

# Open Access Intellectual Property Systems: A Comparison to Commercial Solutions in Competitive Intelligence

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**Abstract:** *ICT/IS management plays an important role within the framework of innovation management, and one of the key elements of this role is the support of Competitive Intelligence in the context of innovation processes. The strategic information needs of innovation management are also directed towards different kinds of intellectual property (IP) information entities and commercialization.*

*The purpose of this paper is to define these entities and IP information systems as an important part of a company's Competitive Intelligence Unit for competitor analysis and technology trends. The open access IP information systems will be analyzed together with commercial solutions.*

*The aim of this paper is to underline the importance of open access IP systems compared to added value commercial solutions for competitive intelligence purposes for SMEs. The comparison will be carried out using examples of patent searches within a concrete dataset.*

**Keywords:** Competitive Intelligence, Patent Databases, Patent Searches, Search Strategy, Comparison

## 1. Introduction

In the present turbulent environment, intellectual property information plays a significant role for innovative companies and has become a solid part of their innovation management (Kim & Lee 2015). Companies usually support their R&D activities with technology intelligence processes to sustain their market share within a given segment (Coburn 1999). Different kinds of business information for innovation purposes bring competitive intelligence as a solution. Moreover, these companies use competitive data and information for better decision-making; we can also observe the increasing need for sharing of sensible business information including patent information (Vorisek et. all, 2011), and other IP information such as trademarks, utility designs and industrial designs.

Firstly, management information needs are also directed towards protection of their technologies and, in addition, to face more effectively any possible negative surprises such as an infringement, non-patentability, etc. Secondly, companies need to follow their competitors' activities, and monitor potential disruptive technologies. Thirdly, the IP information also works as a tool for human resource management in R&D.

From this point of view, we can see IP information systems as an important part of business ICT/IS structure, and as a key source of competitive technical intelligence activities. In this paper therefore, we will analyze IP open-access information systems in contrast with commercial solutions focused specifically on patent information.

This paper will have the following structure:

- Types of patent searches
- IP open access information sources (Patentscope)
- IP commercial vendor solution (Global Patent Index)
- Comparison
- Conclusion

## 2. Types of Patent Searches

In general, patent information provides unique access to technology information and has a significant impact on strategy planning and decision-making. As we weigh the importance of patent information gathering, we need to focus on specific situations and purposes, and the proper search type together with a search strategy must be chosen.

### 2.1 State-Of-The-Art Search

One of the most important patent searches before any R&D activity begins by focusing on an entire overview of a technology field through the state-of-the-art, a.k.a. prior art search. This is a comprehensive search of all available patent and non-patent literature and leads to a large set of references. Moreover, this search does not focus on one single invention or company, but tries to analyze as much information as possible from a given technology field. This is one of the main features that differentiates a state-of-the-art from other search types. (Hunt et al. 2012)

When conducting a prior art search, the searcher should use different levels of patent databases in the following order:

1. Databases with global coverage (e.g. WIPO, Espacenet, TRI)
2. Databases with specific geographical coverage (e.g. national office databases)

To have a complete state-of-the-art we should also consider non-patent information sources including the surface web. The reason comes from a legal perspective of state-of-the-art, to find the required evidence of specific technology.

### 2.2 Novelty Search

Before any patent application is filled, the novelty (patentability) search should be performed. The searcher focuses on patent claims as the main part of the application that describes new perspectives of invention. Moreover, a search report informs the inventor of relevant patents, or applications and their claim limits. This might be helpful when the inventor (or agent) creates patent claims as it has an impact on the strength of patent protection. However, according to (Hunt et al. 2012) we need to see two different obstacles why novelty search is often underestimated:

- a) The inventor is so well informed about state-of-the-art that he fills the application without claim exploration.
- b) Companies often shrink under time pressure as they pretend other subjects would like to obtain the patent protection on the same concept and fill their application as fast as possible. This trend is usual in countries with a first-to-file system, rather than first-to-invent countries.

As in the case of prior art searches, the novelty search should consider global patent databases, national databases and non-patent sources. The main attention is directed towards patent claims.

### 2.3 Validity Search

Competitive environment in the field of innovations often brings the situation that the companies need to find an evidence that the competitor patent should not be granted as its claims contain publicly known information. This is the reason why a validity (or invalidity) search is being conducted – to show that the patent claims were granted misguidedly. In contrast to a novelty search, a validity search starts after the patent is granted.(Hunt et al. 2012)

As mentioned above, the main part of a patent application where a search needs to be performed is the claim part. To avoid non-relevant documents, the search syntax should contain a priority date. However, the searchers are looking for any detail in other types of information sources including technical or non-technical literature.

### 2.4 Infringement Search

When the company needs to check for a possible conflict between its still unpatented invention and any possible existing one, it conducts an infringement search. This should only cover in-force patents (usually 20 years) and should maximally focus on the claim part. There are mainly two search approaches (Koch & Bosch 2011), (Hunt et al. 2012):

- to copy suggested claims in draft and compare them with possible duplicity
- where claims are not defined, it should follow the description and define hypothetical claim versions

## 2.5 Clearance Search

This type of search, often also known as right-to-use or freedom-to-operate, solves an information need as to whether a subject is allowed to make, sell and use a specific invention. The clearance search should be taken as a broader version of the infringement search because of its global focus, not just one geographical area. As sources we consider global patent and non-patent literature, as we need to determine if the specific technology is free to use or not (Koch & Bosch 2011), (Hunt et al. 2012)

## 2.6 Patent Family Search

A patent family is defined as a set of patent documents, where its members have claimed the same invention or innovative concepts as filled in the priority document, and where they have been filed in different regions or in the same region but at a different time (WIPO 2013), (Pičman 2009).

We use this search to determine the potential geographical validity, but also the significance of the invention. For the purpose of this paper we will use a simple patent family concept. According to (EPO 2016b) a simple patent family means all documents that have exactly the same priority or combination of priorities belonging to one patent family.

## 3. Comparison Study

There are plenty of patent information sources on-line that help companies to monitor the technology trends, competitor activities in the R&D field or to support their intellectual property management when filing their new inventions or innovations.

For the purpose of this study we have distinguished between the patent information sources as follows:

- Open-access global patent databases
- Commercial global patent databases
- National patent office databases

Open-access systems with global coverage often represent initial and important sources for competitive intelligence research, or for innovation management in technology information. We have examined the Patentscope system operated by the World Intellectual Property Organization (WIPO) as the administrating institution of Patent Cooperation Treaty. It will be compared to the Global Patent Index (GPI) as a commercial global patent database of the European Patent Office (EPO).

