Maximum value at minimum cost

One of the disincentives to drilling into a patent portfolio to search out further value-enhancing opportunities is cost. However, there are ways to save significant amounts of money – something that financial modelling will help patent owners discover

By **J Scott Bechtel** and **Ray I Throckmorton**

Large patent portfolios typically evolve over time as a result of a wide variety of conditions. A research-oriented university or foundation may own thousands of patents covering many scientific and technical disciplines. Corporations, particularly conglomerates, may own patents traversing a variety of industries. Large portfolios may include legacy patents where transient leadership insisted upon patenting more (or less) than was prudent practice, or focusing upon special areas that may have seemed strategic or even trendy at the time. The net result may be a collection of assets representing a sizeable financial investment with a very uncertain value. The task of extracting value from the portfolio can be risky and challenging. For these reasons, valuable patents often live out their statutory lives in file folders without generating the returns of which they were capable.

Engineers and researchers come and go, or may shift interest. This often means that the intellectual property manager no longer has access to the knowledge held by the inventors. Sometimes, the inventors are available but simply are not interested in revisiting old research. This is particularly true after eight to 12 years have passed; yet it is often the patents falling within this age range that offer the highest promise of generating licensing revenue. The portfolio manager's first challenge is to locate expertise to understand the patents.

When there is access to active and interested inventors, they are among the most knowledgeable regarding the progress of commercial development (and infringement) of their own technologies. For a handful of fortunate organisations, mining patent assets should include communication to all the employed inventors asking for their input on commercial status, known competitors and potential licensing targets. Sometimes circulating a simple questionnaire or holding a series of review meetings can lead to the discovery of a golden bullet within the portfolio.

For the remainder of portfolio owners, the most common C-level solution is to match the portfolio to manager(s) with at least a basic understanding of the technologies. The IP manager faces the challenge of combing through patents to find the most valuable ones and, in turn, to find a viable methodology to drive value from the best patents (by sale, licensing or litigation).

Management: traditional and new approaches

Financial issues aside, the most common approach to portfolio value extraction almost always includes an initial screening step, which we call triage. This is to help focus resources upon the patents with the highest potential value. Triage is usually followed by more focused research on individual target patents and potential licensing candidates. Although the basic objective is the same, the difference between traditional and modern approaches lies in how the work is performed, who performs it and how it actually gets done.

While the evolutionary roadmap is not clear, there has been a general improvement in portfolio screening approaches followed by discovery of more effective techniques for completing the research, analysis and

discovery of licensing candidates. Last but not least, the evolution of licensing itself has been driven by shared experience, evolving patent case law and innovation in professional practice.

Portfolio triage: viable methods for a first sort

Any discussion of ideas about better ways to sort and drive value from a patent portfolio will shift to financial analysis of the costs of doing so. The simple challenge is to avoid spending the entire expected value of the portfolio on managers, consultants and experts focused on reading and analysing patents. Assuming a patent portfolio of 1,000 patents makes calculations easy, this model portfolio will help to illustrate the first point that 10 or 20 hours of highly specialised labour to read, understand, research and evaluate the prospects for each patent becomes an enormous total investment. For example, a minimal triage investment of just US$2,500 per patent becomes US$2.5 million to research the model 1,000 patent portfolio.

Ironically, an inventor or owner probably spends many times this 20-hour example, but it is unlikely that an individual or even a small team of professionals will find it practical to spend 20,000 man hours – unless, of course, the expected return is quite high and fairly certain. The majority of independent inventors do not make money on their patents.

The need for an efficient triage process hits home for financial and practical reasons.

Traditional alternative approaches to triage generally include a quick review by managers. This usually involves reading the title and abstract and perhaps all or some claims. Even 15 minutes per patent equates to 250 man hours (per 1,000 patents), suggesting that a new portfolio manager may need about two months on the job just to expose himself to the portfolio. These processes often include entering some of the information into a spreadsheet or database, perhaps categorising or grouping similar patents.

