

Intellectual property information. A case study of Questel-Orbit

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Abstract. This study presents a detailed description and analysis of an information-industry company: the online-host Questel-Orbit. It is a special provider of intellectual property information services and holds a leading position in the fields of patent as well as trademark information. We are going to outline the company's history originating from the two formerly separate systems Orbit and Télésystèmes Questel. We describe the company's present structure, its clients and content supply, with a special focus on the retrieval systems of patent information as well as trademark information. Furthermore, we are going to discuss the market situation of these information products particularly in regard to aspects such as competitive position, cooperating partners, pricing policy and critical success factors. Finally, we present a SWOT analysis, an analysis of strengths, weaknesses, opportunities and threats.

Keywords: Questel-Orbit, intellectual property rights, intellectual property information, patent information, PlusPat, QPat, QWeb, Merged Markush Service, patent informetrics, information visualization, trademark information, TrademarkExplorer

1. Research agenda

The goal of our article is to present a detailed “anatomy” of a commercial information provider in terms of information science, information economy and information market research. Questel-Orbit sees itself as a special provider in the field of intellectual property information. Questel-Orbit provides patent database collections, trademark databases, and corpora of non-patent literature (among others CAS, COMPENDEX, INSPEC, PASCAL). Its content supply overlaps in parts with data collections by e.g. Dialog und STN International, but Questel-Orbit's strength definitely and exclusively lies with patent and trademark information. The power of Questel-Orbit's retrieval language is comparable to that of Dialog und STN International. Some of Questel-Orbit's offers, including patent full-texts, are – free of charge – also available at national and international patent offices (e.g. the European Patent Office). With its range of products and services, Questel-Orbit targets not only the information professional but also the information non-professional, i.e. the professional end-user. Its strategy is to focus on core business and to phase out the company's non-core businesses. Although Questel-Orbit is itself strongly driven by R&D, other research-oriented companies serve as cooperating partners, such as Anacubis and Lingway. In contrast to several competitors (e.g. FIZ Karlsruhe as a part of STN International) Questel-Orbit does not receive grants from public institutions.

Our study focuses on the following research questions:

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- How do expert users (information professionals and professional end-users) want to search intellectual property information? What specialized content and which specialized system functionality is expected?
- Retrieving patent and trademark information is a difficult matter – especially for the end-user. What kind of facilities does Questel-Orbit provide – also for the non-information professional – to get satisfying results?
- The search for intellectual property information should lead to comprehensive and relevant findings. Wrong results can have severe effects on a company's research policy (e.g. decision in favor of developing something already in existence), as well as on the patentability of one's own results (e.g. refusal of a patent application or demand for license fees by patentee). What functionality does Questel-Orbit provide for the information professional to allow an optimal retrieval?
- Patent searches are not only directed towards single records but also towards whole sets of records, the latter is called patent informetrics. Which possibilities of patent informetrics are submitted by Questel-Orbit?
- Trademarks include apart from trademark words also trademark images. The latter can be searched with the help of language (e.g. by using the notations of the Vienna classification) as well as through image comparison. For trademark words it is central that minor spelling variations are recognized ("Google – Boogle"). How does Questel-Orbit accept those challenges? Is the fuzzy retrieval optimally working with regard to trademark words?
- How does Questel-Orbit secure its success? Which products make it stand out from its competitors? What is its position in the market and its environment? Is it at all appropriate to run a commercial online supplier in view of the World Wide Web and various free offers provided by the patent offices [19]? Even some years ago, Schoch-Gruebler [34] asked, "Patent information: Are the traditional suppliers as doomed as the dinosaurs?"

Research studies on our chosen example case so far pointed out the company's facets, its history and its products (e.g. [3,5,17,18,20,25,27,28,45]). As topics served various aspects of patent information (e.g. [9,12,15,22,23]) as well as trademark information (e.g. [33]). Questel-Orbit itself described its system in several handbooks (e.g. [30,31]). What is missing so far is a comprehensive analysis of Questel-Orbit in terms of both information science and economy.

Extensive testing of Questel-Orbit's system (conducted in spring and summer 2004), a self-assessment questionnaire filled out by the company (turnover, staff, customers, critical success factors, strategy) as well as interviews with company representatives formed the empirical basis for our case study (for further information see [43]).

This article deals with Questel-Orbit as a company (Section 2). We are going to analyze the two product lines for patent information (Section 3) and trademark information (Section 4). Furthermore we are going to sketch Questel-Orbit's position in the market and the environment (Section 5). Finally we would like to analyze the company's strengths, weaknesses, opportunities and threats (Section 6).

2. Questel-Orbit: The company

2.1. History of Questel-Orbit

The historiography of Questel-Orbit can be seen as divided into two lines, the one of Orbit dating from the early times of information suppliers and the other of Questel since the late 1970s, both systems