Both sources work as aggregators of national patent data and data from PCT applications. This fact does not imply that only these sources should be used when different patent searches are being conducted. Furthermore, we highly recommend using the national patent office databases even though there are some obstacles in terms of usage and search possibilities. The leading innovative countries do provide professional search systems (e.g. DEPATISnet) with broad search and analytical possibilities (Jürgens & Herrero-Solana 2015), however a typical national database provides country coverage, albeit with limited analytical possibilities or with limited search options. In some countries, searchers may also struggle with a whole array of patent information systems. For example, India only recently solved the problem of the decentralization of access to patent documents (Moholkar et al. 2015). On the other hand, national databases play a significant role in different types of patent searches, mainly in clearance or infringement searches<sup>1</sup>. Moreover, countries such as Iran that had very poor database quality in the past, have improved it significantly (Bagheri 2014). In another example, Myanmar has started to negotiate cooperation with the Japanese government to establish a national patent office based on a Japanese solution, including making patent information accessible (Zin 2015). These experiences mirror the trend to make patent information as accessible as possible, even in countries whose patent law did not significantly support this, or even ignored it completely. Present business needs reflect the great importance of IP information especially in developing countries and their innovative activities (Takagi & Czajkowski 2012). The operating SMEs in these

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<sup>1</sup> Patent search types will be defined in the next chapter.

countries faced the excessively high costs of patent documents in the past and also the very long process of retrieving patent information (Dou 2004). These events can be summed up in the following points:

- The actual state of any given national economy mirrors the level of business informatics in the companies. If the economy is growing, there are many specific requests on it, including the support of R&D, new product and service sales, entering new markets, taking care of new customers, suppliers and others (Voříšek & Pour 2012). Commercial patent systems play a strong role in this situation because of deep analysis options and value-added information.
- By contrast, a decreasing economy tends to bring cost-cutting in business informatics in particular, and also to limit investments and stop projects with limited revenue possibilities (Voříšek & Pour 2012). In this case companies can mine at least the open-access patent sources. Nevertheless they must count with a longer search process, limited analyses and no value-added information.
- Patent systems are a solid part of business informatics. IT departments should analyze the situation in the IT market (Voříšek & Pour 2012) for IP systems too, e.g. the vendors, pricing, product portfolio, etc.

This paper will analyze the level of IP information services of Patentscope and GPI as a base for IT department decision-making in terms of usage. The comparison will follow this structure:

1. Data coverage
2. Search possibilities
3. Data analysis outputs, including patent family analysis

### 3.1 Patentscope

The WIPO Patentscope (WIPO 2016b) is one of the most usable open-access patent databases with global coverage.

#### 3.1.1 Data Coverage

At the date of this study it provided over 51 100 000 available types of patent information including (WIPO 2016b):

- Latest bibliographic data available to the International Bureau
- International Application Status Reports
- Published PCT international applications in image format.
- Text of description and claims for applications published in:
  - English, French, German, Spanish or Russian
  - Japanese (since 2008)
- Priority documents
- Declarations (PCT Rule 4.17)
- Complete PCT file contents
- PCT National Phase Data

From this point of view we can see the importance of Patentscope concerning the broad range of valuable information.

**Bibliographic data** serves as the first source of descriptive secondary information and provides the first insight into invention or an innovation solution. In Patentscope it usually covers:

- Publication Number and Date
- Application Number and Date
- International Patent Classification Code
- Inventor Name
- Applicant Name
- Agent Name
- Priority Data
- Patent Title

- Patent Abstract
- Designated States
- Publication Language
- Filing Language

**An International Application Status Report** linked from the patent record provides information about the phase of patent application. This contains the key information about the formal acceptance of the application, including an international search report and an international preliminary examination report. If the patent application is provided with drawings, they can be downloaded in **TIFF image format** directly from the patent record. When it comes to the content, WIPO has made significant improvements in the availability of Asian patent documents, and now belongs to the few open-access systems that have started to provide search possibilities in national collections of Japanese, Chinese and Korean patent information. Furthermore, it has been possible to explore Japanese **patent claims and descriptions** since 2008. These can also be searched in English, French, German, Spanish or Russian. **Priority documents** are the original applications from the national patent office and these can be downloaded from the patent record. **Declarations** provide complex information about the procedure of the invention or innovation. **Complete PCT contents** cover, for example, PCT request forms, correspondence, copies of forms, and original documents filed by applicants and other entities. **PCT National Phase Data** is provided by national patent office and indicates that the applicant has requested the application in a given office.

Geographical data coverage is a great advantage of Patentscope. It contains data from 148 countries under the Patent Cooperation Treaty. This does not mean that contains all the data from all participating national offices. Some offices provide only PCT phase applications, so in some cases the searcher needs to perform a search in a national office collection.

### 3.1.2 Search possibilities of Patentscope

Patentscope offers three types of search frameworks: Simple search, Field Search and Advanced Search and Cross Lingual Expansion (CLIR). For the purpose of this study we have chosen the advanced search options as a professional search framework (WIPO 2016b).

**Figure 1 - The advanced search framework**

Firstly, the advanced search framework works with the following search tools (WIPO 2015):

- Boolean operators  
AND, OR, NOT, ANDNOT, "+", "-" are the basic logical connectors in the system. The AND operator is a default value between two terms (or phrases). The ANDNOT operator has the same function as the NOT operator.
- Field codes  
The searcher can conduct a search in all bibliographic data fields. This search feature is necessary to use when complex patent search tasks are being conducted.
- Proximity Operators  
The NEAR, BEFORE and "~" proximity operators are used in patent searching to determine the distance between two terms (or phrases), especially in situations when the search needs to narrow the result set, or increase the relevancy of the set.

- **Wildcards**  
 Patentscope offers stemming as a default search option, however the searcher can affect the shape of the word by using wildcards.
  - auto\* gives back the words as *automotive*, *automat*, *autonomy* etc.
  - colo?r gives back the words *color* and *colour*. It is important that in Patentscope the question mark replaces null or one character.
  - mo\*le gives back the words *mobile*, *molecule*, etc. The asterisk in the middle (or at the end) can also replace null characters.
- **Grouping**  
 The grouping function enables the search to determine logical sets in the syntax. The terms (or phrases) in the most deeply nested groupings are searched first.
- **Fuzzy Search**  
 The similarity of the words can be affected by fuzzy search through the operator “phrase”~x.x. The value range is 0.0-1.0. The lower the value is, the more vague terms will be searched.