Other screening scenarios might include separation of strategic and non-strategic patents. This usually means separating patents that may read upon products being sold or planned as part of the business from those that are no longer viewed as important to the business. Another sorting scenario might include selecting certain age groups, perhaps driven by maintenance fee decisions or based upon an assumption related to the likelihood of infringement, as previously noted. Other sorting scenarios may be based upon SIC codes, citation counts or other criteria selected by the portfolio manager. It has not been clear that any of the traditional low-cost, *ad hoc* methods described above ensure the separation accuracy necessary to justify higher investments to attempt to identify and drive value from the remaining patents.

Patent scoring systems, having their roots established many years ago in both the investment community and commercial university patent management companies, have become more popular as a tool for portfolio triage. Arguably for good reason, the older scoring systems relied upon the use of experts or, as an alternative, managers trained and skilled in an objectively applied scoring process. The mantra was often “don’t fall in love with any individual technology”, as professional managers focused on the claim construction, legal details and relevant industry information, rather than the appeal found in the technology itself.

When multiple experts were used, the quality challenge was always to ensure that the expert doing the scoring was reasonably well versed in all three legs of the stool necessary to support a patent evaluation process. In other words, the expert needed to understand the subject technology, required a statutory and practical knowledge of claim language and the critical (and current) points of patent law, and needed enough business acumen to recognise a golden-bullet patent when he saw one, often including knowledge of how a given market and set of licensing targets might react to a licensing invitation. The general idea was for the experts or IP managers to help substitute for the missing inventor and in part generate findings of an objective reviewer regarding whether the patent had any potential value. This combination could provide a basis of forward investment to drive value from selected patents.

The logic behind expert scoring systems was to put all the patents onto the same level playing field and hopefully to provide normalised scoring that could be used to sort out the strongest and highest value patents. Sometimes the scores were presented and defended among a team of managers to finalise a go or no-go decision. That said, the actual conclusion was often to go and do more research before a final determination could be made. The result was costly and inefficient, representing a problem that still remains.

As scoring systems evolved and criteria were subjectively debated, there was an empirical improvement in the accuracy of results. Today, expert score reports, depending upon complexity, could cost between a few hundred and several thousand dollars. Using the 1,000 patent multiplier, this instantly puts triage costs in the US$250,000 to US$1 million-plus range. This cost level may generate a risk profile that is unattractive to management.

A newer triage idea is to apply objective patent measures that can be observed and reported by lower-cost offshore labour or even minimally trained patent screeners. Taking the idea even further, the idea of computerised scoring is developing on several fronts. Today, these ideas are closer to reality, even including combined computerised and human scoring. Among the most sophisticated and unique systems are those which use adaptive statistical modelling where the individual scores of a subject patent are compared and analysed against patents already known to have been successful in various environments, such as litigation, auction or venture investment. In essence, the debate around scoring criteria has been replaced with management science.

Alternatives are also offered which include computerised custom screening (rather than scoring or rating) for specific elements which may be of immediate market value. This type of programmed screening (much like a multiple choice test) can be performed under tight quality controls offshore by educated but extraordinarily low-cost labour, easily getting below the long-awaited US$100 per patent barrier. This lets portfolio managers apply their own criteria without personally providing all the labour, thus reducing their task to that of final review and interpretation of the offshore results and data.

As these more sophisticated and labour-savings approaches evolve, the potential to complete a successful scoring screening process at US$100 or less per patent has become a reality. One significant licence from the 1,000 patent model portfolio can easily return the sub-US$100,000 investment necessary to get started. Finally, this newer approach makes the portfolio-mining risk profile attractive and profitable.

After triage: examining potential high-value patents

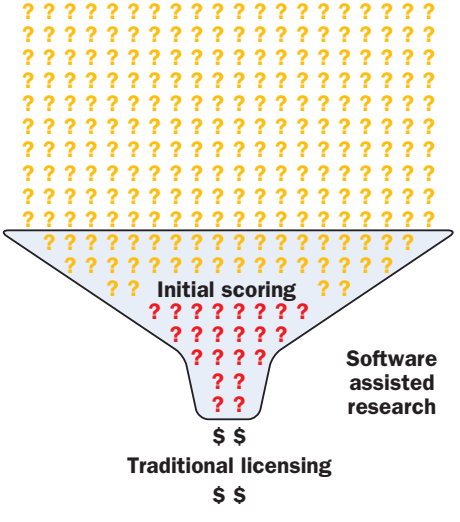
For the sake of continuing the modelling process, distilling the model patent portfolio to one in 20 promising patents leaves 50 patents which may appear to have the most economic potential out of every 1,000. The portfolio manager then faces the next challenge: determining which of these 50 patents merit the initiation of a full-force licensing effort.

