

Strategic Management Of Patent Portfolios

By Martin A. Bader

Portfolios are instruments for analyzing and visualizing strategic positioning and lines of attack. The diversity of portfolio techniques is immense, although every technique has its blind spot as a result of the choice of axis dimensions. This contribution is based on the so-called St. Gallen approach to the management of technologies and patents. The approach was developed in the early 1990s at Europe's well-known Institute of Technology Management at the University of St. Gallen, Switzerland (e.g. Boutellier et al. 2007) and has been constantly fine-tuned to practice on the basis of numerous industry projects. The methodology for the strategic management of patent portfolios, based on and developed from this approach, is presented below (Gassmann and Bader 2007).

The St. Gallen Patent Portfolio Management Approach

In portfolio management, assessed market and technology positions are used to generate an action programme for the implementation of corporate strategy. Here the vision and mission of the corporate strategy form the basis for the assessment of the challenges posed by customers and markets, competitors and substitute technologies. Corporate competences and corporate technology and product fields, which are assessed and positioned against the strength of corporate resources, then form the basis for the formulation of standard strategies. In a final step, the strategies devised are used to derive the necessary measures for using property rights in these fields to build up and secure potential (Figure 1).

Vision and Mission

Vision and mission reflect the normative setting for corporate strategy. These are supplemented by medium-term objectives and general corporate values. A guiding principle of this kind is necessary in order to enable an assessment to be made of the challenges that present themselves in relation to corporate competences. Here it is important that vision and mission are specific and therefore act as a signpost. Interchangeable statements such as "market leader," "customer focus" or "staff development" are not generally sufficient.

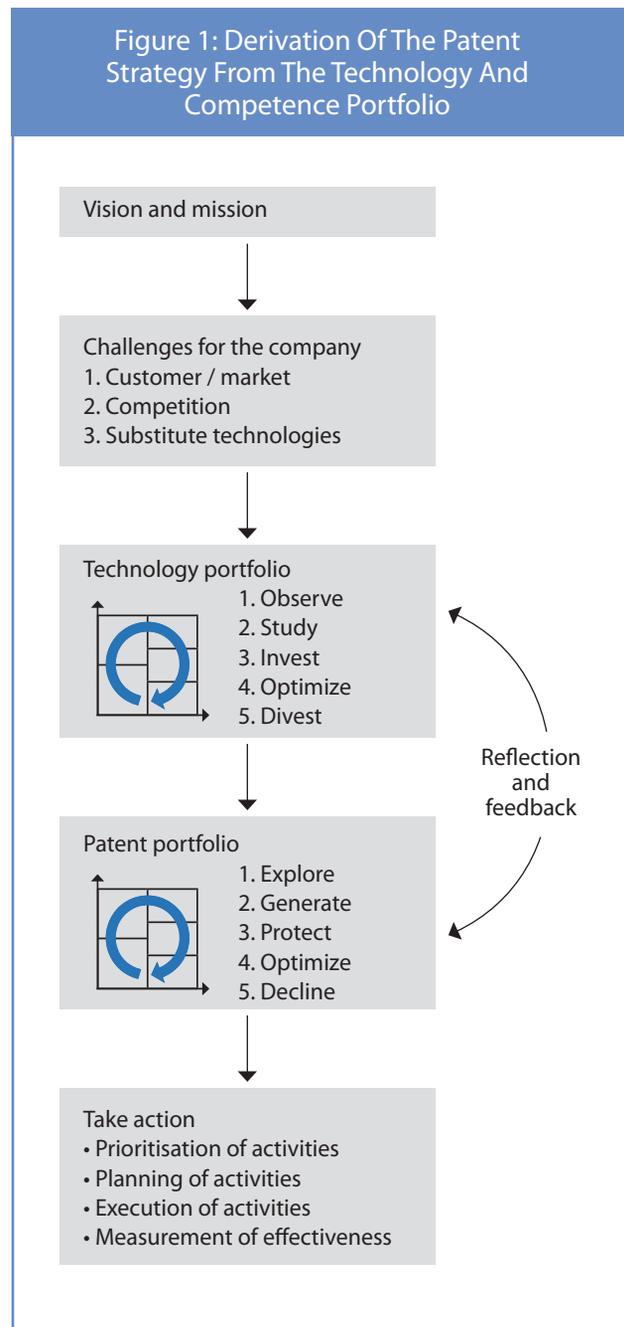
Corporate Challenges

This step determines the technological challenges which the enterprise must face. Here three perspec-

tives have to be taken into account in relation to corporate competences:

- Customer/market,
- Competition,
- Substitute technologies.