Let's give an example of search syntax with the following information need: *The latest developments in the field of Husqvarna lawn mowers.*

```
(EN_TI:"lawn mower*" OR EN_AB:"lawn mower*" OR EN_CL:"lawn mower*" OR IC:"A01D")) AND PA:HUSQVAR* AND DP:[2015 TO 2016]
```

If we analyze the query tree, we can follow the search logic of the system:

```
+(EN_TI:"lawn mower*" EN_AB:"lawn mower*" EN_CL:"lawn mower*" ICS:a01d) +PA:husqvar*
+DP:[1420070400000 TO 1483228799000] --> 89
  EN_TI:"lawn mower*" EN_AB:"lawn mower*" EN_CL:"lawn mower*" ICS:a01d --> 82265
    EN_TI:"lawn mower*" --> 5586
    EN_AB:"lawn mower*" --> 4256
    EN_CL:"lawn mower*" --> 2408
    ICS:a01d --> 78711
  PA:husqvar* --> 2089
  DP:[1420070400000 TO 1483228799000] --> 2611047
```

The first grouping represents a search in the fields of title, abstract and patent claim, followed by the subclass of international patent classification (which covers the field of “harvesting and mowing”) with the OR conjunction. This part of the syntax must be kept together with a given patent applicant<sup>2</sup> and a date range.

This example gives us a good overview of how the structure of the search query can be built based on specific information needs.

### 3.1.3 Analysis possibilities

Patentscope offers simple but information-rich analytical output from result sets. The table in the figure below shows the information entities that are being analyzed. We continue here with the Husqvarna example.

<sup>2</sup> Husqvar\* is used here because of different records of the company name.

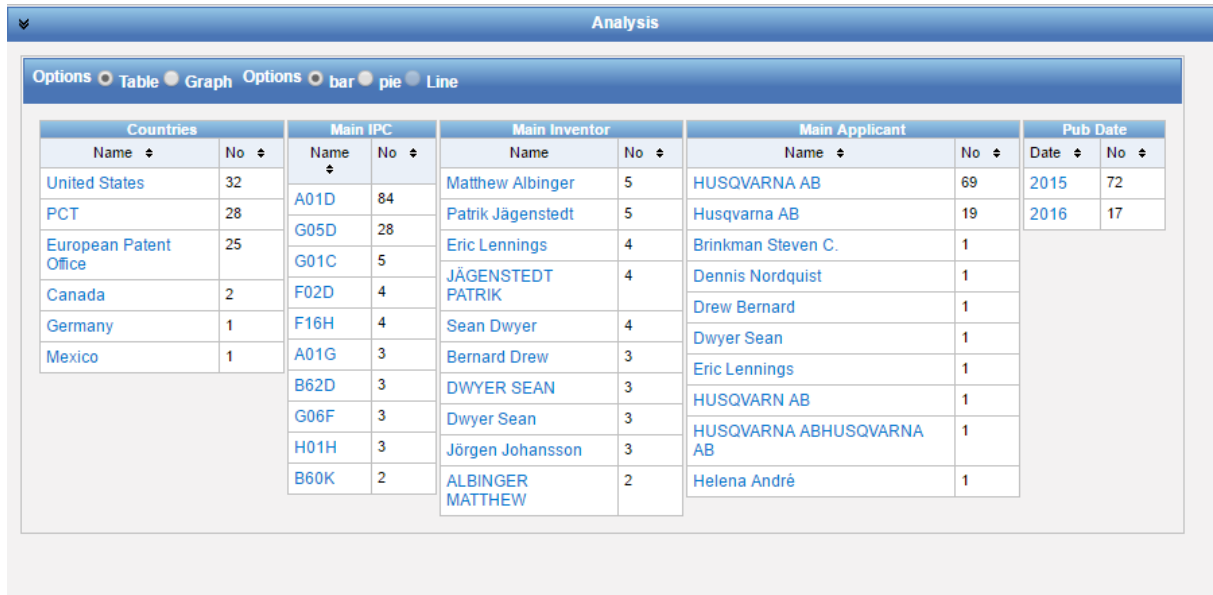


Figure 2 - The analysis output from Patentscope

There are five different types of information that we can focus on. The **Countries** field gives us the geographical location where the applicant has applied for protection. For further patent family information we should explore the application in more detail. The **Main IPC** directs us to a cross-search needs. We can find what other IPC codes the applicant used for invention or innovation activities. We should perform the second-level cross search for example like this (the terms in *italics* below):

We found that this second-level search revealed three more relevant hits. This might represent a significant improvement for an intelligence unit in the company, so the importance of a cross-search based on the main IPC code analysis must not be underestimated.

The **Main Inventor** field lists all the inventors connected to the company. This is valuable information especially when prior art search is being created. We should focus on the names concerning their scientific activities in other resources (vendors, databases, surface web). These names can also give us some idea of areas the company may be actively researching.

The **Main Applicant** field continues with organizational analysis and we can explore which names are written in the document as applicants (not only inventors).

The **Pub Date** informs about the number of published patent applications in each given year.

The Patentscope analysis also offers the result view in a graph. We can choose a bar, a pie or a line view. An example (with an 11-year range) is shown below.