merging in 1994 first as a company and in 1998 also as a system. The history of Orbit reaches as far back as 1962. The company SDC (System Development Corporation) developed the retrieval system CIRC (Centralized Information Retrieval and Control) during the 1960s. Several test runs of this system were conducted under the code name COLEX (CIRC On-Line Experiments). COLEX was the immediate predecessor of Orbit. The leading developer of COLEX and hence Orbit was Carlos Cuadra, who became well-known for his commitment to SDC and above all for the "Annual Reviews of Information Science and Technology" edited by him, for the "Cuadra Directory of Online Databases" as well as for his software STAR. The name Orbit can be traced as far back as 1967, originally standing for "On-Line-Retrieval of Bibliographic Information Time-shared". Between 1967 and 1971 "General-Purpose Orbit" (or Orbit I) was developed, being replaced by Orbit II in 1971. Whereas the early development of this retrieval system was connected with research work for the Air Force, its research interest shifted to medicine information during the early 1970s. The National Library of Medicine ordered a search system for MEDLARS, which became available as "Medline" (MEDLARS On-Line) in 1974. SDC Search Service was started – together with MEDLARS and ERIC – in December 1972, at almost the same time as DIALOG. From 1972 to 1978, Cuadra managed SDC Search Service. While the early development of Lockheed's DIALOG was more economic oriented, the development of Orbit was more R&D-driven. As Charles P. Bourne and Trudi Bellardo Hahn put it in their history of online information services, "The two major organizations in the early online search service industry – SDC and Lockheed – had different philosophies and approaches to their products. SDC staff closely associated with the online search system were R&D-driven. With a history of published accomplishments, SDC hired staff with training, experience, and inclination toward solid R&D work. The online services were focal points around which staff could pursue their R&D interests. Building a business empire based on online searching did not seem to be a major goal for the SDC staff" [5, p. 226]. Orbit's content was concentrated on natural sciences databases (Chemical Abstracts were edited at an early stage, other databases such as INSPEC followed) and on patent databases. Cuadra and SDC Search Service were faced with two problems. The parent company SDC wanted Orbit to use the computers in the house. Since SDC was mainly working for the Air Force, this meant top-class technology at high prices. SDC's internal prices were as high as the external prices, putting SDC Search Service under an enormous cost pressure. The high-powered computers allowed online users very short connect times. Since Orbit charged connect time – as did DIALOG, another problem lurked ahead – not for the users, but for the company. Fast response times meant short connect times and therefore less takings. Carlos Cuadra remembered, "so while I was paying high-end retail at SDC, he (i.e. Roger Summit of DIALOG) was getting almost free disk storage. Not only that, the Dialog response time was so slow that, with the connect hour charge, Roger was making two or three times as much money as we were, because our system was stunningly fast" [3]. Carlos Cuadra left SDC in 1978.

In the year 1987, Robert Maxwell bought Orbit. Maxwell, a person of a dazzling and perhaps criminal character, purchased Pergamon Press in the 1960s and became a Labour member. In 1969, after a financial scandal he lost both control over Pergamon and his political career. In the 1970s he created a media empire that included, apart from the repurchased Pergamon Press, the Mirror Newspaper Group, the publishing company Macmillan, the New York "Daily News" and others. Orbit was attached to Pergamon as "Pergamon Orbit Infoline" and moved into the offices in McLean, Virginia, near Washington, DC. In 1989 Maxwell bought the online host BRS which merged with Orbit to become "Maxwell Online Information". He put this company under Macmillan after he had bought the publisher. After the mysterious death of Robert Maxwell in 1991 it was discovered that he had embezzled several hundred million dollars. Maxwell's company and thus Maxwell Online were forced to file for bankruptcy. First, Orbit

remained with Macmillan, underwent yet another name change this time to “InfoPro Technologies”, and was finally bought by Questel in 1994. This is the end of the first part of our story.

Télésystèmes Questel was founded in 1978. One of the “fathers” of Questel was Pierre Buffet, who received the “Online Information Lifetime Achievement Award” in 2001. Questel was a part of France Telecom and had its head office in Paris with its technical infrastructure being located in Sophia Antipolis (near Nice). Questel’s content was concentrated above all on French databases as well as on trademarks.

Between 1994 and 1998 there was one composite company Questel-Orbit consisting of two separate hosts. The two systems were merged under the “Intellectual Property Gold” project; Orbit was shut down by the end of 1999. As to the functionality of the new, merged system Nancy Lambert reported that, “the enhanced Questel software does have powerful features, many of them original to Questel and some of them added with the enhancements” [20]. The strength of Orbit, the patent databases, as well as the strength of Questel, the trademark databases, complemented each other optimally in the sense of a comprehensive search software system for intellectual property information. As early as 1999 another area of intellectual property information was added, the domain names database “NameWatcher”. In the year 2000, France Telecom withdrew parts of its commitment to Questel-Orbit. Jean Besson, who entered Questel in 1995 and became CEO in 1998, bought 80 per cent of the company in a management buyout, 20 per cent first remained with France Telecom. The new owner used the firm name of IPG (Intellectual Property Group) as a parent company of Questel-Orbit. Subsequently, France Telecom withdrew completely from the company. Questel-Orbit now formed 80 per cent of the IPG; 20 per cent of the IPG were under employee ownership. Thus, the Besson family had a 100 per cent share in IPG.

David T. Dickens ran the business in the United States and Pierre Buffet in Europe. In 2000 Charles Besson, Jean Besson’s son, entered the company. Charles Besson had attended business school and had formed his own software company. In 2002, Charles Besson became CEO of Questel-Orbit. David Dickens now focused on the patent business of Questel-Orbit. Similar to STN on the Web and DialogWeb, Questel-Orbit launched QWeb, a command language that provides browser access to the company’s databases. In 2001 (with the release of QWeb 2.0), Questel-Orbit switched to the XML technique. In the year 2003, Questel-Orbit formed an interesting partnership with Anacubis (a division of the Cambridge-based company i2 ChoicePoint). Since patent information occurs in diverse contexts, e.g. in cited and citing literature or in IPC notations in this literature, citation searches and other informetric commands virtually cry out for visualization. Due to the partnership with Anacubis, this visualization could be realized in QPat (designed for the PlusPat database that is supplied by about 75 databases of national and international patent authorities). David Dickens emphasized that, “by automatically representing entities pictorially as icons and showing relationships between them using link types, it lets users see the ‘big picture’ in one view” [8]. In cooperation with Lingway, a French provider of language processing (located in Ivry-sur-Seine), PatReader was developed in the year 2004 providing a tool for within-document retrieval that allows the scanning of full-text patent data. In 2005 Questel-Orbit acquired Digipat (a file history provider in Alexandria, VA – in this town there are the headquarters of the USPTO, too), Edital (a trademark search provider in Brussels) and a part of Lingway.

2.2. The company and its customers

The three location sites in Paris, Sophia Antipolis and McLean employ approximately 100 people (full-time equivalents). As Orbit was strongly R&D-oriented, so is Questel-Orbit today. Almost one third of the total turnover is invested in R&D projects and in new program items. The field of patent

information, and besides Derwent's World Patents Index Questel-Orbit's own database PlusPat in particular, is responsible for most of the turnover. In the year 2003, Questel-Orbit reached a turnover of approximately 18 million Euros worldwide (turnover in 2002 and 2001 was 20 million Euros each year). Compared to 2002, the realized profit grew about 15 per cent to 1.67 million Euros in 2003. The company calls itself debt-free. According to Questel-Orbit's own statements, success is mainly achieved through a new business model that focuses on core business and thus reduces personnel.

