An organisation’s patent portfolio forms a critical part of its IP holdings alongside its designs, trademarks, copyrights and trade secrets. Much of the value from a portfolio can only be realised through its effective management. In turn, that requires tools and techniques to help understand portfolio content, how and where this fits in with the organisation’s competencies and what the market opportunities are for exploiting the technology owned. There is also a need to identify gaps where complementary technology can be licensed in and identify non-core technology where know-how can be licensed out or divested for financial return. This is the province of patent mining.

A clear and effective IP strategy critically incorporates a clear and effective strategy for managing an organisation’s patent portfolio. But what are the key components of an effective patent portfolio management strategy? In broad terms, it comprises five components:

- What do I have? (the IP audit)
- What do I need? (the gap analysis)
- Acquire what I need (the investment strategy)
- Divest what I don’t need (the deployment strategy)
- Ongoing maintenance and monitoring for effective development of the IP strategy over time

Let’s look at each of these components in turn and highlight some of the research tools that help support these stages.

**IP audit – what do I have?**

In order to establish the patent landscape for an organisation, the process begins with an audit of the intellectual property within the organisation’s ownership or control.

- What patents do I have in my portfolio?
- What technologies are they in?
- Can I identify my strengths (core competencies)?
- Are there any obvious weaknesses?

This is not simply a question of establishing ownership or licensing rights; it includes an...
assessment of the importance of the technology and its likely markets. For key technologies, it can also include an assessment of the strength of protection offered by specific patents and whether these are likely to be assertable in the relevant territories to protect the technology as intended.

As an example of this, when British Telecom (BT) conducted an audit of its portfolio of more than 15,000 patents, it re-discovered a patent for hyperlinking technology dating from a time before the world wide web was conceived. However, when it tried to assert the rights embodied in this patent against companies that used hyperlinking on the web, a federal court ruled that BT was trying to cover too much ground, and in late September 2002 BT abandoned its efforts to uphold the patent.

Although BT didn’t win that particular battle, it still expects to generate annual income of US$100 million in the next five years from licensing its technology and IP rights enforcement from its wider portfolio.

Effective research is the key to understanding fully what is in a patent portfolio. To illustrate this, let’s examine a simple case study based on the US company, TiVo Inc, providers of streaming digital video recording products and services. We have used TiVo as an example because it has a compact portfolio, which makes it easier to illustrate some of the techniques involved. These can, of course, be applied to much bigger portfolios where the volume of data can pose a real challenge.
Effective patent mining

TiVo’s patent portfolio
In answering the first question in the portfolio management process – what’s in TiVo’s patent portfolio? – we need to consider the distinction between patents and inventions. TiVo has developed a number of inventions that may each be protected by multiple patents.

For our case study, we used Derwent World Patents Index® (DWPI®) from Thomson Scientific, as our source. The databasecollates patent documents relating to specific inventions into patent families. A recent DWPI search for TiVo Inc as a patent assignee retrieved 32 records. These correspond to 32 unique inventions for which 122 individual patent publications have been issued in multiple jurisdictions. Although 29 US patent applications and granted patents have been published to date, analysis of the priority data confirmed that patent protection has been applied for in the US for all 32 unique TiVo inventions.

The sample DWPI record reproduced in this article (see page 31) shows a typical invention description and the details of the associated patent family. In this instance, patent publications at the time of the analysis for TiVo’s new software installation method comprised a WO/PCT application, a US granted patent and an Australian application.

Gap analysis – what do I need?
Having completed the first step and determined what is in a company’s patent portfolio, the next step is to determine what else the company needs to get an edge over its competitors. To do this it needs to know:
- The identity of its competitors.
- How many patents competitors have in their portfolios.
- What technology areas these are in.
- Where competitors’ strengths lie.
- Whether these pose a threat.

Taking TiVo’s portfolio as a starting point once more, we can now take a wider look at who else is patenting in the world of video-and TV-on-demand technology.

TV-on-demand – the global patenting picture
In order to analyse the landscape for video- and TV-on-demand technology, we first need to isolate the set of inventions relating to this technology. A further search of DWPI was carried out using a combination of keywords and manual code indexing, specifically for video-on-demand systems and electronic programme guide systems. This retrieved a set of records representing inventions from all players in this market space.

A sample of the search results was exported into a data mining and visualisation tool. Various analyses were generated that show key patentees and their patent filing activity over time.

The resulting illustration shows some of the top patent assignees in this technology. These include many familiar names from the TV and video industries, illustrating how this approach can be used to identify both competitors and possible business partners. This can be of particular importance for smaller companies that may have new technology but not the resources to bring this to a large customer base. TiVo, for example, has established partnerships with Sony and Toshiba, among

Top 20 TV on demand patent assignees
others, to integrate TiVo technology into a host of new consumer electronics products.

It can also be useful to look further down the rankings of organisations patenting in a particular technology sector, in order to identify the smaller players who may be suitable sources of licensing-in technology or potential acquisition candidates.

Acquire what I need - the investment strategy
Having gained a better understanding of where our portfolio sits in the wider market, the next step is to try to identify some of the gaps that need to be filled to drive growth.