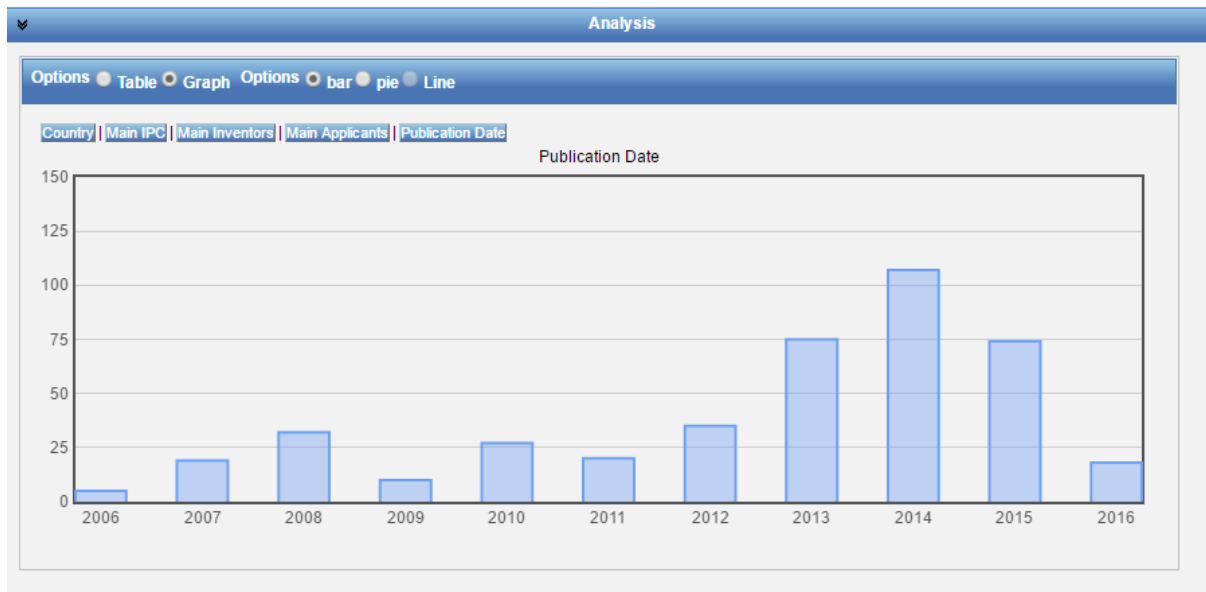


Figure 3 - Graph Analysis of search set (by date)

### 3.2 Global Patent Index

The Global Patent Index (GPI) is provided by the European Patent Office together with other important sources such as the European Patent Bulletin, PATSTAT and the open-access EPAB and Espacenet (EPO 2016c). The GPI can be characterized as one of the most important must-have patent tools for competitive technical intelligence purposes.

#### 3.2.1 Data Coverage

This commercial<sup>3</sup> system works with over 80 million patent records from over 90 countries. The data coverage consists of (EPO 2016d):

- Bibliographic information
- Citations
- Legal Information
- Statistics
- Classification Data

We should keep in mind that the GPI is a bibliographic database and as such it contains limited, but valuable patent information. For example, we will not find information about claims or full descriptions. However, we do have the possibility of getting this information from **external collections via a link**.

**Bibliographic records** in the GPI cover the following (EPO 2016c):

- Title
- Abstract
- Inventor
- Applicant
- Classification
- Application numbers
- Patent family
- Designated states (WIPO)<sup>4</sup>
- INPADOC data

**Citations** are a very powerful tool for patent analysis, especially when conducting a novelty search. The GPI provides broad search possibilities with citation information. We can explore search categories of search reports, patent citations and non-patent citations, and then the search can be further narrowed using these search criteria (EPO 2014):

<sup>3</sup> First year subscription costs 690 EUR

<sup>4</sup> Only for PCT applications

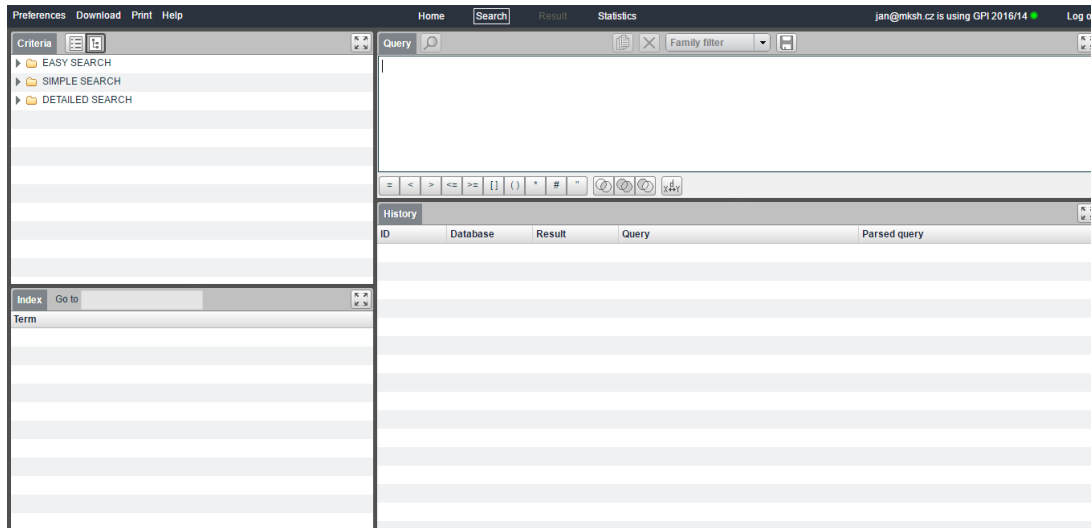


- Applicant
- Search report
- International search report
- Supplementary search report
- Examination phase
- International preliminary examination phase
- Opposition phase
- Appeal phase
- Third parties

**Legislative information** is among the most valuable information in the GPI that is provided through the INPADOC database. The legal statuses of the patent documents are represented by a specific code. We can monitor in detail e.g. the process of application filing, the maintenance of the patent fee, the decision about the granting or refusal of the application, and search report phases or expiration.(EPO 2016a)

### 3.2.2 Search possibilities of GPI

The GPI is a professional search solution for the deep patent analysis. There are three functional modes available from the main framework: **Search, Results, and Statistics** (EPO 2016c).



**Figure 4 - Search framework of the GPI**

The **Search** framework (see Fig 4) consists of four separated operational windows: **Criteria, Query, Index and History**. The Criteria window serves as a reference field code guide for the search and can be used in Easy, Simple or Detailed tree structures. We can use these to choose specific field codes<sup>5</sup> for our searches.

Each of the field code in the **Criteria window** is connected with the Index window that provides a list of specific values. The searchers therefore have broad possibilities as to how to tune their syntaxes. We can explore the Index window through the standard input text field.

The **Query window** works only with the specific field code usage. The field codes imply in which part of the patent documents the term is being searched. Furthermore, we have following search possibilities (EPO 2014):

- Boolean operators AND, OR, NOT, ANDNOT
- Proximity operator /Xw implies the distance between two terms regardless of the order where X is the number. If use +Xw entry, the two terms must be in the same order within a given distance.
- Arithmetic operators
  - = equal to value in the field code
  - >=, <=, <, > are mainly used in date field codes.

