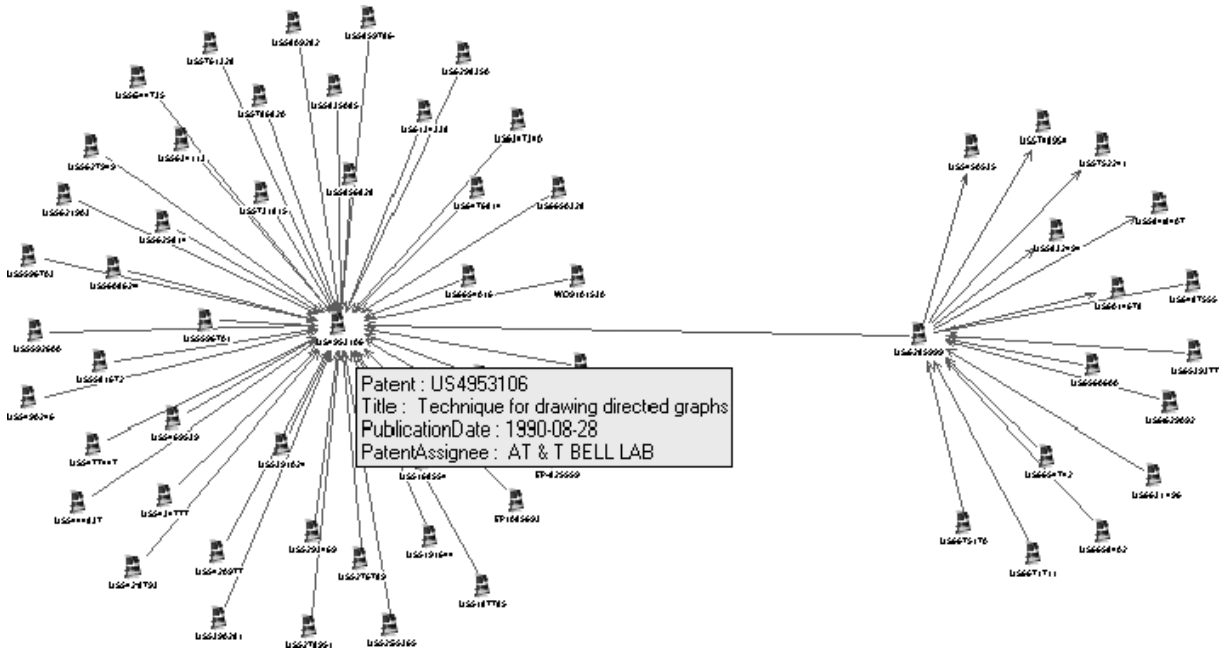

FIG. 1. Visualization of patent citations and references. Source: Questel-Orbit.

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Rankings are generated by sorting field contents according to frequency. DIALOG, Questel-Orbit, and STN already cover this function. Time series indicate the power of the number of hits a query received according to time. Examples are "How does a company's application behavior change in a technical field during the course of time?" or "How many patents in the IPC Class X did the company file during the last 20 years?" In this respect, the systems' functionality is principally sufficient, but it lacks easy operating features and a graphic output. Until now, users have been dependent on the additional use of a table calculation program. One application of the time series analysis is the forecasting of tendencies. By monitoring particular classification codes over time, one could receive early alert information about technology trends (Genth, 2002; Okawa & Furukawa, 2000). Semantic nets emerge from the analysis of terms co-occurring in a document. These can be, for example, notations (i.e., co-notations) or words in flow text (i.e., co-words). For visualizing the results, software such as Anacubis would be appropriate.

Information flow analyses focus on references and citations. DIALOG, Questel-Orbit, and STN already have mastered direct citations thus far; desiderata are patent co-citations and bibliographic coupling of patents. Bibliographic coupling (Kessler, 1963) means that two articles (A and B) are coupled when they reference to the same document (C). Bibliographic coupling of patents means, accordingly, that two patents A' and B' are coupled when they name the same Patent C' under 'Cited Patents.' A useful variant on this is the bibliographic coupling of patent assignees. This type considers in C not individual patents but their applicants. Two patents are coupled when they cite both patents of the same assignee (Huang, Chiang, & Chen, 2003). Co-citation (Small, 1973) means that two documents (Y and Z) are co-cited when they are both referenced to in an Article X. Patent co-citation means, accordingly, that two patents Y' and Z' are co-cited, when they occur together in the 'Cited Patents' field of patent X' (Chen, 2003, pp. 161 ff.; Mogee & Kolar, 1999). Here, it is useful as well to consider the assignee. Co-assignee citation means the citation of patents of different assignees by one patent.

