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Benchmarking R&D and companies through patent analysis using free databases and special software: a tool to improve innovative thinking

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Abstract

The availability of free patent databases on the Internet, offers the opportunity of opening the door of patent information not only to patent specialists, but also to many other groups, such as researchers, decision makers, potential inventors and students. The goal of this paper is to show how the combination of free patent databases (in this paper esp@cenet®) and dedicated software makes it possible to perform easily and rapidly tests on new ideas, the automatic benchmarking of an enterprise's activity and the stimulation of innovative thinking. The benchmarking of companies alone, or of clusters of enterprises is exemplified with reference to the concept of high temperature lubricating oil technology. How to improve innovative thinking is shown within the context of an analysis of coconut technology in postgraduate courses of competitive intelligence provided in Indonesia. Both applications emphasize that the role of patent information is expanding as a unique source of technical information because free availability combined with easy patent mapping and analysis allow non-specialists to use this information source in all technical aspects of innovation, research and development, and strategic planning.

Keywords: Automatic analysis; Bibliometry; Benchmarking; Innovation; Development; Developing country; Innovative thinking; Patent analysis; esp@cenet®; Competitive intelligence; Coconut technology; Lubricating oil technology

1. Introduction

The availability of free patents databases such as esp@cenet® or USPTO (US patent Information Database) is a real breakthrough in the field of policy analysis for western countries for instance [1], but it is also an invaluable tool for developing countries, where the financial resources are scarce. The scarcity of resources prevent the people, even the government agencies, making wide use of commercial databases to facilitate the development of scientific or technological programs. From a political point of view, the development of autonomy (for instance in Indonesia, where many provinces are now autonomous), also diminishes the financial effort which could be made in these areas. In the same frame of mind, in developing countries, many SMEs cannot use patents because they were too costly in past years, and also because to retrieve patents one by one from the Internet available databases takes too long.

The work which is presented here, deals with this aspect of the problem, and is in some ways complementary to the work of Meyer et al. [1] which used free patent information data (USPTO) to make a policy analysis of the relationships of Technologies—People—and Finnish Universities, using like in our case various bibliometric tools to obtain such a correlation. But, in that case, more than 500 Finnish Scientists have been involved in patents. In our case, it was quite different: no patents and, from a search made with Chemical Abstracts, very few scientific papers were available from Indonesian researchers, and if we speak about small SMEs (unipersonnal company for instance or TPE), for instance in the Provence Alpes Côte d'Azur where we lived the number of patents is so small that almost no correlation can be made.

We focused our attention on the use of esp@cenet® as a think tank to help people to test new ideas, to map the

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technologies developed in a specific area (those protected or already in the public domain), to know the companies involved in this field, and also to be able to select technologies suitable for the level of competency of the SME or the Region.

This needed a very simple tool to use (as far as ergonomic aspects are concerned) to select, download, built up automatically a local patent database, and analyze automatically the content. In this paper, according to the various applications, different aspects of the software that we used will be presented [2].

Thus while Meyer et al. [1] used the free patent databases to provide information on technology policy in developed countries, we used patents to try to stimulate innovative thinking in developing countries and to help these people to valorized their local resources or competencies.

Comparing technologies and knowledge necessary to move from one technical state to another one, will involve benchmarking. Benchmarking could be defined as a system which allows a company and institution or an individual to compare some of their activities with those of the "best in class". Many books and papers described benchmarking practices and various guidelines have been established in this area [3]. By extension, in our case, we will consider benchmarking in its broad sense which is to compare the area of R&D of various firms in one sector of development or application; it can also be used to compare the activities of these firms without restriction to one sector. Various aspects will be considered:

- What are the technologies, products and applications and applicants linked to a particular domain.
- What are the core competencies of a set of firms selected in the above domain.
- What are the competencies and strategies which differentiate their activities.
- How the use of IPC mapping may help to select technological areas to improve innovative thinking.

If these analysis are made very rapidly, this will provide a tool which will help to create a new type of information to assist the decision makers in their choices and strategies for development. This will provide also a way to stimulate innovative thinking and new ideas in a disciplined manner as a "cognitive coaching" [4]. Then, this methodology will be helpful not only for decision makers and enterprises, but also for the students involved in Competitive Intelligence at a post graduate level. [5] This is the case for different applications made at the Institute of Technology of Bandung and at the University of Manado (UNIMA) in North Sulawesi, Indonesia by the author [6]. Obviously, in remote places like Manado in the North Sulawesi, there are many possibilities for product development such as coconut, cloves, nutmegs, vanilla, pepper, sea-weeds, woods, but all those local materials are sold as crude materials and almost no added value products are developed. This is why we decided to use patents as a leverage to change the mental model of people, since almost no fundamental scientific research is produced and practically no R&D exists. The system is as follows: we have a contract with the Regional Government to provide in Manado the DEA (equivalent to a Master degree) of Competitive Intelligence. Most of the students already work in University or in Regional Institutions or in Industry. They must provide during the course a short thesis about an application of Competitive Intelligence. They access the Internet at a decent speed (64 KB) sufficient to create databases and make their application on the valorization of natural products, using patents as the main information tools.

This paper will be structured in three parts, each of these parts may be taken separately according the problems and the target. The first part deals with the information and software, the second with the determination of various patent groups and their comparison in a type of "benchmarking" process exemplified by reference to high temperature lubricating oil technology (HTLO), and the third with an application made in the field of the coconut industry in North Sulawesi in Indonesia.

2. Information and method

2.1. Information

To reach such an objective, we have selected an information source which will enable the user to get a good view of the technological activities of enterprises. The database selected was the esp@cenet®, (European Patent Office) [7], which is free on the Internet and which covered most of the inventions and applications since most of them (if they are of a sufficient interest) will be protected in European countries and the database also provides extensive coverage of patent specifications worldwide. To facilitate the choice of relevant patent, and to save time, it is possible to build up with the software the patent family. The system will check for all patents belonging to the same family (related by the patent priority numbers present in the bibliographic description of one of the patent of the family). For instance, if we examined the family number 25 (used the create patent family option of the software to create all the families), the following patents are either present in the local database, some of them being not present but cited into the patent family: because one family is related to one invention only, this is a way to save time and to examine globally less patents (Table 1).