<sup>5</sup> The GPI offers over 100 field code types to narrow a search syntax.

- Wildcards
  - \* asterisk implies zero or more characters and can be used in any part of the term.
  - # hash implies for one mandatory character
  - Wildcards cannot be used in phrase (double quotes)
- Brackets [] are used for a date range.
- Parentheses () affect the order of how the logic sets will be searched.

The Query window provides also the icons that obviate the need to remember all the operators and the search can build a syntax using them.

Let's give the same example of search syntax with the information need mentioned above: *The latest developments in the field of Husqvarna lawn mowers.*

**(WORD = (lawn /1w mower\*) OR IPC = A01D) AND APP = HUSQVAR\* AND PUD [2015,2016]**

The first grouping under field code WORD represents a search in the fields of title and abstract possibly in English, French or German followed by the same subclass of international patent as in the previous system with the OR conjunction. This part of the syntax must be kept together with a given patent applicant<sup>6</sup> and a date range.

In the Query window we have the first information about the number of relevant patent documents. The value-added information provides the number of patent families and unique patent applications. For example, in our search the GPI gives us the information that there are 197 patent documents in 123 patent families. We can further filter the search set by Application or Patent family criteria. The first possibility helps us when a patent application has multiple publications, the systems gives us back only the oldest one. The second possibility aims to limit the search set only on existing simple patent families that are connected to the same innovative concepts or solutions under the same invention. The oldest family representative is displayed, otherwise the oldest family member.

**The History window** provides the syntaxes that have been used in different searches (see Fig 5). We can use a specific identifier in our query, e.g. the syntax \$12 NOT \$13, and exclude (or include) the results from each search set. We can also see the mined database, number of hits, original query and parsed query.

History				
ID	Database	Result	Query	Parsed query
\$13	GPI 2016/14	123	(WORD = (lawn /1w mower*) OR IPC = A01D) AND ...	(TIEN = lawn /1W mower* OR ABEN = lawn /1W mo...
\$12	GPI 2016/14	189	(WORD = (lawn /1w mower*) OR IPC = A01D) AND ...	(TIEN = lawn /1W mower* OR ABEN = lawn /1W mo...
\$11	GPI 2016/14	123	(WORD = (lawn /1w mower*) OR IPC = A01D) AND ...	(TIEN = lawn /1W mower* OR ABEN = lawn /1W mo...
\$10	GPI 2016/14	189	(WORD = (lawn /1w mower*) OR IPC = A01D) AND ...	(TIEN = lawn /1W mower* OR ABEN = lawn /1W mo...

**Figure 5 - The History window in the GPI**

The **Parsed query** table uncovers the logic of the field code sets. Our example in a parsed structure:

**(TIEN = lawn /1W mower\* OR ABEN = lawn /1W mower\* OR TIDE = lawn /1W mower\* OR ABDE = lawn /1W mower\* OR TIFR = lawn /1W mower\* OR ABFR = lawn /1W mower\* OR TIXX = lawn /1W mower\* OR ABXX = lawn /1W mower\* OR FAB = lawn /1W mower\* OR ICFI = a01d\* OR ICFA = a01d\* OR ICMI = a01d\* OR ICMA = a01d\* OR IC17F = a01d\* OR IC17M = a01d\*) AND (APPD\_WORD = husqvar\* OR APPD\_EXPR = husqvar\* OR APPDA\_WORD = husqvar\* OR APPDA\_EXPR = husqvar\* OR APPO\_WORD = husqvar\* OR APPO\_EXPR = husqvar\*) AND (PUD\_FOR\_RANGE[20150101,20161231])**

### 3.2.3 Analysis possibilities

The search sets of patent documents can be further analyzed through the Results or Statistics modes. The Results mode (see Fig 6) is determined for content analysis of each of the documents that have been searched, and it consists of three operational windows: Query, Result list, Document.

<sup>6</sup> Husqvar\* is also used here because of different records of the company name.

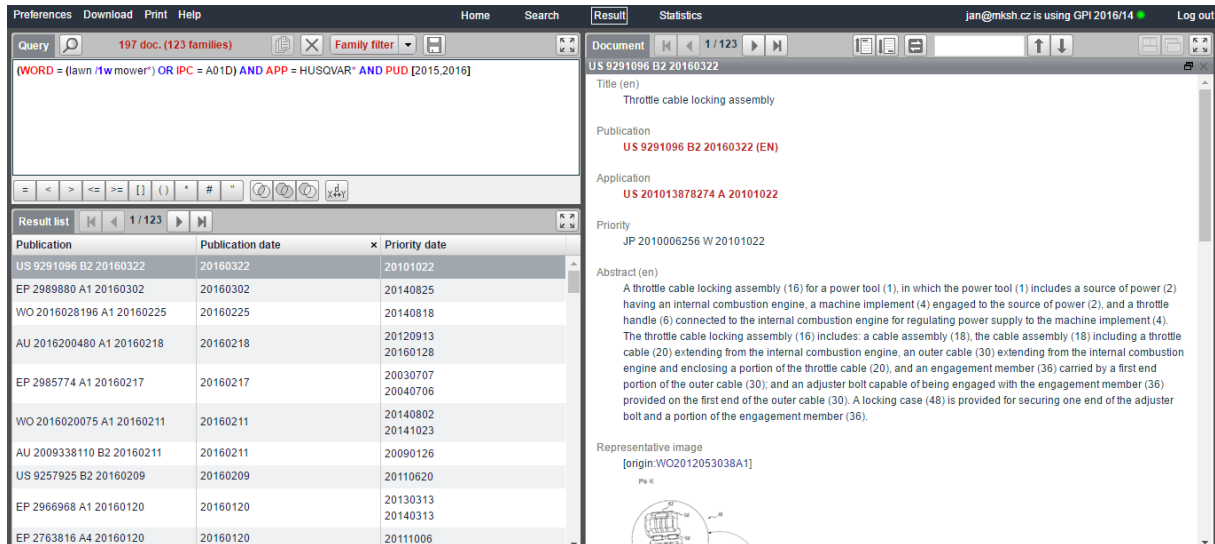


Figure 6 - Results mode in the GPI

The Query window provides the same functionality as in Search window, so we can tune our search during exploration of the result set. The Result list is sorted according to our preferences<sup>7</sup> (e.g. Publication, Publication Date, Priority Date, etc.) and the chosen document is further displayed in the Document window.