Figure 1: Derivation Of The Patent Strategy From The Technology And Competence Portfolio



Customer/market: The customer and market perspective takes account of the challenges posed by customers and markets in relation to the competences, competencies, technologies, products and services available in the enterprise. Here a distinction has to be made between the requirements of individual lead users and broad market trends. BMW takes less account of current customer demand and tries more to estimate probable future customer requirements following product launch.

Competitors: The competition perspective establishes the relative comparison with the activities of the competition and takes account of the comparative advantages and disadvantages, strengths and weaknesses. If, in one sector for example, the enterprise is not a technology or competence leader, the question arising from this perspective is whether the enterprise should occupy a fast follower position or, preferably, a differentiation position.

Substitute technologies: On the one hand, an assessment needs to be made of the significance of internal corporate competences in relation to their possible substitution by new external technologies, products or services. On the other hand, the replacement of existing technologies by new internal ones needs to be considered. Even if the new technology introduced does not bring any new advantages to the market or even delivers extra functionalities that have not been called for, the introduction of substitute technologies is useful if costs can be cut internally or internal logistics processes can be optimized. Taiwanese LED manufacturer Huga Optotech is, for example, relying on squeezing out conventional neon tube lighting in office premises and replacing it by light emitting diodes.

Technology Portfolio

The basic alignment of the technology portfolio can be deduced by means of a two-dimensional portfolio representation. Starting with gradable competences, the strategic importance of those competences is determined on the basis of the challenges posed by customers, the market, competition, and substitute technologies; it is then displayed on the vertical axis. For each competence, the relative strength of corporate resources is also identified and displayed on the horizontal axis. This process also involves a consideration of corporate technological capabilities, for example infrastructure, staff, available knowledge and experience, and their assessment in comparison with the competition.

The St. Gallen approach distinguishes five portfolio sectors and resultant standard strategies, the time

sequence of which corresponds to a typical product generation life cycle: observe, study, invest, optimize and divest.

Observe: in this segment competences are characterized by a strategic importance which is perceived to be still slight. As a rule, no budget is available here and responsibility for the radar lies with the person internally responsible for technology. The relevant competence, technology, product or service fields are to be actively observed, for example by visiting exhibitions and congresses, studying magazines, journals and the Internet, and by collaboration with universities.

Study: If the strategic importance from the customer, market, competitor or substitute technology perspective increases, initial experiences and competencies are to be generated, for example by means of prototypes. Projects in this area frequently have to struggle with a tight budget and chances of success are very uncertain. External partners are also sought and integrated to enable competences to be generated as efficiently as possible.

Invest: A long-term high level of strategic importance stands opposite considerable internal resources. Long-term investment in the core area of competence is therefore necessary and useful to secure existing technologies and investment and to expand competitive advantages further. The desired return on investment must be achieved at least in the long term, while short-term results are not necessarily to be anticipated.

Optimize: If, despite considerable internal resources, strategic importance is only moderate or if the strategic importance may even be expected to decrease, it is sensible not to make any further large scale investments; instead, there is a need to optimize. The return on investment must be achieved in the short term.

Divest: If no competitive advantage is foreseeable over the next 5 to 10 years, the resources committed up to this point must be promptly curtailed so as to be available for new technology potentials. It makes sense to continue with the technologies and products only as long as revenue can still be achieved. There should, however, be no further investment in the expansion of competences.

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Patent Portfolio

The patent strategy to be derived from corporate strategy is intended both to help generate business potentials and to secure existing and realized potentials. It is therefore obvious to deduce appropriate standard patent strategies from the technology portfolio structure already explained. These strategies are aligned with the strategic importance of and internal resources available for the corporate technology, product and service competences.

The standard patent strategies make general statements concerning the control of both the inflow and the outflow of property rights from the corporate strategy perspective. An inflow into the portfolio takes place, for example, as a result of the company's own patent applications, the purchase or acquisition of property rights or as a result of acquiring a license. An outflow from the portfolio takes place when patents are abandoned, sold or transferred in the course of spin-offs. In the USA there are also tax advantages in the alternative method of donation. There is also a corresponding outflow of rights when a license is awarded.

One major factor in patent portfolio management is the grading of the patents according to their relevance. Here both the scope of protection of the relevant patent claims and the extent to which a patent infringement can be proved have a considerable bearing on the value of the patent. This can often be deduced just from the categories of the claims. For example, the chemical industry differentiates between claims to production methods and substance claims. While production methods are usually difficult to demonstrate, substances can be relatively easily verified by means of product analyses.