The use of a free patent database will become a resource not only for patent specialists, but also for other

Table 1
Patents from family 25, present and not present when we build up the local database

Patents present in family 25	Patents really present	Patents not present
US6189260	X	
NZ503743	X	
AU73298799	X	
AU734551	X	
BR9907963		X
CA2320695	X	
EE200000666		X
EP1037863	X	
NO20004132		X
PL341799		X
JP2002503499		X
TR200002421		X
WO09942422	X	
ZA9901367	X	
HU0004754	X	

people such as policy analysts, academic researchers, students. This new role has been underlined by Meyer et al. [1]. Of course, performing the patent retrieval from the database, will not be as sophisticated of what can be made from commercial databases such as WPIL (World Patent Index Latest) from Thomson Derwent, but we believe that the set of commands available to search the esp@cenet® database, combined with its extensive country coverage, is sufficient to perform global searches to provide useful indicative results on the one hand, and to use the database as a think tank on the other hand.

2.2. Software

To fulfill this analysis rapidly and to obtain all the necessary information to make a "value-map" of the firms activities, we used a software Matheo-Patent [2] which enables very fast queries and patents extraction from the esp@cenet® database to be performed: for instance with an Internet speed of 128 KB first commercial ADSL plateau, to download 600 patents with their bibliographic data, abstract and claims, will take approximately 18 min. At the same time, the software structure allows a wide range of correlation between the various patent fields available: IPC, EC, Publication Date, Inventors, Applicants. That is to say: by order of complexity: histograms, matrix by crossing the different fields and networks [8].

2.3. Searching for patents

The esp@cenet® database allows the user to perform various searches, in standard or advanced mode. These facilities are used by Matheo-Patent. It is easy for the user to perform various searches, to buildup a local database and then to "benchmark" various patent groups according the strategy and goals of the user (cross-correlation are performed with all the available documentary fields). For the purpose of the example, we made several searches on the following topics, using combinations of words in the titles and abstracts, and also using a combination of some of these words and an appropriate IPC subclass

(i) high temperature lubricating oil
- The most general **high AND temperature AND lubricating AND oil** 211 patents are retrieved.
- More specific **C10M AND "high temperature"** C10M is an IPC subclass dealing with lubricating oil compositions and additives [9]. 320 Patents are retrieved.

These two strategies will be used to select various patent groups from the downloaded patents and to "benchmark" these groups in various ways.

(ii) coconuts OR coconut.
We retrieved 1125 patents.

3. Building up and comparing patent groups in HTLO technology

When all the patents have been downloaded into the software, they can be presented to the user in various ways. On the left part of the initial screen (Fig. 1) the list of the available fields and on the right part the patent titles are provided. The bottom of the screen gives further information on a particular patent selected in the right part of the screen. The software also gives opportunities to the user to build up patent groups, that is to say to group patents by applicant names, IPC, technologies, applications, inventors, ...To build up a group, you may select one or more patents and with a

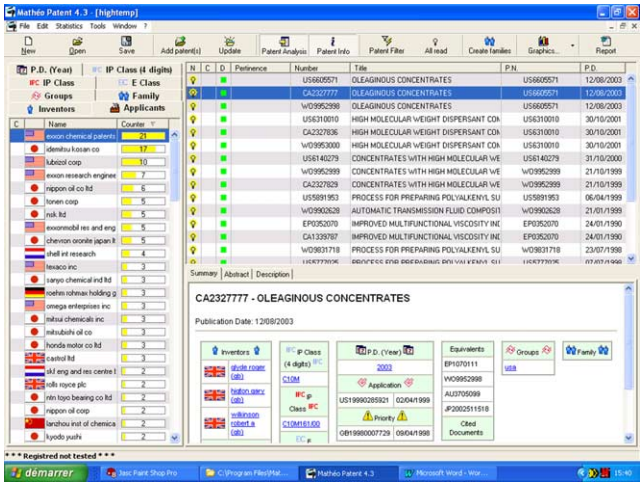


Fig. 1. Presentation of the patents sorted by Applicants.

right click of the mouse button, add these patents to the group. You may create as many groups as necessary.

Then, all the groups may be benchmarked by creating various histograms or matrices (groups and IPC, groups and publication dates, groups and inventors, etc.).

3.1. Building up patent groups

Fig. 1 shows the presentation of the downloaded patents for the HTLO example sorted by applicants (within the first query). The patent titles presented on the right part of the screen being the patents related to the applicant selected on the left, and on the bottom of the screen the information is related to the patent selected on the right. Basically the information contains the bibliographic data, the abstract, the claims, the description, and if necessary the first page, the drawings (you select these latter options before making the query). For special patents of interest, it will be possible to select them and to download the full text if necessary. Patents could be sorted by, for example, inventors, Publication Dates, IPC, EC. This way provides to the user various facilities to build up patent groups which can be further analyzed and compared.

The patents groups can be used to perform various analyses able to "benchmark" the activities between the various groups.

To build up patent groups we may for instance create the EXXON group, the LUBRIZOL group, etc. The following groups have been made from the following queries:

- The most general **high AND temperature AND lubricating AND oil** query.

We build up various groups by countries or by patent applicant. Fig. 2 shows the groups and the number of patents in each group (we used the Chart facility from Matheo-Patent). Results: 210 patents. Fig. 3 shows data in similar fashion, by patent applicant.

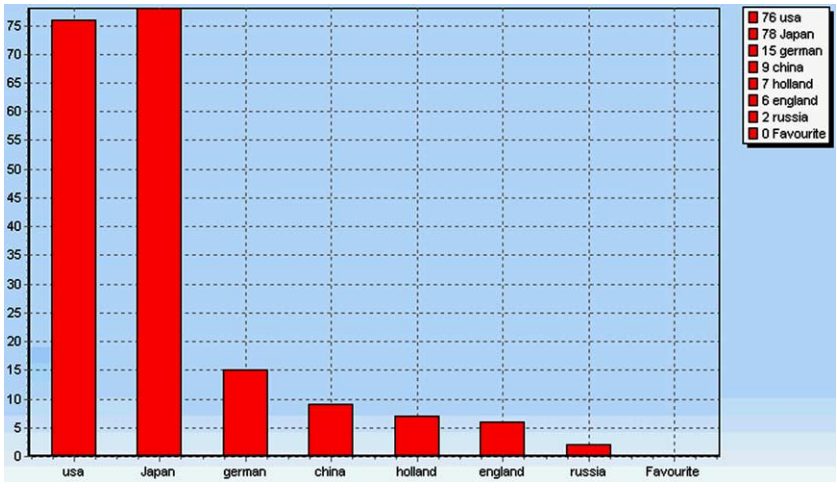


Fig. 2. Country groups from the most general HTLO query.