The by far largest part of user groups comes from industry: 40 per cent come from the chemical and pharmaceutical industries and 35 per cent from other branches of industry. Information brokers represent about 10 per cent. Five per cent of the customers come from banking and insurance businesses and other financial services companies; 5 per cent are involved in management consulting, and another 5 per cent are from public offices. Questel-Orbit's clientele includes neither private customers nor universities nor public research institutes. Who needs above all intellectual property information? Customers listed by Questel-Orbit are among others IBM, Merck & Company Inc., AUDI, BASF, Siemens, Exxon, Henkel, Sony and the European Patent Office. With its range of products and services Questel-Orbit targets information needs of innovative companies, information brokers, patent experts, decision makers and marketing specialists.

About two-thirds of the contracting customers (63.7 per cent) gain access to the system through the World Wide Web. While this type of access steadily increases, access via Telnet (currently 28.7 per cent) or X.25 (7.6 per cent) decreases according to tendency. Customers who do not connect over the Web predominantly use the Windows client IMAGINATION.

2.3. Overview on databases

Questel-Orbit's homepage allows different ways to access the whole system or parts of the system. These are in 2005:

- QWeb: comprehensive system that requires command language skills for complex searches; however, it also provides a search assistant to allow for easy searches,
- QPat: menu-driven access to the database PlusPat and to full-text databases, enabling search for titles and abstracts as well as full-text, delivery of copies in PDF format, and offering Alert Service. The integration of Anacubis allows visual presentation of the citation search results in clusters. Patent Delivery Service included,
- TrademarkExplorer: menu-driven search for trademarks on one or several databases and search for domain names,
- Patent Delivery Service: patent documents from more than 30 countries and international patenting authorities are available as PDF files by email or can be directly downloaded,
- PatentExaminer: tool for managing patent documents,
- PATOLIS-e: access to the Japanese information system PATOLIS including patent information in English for non-Japanese speakers.

Relatively well covered – also seen globally – are three areas of intellectual property rights: patents, utility models, and trademarks. One great desideratum is information on industrial designs. However, Questel-Orbit offers access to international industrial designs by providing the database WODESIGN whose data are supplied by the WIPO (World Intellectual Property Organization) and the French patent office INPI (Institut national de la propriété industrielle).

It is worth to remark that with its databases and services including Derwent WPI, Inpadoc, Patolis-e, PlusPat (with about 50 million documents of 75 patent authorities), FamPat (a patent family file based

upon PlusPat; [9]) and its special offers such as the Derwent/INPI MMS structure database (Merged Markush Service) Questel-Orbit currently presents a large and comprehensive one-stop shop of patent information. The trademark content covers most European countries and North America (US, Canada, Mexico). Questel-Orbit's "piece of tenderloin" is undoubtedly the database PlusPat (with FamPat) – actually being the only product competing with Thomson Scientific's Derwent World Patents Index. Questel-Orbit's PlusPat has been derived from the European Patent Office's DOCDB database with enhancements from Inpadoc, US patents and Japio.

Aside from the International Patent Classification (IPC) some databases also use the more specific classification system of the European Patent Office (ECLA). Available in full text are patents of the European Patent Office, PCT patents, and patents from the US, France, Germany and Great Britain. The tool PatReader supports within-document retrieval, for managing of own patent portfolios Questel-Orbit offers the PatentExaminer.

3. Patent information

Research and development in a company may represent an economic risk unless patent information is considered. On the 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 you produce an invention and do not protect it from being used by others. An innovative company should avoid inefficient research, patent infringement and unprotected inventions, since all these things could result in high expenses. You must seek protection for an invention in each country where patent protection is desired. All worldwide patent applications and publications for an invention can be located by conducting a patent family search. How do individual patents interrelate? Which patent cites another patent and which patent does another patent cite? Citations and references are of paramount significance in the patent area. Here we have to point to the fact that although online information of the European and American Patent Offices does include citations, the patent offices of most other countries offer no options for searching citations. Furthermore, it is important to be familiar with the legal status of an invention. Is it just an invention description or has a patent already been issued, have there been oppositions, has the ownership been transferred, is the invention offered for licensing, has the patent expired?

Due to an international agreement (Strasbourg Agreement), patent offices and additionally all database producers consistently classify patent literature according to the International Patent Classification (IPC). Although the IPC lists over 60,000 classes, a search within a much-frequented class is seldom successful, since such a search would retrieve – on the lowest level of IPC hierarchy – thousands of matches. The 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 by the databases of the European Patent Office. Questel-Orbit uses ECLA in its PlusPat database for all patents of the PCT minimum documentation (about 40 per cent of all PlusPat records). David T. Dickens summarizes the merits of the ECLA system as follows: "ECLA is a powerful and valuable tool for online patent searching. Not only there are 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" [7, p. 32].

3.1. Patent search suitable for end-users: QPat

Questel-Orbit's search functionalities for patent searches are too complex to be described in detail. By the way, the handbooks are descriptive, easy to understand, and offer sufficient help. We limit ourselves to only some details and highlights. In this first part, we run searches on QPat (including the PlusPat database and the full-text databases). QPat [22] offers the following search modes to the user: quick, standard, advanced, patent family, citation and similarity search modes. You can also order patent documents, save results, and set up an alert.

Our query does not result in a hit list, but in the option to select a particular display format (DOC: short format; KWIC: with highlighted search terms; CLASS: with classification codes; LEGAL: with legal status and references; BIB/CLAIMS: with claims; FULL-RECORD: full-text record). Figure 1 represents the DOC format displaying patent number and type, title, inventor's name and patent assignee. When the system retrieves patent classification codes, it also provides a link to the ordinary expression. One or more documents can be exported without any problems. Formats supported are RTF and HTML. Also available is the delivery of documents with or without images via email. A nice additional option is the "Translate" option that, at least, provides a raw word-by-word translation through AltaVista's Babelfish (Systran). In addition, full text documents are, of course, available as PDF files (covering over 30 countries and international patent offices). The user can add full texts – if desired – to his/her own special collection or his/her "patent portfolio". Similarity searches start from a particular patent and open up a search window for the classification codes contained in the document text. Here, in order to allow more specific searches, further refinement is necessary, as to principal terms or references in the original source patent. One single click can achieve a family search for each patent document.