A simple method to receive additional information about the effect of a patent is to count the number of citations per patent. Since patents from different times show a varying probability of being cited, the indicator can be narrowed to citations per patent and per year. This indicator becomes extremely useful in searches for patent assignees, inventors, or technical fields (e.g., by IPC or ECLA), so that now the annual average citation rate of assignees, inventors, or technical fields is calculated. In patent informetrics (Hall et al., 2005; Narin, 1994), further characteristic values are possible, such as the Current Impact Index of a company (i.e., number of citations of a company's patents with priority from the last 5 years during the year under review, related to the average citation rate of the corresponding technical discipline) or Science Linkage (i.e., average number of a patent's references to scientific literature), which are both used at CHI Research (Narin, 1999).

Trademark Information

In the information industry, there are only two online information suppliers with a broad range of trademark information: DIALOG and Questel-Orbit (Rhodes & Legg, 1996) (see Table 2). STN International and Esp@cenet do not offer

TABLE 2. Specialized user needs on trademark information and the offers of Questel-Orbit and DIALOG.

Trademarks	Questel-Orbit	DIALOG
1. Content		
international content	WIPO (0.47 mio.records)	WIPO (0.47 mio. records)
regional and national content	24 trademark authorities (14.4 mio. records) AvantIQ: FI, MX, NO; CCH TM Res./AvantIQ: US States; Questel-Orbit: CA, FR, US Fed.; CompuMark: else	25 trademark authorities (16.8 mio. records) Trademarkscan
legal status	yes	yes
2. Content representation		
use of Vienna Classification	yes (AT, BX, CH, DE, FR, GB, IT, LT, WO)	yes
use of Nice Classification	yes	yes
3. Trademark retrieval functionality		
multiple truncated search	yes (Name Explorer)	yes
phonetic search	yes (Edital CaTaMaran)	no
graphic search	no	no
4. Trademark-informetric functionality		
ranking	yes	yes
tables	no	no
time series	no (not directly)	no (not directly)
5. Display, print, further processing		
drawings in graphic format	yes	yes
portfolio management	yes (Edital)	no

Sources: Questel-Orbit: Stock & Stock, 2004b; Pierre Buffet (personal communication, June 2005); information from the company's homepage (www.questel.orbit.com). DIALOG: Stock & Stock, 2003a; Michael Fischer (personal communication, June 2005); information from the company's homepage (www.dialog.com). All figures are from November 2005.

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TABLE 3. Content of worldwide trademark authorities on Questel-Orbit and DIALOG.

Trademark authority	Questel-Orbit	DIALOG
Algeria	–	–
Arab States of the Gulf	–	–
Argentina	–	–
Australia	–	–
Austria	138,000	148,000
Benelux	432,000	448,000
Canada	903,000	917,000
China	–	–
Croatia	–	–
Czech Republic	145,000	141,000
Denmark	156,000	173,000
European Community	387,000	379,000
Finland	115,000	127,000
France	1,569,000	955,000
Georgia	–	–
Germany	994,000	966,000
Greece	–	–
Great Britain	628,000	721,000
Hong Kong	–	–
Hungary	75,000	70,000
Ireland	–	125,000
Italy	737,000	765,000
Japan	–	3,100,000
Korea	–	–
Latvia	–	–
Liechtenstein	10,000	12,000
Lithuania	44,000	43,000
Macedonia	–	–
Moldova	–	–
Morocco	–	–
Monaco	11,000	–
Mexico	697,000	500,000
New Zealand	–	–
Norway	229,000	188,000
Panama	–	–
Phillippines	–	–
Poland	156,000	147,000
Portugal	–	–
Romania	–	–
Russia	–	–
Slovakia	47,000	47,000
Slovenia	–	–
South Africa	–	–
Spain	1,127,000	1,103,000
Sweden	327,000	324,000
Switzerland	235,000	246,000
Taiwan	–	–
Thailand	–	–
Trinidad and Tobago	–	–
Turkmenistan	–	–
US (Federal)	3,880,000	3,880,000
US (States)	1,410,000	1,228,000
Yugoslavia	–	–
International (WIPO)	472,000	468,000

Sources: library.dialog.com/blusheets (2005–07–07); www.questel.orbit.com/EN/customersupport/Userdoc/DocPDF/Databasecatalog.pdf (2005–07–07); PTDLA (2004). All countries with online trademark resources.