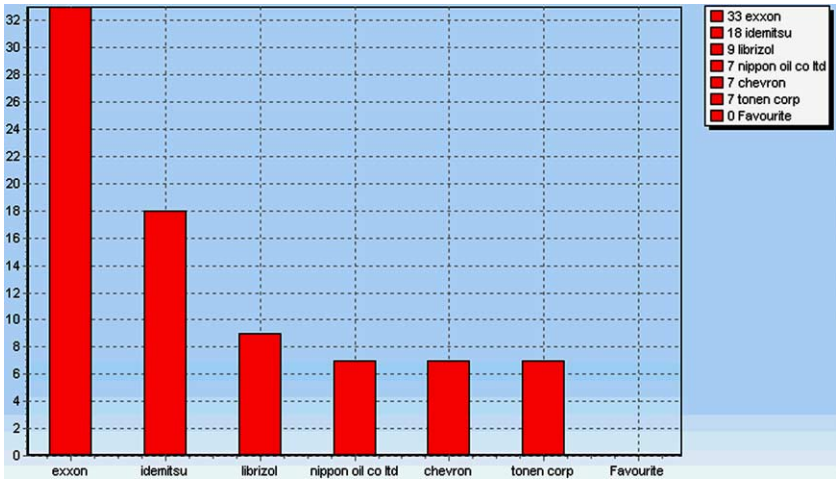


Fig. 3. The applicant groups from the same HTLO query as above.

- The more specific HTLO query, the IPC groups: **C10M AND "high temperature"** Result 320.patents.

There are other ways to regroup applicants and to create new groups. We have seen above, that to make applicant groups, we used names with the same root or with the same part of an applicant name, for example Exxon. In commercial databases, such as WPIL from Thomson Derwent, the use of company codes help to build up relevant group of patents. But, when different companies co-publish a patent, the only way to link these two (or more) companies will be to determine and drawn together the cluster of co-applicants.

Looking at other ways to make applicant groups using data from free patent databases, one is to know the companies which belong to the same entity, for instance all the companies related to ELF in France. This is nice if you know all the related names, but this is not the case most of the time, because it is difficult to know all the companies belonging to the same holding. The second way to improve the applicant groups is to use the network of applicants which are related (when two or more applicants are present in the same patent), and out of which to make new applicant groups. In Fig. 4 we see the network of applicants (square matrix of applicants and network of applicants drawn from this matrix).

From this network we may select the following groups of applicants (we limit the cluster to those with at least three applicants).

Group 1. tanaka koichi, zaleski peter, seki atsuski, superior graphite co, sony group, kondo hirofumi, bourret robert j, kamei takahiro

Group 2. sumimoto metal int ltd, others, kawasaki steel corp, nippon steel chem co ltd, nippon kouyu:kk

Group 3. tokai rita co ltd, kyodo yushi, nsk ltd, showa shell sekiyu

Group 4. aoki toru, nippon mitsubishi oil corp, bappu yukiharu

Group 5. vedatech ltd, bukin victor yavgenovych, chednichenko petro georgiyov

Group 6. n promy i kommercheskoe tovari, mited, tvo s orgranichennoj otvetsven

Some of the clusters are only one patent with several applicants (when the frequency is 1 for all the links of the members of the cluster, with a frequency of all the applicants of 1) but in other cases one of the applicants may have several patents. In this case this will give rise to a new patent group.

Fig. 5 shows all the groups which have been selected, by applicant names but also by clusters. This result shows significant differences from the applicant name only result (Fig. 3).

Note. From the applicant names found in cluster, it is sometimes possible in certain cases to extend the group by adding applicants with the same roots in their name. This is not the case in this particular set of patents in which related names could not be found.

The patent Exxonmobil is alone since there are already Mobil and Exxon groups.

3.2. Benchmarking to the various groups

With the various groups selected, it is possible to make various "benchmarking", using various matrices. We will give here some examples, but the matrix may be made with a wide range of entities and then the user is only limited by his own innovative thinking. For these examples we used either the set of patents of the first or

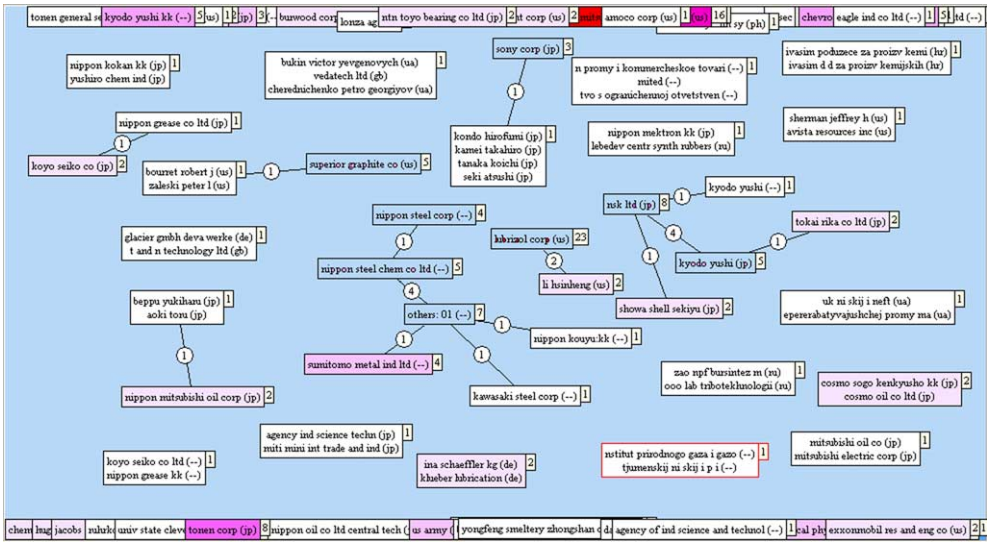


Fig. 4. Network of applicants for HTLO query.

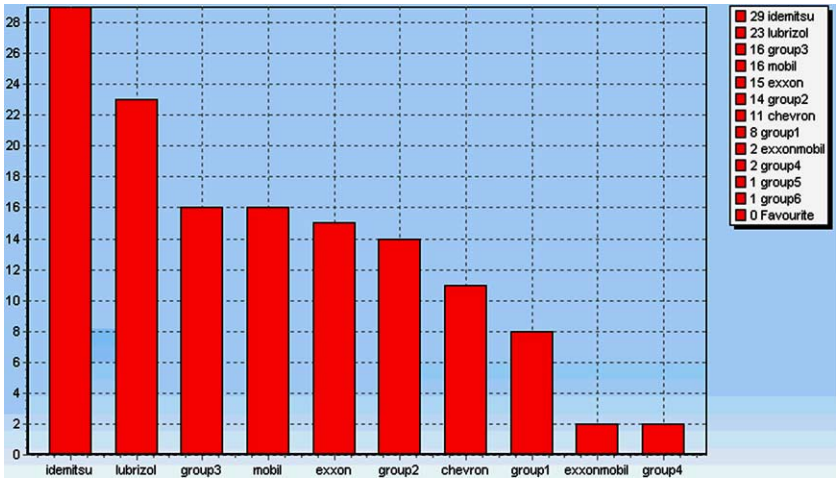


Fig. 5. HTLO: groups selected by applicant names and the cluster method.