At this point, if a patent scores well within a sizeable market, the obvious questions then focus upon further determination of its actual potential. Examples of important questions yet to be resolved include the following:

- Is the patent infringed and who might need a licence?
- What are the products needing a licence and how much are the sales and/or profits?
- How robust is the patent in legal terms? Is there prior art? Is there an obviousness argument?
- How solid is the prosecution history?
- If the patent and case are solid, how receptive are the licensing targets to accept a licence?
- Alternatively, how much will it cost to prove the infringement (or hurdle the Rule 11 bar in the US) and litigate the case?

Traditionally, licensing managers have technical expertise in fields at least partially related to the portfolio assets. In university technology transfer, there are often specialists – an electronics manager, say, or a life sciences manager. In corporate licensing departments it is more common to blend members of the legal team (or managers with professional understanding)

Figure 1. **Patent portfolio triage**



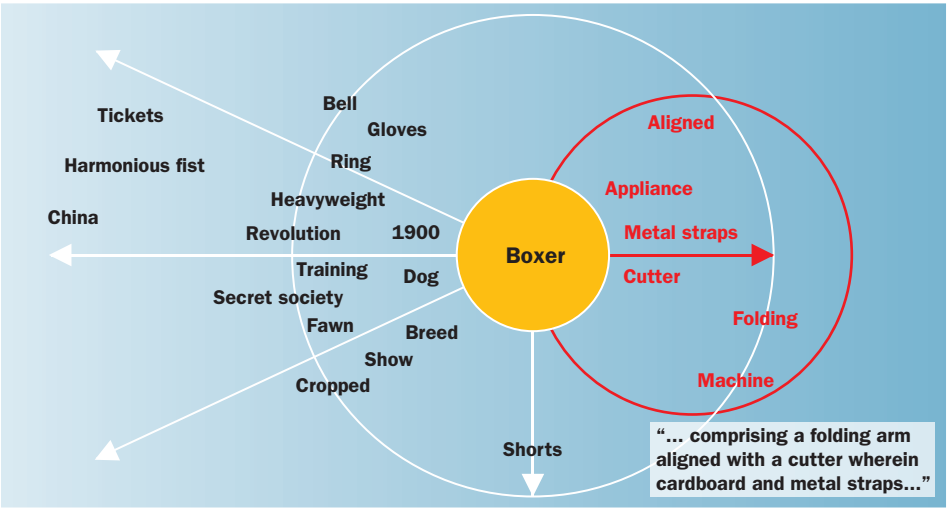
with technical experts. These individuals are already built into the budget and can do much of the preliminary analysis. That said, and from a C-level perspective, staff salaries are still part of the cost. In this sense, better use of professional tools to improve efficiencies or lower-cost outsourcing to permit more screening has been part of the overall model. In other cases, outsourcing decisions are driven by a need for special expertise, laboratory resources or a desire to produce objective third-party reports.

Years ago, the cost of determining whether a patent merited a full-force licensing campaign could easily cost US$5,000 to US$15,000 in labour, research or laboratory investigation. Today, almost all of these cost areas have increased dramatically, so that equivalent results today can cost between US$15,000 and US$50,000 with no guarantee of a return. Labour costs for licensing professionals and experts have increased. Legal analysis and basic hourly rates for any legal service have increased. Finally, laboratory investigation has received a twofold cost pressure because the hourly rates have increased and the complexity of products has also increased. Opening an electronic device or undertaking chemical analysis used to be a fairly simple process with readily available equipment. Today, opening a cellphone may require rental of a US$250,000 network analyser with precision probing tools to access sensitive circuit traces. It is not unusual for a relatively basic laboratory report to cost US$50,000 merely to determine whether basic evidence hurdles a Rule 11 requirement. Full litigation support work can easily approach US$1 million. The infringement damages must be many times these costs in order to justify the filing.

If the US$100,000 triage budget to discover 50 patents leads to a requirement to spend another US$50,000 per patent for the remaining 50 patents, the total budget requirement of US$2.6 million may begin to seem like a significant risk for an uncertain return; unless, of course, one or more significant infringement cases or licensing opportunities can be identified.