• Where can a company increase R&D investment to build on strengths?
• Which key inventors should the company head hunt to gain competitive advantage?
• Where should the company license in technology to compensate for areas of weakness?
• Where do competitors’ strengths lie?
• Do these pose a threat?
• Is there an opportunity to create an alliance?

A patent portfolio doesn’t sit in isolation from the rest of the organisation. People are a vital part of the technology expertise of an organisation. “Patents plus people, often makes a more valuable proposition,” says Mike Carr of BT Exact, one of those who have helped drive the change in IP strategy at BT.

An important piece of information that patent data mining can provide is the identity of key individuals involved in developing a technology. This can be invaluable to an organisation seeking to enhance its inventive capacity by recruiting key staff.

At TiVo, the top 10 inventors are: Barton JM (15 inventions); Look H (6); Platt DC (6); Vallone RP (4); Beach B (4); Look HD (4); Van Stam W (4); Kao JS (3); Chow CT (3); Waterman A (3).

This analysis is based on data from the 32 TiVo inventions identified in the Derwent World Patents Index database. The individual inventor names are mapped against the number of patent families where those names appear. Information about the individuals associated with new inventions of this type could be of particular value to a company searching for expertise in the field of streaming video technology.

In addition, inventor information can be of particular relevance in the case of merger and acquisition activity. For example, in a takeover scenario, patent analysis can be used to identify those individuals who are key to the future product development pipeline of an organisation in the post-acquisition phase.

When using patent information in this way, it is always important to put it in the context of other business information about the organisation. In this case study, the analysis
shows that J Barton is the most common inventor name on TiVo’s patent applications. Jim Barton is, in fact, one of the original founders of the company as well as being its Chief Technology Officer.

Data mining and visualisation tools can be used to carry out further analysis of the inventions associated with key individuals, and so reveal their particular areas of expertise.

The specific focus of the inventions associated with each individual inventor can be analysed in more detail using the International Patent Classifications (IPCs) assigned to each patent publication.

Taking the most common inventor name at TiVo, J Barton, as an example, the IPC listing indicates that his primary area of expertise is in pictorial communications such as television - as represented by IPC H04N. Comparisons with the IPC profiles of the other TiVo inventors indicates that their patenting activity is focused on different areas, in particular information storage and digital information transmission as represented by IPCs G11B and H04L respectively.

Divest what I don’t need - the IP strategy development

Licensing out patented technologies is now an important part of intellectual asset management and one of the key gains to be realised from data mining of patent portfolios. The scale of those gains can be appreciated by considering the report of a dramatic 10-fold increase in recent times of global licensing and technology transfer revenues, from US$15 billion in 1990 to US$120 billion in 2002, according to a report by US News and World in June 2002.

Specific examples of potential gains include Texas Instruments which, according to Deloitte & Touche, “now derives more than US$500 million of licensing revenues from its unused patents”; and IBM, whose licensing revenues, according to the MIT Technology Review from 2000, “top US$1.7 billion accounting for 15% of the company’s profits”.

Of course, these are seminal examples of effective licensing-out strategies, and there are very few that will be able to come close to equaling such figures. However, they do illustrate a wider truth: there may be potential in any patent portfolio to identify and then exploit technology for licensing purposes – the rights owner will never know unless it looks. How then can we use patent data mining to identify potential licensees for unwanted technology?

As already discussed, we can use patent analysis to identify those companies patenting in the same areas of technology and in this way identify firms that may be interested in licensing a company’s technology. However, we can find closer connections between a target organisation and other players in the market by using citations to focus on those patents that represent a common point of interest.

By way of example the table opposite illustrates the US patent citation relationships for one of the patents from the TiVo portfolio - US6233389 “Multimedia time warping system” – using the Delphion Citation Link visualisation tool.
The patent of interest - US6233389 – is in the middle of the citation map. Those patent citations identified by the US Patent Office examiner for TiVo’s US6233389 patent are shown to the left of US6233389 and those later published patents that subsequently cite this invention are shown on the right. US6233389 was subsequently cited in later published US patents filed by Sony, Prediwave, Microsoft, IBM and Micron.

Such a citation analysis has a number of applications in addition to the identification of organisations that may represent potential licensees for a technology, such as the identification of non-obvious competitors and potential infringement issues.

**Ongoing maintenance**

Dwight D Eisenhower once said: “Plans are nothing; planning is everything.” In other words, successful completion of the steps in determining what is in the starting portfolio, identifying what is missing and what can be divested, is only part of the process. Ongoing realisation of rewards from mining a patent portfolio depends on keeping the intelligence behind the patent portfolio management strategy up to date. There are various tools that organisations can use for this ongoing maintenance, including current awareness services. These will help to monitor both competitors’ activities and what is happening in the wider technology area.

**Conclusion**

In this review, we’ve looked at some of the patent data mining techniques that can answer key questions involved in developing an effective patent portfolio management strategy. The returns that can be realised by streamlining areas of competence, as well as directly through licensing revenues, are substantial, and increasingly contribute a significant proportion of the earnings of technology-based businesses.

The patent data mining techniques described here, used wisely and in conjunction with the effective management of a patent portfolio, can help organisations extract pure gold from the nuggets of technology covered by the patents they own.

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