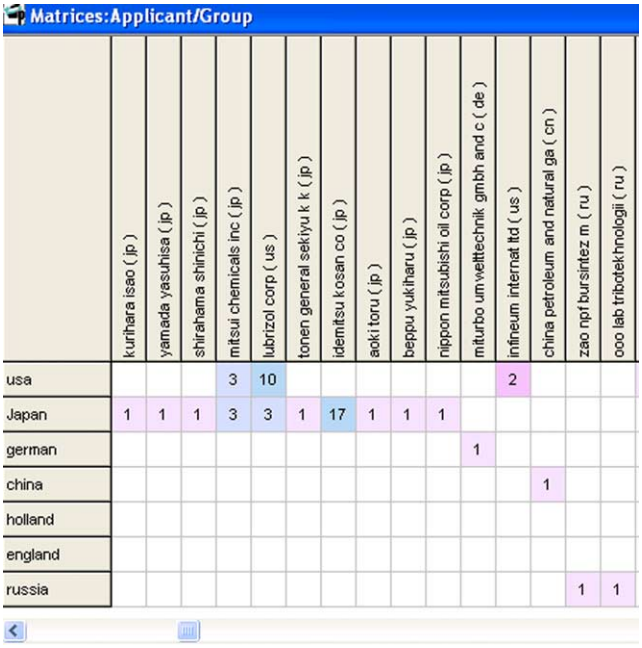


Fig. 6. HTLO: applicants in the various geographical zones.

second query, but groups may be made as the user likes, depending of what he needs to search and retrieve.

Example 1. Question: *In country groups, what are the applicants involved in these countries.*

Answer: Made a matrix of country groups (Fig. 2) and applicants, as shown in Fig. 6 We used the country groups made from the set of patents of the first query.

Note that the Ethyl Japan Corp., is present in Japan and USA and also that Fig. 6 is a partial view of the matrix.

Example 2. *What are the key differences in technologies and applications between various applicants.*

Answer: Made a matrix of applicant groups (Fig. 3) with IPC or EC (for a more precise study).

We used the country groups made from the set of patents of the first query—see Fig. 7.

Example 3. Question: *What are the key differences in technologies and applications between "applicants names" and "clusters of applicants".*

Answer: Make the matrix of Applicants plus clusters of Applicants with IPC. We used the groups made from the set of patents of the second query—see Fig. 8.

Example 4. Question: *What is the strategy of patent publications from* 1990 *to* 2003. (*The set of dates can be extended to a period of* 20 *years if necessary*).

Answer: Made several matrices from Publication Dates and applicants, or Groups of applicants or Clusters of applicants.

We used the applicants from the set of patents retrieved with the second query. The results presented here are only a partial view of the matrix—see Fig. 9.

Example 5. Question: *What is the chronological series of technological applications from* 1990 *to* 2003.

Answer: Make a matrix of Publication Dates and IPC.

We used for this answer the set of patents retrieved with the second query see Fig. 10.

Other applications can be made, for instance by using patent families which are automatically built up by Mameo-Patent and which can be used in various matrices.

4. Benchmarking and innovative thinking, in the coconut technology area in Indonesia

Indonesia is one of the top producers of coconuts in the world [4], but from a technical point of view the

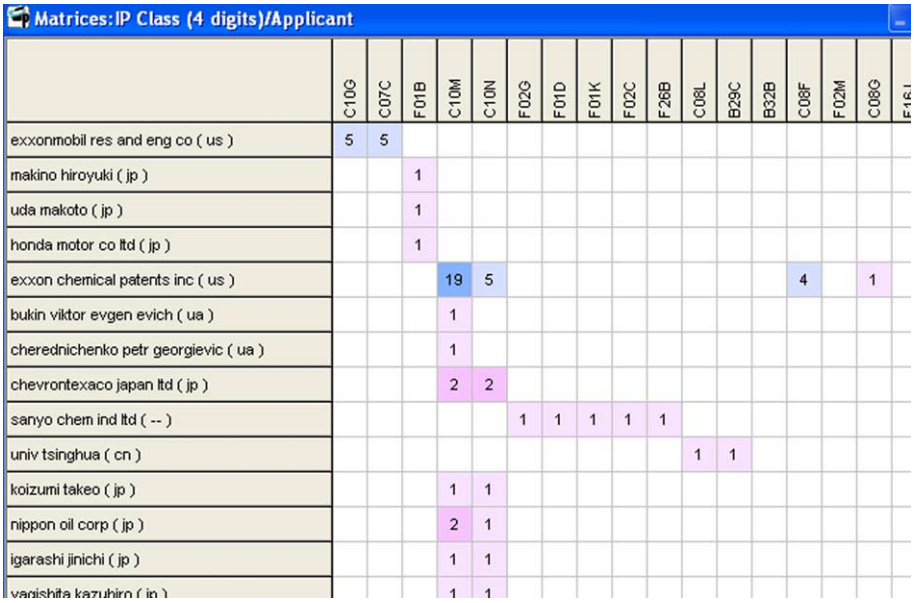


Fig. 7. HTLO: benchmarking of various applicants (technologies and applications).