One interim solution is to try to down-select from the 50 patents to just five or so with the most promising potential, perhaps meritorious of a US$50,000 laboratory investigation to develop a rock-solid licensing case. This implies a shift from patent quality, now established *prima facie* by screening to be fundamentally good, to market confirmation, size and viability. Hopefully, funds spent on third-party reports will generate viable settlement instruments and help avoid the dispute escalation that results when two sides see things differently.

Figure 2. **Relevance vector example**



The post-triage next step is to look seriously at licensing potential which generally equates to potential infringers. Under the labour-savings model presented here, if a significant licensing opportunity is to be identified among the 50 or so high-scoring patents, the total portfolio cost per patent is reduced simply because only one patent for every 20 survives triage to merit further investigation.

The resulting challenge is to develop an approach for evaluation of the 50 high-scoring patents. Example approaches might include:

- Internal experts and detailed internal research.
- Industry and technology experts or consultants (firms, hire back the inventor etc).
- Evaluations performed by outside counsel.
- Offshore industry and technical researchers.
- Labour-saving research services or tools.

Internal experts and detailed internal research

Many portfolio management teams are chartered with internally discovering licensing candidates and opportunities. Given that salaries vary widely among licensing professionals and staff members, benchmarking per patent costs of internal identification of viable licensing targets is difficult. Depending upon the organisation, research tools such as subscription

Expected value: financial modelling drives the decision

Broad statistical research indicates that US$10 billion in annual revenue generated from licences or litigation settlements is a conservative number. While many suggest that the number is much higher, utilising this arguably low number is sufficient to demonstrate the second half of a model for extracting value from a portfolio of 1,000 patents. To do so is to answer the question: "How much can I expect to get if I execute on the model and successfully license the valuable patent(s) (assuming my portfolio is average)?" The US$10 billion annual number helps us compute the statistically derived expected value answer.

Another useful approximation is the knowledge that between 2 million and 2.5 million US patents still possess the statutory capability to generate revenue. This suggests that the population of currently in force US patents may have the statistical (expected value) capacity to generate US$5,000 per patent. This number, which is deliberately conservative (and below the cost of obtaining a patent), simply reveals that a 1,000 patent portfolio may easily be able to generate US$5 million annually in licence or litigation revenue. This benchmark of US$5,000 in annual revenue per patent is easily supported by performance analysis of university and corporate licensing programmes. In addition, more recent auction data also tends to support this per-patent expected value, even when unsold lots are included.

Given a US$5 million expected revenue result from a 1,000 patent portfolio, the cost of analysing and investigating the portfolio generates a positive expected return given the risk of such an exercise. While this article does not specifically evaluate and quantify the risks, a portfolio of 1,000 patents is sufficiently large to suggest that the law of large numbers will greatly reduce the odds of returning revenue below the expected value. Much like stock portfolio risk minimisation through diversification, risk is asymptotic to a minimal number as the portfolio becomes larger and larger; therefore, the decision to invest in driving value from a larger portfolio should become easier. Additionally, the reduction of the costs of the project should drive a decision to accept the project if the risk remains constant.

The best practices described here are tabulated below for a 1,000 patent portfolio:

Cost and revenue calculations

Step 1 – Preliminary screening of 1,000 patents:

Labour (offshore):	US$100,000
Rating or screening tool:	US$25,000
Step 1 subtotal:	**US$125,000**

Step 2 – Analysis and investigation on 50 selected patents:

Labour (10 domestic hours per patent):	US$125,000
Research tool:	US$100,000
Step 2 subtotal:	**US$225,000**

Step 3 – Licensing efforts/legal services (litigation costs would have to be added on a case-by-case basis): US$100,000

Total costs: US$450,000

Expected results from 1,000 patents: US$5,000,000

Present value conversion (24-month project):

Patent revenue stream discounted at 10%: US$2,931,000

Costs (24 months) discounted to PV at 10%: US$-405,000

Net present value of portfolio value extraction: US$2,537,000

information services, citation tree analysis tools or semantic-based mapping tools may be available. A common cost allocation for these costs should also be applied. When operating budgets and salary costs are factored in, the allocations can easily exceed US$10,000 per selected patent.

