



Patent landscaping and visualisation tools

IP Pragmatics' **Elaine Eggington** and **Quinton Fivelman** make sense of patent landscaping



Picture: Modella / Shutterstock

Patent landscaping is the art of analysing and communicating information about a patent technology space in a visual and informative way allowing for easy interpretation of trends and patterns. But how can you make sense of it all?

In today's knowledge-based market, patents play a key role in innovation and technology development. With the advances in digital media, most of the patent information we have today is in a searchable electronic form. But it can be largely disorganised and with the high volume of data across many territories, it can be overwhelming to find and extract meaningful and relevant information. Most of the information is buried within patents and publications which need detailed analysis of many documents and files to draw any conclusions. It has been claimed that utilising patent information to the best advantage could shorten R&D time by 60% and save 40% of R&D costs¹.

Patent landscaping tools offer a way to simplify this complexity, and convey the information in a form which is easier to interpret and digest. A range of patent visualisation and data analysis techniques are available and can make the data in a patent technology field accessible to those who are not patent specialists from board level down. They say that a picture paints a thousand words, and these techniques are valuable not just to communicate complex information, but in particular to stimulate discussion and to identify which areas need further investigation.

Why use patent landscaping?

A patent landscape analysis report typically contains a visual representation of the patents retrieved from a carefully designed

keyword search, along with graphs and charts showing key patent assignees, patenting trends over time, patents filed by country and other useful information. This intelligent and relevant patent analysis can be extremely beneficial when developing an intellectual property management strategy or when tactically preparing and filing related patents. Patent landscaping can enhance more traditional patent searching, and the findings are important for many areas of business strategy.

Competitive position

The most common use for patent landscaping is as part of a more comprehensive market or commercialisation analysis. This can give information about the strengths and weaknesses of an organisation's patent portfolio and that of its competitors. This is the type of information that is essential when planning a research and patenting strategy, when looking for investment, when defining a competitive position, or when valuing a portfolio for investment, merger, acquisition or licensing. These are some of the questions that might be addressed:

- What are the overall trends in patenting in a particular sector over time, territory and application area?
- Which are the major companies or universities patenting in this sector?
- How does a client's portfolio and patenting strategy compare with that of its major competitors?
- For which application areas is the technology/invention typically used?
- Which fields are being exploited by which companies?
- Who is citing the key patents in a technology field or client portfolio?

Partnering

Another effective use of landscape analysis is to discover suitable partners. This may be for in or out-licensing, to find co-development partners, or to identify potential acquisition or merger targets. In this case, we might want to know:

- Where are there potential in-licensing opportunities to strengthen the patent protection of the client?
- Where are there out-licensing opportunities to generate additional revenue for the organisation?
- What would the combined portfolio of a client and a potential merger partner look like compared with the competition?

Patentability and freedom to operate

The final major use for landscaping is to support the preparation, filing, prosecution and exploitation of a patent. Relevant questions here would include:

- How does an invention disclosure compare with current patents and applications?
- Where does the patent portfolio sit in the overall landscape – does it form a distinct well-protected area, or is it a single patent surrounded by a thicket of competitors?
- Which existing patents may be relevant for freedom to operate and for patentability?

This type of analysis should never replace professional advice from a patent attorney, but can enhance this relationship by focusing attention onto the specific areas of highest concern.

Visualisation and patent analysis tools

The techniques discussed in this article can be provided by a number of different software products. Some examples are TotalPatent™ from LexisNexis, Innography in association with Dialog, Patent INSIGHT Pro™ from Gridlogics and Thomson Innovation from Thomson Reuters². Each of these has particular strengths³, and it is important to keep in mind the actual requirements of the researcher and the company strategy, which in turn can change the type of analytical tools required to complete the landscaping task. This is by no means an exhaustive list, and there are many reviews of the tools available elsewhere⁴. What we are aiming to do in this article is to demonstrate the types of insight that can be achieved by using these techniques.