Categorization by products and countries enables country-specific legal requirements to be taken into account at a later stage. Portfolio management must also include a strategic assessment of the countries, for example which countries are relevant to the market and production—and not just from the perspective of the enterprise concerned, but also from that of its competitors.

A further criterion in portfolio management is the potential for internal use and third party use, which is a major requirement for licensing projects.

In the pharmaceuticals industry in particular, an important part is played by life cycle management, where companies attempt to create follow-up product related property rights in addition to the basic patents. This is often the only way of maintaining an effective blocking action even after expiry of

the basic active ingredient patent. This is of great importance owing to the dramatically increasing market for generics.

The life cycle of patents has five phases, which follow the technology life cycle (Figure 2):

1. Explore
2. Generate
3. Protect
4. Optimize
5. Decline

1. Explore

If a field is still of only slight or as yet unidentifiable strategic importance, the further development of potential should be explored (patent scanning). Here potentials can be evaluated by means of cross-industry patent searches. This involves broad searches. If new potentials that are ripe for development are identified, patent applications with broad claims can be filed for the appropriate concepts and architectures.

Roche Vitamins makes systematic use of patent searches to enable it to identify trends in production process technologies and to recognize efficient substitute technologies in good time. With research workers and marketing specialists, search profiles are defined on the basis of keywords to narrow down relevant areas of interest. One particular focus of the trend analyses is the life cycle curves, which are very difficult to identify, however. The time horizon is 5 to 10 years.

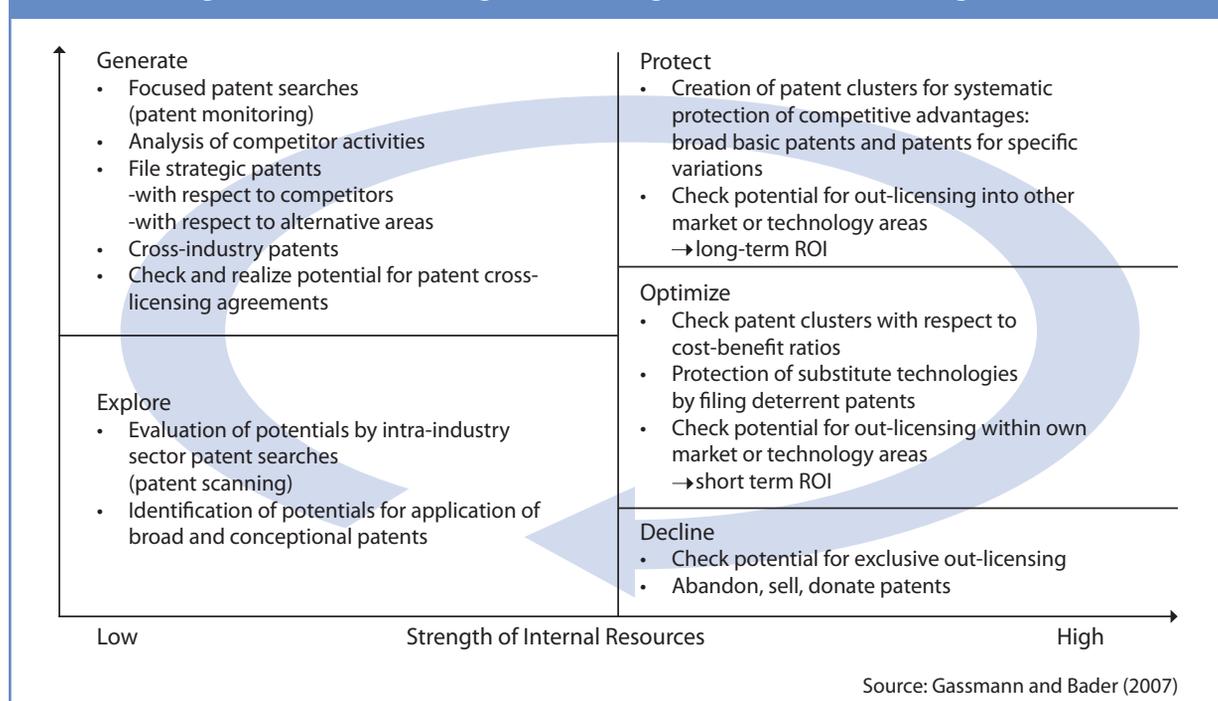
2. Generate

As soon as subject areas and areas of competence with increasing strategic importance are identified, selective patent searches should be carried out (patent monitoring). The aim is to selectively monitor further developments in specific fields of technology and specific competitors by means of patent searches. Here it should be borne in mind that most patent documents are published only 18 months after the priority application. Within the enterprise it is recommended that, for specific competitors and areas of competence, specialists be appointed to carry out these searches and, where appropriate, to analyze prototypes already available.