As we mentioned earlier, the GPI is a bibliographic database and does not provide full documentation of patent applications,<sup>8</sup> however its main advantage is in full analysis with value-added information of legal statuses and patent families (EPO 2016d). We comment simple patent family and INPADOC legal status below on the following example.

If we explore the latest bibliographic record concerning Husqvarna (See Appendix 1), we get detailed information about the **simple patent family** of this invention that is defined by these family members:

- WO 2012053038 A1 20120426;
- CN 103180624 A 20130626;
- CN 103180624 B 20160330;
- EP 2630378 A1 20130828;
- JP 2013540222 A 20131031;
- JP 5818883 B2 20151118;
- US 2013186369 A1 20130725;
- US 9291096 B2 20160322

These application numbers uncover the geographical scope of the patent, however when PCT application is among patent family members (represented by applications with the WO prefix), we need to get the information about designated states under PCT (see Fig. 7) to gather protection patent validity.

<sup>7</sup> The Result list preference can be edited through the field Preferences in the Main menu section.

<sup>8</sup> If we want to see the full documentation for the requested patent, we can use the EPAB.

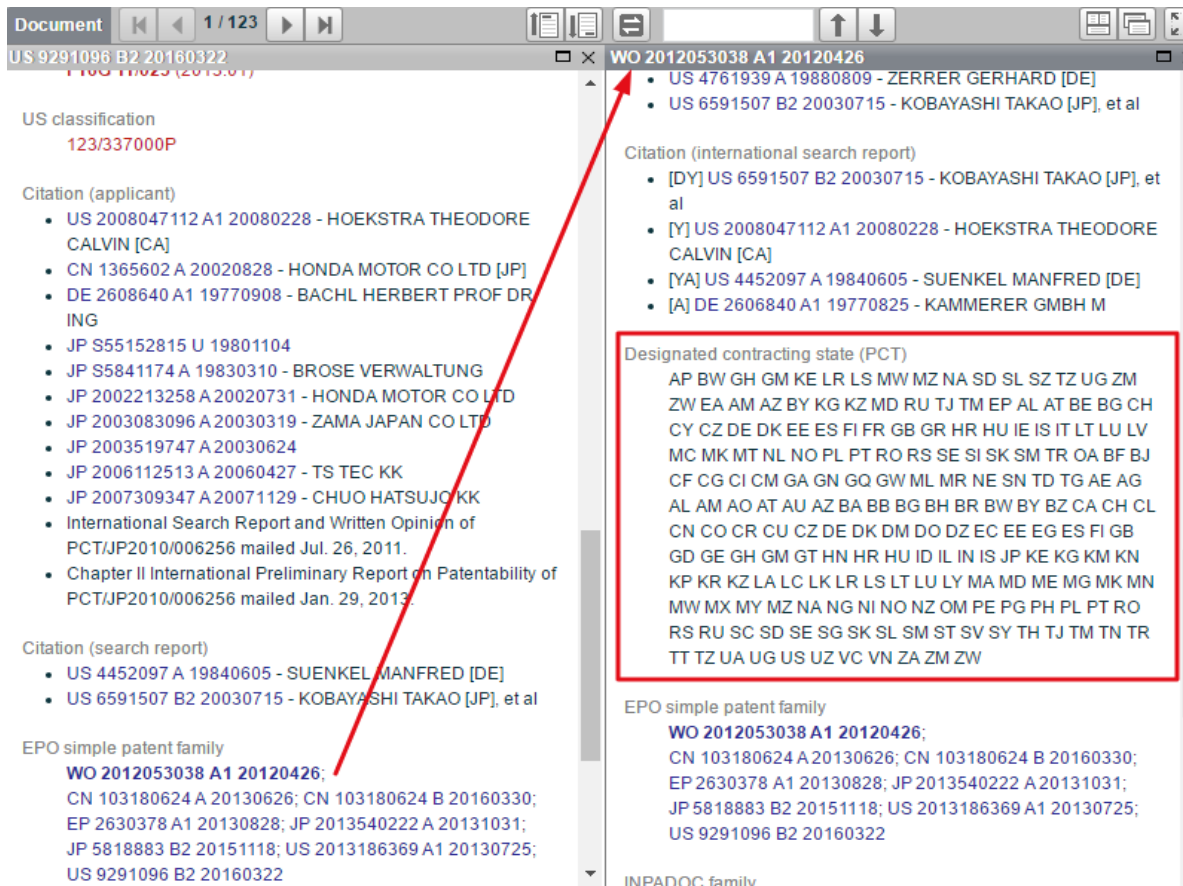


Figure 7 - Patent family analysis in the GPI

Legal status information from the INPADOC database is represented by a specific code that is determined by the country origin of an application.<sup>9</sup> When we analyze the same bibliographic record, the legal status of this application is:

2013-04-09 [AS] ASSIGNMENT

Owner name: HUSQVARNA ZENOAH CO., LTD., JAPAN

Free Format Text: ASSIGNMENT OF ASSIGNORS INTEREST;ASSIGNOR:KOBAYASHI, MASANORI;REEL/FRAME:030179/0586

Effective date: 20130402

We get the full meaning of the code from (EPO, 2016) description of **legal status code** database and output that the rights for this patent are being transferred from Kobayashi Masanori (inventor) to the Husqvarna company (valid for the United States Patent and Trademark Office). If we need to analyze Kobayashi Masanori's invention activity in the same field of lawn mowers, we set the new search syntax as:

NAME = (Kobayashi /1w Masanori) AND IPC = (A01D OR G05D OR B62D OR B25F OR A01G OR B60L OR G01C OR H01H OR F16F OR B60K OR A01B OR H02K OR G06F OR F16C OR F02B OR H03K OR G06Q OR G05G OR F16D OR F02D)

After we had conducted this search, we discovered that this inventor cooperates heavily with other companies that can be described as competitors of Husqvarna..

The **Citations** are a good option to further focus on patent claim validity. The database gives us the list of cited patents by inventor, but also by the examiner (searcher) through the search reports that are an indivisible part of every patent protection granting phase.

The Statistics mode is connected to the Result mode and can be used for visualizing the search results. We can choose between the **Simple Statistics** and **Cross-reference** option. The Simple

<sup>9</sup> The complete list of legal status code is available on (EPO, 2016).

statistics are provided in the form of tables where we choose the specific fields. We have used this possibility to explore the further IPC subclasses (as in Patentscope case) and perform a cross-search (see Fig 8).