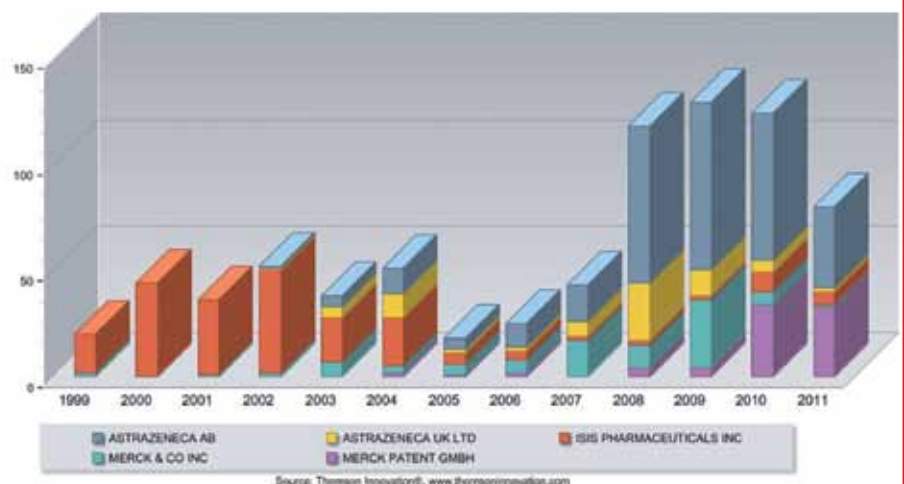
Graphical patent trends

Graphs showing trends in the number of patents filed per year and by territory are useful to indicate the level of research activity, innovation and advancement in a particular technology area over time. There are a number of non-research reasons which too can influence the number of filings per year. For instance, periods of economic growth and stagnation can affect the level of annual filings as funding scenarios change. Within these trends, various sub-specialties or sub-sectors of research can show varying activity over the same period which can be analysed in greater detail. This could be due to changes in technological approaches, research priorities or funding initiatives. Information from the number and range of inventors can provide information on research collaborations and teams. This jointly-developed intellectual property

can provide valuable information about future directions of a product, although cross-licensing between collaborating partners may not be obvious from such searches. Figure 1 shows an analysis of the number of patents filed by the top assignees in a field over time, showing that in this example, AstraZeneca is becoming more active, and Isis Pharmaceuticals less active in the technology. In a few cases, inventions are filed by a single person or team not affiliated to an organisation or large company. These “independent” inventors often have a higher chance of producing inventions that are never commercialised, although they can be important in freedom to operate searches and strategies, and these patents are often renewed solely for this reason.

Figure 1: Example of a trend analysis, showing the patenting strategies of the top assignees over time

Top Assignees by Year



Source: Thomson Innovation®, www.thomsoninnovation.com

Data Source: Thomson Innovation

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Using patent filing location analysis, territories where the key research and innovation is occurring can be identified by the country of the priority patent filing. The city and country of filing is typically the location of either the organisation filing (in some cases the headquarters of a company) or the inventor; however there may be specific reasons

for priority filing in non-home territories. By using territory trend graphs and pie charts, one can illustrate the variations from territory to territory and the geographic spread of patents on a particular subject indicating where the major commercial opportunities are thought to be located. Trends can indicate that due to local expertise, research in different regions can demonstrate specialisation in specific subsectors of technology and product development.

The top patenting organisations and inventors can be identified in specialised fields and patent strategies can be compared. Often this sort of information gives little indication of the commercial value of each patent or the potential earnings. However, companies will use patents to protect various areas of technology in which they are investing and the number and breadth of patents filed can give valuable information on a competitor's patenting and future research strategy and priorities. Citation analysis is another way to uncover other companies and groups with an interest in a particular technology area. The analysis can begin from a client's patent, or from a key early patent in the technology field. The group of patents and organisations which have cited these early patents in their later filing shows who else has an interest in this technology. This can also be valuable to assess which patents may be relevant for freedom to operate and which patents may limit the claims on a filing or an intellectual property strategy.

Landscape maps

For the patent mapping examples in this article, we have used the proprietary ThemeScape™ mapping tool from Thomson Innovation. ThemeScape™ uses term frequency and other algorithms to cluster documents based on shared language. Selected text fields from one patent record are compared with text fields from all other patent records within the search collection. Specific keywords can be selected or the entire full text of patents can be searched using the system to compare common frequently appearing text. The outcome of this analysis is a visualisation of the patent space with

each patent (dot) represented once in the map. Patents in close proximity will share more phraseology than those located apart. The patents are grouped into map "contours" to show areas of high and low patenting activity organised into common themes. The illustration (figure 2) shows these contour lines, with the "mountain peaks" representing a concentration of patents. Each peak is labelled with the key terminology concepts contained in the patents within the cluster.