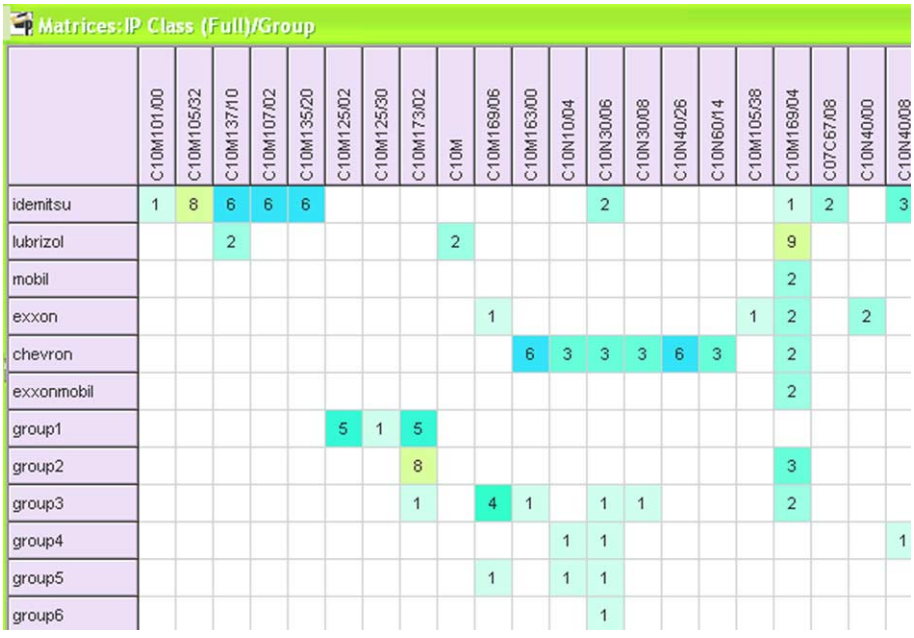
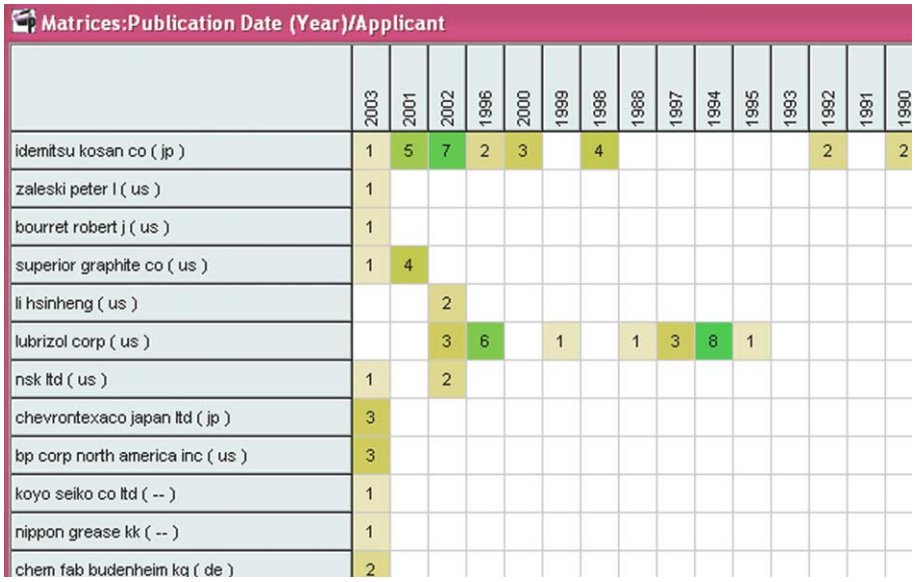


Fig. 8. HTLO: benchmarking of applicants and clusters of applicants with IPC.

esp@cenet® database does not contain Indonesian patents in this field of application domain and from the scientific point of view an analysis of the Chemical Abstracts database show only three Indonesian papers over the 3.000 available for this application domain and shows no Indonesian patents [4]. We decided to use the technological analysis from the esp@cenet® database as a tool to improve decision making and to promote innovation. In his work on improving decision-making, Chermack [10] points out that the decision makers struggle with four aspects: "bounded rationality, tendency to consider only external variables, the sickness and friction of information and knowledge and the mental model of the decision makers". We believed that using a technical information source such as the patents, will

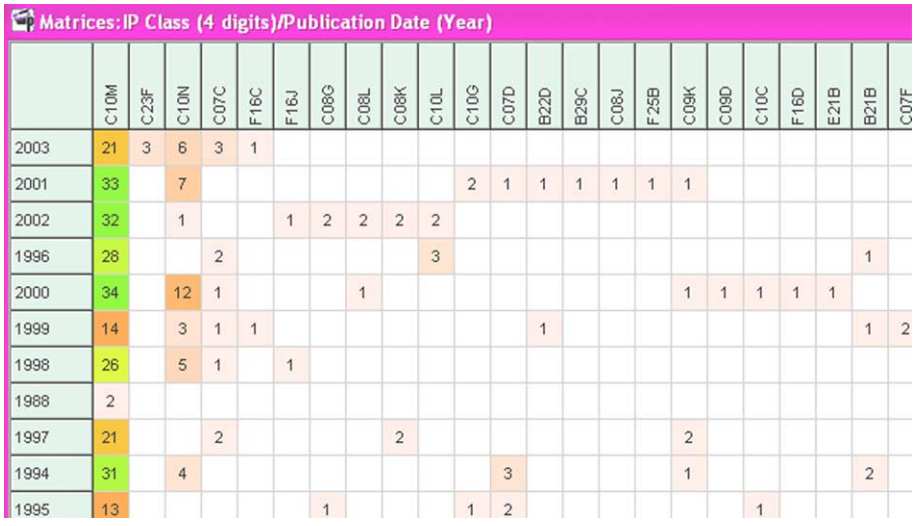
- smooth the communication with the decision makers, since only technique and applications will be discussed;



Matrices:Publication Date (Year)/Applicant

	2003	2001	2002	1996	2000	1999	1998	1988	1997	1994	1995	1993	1992	1991	1990
idemitsu kosan co (jp)	1	5	7	2	3		4						2		2
zaleski peter l (us)	1														
bourret robert j (us)	1														
superior graphite co (us)	1	4													
li hsinheng (us)			2												
lubrizol corp (us)			3	6		1		1	3	8	1				
nsk ltd (us)	1		2												
chevrontexaco japan ltd (jp)	3														
bp corp north america inc (us)	3														
koyo seiko co ltd (--)	1														
nippon grease kk (--)	1														
chem fab budenheim kg (de)	2														

Fig. 9. Strategy of HTLO patent publications from 1990 to 2003.



Matrices:IP Class (4 digits)/Publication Date (Year)

	C10M	C23F	C10N	C07C	F16C	F16J	C08G	C08L	C08K	C10L	C10G	C07D	B22D	B29C	C08J	F25B	C09K	C09D	C10C	F16D	E21B	B21B	C07F
2003	21	3	6	3	1																		
2001	33		7								2	1	1	1	1	1	1						
2002	32		1			1	2	2	2	2													
1996	28			2						3												1	
2000	34		12	1				1									1	1	1	1	1		
1999	14		3	1	1								1									1	2
1998	26		5	1		1																	
1988	2																						
1997	21			2					2								2						
1994	31		4									3					1					2	
1995	13						1				1	2							1				

Fig. 10. HTLO: chronological series of technological applications from 1990 to 2003.