Medium-sized German medical engineering company *Erbe Elektromedizin* (600 employees worldwide) systematically monitors its competitors:

- Every month the patents department receives the new publications from the previous month generated by property rights monitoring. Property rights are mostly monitored through the search department of an external patent attorney who

Figure 2: Standard Strategies For Strategic Patent Portfolio Management



sets this up on the basis of a specified filter. In urgent cases the department can also carry out searches itself.

- The patents department examines and pre-selects the documents, which are then forwarded to the relevant technical experts in R&D. An engineer therefore receives precisely those documents that relate to his technical fields.

- The technical experts prepare synopses of the documents presented to them. They are allowed three minutes for their report.

- The technical experts' brief reports are presented in the course of a monthly patents round, for example every first Tuesday of the month at a specified time. Each report is followed by a brief discussion, and the next steps are decided, for example decision to file an opposition or to include in document monitoring. Since the patents round meets once a month, in principle there is the possibility of an opposition for any of the documents discussed there.¹

- The patents department prepares minutes which are distributed to those involved in the patents round.

1. The period for opposition in Germany is three months, while the period for opposition in the European system is nine months following publication of the mention of the grant.

Advantages of this procedure: the fixed date for the patents round guarantees considerable regularity which, in turn, ensures that the engineering specialists are always fully aware of the property rights situation. The obligation to provide synopses ensures: that the engineers analyze the patent documents at the appropriate time (period for opposition) and report back directly to the patents department and colleagues; that there is a lively discussion of the documents; that specific suggestions are submitted to each R&D work group; and also that duplicate developments and duplicate applications are avoided.

Highly innovative Swiss hearing systems manufacturer Phonak makes very intensive use of patent information in support of its internal technology intelligence. This means that the unexamined patent applications of all relevant competitors, such as the German Siemens Audiology, are recorded, classified by fields of technology and core competence, and analyzed under the responsibility of the research department heads. A time horizon of three to five years is achieved for the recognition of trends.

Despite few internal competences, even at this stage ground-breaking problems and foreseeable solutions have to be extracted and placed as patent applications with strategic value and a broad range of countries. The focus here must not be restricted to activities of the enterprise concerned but must

also encompass the expected lines of attack of existing and potential competitors. This is the only way that an effective blocking potential can be promptly generated by property rights.

The patent claims should endeavor to cover the broadest possible scope of protection, address solution architectures and concepts and be formulated across industries. In this phase the foundations are laid for later patent cross-licensing options. Even if competitors are not directly confronted until after a further competence development phase, pioneering property rights generally date back to this technology phase. The industrial process and measurement engineering company Endress+Hauser selectively generates property rights to enable them to avoid disputes with major competitors later.

If R&D activities involve external partners, consideration needs to be given to what exploitation and commercialization need is sought later. Collaboration talks accordingly need to be conducted with this in mind (Bader 2006). CeramTec, a subsidiary company of the Swedish Dynamit Nobel Group, developed a cylinder head for engines in collaboration with a supplier to the automotive industry. Negotiations over the use of ensuing property rights and rights associated therewith were carefully conducted. While a joint use was agreed for engine applications, CeramTec obtained the exclusive rights for the ceramics market.

3. Protect

The enterprise has succeeded in generating its own resources in a field of competence with a high level of strategic importance. The potential for filing broad basic patents declines since public knowledge, the prior art, has greatly increased in these fields. The patent applications now focus increasingly on more detailed, very specific embodiments. Here it is important to check the subject fields systematically for solution and performance variants or for circumventing solutions.

In the course of patent portfolio optimization, enterprises therefore increasingly seek to create patent clusters in strategically important fields of technology. This involves, first, generating patent portfolios which have a broad sweep (growing) but which, at a later date—once it is easier to estimate which ideas are technically and commercially relevant—are thinned out again (pruning). Cost-related decisions are advantageously already made on the basis of utility in the current patent application procedure. At present DaimlerChrysler is actively pushing ahead with the development of clusters which, according

to the head of technology strategy, is still underdeveloped. Appropriate portfolio adjustments can then be made on that basis.