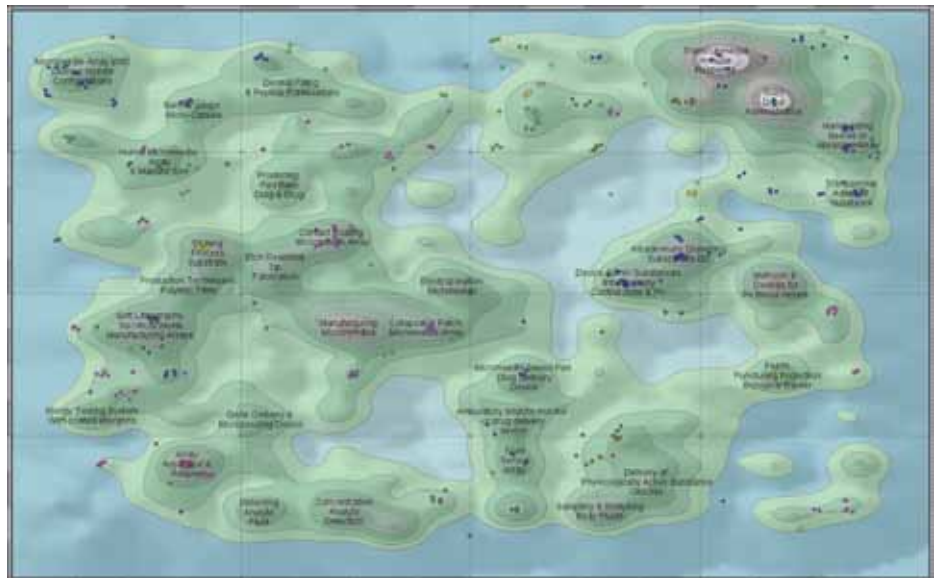
At a simplistic level, if a patent lies at the top of a large "mountain peak", then it can be considered to be in a competitive patent space and may face more difficulties in patent prosecution and eventual commercialisation. The flip side to this, of course, is that the technology area is likely to be more commercially attractive and may offer greater partnering opportunities. The "valleys" represent less well exploited technology areas which may help to steer future research directions.

The real insights come from exploring the maps in more detail,

for example subdividing them into different application areas to allow for a more in-depth analysis of the strengths and weaknesses of the company's patents in different fields. By focusing on specific sections within the landscape, patent lists can be devised which may be valuable to research in-licensing opportunities to complement and strengthen the client's existing holdings. They can also pinpoint companies which may be interested in taking a licence to patents in the client's portfolio. Both of these are excellent ways to identify potential partners and learn about their patent portfolio's strengths and weaknesses before approaching them.

Through this mapping, key competitors can be easily identified and further investigated. This is shown in figure 2. Competitors who have become increasingly active in the last few years can be flagged and tracked before their products reach the market. In many cases, these competitors may not be well known beforehand and the landscaping allows a demonstration of the particular application fields where these competitors are focusing their research.

Figure 2: Example of a patent landscape, with pink dots identifying the patents held by the client, and different coloured circles highlighting the patents belonging to particular key competitors. The patents are grouped into map "contours" to show areas of high and low patenting activity organised into common themes. If a patent lies at the top of a large "mountain peak", then it can be considered to be in a competitive patent space and may face more difficulties in patent prosecution and eventual commercialisation.



Source: Thomson Innovation

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Case study

IP Pragmatics used many of the tools and techniques described in this article for its work with a multinational specialty chemicals company. The company has a core group of chemicals that forms the backbone of its product range, and are used for some specific applications which

are the focus of their expertise. This type of chemical can also be used for other applications, and the company had patent landscaping performed to identify the position of its patent portfolio within the overall technology field.

The analysis and landscaping we carried out allowed us:

- To pinpoint which application areas were particular strengths of both the company and their key competitors.
- To compare the company patenting strategy with that of their main competitors. This information then fed into the company review of their future patent strategy.
- To identify some additional competitor companies working in adjacent application areas, which had not previously been monitored closely by the company.