- show among the applications and products, areas of development available with the local knowledge [11];
- develop the innovative thinking by copying technology described in expired patents (i.e. patents in the public domain). This aspect is important since copying will create a peer group effect which will act as a catalyst for other less advanced people. This aspect has been underlined by Pomp and Burger [12] in North Sulawesi when the new culture of cocoa was introduced.

4.1. Performing the search

We performed a search using the words COCONUT OR COCONUTS in the title and abstract of the patents. We obtain 1125 patents [6] which were downloaded (title, bibliographic reference, description and claims), and we built up a local database.

To be sure that there are no Indonesian patents in that field, we of course made the combination of the former words with the initials ID present in the PR (priority date field) or in the PD (publication date field). No Indonesian patents were retrieved. But, this is not sufficient, because if we select Indonesian patents from the database, we may see that some Indonesian patents are present, and that for some of them, only the titles in Indonesian are present, without abstract. For instance:

ID30585: KONSTRUKSI INTERIOR PELAT KAYU BERORNAMEN MULTI-GUNA

ID30101: PESAWAT TELPON MOBIL DENGAN DUA ATAU LEBIH "SLOT" UNTUK "SIM CARD"
ID30587: RANGKA KANOPI UNTUK PAYUNG DENGAN BERBAGAI BENTUK

Then, we tested the term Indonesian KELAPA (coconut) in the title field. No patents were retrieved.

From this database we sorted the data by IPC (International Patent Classification) subclass, to select the technologies and applications closely related to the local technological ability of people.

Fig. 11 shows the various IPC involved in the patents retrieved during the search.

The total number of sub classes is 185. The IPC may be viewed within the context of the patent (titles) and from the titles to the bibliographic patent data. Fig. 12 shows how the IPC may be viewed and how from the meaning of the IPC and from the patent title, description and claims the selection of the applications or technologies are made.

This allows the selection of the best technologies to improve the innovative thinking of the users.

4.2. The choice of the technologies

We choose a set of technologies which are consistent with the local facilities and expertise. This is the reason why cosmetic products and extracts for cosmetic products as well as various chemicals have not been selected, because the technologies involved are far away from what is locally available.

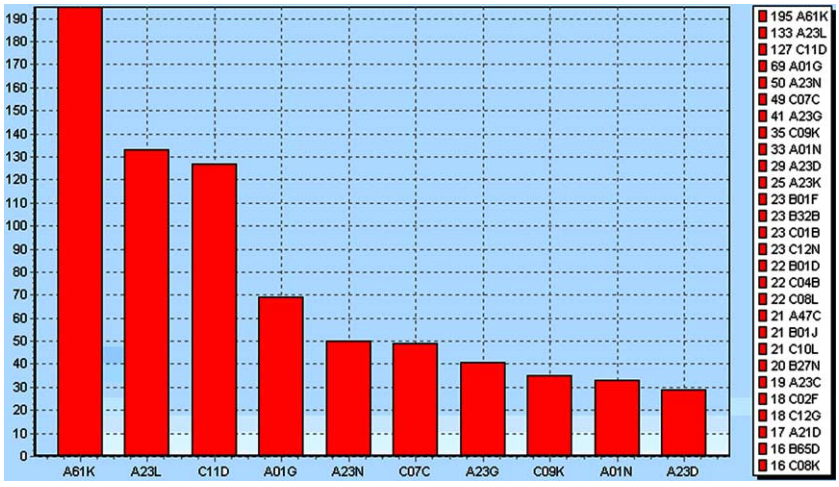


Fig. 11. Coconut technology: main IPC subclasses involved in the 1125 patents.

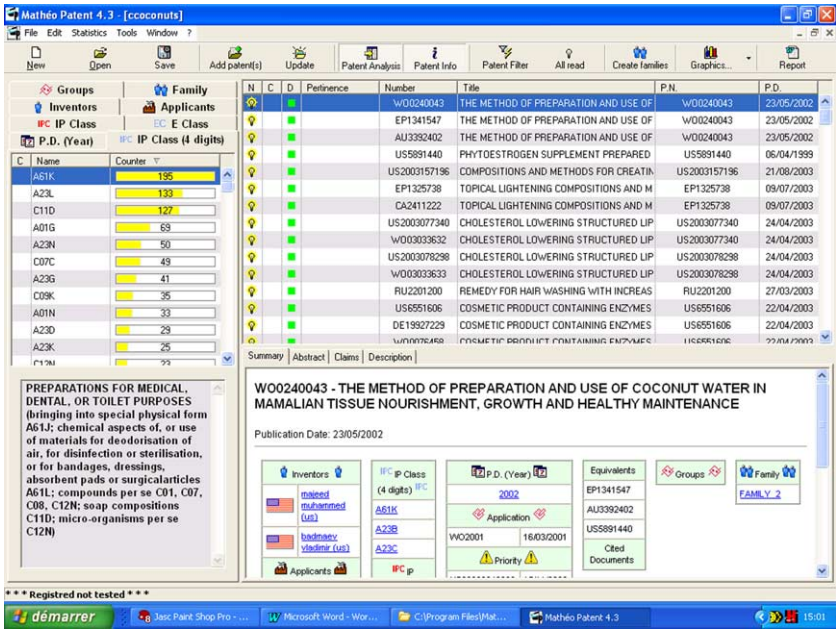


Fig. 12. Coconut technology: IPC, Titles and information on patents.

The selected technologies are presented in Fig. 13, and are biodegradable pet litter, building material, fodder animal food, horticulture cultivation, mattress chairs, objects made from fibers, organic fertilizer, preparation of wine from fruits, separation, textile, and treatment of water.

Some detail on these subclasses is provided in Table 2.

For each of the technologies selected, various analyses of Applicants, Inventors, and related technologies (using the IPC, since one patent may be indexed with more than one IPC subclass) may then be performed The correlation can involve charts as well as matrices and networks.

Fig. 14 shows a network between the selected groups and the IPC involved in all the groups; this helps to establish the map of the local competencies which will be necessary to develop this type of application [13]. The technologies investigated were mattress chairs, treatment of water, fodder animal food, and preparation of wines from fruits.

4.3. Results improving the innovative thinking

Coconuts are one of the most valuable resources from North Sulawesi but only a very few products are developed locally: coco's nata, coco fibers, carbon black from coconut shell—and they are sold as crude materials. The profit made from these products remains limited. It is then urgent, that in the framework of Competitive Intelligence and Innovation a move should be made toward a more sophisticated approach.