When the "Visualize Citations" option is used, it shows innovative and exciting features. By clicking the icons on the right screen margin, a table pops up first displaying the most important information: name of the inventor, name of the patent assignee, and notations of the American classification and the IPC systems. A click of the right mouse button offers further information. All references (i.e. those mentioned in the patent) as well as all citations (i.e. patents citing an original source patent) are searchable provided the corresponding patent database does store citation information. In the resulting clusters you can do further searching by highlighting particular patents. The arrows indicate the

The screenshot displays the Questel-Orbit QPat search interface. At the top, there are navigation tabs for Quick Search, Standard Search, Advanced Search, Family Search, Citation Search, Similarity Search, and Patent Delivery Service. Below these are utility links: Back, Update Info, Hit List, Refine search, Shopping basket, Scroll session, SubAccount, Create Alert, and Modify Alert. The search criteria are shown as Database: PLUSPAT, Results: 1, Standard Search: ((Stanford/PA)) AND ((Page/IN)). A Help button and an Analyze Top dropdown menu are also present.

Below the search results, there are buttons for Export Page, View Selected Records, and Select All/Select None. The View Format is set to DOC, and the Full Field Names checkbox is checked.

The main content area shows a single patent record for US6285999 - Method for node ranking in a linked database. The record details are as follows:

Patent Number:	US6285999 B1 20010904 [US6285999]
Title:	(B1) Method for node ranking in a linked database
Inventor(s):	(B1) PAGE LAWRENCE (US)
Patent Assignee:	(B1) UNIV LELAND STANFORD JUNIOR (US)

At the bottom of the record, there are buttons for Export Page, View Selected Records, and Select All/Select None. The page number is 1 / 1 PLUSPAT - @QUESTEL-ORBIT.

Fig. 1. Questel-Orbit's QPat: Hit list in short format.

type of information flow from the citing patent to its reference object. The arrows indicate the type of information flow from the citing patent to its reference object. The integrated software Anacubis creates star-shaped clusters; it illustrates content relationships between patents and shows their position within the technical information flow. The influence of individual patents is easily recognizable (by the number of citations). Anacubis exclusively works with direct citations. Patent co-citation and bibliographic coupling of patents are highly suitable for cluster forming; unfortunately, they are not applied on Questel-Orbit.

For a raw statistical analysis, QPat provides the command "Analyze Top". If the total number of hits is below 500, every patent will be analyzed, if it is above 500, the system is taking a random sampling. The ranking lists refer to the patent assignees and the three classification systems used (ECLA, IPC, US Patent Classification). The class notations are considered in full length; modifications (e.g. a restriction to IPC four-digits) are impossible on QPat; however, they can be made on QWeb.

3.2. Search for chemical structures: Merged Markush Service

Markush structures are generic structures that cover real and potential ("prophetic") chemical structures. "Normal" chemical databases such as the Chemical Abstracts Registry File or Beilstein do not index such prophetic structures. There are only two services in information industry today, MARPAT by CAS (available on STN) and Merged Markush Service (MMS), jointly produced by Derwent and the French patent office INPI (available on Questel-Orbit). In a comparative analysis, A.H. Berks concludes, "a comprehensive Markush structure search should employ both services" ([2, p. 12], see also [36]).

The term "Markush" describes a substance, substituent, agent, reactant or other material from a group consisting of certain specified materials, which can be an element, a chemical structure, a functional group, a class of chemical structures (such as alkyl) or of functional groups (e.g. esters). "The value of 'Markush' structures in patents is that a number of different chemical compounds can be described in a single chain. Markush structures are allowed in patents to protect the invention of related compounds without requiring the inventor to prepare and test each and every possible compound" [4, p. 1-3]. A search for Markush structures can be conducted in the MMS Structure File, hits are identified through a Compound Number (CN). The patent datasets are reached via links to the bibliographic databases of Derwent (World Patents Index) and of INPI (PharmSearch with pharmaceuticals patents from the US, France, the European Patent Office, and PCT) (Fig. 2). Questel owns a patent about a method and a storage and retrieval system of Markush formulae [32].

3.3. Professional search on QWeb: Patent family – legal status – patent informetrics

QWeb is Questel-Orbit's comprehensive system that allows the user to address all databases by using a command language (moderately supported by a search assistant). The command language is fairly advanced (it includes e.g. an unlimited left truncation) and meets (practically) every desire of the professional searcher. From the wealth of possibilities we choose as an example the search for patent families and their citations, as well as the legal status of a patent, and the informetric analysis. In contrast to QPat, which only contains PlusPat and full-text databases, QWeb provides all patent databases, including Derwent's World Patents Index and INPADOC.