Industry and technology experts or consultants

Some portfolio management teams readily use the services of outside consultants. These engagements may be arranged through patent consulting service firms or may be arranged directly with individual experts. In the case of the latter, internal management costs must be balanced against the marked-up billing rates charged by patent consulting firms. Tools available to experts also vary, particularly if the expert is operating independently. Many independent experts do not have the tools available to the portfolio management team or found at larger patent consulting firms.

The budget necessary for hiring industry and technology consulting experts can vary widely. Typical ranges, without laboratory work, can easily range from US$5,000 to US$25,000 per patent, suggesting that a benchmark of US$10,000 for preliminary exploration (without hard proof of infringement) may be typical.

Evaluations performed by outside counsel

An increasing number of law firms have begun participating in the portfolio evaluation process. This leverages the technical acumen of many patent attorneys, who are generally well equipped to evaluate the legal merits of a potential claim. This business tends to fall between simple prosecution of patent applications and full litigation, and helps reduce overall legal costs by balancing workloads within the firm. In addition, firms often have a supplier base of experts and laboratory resources capable of testing specific questions regarding infringement and licensing opportunities. This approach can cost between US$15,000 and US$50,000 per patent to refine the target opportunities and assist with licensing, suggesting a benchmark of US$25,000 per patent.

Offshore industry and technical researchers

In the US, labour costs, particularly among professional ranks, have driven many portfolio entities to utilise the services of offshore researchers. In this case, the hourly costs can be relatively low. However, the total savings sometimes do not follow a linear ratio because the offshore researchers often require more time to produce their reports, including learning-curve time to become familiar with the field and industry. There are even more significant risks related to bypassing direct industry experience and knowledge, often not appearing in any published literature, which may be held uniquely by expert consultants. In the end, savings of 20% to 30% are more typical. This suggests budgets for basic paper (published document research) evaluations in the US$5,000 to US$10,000 range, with a benchmark of US$7,500.

One of the more successful ways to balance domestic and international labour costs and skill levels is to hire an industry luminary to help direct the offshore efforts. Relatively few hours of expert time may be needed to vector the offshore researchers in the right direction. The results are likely to be significantly better; however, the cost may end up about the same. This approach puts the benchmark back to US$15,000 per patent; albeit with an expectation of better results.

Labour-saving research services or tools

In recent years, the intersection of two trends has facilitated better IP research using automated tools. First, ever-increasing portions of the world's information have become available on the internet. Second, the efficiency with which this information is indexed and accessed has also improved. The result is more information that can be sorted at ever-increasing efficiencies.

Like other computerised tasks, complex internet or database research that used to take hours now takes minutes (perhaps seconds). Simply stated, this is the sort of thing that computers do very efficiently. The challenge has been telling the computer exactly what to look for, usually in the form of keywords or a search equation. An example of a recently developed computerised search assistance tool contains software that essentially reads a patent and identifies the most effective keyword string for internet search. Rather than comprehend the document in a human sense, the computer determines the core meaning of the patent in order to define a relevance vector. Ordered keywords driven by the relevance vector help target search results using Google, subscription databases and other keyword-triggered research tools. The general idea is to find similar documents and subject matter much like a fingerprint matching or a facial recognition algorithm finds the closest matches. The returned set of similar documents can then be reviewed by a skilled person.

Using a search assistant can easily help a portfolio manager, expert consultant or patent attorney jump through the first 10 to 40 hours of research trials in a matter of a few minutes. This tool supplements the human development of a keyword search string, helping to reduce errors of omission or oversight while still relying upon the knowledge and skills of the expert in determining the value of the final discovery. Results are often non-intuitive but economically valuable; for example, a search from reading a patent on an "ergonomically featured computer input device" will return the intuitively obvious video game controllers and pointing devices, but may also return non-intuitive discovery of less popular devices for the disabled, elderly users or even hospital patients.

Although a research assistant saves research hours, it does not eliminate the need for human expertise. The model benefits from savings and improved accuracy, and can easily trim costs for this phase by 50% or more, reducing the benchmark research labour budget to less than US$5,000 per selected patent. ■

Scott Bechtel *is president of AmiCOUR International.* ***Ray Throckmorton*** *is the company's executive vice-president*
www.amicour.com