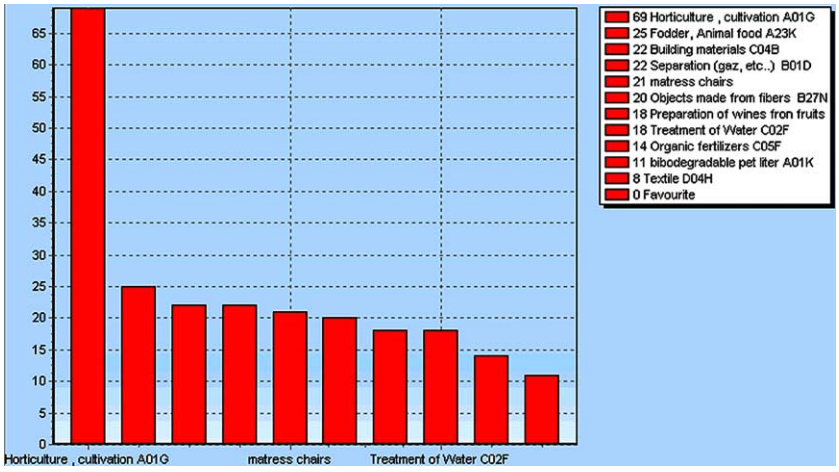


Fig. 13. The coconut technologies selected according to the local expertise.

Table 2
Coconut technology: example of selected IPC subclasses according to the local facilities and expertise

IPC (subclasses)		Products or applications
A01G	Frequency 69	**HORTICULTURE; CULTIVATION OF VEGETABLES, FLOWERS, RICE, FRUIT, VINES, HOPS, OR SEAWEED; FORESTRY; WATERING** (picking of fruits, vegetables, hops, or the like A01D 46/00; plant reproduction by tissue culture techniques A01H 4/00; devices for topping or skinning onions or flower bulbs A23N 15/08; propagating unicellular algae C12N 1/12; plant cell culture C12N5/00)
A23K	Frequency 25	**FODDER** **FOODS, FOODSTUFFS, OR NON-ALCOHOLIC BEVERAGES, NOT COVERED BY SUBCLASSES A23B TO A23J; THEIR PREPARATION OR TREATMENT, e.g. COOKING**
B01D	Frequency 22	**SEPARATION** (separating solids from solids by wet methods B03B, B03D, by pneumatic jigs or tables B03B, by other dry methods B07; magnetic or electrostatic separation of solid materials from solid materials or fluids, separation by high-voltage electric fields B03C; centrifuges, vortex apparatus B04; presses per se for squeezing-out liquid from liquid-containing material B30B 9/02; treatment of water C02F, e.g. softening by ion-exchange C02F 1/42; arrangement or mounting of filters in air-conditioning, air-humidification or ventilation F24F 13/28)
C04B	Frequency 22	**LIME; MAGNESIA; SLAG; CEMENTS; COMPOSITIONS THEREOF, e.g. MORTARS, CONCRETE OR LIKE BUILDING MATERIALS; ARTIFICIAL STONE; CERAMICS** (devitrified glass–ceramics CO3C 10/00); **REFRACTORIES; TREATMENT OF NATURAL STONE**
A47C	Frequency 21	**CHAIRS** (seats specially adapted for vehicles B6ON 2/OO); **SOFAS; BEDS** (upholstery in general B68G)

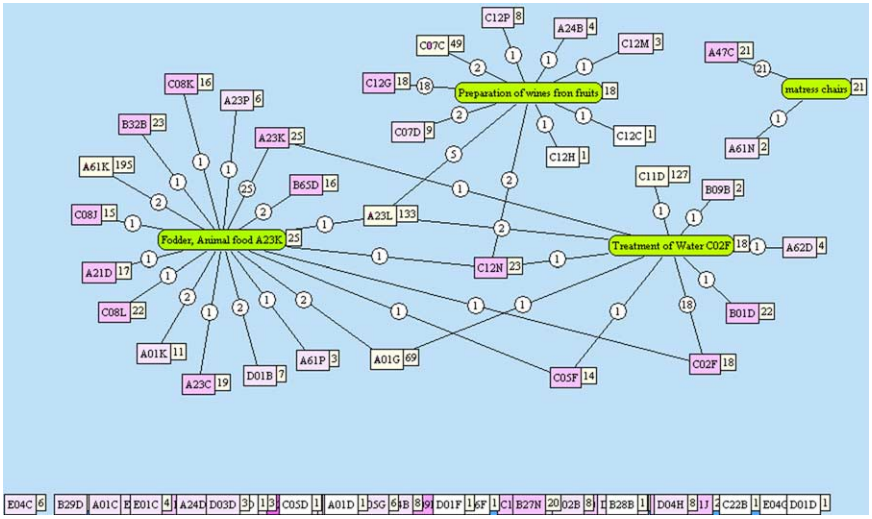


Fig. 14. Coconut technology: network between IPC and four groups.

The results obtain above, open the way to new areas to valorize the coconut products.

For instance:

- The Region is a volcanic area, so building materials characterized by their very light weight is interesting.
- The vicinity of the Port of Bitung provides all available facilities to ship all kind of products. In this condition, the production of biodegradable pet litter may be an opportunity, as well as the insulating panel or building materials.
- The region of North Sulawesi is well known for its pig breeding. The production of fertilizer by using pig droppings and coconut material is also an opportunity.
- Wine and alcohol from fruits because of their availability may be also an opportunity. In fact, because we worked for more than 7 years with Brazilian students and various Brazilians institutions, cross-collaboration south–south are interesting, especially for the domain of alcoholic beverages (cachassa), dry fruits (bade), corn (polenta), etc.
- Water treatment, either by coconut fibers or carbon black, opens the way to move from crude material to more sophisticated product, etc.

These small examples show how, by using technological analysis and patent database as a source of unique information, people will acquire a global view of the potential development of the area.

4.4. Innovation and copying

To show the importance of copying, let us go back to the patents selected and sort them by Patent Dates. Fig. 15 gives an example of the result obtained:

Why did we select this patent? This is because it is in the public domain, and then could be submitted to copy. This could make a valuable and fashionable disposable and ecological container. This way of using the analysis by date and IPC of patent in the public domain to improve innovation is suggested by the work of Quoniam et al. for Brazilian patents [14].

Now, this patent is near to the groups of "making alcoholic beverages from fruits" which was formerly selected. This is interesting, because the technology to make alcoholic beverages could be obtained from the data relevant to this IPC, and this will be enhanced by the fact that containers and older patents could bring added value to the whole process.

We then made the network between the former group and the publication dates. This is presented in Fig. 16.