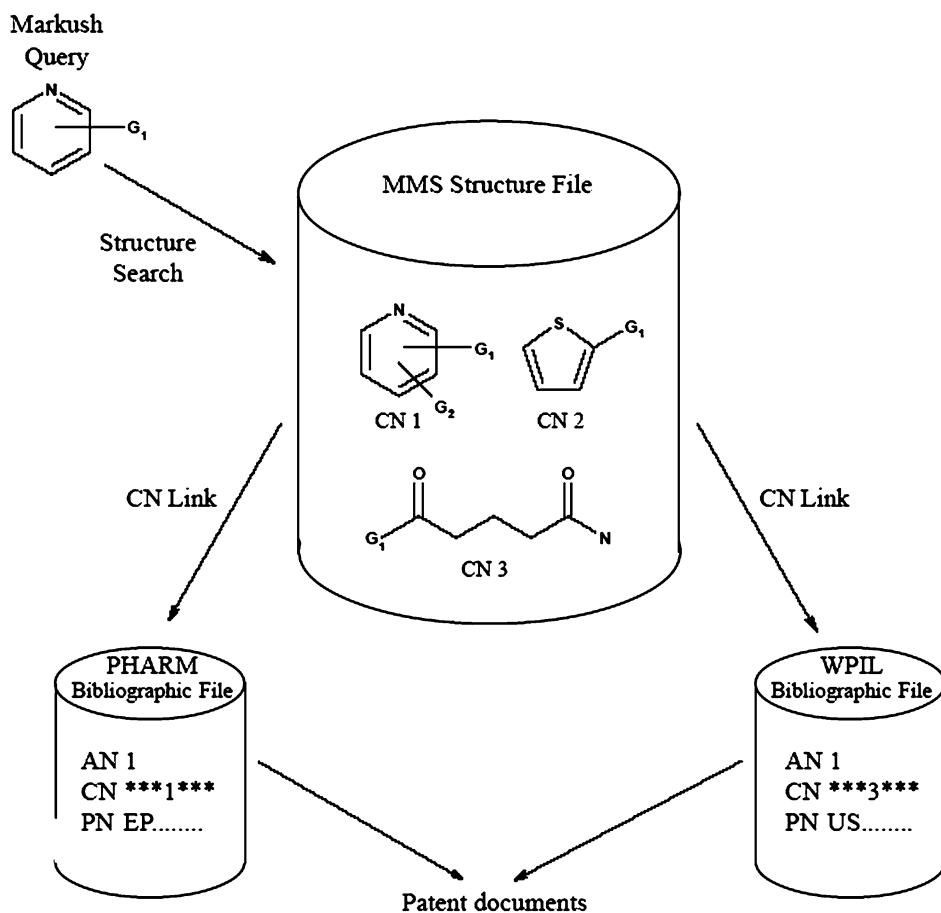


Fig. 2. MMS: Search for chemical structures in patents (Source: [4, p. 1-15]).

Starting with the patent WO9809013 by Finden Coatings in Nottingham we want to know in which countries this invention was filed for application. Patent family search is offered as a separate menu item within the search assistant in whose dialogue the FAM command starts the family search. Family members are displayed with the serial numbers providing links to the corresponding datasets. Of course, we can also search for references and citations as we can on QPat. In addition, the command FAMCITE considers every family member of a patent in the citing as well as in the cited literature.

Legal status information is available from 42 patent authorities. Legal status search can be conducted after a family search by using the command FAMSTAT. It displays the whole documented history of an invention. Attention needs to be paid to the indeed long time period of prosecution between the filing of the application and the issue of the patent. It also has to be taken into consideration that the patent offices need a long time until they are able to present a patent application in full text. An example to illustrate this problem is the following: The English company Finden Coatings filed a patent application on March 18, 2003 with the British patent office. On April 23, 2003 only the title, the patent applicant, the application date and the number – and nothing else – were published in the “Patents and Design Journal” No. 5944. Exactly the same information can be retrieved from PlusPat on Questel-Orbit, too. Until the patent office publishes the patent specification – and this can take long time – content and

claims of the filed patent are left in the dark. It is not Questel-Orbit but the patent offices that must be considered a hindrance to an optimal and actual retrieval.

Informetric search possibilities were offered for years on Orbit (remember GET) as well as on Questel (MEMSORT). Ranking lists can be created by using various fields. In combining these with the citation analysis tools the user has powerful options for patent informetrics. In our example we use the command MEMSORT. Let us suppose that an unknown competitor called Boll & Kirch enters our market. We now want to know the company's area of R&D-emphasis. This time we select the Derwent database because it provides patent families already as documentation units and therefore represents a clear counting basis. We approach R&D via the notations of the International Patent Classification (IPC). In order to get a general idea we restrict our search to the IPC 4-digits. After we have found 32 patent families by using the PA qualifier Boll Kirch, we apply the command MEMS 1-32 Top 10/IC LG4 and receive the following top-10 codes:

Rank	FREQ	Term
1	31	B01D
2	2	F02M
3	2	F15B
4	2	F16K
5	1	B05B
6	1	B23Q
7	1	C02F
8	1	C10M
9	1	D03D
10	1	F01M

This rough survey plainly indicates the technological areas Boll & Kirch is working on. The IPC 4-digits are on such a high level of hierarchy that they clearly reflect the business lines a company is committed to in its R&D. This can be helpful to economic experts, e.g. when preparing a competitors analysis. In our example, we first wanted to find out the key business lines of Boll & Kirch. The ranking clearly shows a single section on which 'our' company concentrates: separation (IPC B01D).

In a second step, bordering on the IPC's limits of what is possible, we formulate MEMS 1-32 Top 10/IC.

Rank	FREQ	Term
1	9	B01D-029/68
2	7	B01D-035/22
3	6	B01D-029/66
4	5	B01D-029/38
5	4	B01D-024/46
6	4	B01D-029/11
7	4	B01D-029/50
8	3	B01D-029/52
9	3	B01D-029/54
10	3	B01D-029/62

Now the details become visible. The complete IPC codes target the technical expert. Not only the lines but also the subsections of R&D are displayed here. In which special fields of separation did Boll

& Kirch file the highest number of patents? The ranking shows several technical fields of which the following two are obviously central to the technical development of ‘our’ company: “Regeneration of the filter material in the filter by flushing with backwash arms, shoes or nozzles” (IPC B01D-029/68) and “Directing the mixture to be filtered on to the filters in a manner to clean the filters” (IPC B01D-035/22).

3.4. PatentExaminer and PatReader

PatentExaminer is a patent portfolio management system. Its groupware features provide corporate-wide access to patent knowledge. PatentExaminer imports search results or SDI alerts, sorts and filters records according to user needs. For examining patents, this product offers a side-by-side display of both text and images and ASCII- and PDF-texts, it allows rating and annotating documents. The user can enter words or word stems to highlight in the full-text window.

PatReader, using Lingway’s linguistic technology, is a tool for scanning full-text patents. If you consider the fact that some patents contain considerable amounts of text, this is a tool for speeding up the reading process of extensive patents. Beyond the scanning of query-related text parts, PatReader offers automatic text summarization. PatReader is on the way to a special kind of information retrieval: passage retrieval.