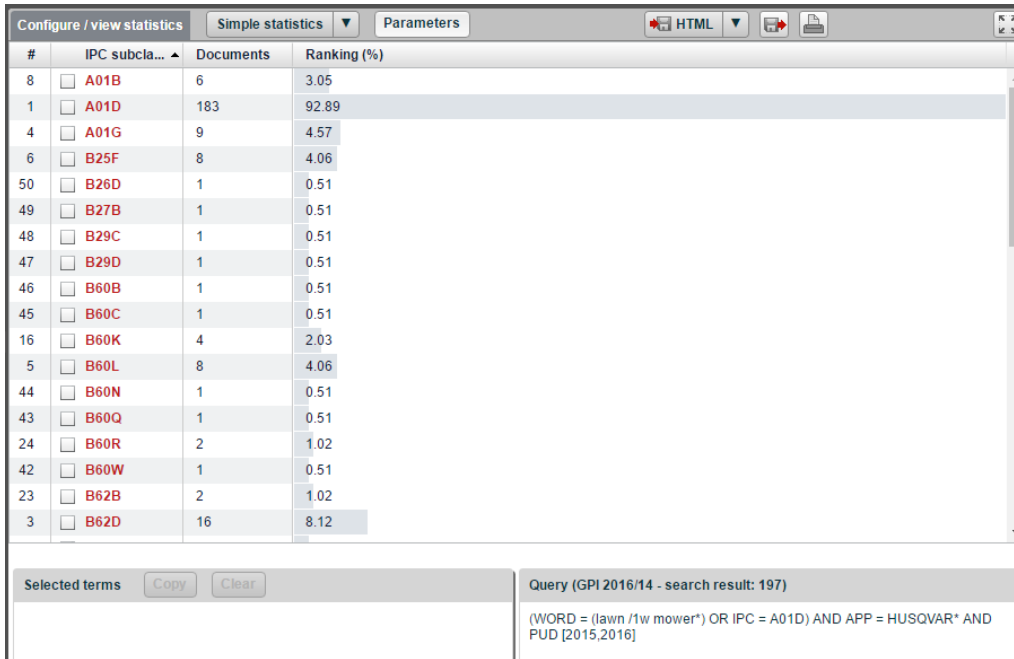


Figure 8 - Simple Statistics in the GPI

As we had researched a requested IPC subclass, we have built new syntax as follows:

((WORD = (lawn /1w mower\*) OR IPC = A01D) AND APP = HUSQ\* AND PUD [2015, 2016]) OR (IPC = (A01D OR G05D OR B62D OR B25F OR A01G OR B60L OR G01C OR H01H OR F16F OR B60K OR A01B OR H02K OR G06F OR F16C OR F02B OR H03K OR G06Q OR G05G OR F16D OR F02D) AND WORD = (lawn /1w mower\*) AND APP = HUSQ\* AND PUD [2015,2016])

This cross-search led to the same number of relevant documents as in the first syntax.

The Statistics mode provides the unique function of industry analysis through the Cross-reference. We can explore who are the key players in the specific field and in which class is the greatest innovation activity.

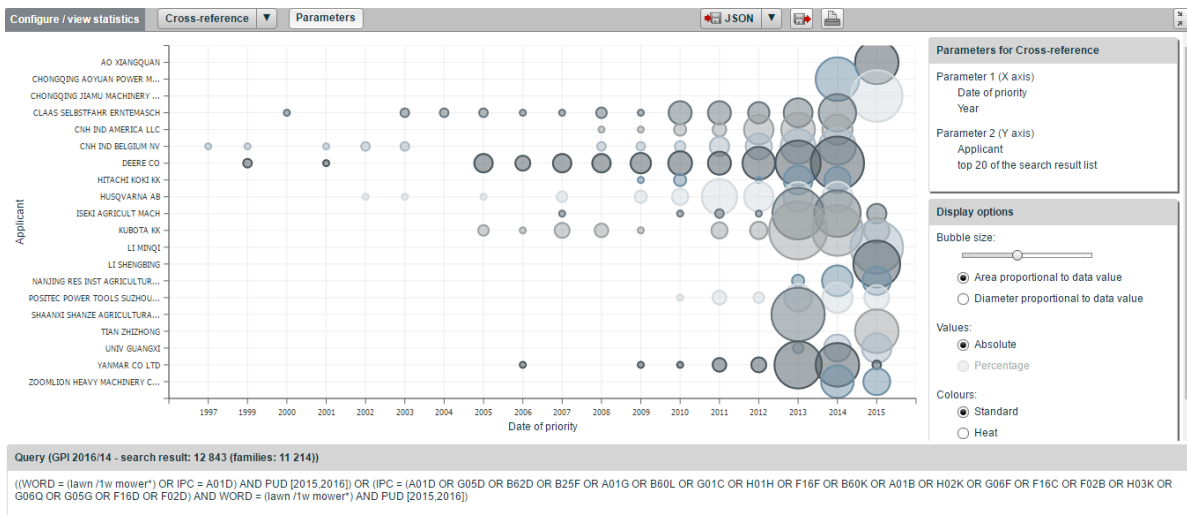


Figure 9 - Key players in the lawn mower industry

Firstly, to get the 20 key players overview in a given field, we need to edit our search syntax by deleting the field containing Husqvarna. The syntax will look as follows:

IPC = (A01D OR G05D OR B62D OR B25F OR A01G OR B60L OR G01C OR H01H OR F16F OR B60K OR A01B OR H02K OR G06F OR F16C OR F02B OR H03K OR G06Q OR G05G OR F16D OR F02D) AND WORD = (lawn /1w mower\*) AND PUD [2015,2016]

As a result we have 11 214 documents covering the latest developments in the lawn mower field. We have set up Cross-reference parameters in the Statistics mode with Applicant field as the X axis and Date of priority is the Y axis. We have chosen a Date of priority to get a retrospective view of some of the recently published applications. After that we can further analyse the key inventions in the field (see Fig 9).

#### 4. Comparison

For the purpose of this paper we have decided to create a comparison table focusing on the earlier analyzed entities.