We saw that the years 1984 and 1987 are critical, new work inspired from the patents with publication dates 1984 and 1987 will have to be considered first, to avoid potential infringement problems. But, because most of the patents have recent publication dates, it will be necessary to use the tacit knowledge of local people to develop alcoholic beverages.

4.5. Cross-cultural evidence from the above example

This above example may seem theoretical. It is important to show to Indonesian users, that this way of thinking, using technology to go to innovation is important and grounded in real life applications. A useful indication is available from Brazil, a tropical country with the same weather conditions as Indonesia (for some regions). In Brazil, there is an alcoholic beverage which is made from sugar cane: "the cachaça". By extension many other cachaças have been produced for

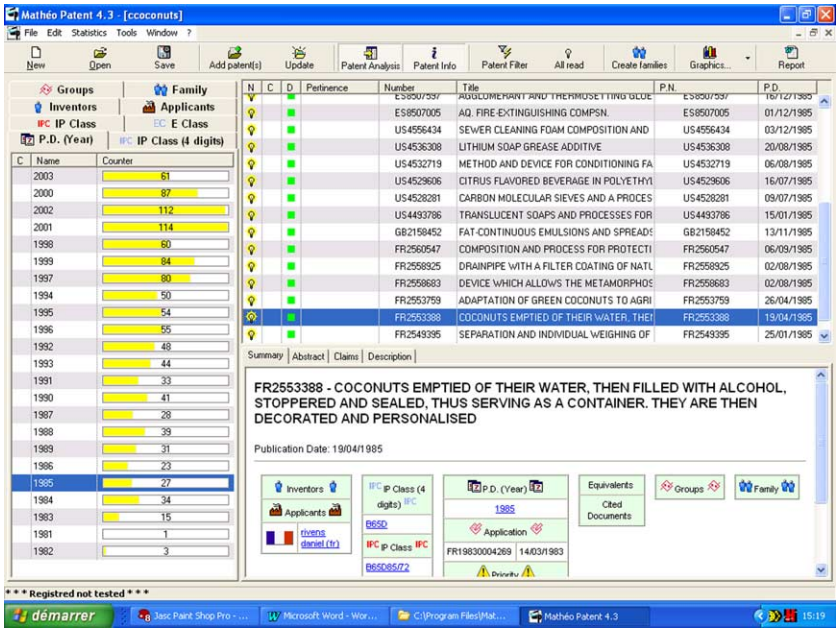


Fig. 15. Coconut technology: patent sorted by Publication Dates. Depth view of 1985 with the 27 patents on the right. The patent FR2553388 is selected. It concerns a container for alcoholic beverages made from a coconut shell.

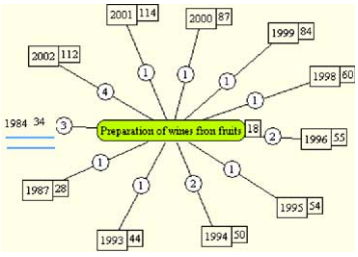


Fig. 16. Coconut technology: network of publication dates and group of alcoholic beverages.

instance ''cachaça no banana''. The production of cachaça from coco has also been developed. We asked to some friends in Brazil if it was possible to find this type of coconut brandy commercially available and, if so, in what type of container it was sold. In fact they found a cachaça colonial, available in a container in glass ceramic, with a coconut shape, sold in 500 ml (mark A. Targino & Filhos Ltd.). Moreover a search on the Internet with the terms ''cachaça no coco'' provides several relevant hits [16].

This type of evidence is very important to people, since it brings to them a strong link between theoretical thinking and innovation to real life products.

5. Conclusion

An easy access to free patent databases such as esp@cenet®, and the development of software allowing a fast downloading of the patents from this database, the development of local patent databases and their automatic analysis, provide to all users (even if they are not experts in bibliometry) the chance to make all possible correlations to understand the links, the chronology, the relationships which exist in the set of patents. The various ''views'' of the patent set, either by charts, networks or matrices allow a value-map [13] to be created, related to the query used to retrieve the patents.

The possibilities offered by Matheo-Patent to update the local databases, and to download the drawings, the first pages or the full text of the patent, will in our opinion increase the global use of patents, especially in developing countries, in academic research, PME (in a first step as a think tank to test new ideas and to know what is ''going on'' in the area of competence of the firm), and even in large companies.

This software tool has been built up to be an excellent tool for people engaged in competitive technical intelligence or competitive intelligence more generally. This is also why we provide within the software a system to build up automatically reports out of the patent set examined by the users (the report contains the query, main IPC and EC, charts, and matrices as tables of pairs of e.g. applicants/IPC or Inventors/IPC or Applicants, etc.).

In the field of education, we used the free patent database esp@cenet® to increase the innovative thinking of students (post graduates), either in Europe or, more particularly, in various developing countries (e.g. Indonesia, China), as explained here for the case of Indonesia. Because patent databases are unique since most of the information that they provide is not published elsewhere, we believe that this type of ''intelligent

interface'' will induce more users to benefit from the patent information in research, development and innovation and of course in intellectual property protection. To facilitate the mapping of new ideas and their association with patent information we very often associate Matheo-Patent with The Brain which is a software which assists innovation, brain mapping, etc. [15] and which benefits people in their efforts to correlate patent information and strategic analysis.

Acknowledgements

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[11] The patent analysis provides the way to select applications and products which are close to local expertise. In fact, in developing countries, if the technology to be transferred requires a scientific and technological level that is too far from the local possibilities, the transfer will not work.

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[15] We combined very often Matheo-Patent with the software The Brain, allowing us to map ideas and to associate this mapping information. These applications can be stored on your computer and updated if necessary. This is a very powerful tool for brain storming and to stimulate working groups, http://www.thebrain.com/. The Brain allows you to draw the map of related ideas (called thoughts), and information (such as patent title, number, abstracts or claims) can be linked to all those ideas. The end of the idea network will be a sort of tree, all the branches being ideas linked to relevant information (patents, competitors, close products, potential market data, etc.). For instance we could make the mapping of the application: coconut brandy. We would start from technologies used to make the brandy, type of containers, potential customers, etc. This will help people to make the best choice having on their computer the global mapping of the application. The map will also help to consider all the possible paths (branches of the tree) in term of Quick SWOT analysis (Strength, Weakness, Opportunity, Threat).

[16] From the www on February 20th 2004: http://www.clubbi-envenue.com.br/web/site/iframe_gourmet.asp?id_receita = 144, http://www.olindavirtual.net/info21.htm at the end of this page, a picture of container with coconut shape is shown.

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