4. Trademark information

Whereas patents refer to the protection of particular inventions of a company or developer, trademarks aim at the protection 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 competition success in its respective markets. Well-established marks imply associations acquired by the consumers by force of habit: either confidence (e.g. assumption of good quality) or dislike (e.g. branding as low-value product). Marks positively or negatively affect consumer behavior. Hence, every company is concerned about detecting names that are easy to remember, about establishing and protecting them against copying. In the Internet Age, protection of one’s own domain name is steadily increasing in significance. A domain name provides identification and access to a website. Questel-Orbit [33] offers search options for finding out whether the mark under consideration has already been registered in a particular line of business and in a particular country and is therefore no more available or whether a domain name is already existing for a company or a mark, and provides a push service as control function that monitors the relevant registered marks of a client, so that no one else makes illegitimate use of this protected mark.

Let us turn to the functionalities of the TrademarkExplorer. The screen of the trademark search is clearly structured and easy-to-use, searches can be performed for one or more countries. If users do not want to search for the exact mark, but want to search for similar terms, they can do so by either truncation or selecting a field from the “Name Explorer” menu box. If we input “Microsoft” and select e.g. the field “Similar Trademark” to search for a similar mark, if we furthermore lay down the similarity level and the initial letter, the system automatically creates a fuzzy search in the field “Construct a Search”. The fuzzy search replaces one or more – according to user selection – consecutive characters by a wildcard; a fuzzy search for several characters that need to be replaced at different places in the word is not successful, though. Therefore, the mark “Microsoft” cannot be retrieved from a search for “Mikrosaft”, since “k” and “a” are not neighboring characters. There was no phonetic trademark search on Questel-Orbit. But the acquisition of Edital in 2005 does fulfill this function through its CaTaMaran online service.

Of course, the user can also create an individual search query. Since marks are always protected within particular classes, it is important to be able to search also for these classes. The field “International Classes” provides an index (Nice classification) that can be opened as required and from which you can transfer the selected class(es) (i.e. contractions) into your search. The classification is available in English, French and German.

After running the search the system displays the number of hits in each database. The user decides whether he/she wants to get all the hits displayed or only those from a particular database. He/she selects the display format (Trademark & Class; Trademark, Class & Owner; Trademark, Class, Number & Owner; Full Document) and – if desired – the image of the mark i.e. the logo. The stylized writing characterizing and identifying ‘our’ mark will be displayed and can be downloaded in TIFF format. The following trademark information will be displayed: type of mark (e.g. trademark word or image), legal status (e.g. registration), number and date of filing, proof of publication, owner’s name, address and country of origin, Nice classification codes (additionally mentioned: products and services); and for trademark images: Vienna classification codes (though not verbalized here), protection duration and expiration date as well as past occurrences (e.g. exceeded deadline for objections). Links lead to possibly available domain names as well as to a direct search on Google Web and Google Images respectively. The acquired company Edital offers a portfolio management system for trademarks. There is no retrieval option to work with the trademark image itself.

Domain names are searchable either by starting from the main menu screen of the TrademarkExplorer, or, if a trademark search has already been performed, you follow the link on the document display page. For search limiting purposes three category groups are available to be inserted altogether or separately into the query: “Trademark Groups” representing country groups (e.g. EFTA, European Union), “Geographic Groups” representing countries divided according to continents, “Other Groups” such as global top 50 countries and the 14 generic Top-Level Domains (gTLDs – e.g. .com, .org, .edu, .gov). You can extract certain global and certain less relevant TLDs and add single desired TLDs. Identical as well as similar domain names are researched, the latter by means of truncation. The system displays a list of all domain names retrieved as matches.

5. The company and its market

Focusing on information about intellectual property rights, monitoring user behavior and enhancing customer service are – according to Questel-Orbit in the questionnaire – the strategies for further company development. In an interview with Marydee Ojala Jean Besson emphasizes the impact of the five “I’s” on the company: “Innovation, Internet, International, Intelligence, and Intellectual Property” [28, p. 26].

Not only STN International ([40,41]; for CAS see [35]) and Thomson Delphion are considered competitors by Questel-Orbit itself, but also all free services offered by the patent offices and here those by the European Patent Office (EPO) [24,29] in particular. In our opinion also MicroPatent, Thomson Scientific and Dialog (like Delphion all parts of the Thomson Corporation) must be considered competitors. Dialog [6,37,38] offers important patent databases in context with various specialized scientific/technical databases; Thomson Scientific [39] possesses with its Web of Knowledge the patent database of Derwent that is flanked by the Science Citation Index and other science-oriented products; Micropatent [26] has patent databases and with Aureka it is being provided with a means for conducting informetric analyses and for visualizing search results. Figure 3 shows the three blocks of companies and offices that compete

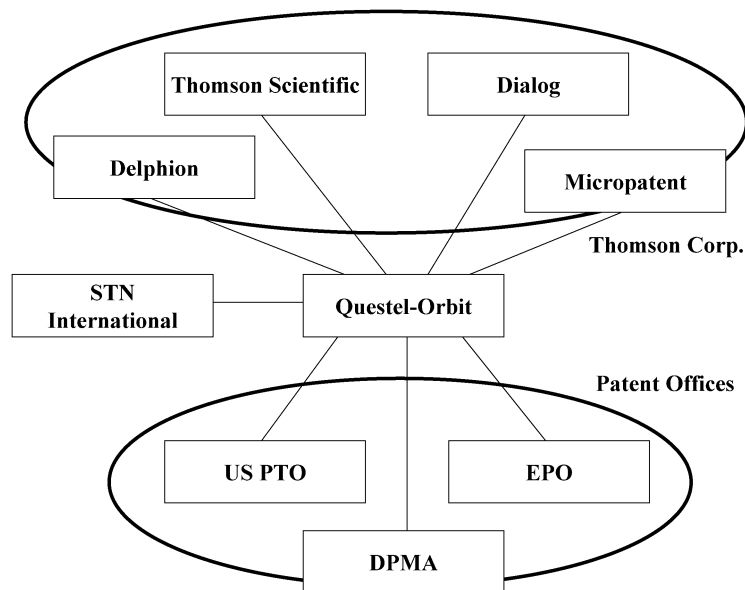


Fig. 3. Questel-Orbit and its competitors.

with Questel-Orbit: the companies of Thomson Corp., the partners of the STN combine and the national and supranational patent offices [44]. Additionally, there are competitors from the group of software companies, which offer specific program tools for patent text mining or patent mapping (see e.g. [10, 11]). Together with other companies and institutions Questel-Orbit is a member of PatCom [16], which is a communication platform for commercial patent information suppliers and European Patent Office. Questel-Orbit and other commercial information suppliers such as Dialog, Delphion, MicroPatent, Patolis and STN International get the bibliographical and legal status information from EPO paying only EPO's marginal costs [29, p. 23].