any trademark records. From an "ideal" system, users would expect information about all trademarks from all over the world. But the trademarks are by no means complete on DIALOG nor on Questel-Orbit. The Patent and Trademarks Depository Library Association holds a list with 54 trademark authorities with online resources (Patent and Trademark Depository Library Association, 2004), DIALOG offers 26 databases produced by its sister company, Thomson CompuMark (Thompson, 1989), Questel-Orbit holds 25 databases produced by AvantIQ, CCH TM Research, and CompuMark, and by Questel-Orbit itself (see Table 3). On Questel-Orbit, we are missing the Japanese trademark information (DIALOG offers Japanese trademarks.). On both online information suppliers, we are missing trademark information from countries such as Argentina, Australia, China, Korea, Russia, and South Africa.

The type of goods and services and the content of trademarks are represented by an industrial classification (the Nice classification) and—for graphic marks—by a classification of figurative elements (the Vienna classification). All trademark databases contain the Nice classification, but only a few countries use the Vienna classification. In trademark retrieval, a fuzzy search is essential (Fall & Giraud-Carrier, 2005). Multiple truncated search is already possible, but there is no phonetic search (e.g., the Soundex algorithm; Jacobs, 1982) on DIALOG (but there is on Questel-Orbit since its acquisition of Edital, whose product CaTaMaran offers phonetic search), and there are no possibilities to search with the image itself. There are tools for trademark-informetrics functionality such as ranking. It is possible to display and print the records, tools for further processing for the text, and the drawings are offered as well. There is no special software for trademark portfolio management on DIALOG, but there is on Questel-Orbit (by the Trade Mark Portfolio Management System of Edital).

We want to point to a search option for a trademark image search that is strongly discussed in literature on information science and computer science as well at the present time: the query by visual example (Hirata & Kato, 1992; Ravela & Manmatha, 1999; Ravela, Manmatha, & Croft, 1998); that is, the graphic search via image elements such as shape (Cortelazzo, Mian, Vezzi, & Zamperoni, 1994; Eakins, Boardman & Graham, 1998; Eakens, Riley, & Edwards, 2003; Jain & Vailaya, 1998), visually salient features (Kim & Kim, 1998), color (Wang & Chen, 2002), or with the help of visual clustering (Hussain, Eakins, & Sexton, 2002). You select a graphic trademark as the original source document and search for graphics which should be as similar as possible. In research, several different approaches are pursued that are all more or less successful; however, it would be appropriate for technology-oriented companies such as DIALOG or Questel-Orbit to take part in this research to put (medium or long term) a graphic retrieval of trademark images into practical use.

Conclusion

In comparison to an "ideal" system of intellectual property information, there are possibilities to optimize the systems of the commercial online suppliers:

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- Expanding the content in all four areas of intellectual property towards completion;
- expanding the patent information indexing by applying the ECLA system on further databases, in the ideal case, on all;
- creating new forms of clustering by using bibliographic patent coupling and patent co-citation as well as new forms of visualizing them;
- introducing indicators on the basis of citation rates, for enterprises, inventors, or technical fields;
- providing visualized, graphical output of time series;
- creating a tool for early detection of technological trends; and
- providing a graphic retrieval for image trademarks.

We see the need for further research activities in describing and analyzing other information providers not only for intellectual property information but for all types of information. Some open questions remain concerning the actual user needs of information professionals and expert end users with regard to specialized information types (e.g., intellectual property) and with regard to the technical and economical possibilities of the realization of system functionality to satisfy such specialized information needs (e.g., the patent family search functions, which have been implemented, or searching trademarks by graphics, which has not been implemented so far). It seems to be necessary to study empirically how information professionals and expert end users search for specialized information using DIALOG, Esp@cenet, Questel-Orbit, STN, or any other system (Hall, Oppenheim, & Sheen, 1999, 2000). User behavior in highly specialized information areas is still partly unknown. Some research topics in intellectual property retrieval may be: (a) How many users do and how often do they search for Markush structures in patents? (b) Is patent co-citation and bibliographic coupling searching really helpful for users, and if yes, in which context? (c) Would users be willing to scan a trademark draft and search with this picture for similar registered trademarks? And, as Nicholas (1995) asked, "are information professionals really better online searchers than end-users?" (p. 383).

What are the critical success factors of information providers? Is the market of specialized information a niche market with small volume only, or is it important for all research and development activities in companies and universities and therefore indirectly important for whole innovation systems of countries? And what role does information science and do information scientists play? Is it a task for information scientists to analyze products of professional information providers? (Of course, we mean "Yes.")

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