Field	Patentscope	Global Patent Index
Data Coverage	Complete patent application (either available on WIPO servers or directed through the links) with bibliographic information	Only bibliographic records
Number of documents	51 100 000 <sup>10</sup>	96 900 000 <sup>11</sup>
Updates	Daily (national office collections), Weekly (PCT)	Weekly
Geographical Data Coverage	Countries under PCT (148) + Euroasian Patent Organization + European Patent Office + African Regional Intellectual Property Organization + 46 national offices <sup>12</sup>	Countries under PCT (148) + Euroasian Patent Organization + European Patent Office + African Regional Intellectual Property Organization + 92 national offices <sup>13</sup>
Search modes	Simple, Advanced, Field, CLIR	Expert
Advanced search syntax tools	Boolean, Proximity, Fuzzy search, Wildcards, Relevancy Factor	Boolean, Proximity, Wildcards
Classification systems	Only IPC	IPC, CPC, US Patent Classification System, JP Classification (FI), JP Classification (F-Terms)
Legal status	Under development	INPADOC legal status codes
Patent family information	National Phase entries information	Simple patent family, INPADOC patent family
Data analysis outputs	Country, Main IPC, Main Inventor, Applicant, Publication Date	<ul style="list-style-type: none"> <li>• <b>Simple statistics</b> IPC, CPC, FI, F-Terms, Applicant, Cited Applicant, Inventor, Publishing Office</li> <li>• <b>Cross-reference</b> IPC, CPC, Inventor, Applicant, Date of Filing, Date of Publication, Date of</li> </ul>

<sup>10</sup> By 10th of April 2016

<sup>11</sup> By 10th of April 2016

<sup>12</sup> By 10th of April 2016

<sup>13</sup> By 10th of April 2016

Field	Patentscope	Global Patent Index
		Priority
Data visualization	Simple statistic graphs	Simple statistics graphs, two dimensional graphs
Data export	Only graphs	Full records in RTF, PDF, or XML format, Result lists in PDF, XML, XLS or HTML, Statistics and Cross-reference graphs in JSON, CSV or PDF

According to this comparison we have summed up that the open-access Patentscope can broadly be used as a cross-search system however it cannot be considered to be the only patent system for state-of-the-art searches. The GPI as a global bibliographic database can possibly serve as the first source for prior art with value-added information such as patent family and the legal status of patent documents, nevertheless if the searchers want to explore the full content of each of the documents (e.g. claims, descriptions), they need to use either Patentscope, or another open-access system, e.g. European Patent Application Bulletin.

### 5. The importance of patent information for IT management

Cooperation between IT management and the business department leads to a strengthening of the competitive advantage of the company, however not every company will reach this point in terms of the situation when the role and function of the IT department is not clearly defined (Peppard & Ward 1999; Tian et al. 2010). The Competitive Technical Intelligence Unit should closely cooperate with the IT department as its ICT services provider and focus on the efficient transfer of technical information that is important for strategic planning of R&D activities.

Patent information provides top management with unique insights into competitor’s developments and industry trends. In the Husqvarna example above, we explored methods of gathering sensible information from two sources. To be clear, even open-access systems can provide an important set of information that can be used for valuable analysis.

Company top management should specify its information needs in IP as follows:

- What is the patent activity rate in our field?
- What are the latest developments of our key competitors?
- Which inventors cooperate with our key competitors?
- Can we invalidate one of our competitor’s specific patents?

A question arises when an ICT company wants to patent their products or services. The importance of state-of-the-art was discussed, but there is a problem with the significant differences in ICT services patent protection in different countries. As an example we can compare Czech and American patent law.

In the case of the Czech Republic, according to Law No. 527/1990 of November 27, 1990 on Inventions and Rationalization Proposals (as last amended by Act No. 378/2007 Coll.) (Czech Republic 2007), the following cannot be patented:

- Computer programs (software)
- Information supplies (service)
- Scientific theories
- Mathematical models

These entities should seek protection not under this patent law but under the Act of April 22, 2008 Amending Act No. 121/2000 Coll., on Copyright and Rights Related to Copyright and on Amendment to the Copyright Act (Czech Republic 2008). Moreover, when we look at European Union patent policy through the Proposal for a Directive of the European Parliament and of the Council on the patentability of computer-implemented inventions (European Commission 2002), we can see that computer program related patents and business methods based on computer programs bring different views as

to whether to patent or not. Today, the European Patent Convention (EPO 2013) excludes any computer programs and methods of doing business as patentable entities.(WIPO 2016a)

In contrast, according to American Patent Law anything made by man can be patented from four different angles of usability (USPTO 2009):

1. Process
2. Machine
3. Manufacture
4. Composition

Computer programs, business methods, or mathematical models can be considered as a patentable intellectual commodity (WIPO 2016a) with a specific application process.(USPTO 2014)

Both examples show the importance of patent law country analysis before any patent application with an ICT-related invention is filed. The first source should be WIPO Lex, a comprehensive patent law list made by WIPO, with the possibility of full text search.(WIPO 2016c)

The IT department should also not underestimate the legal status of patent information and inventor (or applicant) information for their future licensed IT services that could possibly be under patent protection. New commercial solutions in particular must be checked from the IP law perspective. At this point, the patent information provides valuable analysis and infringement prevention.

In view of these factors, top management should consider these managerial decisions to strengthen company knowledge management:

1. Use patent information for strategy planning purposes.  
Research (Ernst 2003) has shown that companies that use patent information as a part of strategy management planning perform better than those that do not.
2. Monitor patent activities (key players, industry).  
Patent information brings deep insight into a competitor's profile and future developments. It also helps the company by removing the possible danger of infringement and validating licensed products or services.

## 6. Conclusion

Patent systems are a solid part of the Competitive Intelligence Units in company IS/IT management as a valuable source of technical information, mainly used for competitor research or innovative activity analysis, technology trends analysis or industry key player analysis.

This paper has focused on the comparison of two global patent systems: the open-access Patentscope operated by the WIPO and the Global Patent Index commercial bibliographic database, operated by EPO. We have analyzed the three main characteristics of both systems: data coverage, search possibilities and data outputs.

Both systems fulfill the requests for a wide portfolio of patent searches. The GPI provides, on the one hand, broader data coverage as well as data outputs, but on the other hand any search must use a second source to obtain the full content of the application. In contrast, Patentscope is a complex source for PCT applications that provides full documentation for each record, but with poorer national data coverage. Definitely, they should be considered as the must-have-tools for different types of patent searches.

The paper also discusses the importance of patent information from the perspective of IT management in cooperation with the Competitive Intelligence Unit. It supports top management decision-making together with strengthening knowledge management.

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