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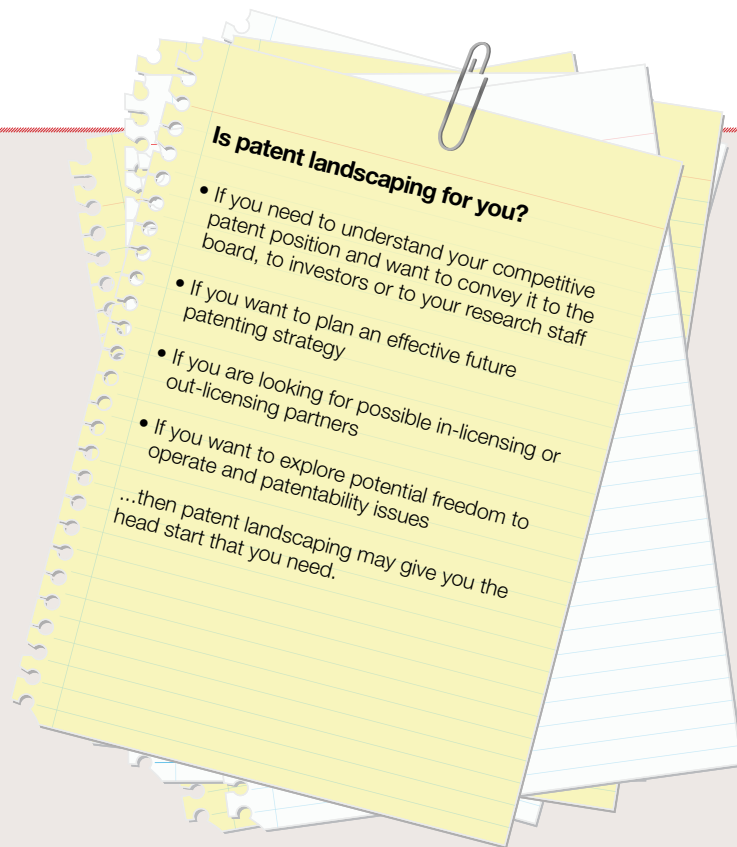
- To visualise where there were “gaps” in the patent landscape that may be valuable future research areas.
- To compile a shortlist of potential partner companies who might be interested in licensing patents from the company portfolio for applications which fall outside their core expertise.

Final thoughts

Overall, patent landscaping reports provide critical competitive business intelligence in an easy to digest format for reporting to non-patent-professional staff. Importantly, it is essential to provide this clear and detailed interpretation of all the information in the context of a client’s patent and business strategy. A good, well-researched and detailed patent landscaping analysis should provide a client with a clear understanding of their patent position in the marketplace and enable them to develop a successful intellectual property strategy. The analysis should allow a company to best position itself within the overall technology and business landscape giving a clearer path towards commercialisation.

Footnotes

1. Cantwell, JA, and Jane, M (1999) Technological globalization and innovative centers: the role of corporate technological leadership and locational hierarchy. *Research Policy*, 28 (23), 119-144; or Liu, C-Y and Yang, JC (2008)



Decoding Patent Information Using Patent Maps. *Data Science Journal*, 7, 14-22.

2. See: law.lexisnexis.com/total-patent; www.innography.com/; www.patentinsightpro.com/; www.thomsoninnovation.com/.
3. Inclusion of these tools in the list does not represent an endorsement of their suitability for your needs.
4. Eldridge, J (2006) Data visualisation tools—a perspective from the pharmaceutical industry. *World Patent Information*, 28 43–49; or Yang, YY et al (2008) Text mining and visualisation tools – Impressions of emerging capabilities. *World Patent Information*, 30, 280–293.

Authors



Elaine Eggington is senior business development manager at IP Pragmatics, where she has produced patent landscapes for technologies from specialty chemicals to medical devices. She began her career in industry and has spent the last 11 years helping companies and universities to commercialise early-stage life science technologies through venture capital investment and consultancy.



Quinton Fivelman is a life science and cleantech business development manager at IP Pragmatics and has a range of business development, start-up formation and consultancy experience in European and developing world markets. Quinton regularly uses patent landscaping to visually communicate complex patent information to a variety of clients.