What does Questel-Orbit have to offer what the competitors do not have? Three unique selling points are mentioned in the questionnaire: (1) biggest combined offer of patent databases (Derwent and full texts and PlusPat and Patolis), (2) exclusive offers (e.g. PlusPat or MMS) and finally, (3) longterm experiences in the area of intellectual property rights.

To our question, which cooperation partners are considered to be the most important, Questel-Orbit responds in a detailed and argumentative way. Very interesting is the incorporation of the user into the group of important partners, since the user is seen as essential in the process of offer creation. Questel-Orbit offensively pursues a Customer Knowledge Management, i.e. they learn from the customer and with the customer. This seems very important to us, since especially in the information market, through constant use of databases and retrieval systems, one or other of the power users might know more about this matter than the employee of an information provider. On the side of information suppliers the patent offices and the database producers like Derwent, Patolis and CompuMark are appreciated as cooperating partners. Some of them are also seen as competitors: Derwent offers its information also on the Web of Knowledge, the European Patent Office operates a host of its own. The juxtaposition of cooperating partners and competitors does not at all seem to be unusual in the information industry [42]. Equally important, especially during the current development, are the partnerships with software companies that provide analysis programs. Emphasized are the business connections with Anacubis and Lingway.

Questel-Orbit offers two price models: fixed fee subscription (the dominant model) or pay per view. The pricing policy is not at all simple in the variant pay per view. Various items are charged. The annual contract fee amounts to 350 EUR for a UserID; each additional UserID assigned to users within the same organization is charged at the rate of 50 EUR. The use will be charged monthly, if a minimum amount of 200 EUR is reached. Billable elements include connect time, document delivery, special commands as well as patent full-texts in PDF format. In the patent sector the prices for using e.g. DEPAT are 175 EUR (connect hour), 1 EUR (document) and 28 EUR (per periodic SDI run) or for using Derwent's World Patents Index 365 EUR (connect hour), 6.12 EUR (document) and 152 EUR (per monthly SDI run). PLUSPAT comes to 170 EUR (connect hour), 1.50 EUR (single patent document display), 16 EUR (patent family display) and 28 EUR (per periodically executed SDI run). PDF full-texts are offered by the Patent Delivery Service at 3 EUR. In the trademark sector, information is more reasonably priced. Most of the databases are priced at 60 EUR (connect hour), 2.70 EUR (document) and 12.50 EUR (SDI run). The delivery of a domain name is charged at 0.50 EUR. Special commands have their own prices. So the informetric analysis on MEMS or GET, for instance, is billed at the rate of 7 EUR per command. The search help PatReader is charged at 6 EUR per document. If you would like to make use of the PatentExaminer, you have to pay an annual subscription fee of 5,000 EUR. The price model of pay-as-you-go is extremely varied and – at least for non-professionals – not simple. Such a complicated billing system may deter some customers from usage. Furthermore, the products are placed in the high price segment without exception. Questel-Orbit is certainly not free to decide, but is dependent on the price policy of its database suppliers. By the way, similar price systems can also be found with STN International or Dialog.

Questel-Orbit's critical success factors focus above all on two areas: the expansion of the B-to-B market and strategic alliances with other enterprises in the same line of business. Both factors are rated 1 on a scale from 1 (extremely relevant) to 6 (completely irrelevant). Cooperation with enterprises in the New Economy, a wider offer of databases, and the more reasonably priced input organization reach a value of 2. Uniform indexing across all databases, more powerful automatic indexing systems and full-texts in the original layout are in the middle range (3). More powerful Boolean retrieval systems and business line marketing are rated little relevant (4). Cooperation with universities, libraries and publishing companies is not seen as a success factor (5). The B-to-C market is not a business model (6) for Questel-Orbit.

In the questionnaire we wanted to know how the company has developed in the last five years and how it might further develop in the next five years. Questel-Orbit's turnover was more or less stable during the five years interval under consideration. In some countries, e.g. in Germany, the turnover is very low. Due to a drastic enhancement of the profit and loss account, the investments in new services could be expanded. The core business and the area of intellectual property information registered an increase in turnover; marginal products like press or enterprises databases showed a decrease in turnover. For the next five years the host expects a steady growth of approximately 5 per cent per year.

The development of the number of employees is subject to strong changes. Since the IPG, i.e. the Besson family, took charge of Questel-Orbit, taking over from France Telecom, the enterprise has shrunk to profitable size, i.e. from 160 full-time equivalents down to presently 100. Most personnel were reduced in the computer operations area. The focus is put on qualified personnel in core business and the phasing out of auxiliary functions. In the 5-year future perspective, Questel-Orbit will pursue the strategy to shrink in-house help services, but to expand marketing, sales and product design. Strong have been research and development in the past, strong will they remain in the future. Especially by expanding

staff in sales and other customer interfaces, the number of employees should mount to about 120 full-time equivalents. What are the staff qualifications that Questel-Orbit depended on in the past, what are those it will be dependent on in the future? Here, a clear trend appears: Has it formerly been dependent on every aspect of computer science, the qualification structure is shifting towards experts in information content ("content experts" we read in the questionnaire) as well as towards specialists in content software à la Anacubis, and consequently towards information scientists.

The number of contracting customers remained constant over the last five years; however, there have been shifts in favor of large-scale enterprises and to the disadvantage of smaller companies. Within the enterprises new user segments were endeavored to be gained, in order to address not only information professionals, but to reach the "professional end-users". This strategy gives cause for hope to be able to serve about 5 per cent more customers every year. How about occasional customers on the internet? After not very successful experiments on QPat B to C is not a business model for Questel-Orbit; they concentrate exclusively on B to B.

Has the company been harmed or rather benefited by the internet? In the past, there have been problems as well as advantages. Problems arose above all from free services on the WWW. Everybody can perform a – though ponderous and incomplete – search for information on intellectual property protection, free of charge, in the databases of patent offices. Advantages of the internet include flexible possibilities for cross-linking data (documents, codes, etc.) and a number of worldwide acknowledged standards like XML. Questel-Orbit sees only advantages in the future. This also means that the company has to innovatively adapt to the new environment. The main innovations of the past five years were the adaptation to the world of the Web and the management of vast databases. PlusPat, for instance, reaches more than 45 million patent documents that provide, for the most part, images and PDF full-texts. Innovations planned for the next five years concern rapid and completely new output processes such as Anacubis graphs or Lingway's "Analytical Patent Reader" as well as the further elaboration of the trademark similarity search by means of informational-linguistic methods or neuronal nets.

Questel-Orbit sees a pent-up demand for the provision of full-text data. In their opinion, the report export functions, further processing steps and offers tailored for various user segments need to be expanded.

6. Conclusion

Finally, we would like to present a short SWOT analysis of Questel-Orbit. Strengths and weaknesses concern the company itself, whereas opportunities and threats elucidate the company's position on the market.

The strengths of this online provider clearly lie in the patent and trademark information sectors in conjunction with retrieval commands synchronized therewith. In comparison to competitors, Questel-Orbit's patent databases include broad content, probably the most complete collection in the world. In comparison to its competitors, Questel-Orbit's trademark databases are a little smaller than Dialog's. But both suppliers, Questel-Orbit and Dialog, do not cover the world-wide trademark information. Worth to mention is the use of the ECLA codes in some patent databases, which allows for a far more refined retrieval than the otherwise usual IPC. Questel-Orbit, being itself strongly R&D driven, provides innovative search and processing options. The database of Markush structures is an important tool for the patent retrieval in the areas of chemistry and pharmacy. QWeb is a matured retrieval system, which, however, only highly specialized information professionals are able to operate. Commands like e.g.

FAMCITE considerably facilitate the work of experts; rankings can be created by using MEMS. PlusPat (with FamPat) is – aside from Derwent's World Patents Index – the biggest database in the world that provides (with QWeb) an end-user oriented interface and thus targets professional end-users. The Visual Citations option is a first step in the direction towards the visualization of informetric results. Trademark-Explorer contains the trademarks of important industrial countries. The trademark similarity search that is able to handle different truncations must be particularly mentioned here. The products PatentExaminer and PatReader already cover the fields of portfolio management and within-document retrieval. From a business management view, the fact must be emphasized that with a relatively small number of employees (and therefore low personnel costs) Questel-Orbit has created very interesting and partly worldwide unique products (like PlusPat). In addition, it seems a strength to us that the host knows to shift the focus from a more computer science-oriented to a content- and thus information science-oriented attitude.

The main weakness might lie in the turnover – at least in some countries (as e.g. in Germany) where Questel-Orbit – or more generally spoken: the facility for retrieving information on intellectual property rights – is much too less known. Many enterprises are not aware of how important intellectual property information may actually be to them [13,14]. The marketing of a special business with information about intellectual property rights should start from this point by “collecting” the customers from there. For Questel-Orbit, cooperation with universities is no critical success factor. This can be a risky policy, for universities and their libraries are the places where the future patent and trademark specialists – i.e. the current students in the schools of technology, business administration, information science and economics – can be found. We recognized a weakness in content represented by a lack of patent information including biosequences. In trademark information, Questel-Orbit consists only on 25 databases of trademarks authorities. In contrast, there are more than 50 authorities which publish trademark information online. There are no Japanese trademark information on Questel-Orbit, but on the system of one of the main competitors, Dialog. Markedly weak is the offer for information on designs. The not always transparent price system – outside the fixed fees – could deter users. If Questel-Orbit was able to reach more customers, this would lead to a higher turnover and to possibilities for expanding its own research and development.

That brings us to the opportunities. We see possibilities involving the acquisition of new customers. The strategy followed by Questel-Orbit itself to gain further user segments in large-scale enterprises that are already clients may be successful if the retrieval systems are made easier and can be used by end users, and – above all – if informetric analysis and visualization are driven forward. In particular, we see especially in a R&D driven enterprise like Questel-Orbit optimal conditions to implement the results of information science.

Risks lie on the one side in the competitive situation with the commercial, chief competitors Thomson Corp. with e.g. Dialog as well as STN International; on the other side risks lie in the free offers by the patent offices that provide free information on intellectual property rights as a universal service. Fortunately – for commercial information providers, not for the customer – the patent offices' databases are sub-optimal – the content is incomplete, the retrieval systems hardly offer convenience, the page-wise document output of some systems is awkward. The risk decreases when Questel-Orbit generates informational value added in content, functionality and usability, which the commercial and public competitors are not able to offer. Another risk lies in the lateral entries into the market, who provide analysis systems with specialized software and who commercialize these as a tool for Competitive Intelligence and other business management tasks. Here, Questel-Orbit can hold against it, however, it has to learn to expand its marketing business also towards intellectual property information as law and business information and not only as technological information.

So, will the online hosts faced with the internet in general and our case study Questel-Orbit in particular become extinct, as did the dinosaurs? According to our analysis, a prediction should be cautiously optimistic. According to J. Besson, Questel-Orbit is sufficiently equipped for the future. "By concentrating on the intellectual property niche, Questel-Orbit is ensuring its survival in a Web world" [28, p. 30]. Important for the survival of online hosts might be: (1) a content as complete as possible in the topic area (on Questel-Orbit: bibliographic displays and full-text for all patents, utility models, trademarks and designs worldwide) as well as (2) the consistent application of results provided by information science, which differentiates them from free and unique commercial information providers on the WWW. Elaborated documentary means such as taxonomies (e.g. the ECLA system used with patent information and the Vienna classification with trademark information) should be offered in an end-user comprehensible interface. The results of informetric researches (such as, e.g., bibliographic patent coupling or patent co-citation) should be usable as easily as possible and should lead to a comprehensible and clearly visualized retrieval.

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