German consumer goods manufacturer Henkel uses the growing and pruning method successfully to protect as many variants as possible at an early stage and to prevent the patent portfolio from later incurring excessively high costs. At this stage, searches often no longer produce the desired up-to-date information since, owing to the 18-month waiting period for publication, it is impossible to say which variants competitors are continuing to develop or which technical means have been selected to solve the problem. Especially in the case of competences generated with external collaboration partners, consideration should be given to the extent to which it is possible to out-license in other technical fields or market segments in order to be able to generate revenue from licensing agreements in the long term.

For the collaborative development of the central multifunctional “iDrive” control element, car manufacturer BMW collaborated with the small Californian software company Immersion. This company had already developed relevant competences in the field of force feedback technology, which is used in joysticks, controllers in the field of design engineering and in medical technology. It was agreed that BMW would acquire exclusive rights, limited in time, to the development results in the automotive field while Immersion is entitled to engage in independent exploitation and marketing outside the automotive sector.

4. Optimize

The enterprise has high levels of competence in these fields but the strategic importance from the customer, market, competition or technology perspective is in decline. Existing patent clusters must now be thoroughly reviewed against cost-benefit considerations if this has not already been done. If there is the risk of competences being replaced by substitute technologies, the enterprise's own patents in these fields should be used as blocking property rights to prevent a premature unilateral decline in the value of the existing core technologies.

German sports car manufacturer Porsche, for example, utilizes property rights relating to substitute technologies specifically to prevent the premature decline in value and dilution of existing technologies. Where appropriate, exclusive licenses are even acquired for this purpose and kept on a shelf.

A review also needs to be carried out on out-licensing opportunities which, unlike when securing po-

tential, also include the enterprise's own technical fields or market segments so that revenue can also be generated from licensing agreements in the short term. Sometimes it is even possible for this to stimulate a market segment by opening it up more so that the likelihood of substitution can be delayed further by greater standardization and price reductions.

For example, after a patent dispute Danish hearing aid manufacturer ReSound was able to buy from 3M a strong patent portfolio which ReSound contributed to the hearing instrument patent pool HIMPP (Hearing Instrument Manufacturers Patent Partnership). Companies can join this pool, which was set up by Danavox, Oticon, Phonak, Starkley and Widex, on payment of a membership fee. In practical terms, this creates market entry barriers for potential new competitors.

5. Decline

If the strategic importance of a technology or competence has greatly declined, the corresponding property rights should undergo a further review to determine whether the wording of the patent claims permits a reassessment and assignment to other fields of competence or competition. The possibilities for exclusive out-licensing should be considered here, where this is possible on the basis of other, already existing licensing agreements. Otherwise it must be assumed that there is little benefit compared with the high costs. If there are no other reasons against this, for example the need for a large patent portfolio, such patents can be abandoned, sold or disposed of or donated.

Endress+Hauser, for example, select or sell any patents whose subject areas do not involve its own products or production processes within a period of some seven years.

In the early 1990s, Dow Chemical conducted a full review of its entire property rights holdings. Abandoned or donated property rights thus enabled it to make savings of U.S. \$50M in unnecessary renewal fees and tax advantages.

Take Action

After the technology and patent strategies have been deduced, in a last step the portfolio measures also have to be implemented. Unfortunately the implementation of measures is often dominated by the "paralysis through analysis" dilemma. For the strategies developed to be implemented in frequently overburdened patent departments, the lines of attack first need to be prioritized. The vital few actions should be planned in detail with the business areas or developers and implemented with them. It is precisely because the effects of patent measures

are often indirect and not felt until later that they threaten to fizzle out. Clear operative targets which are regularly measured and are reviewed by management are of great importance here.

Example Case: Patent Portfolio Management at DaimlerChrysler

Car manufacturer DaimlerChrysler pursues the following two main objectives with its intellectual property strategy:

1. Safeguarding its own competitive positions;
2. Protecting itself against third-party competitive positions.

To achieve these objectives, according to the former intellectual property manager, Einsele at DaimlerChrysler relies on project-integrated patent work. This means that, at the start of development projects, searches are carried out according to the relevant state-of-the-art and third-party property rights, and the relevant property rights situation is recorded and assessed.

A separate patent strategy is defined for each development project. In the course of the project, the evaluation of the property rights situation is regularly updated, and project-related information on third-party property rights is made available. This reduces duplicate developments, and conflicts can thus be avoided. This phase is also used to identify outcomes that can be protected. During projects, the acquisition of third-party property rights is an increasingly important aspect, although the marketing and licensing of the enterprise's own know-how also gains in importance. In the case of collaboration link-ups or R&D partnerships, the search for suitable partners also starts with patent portfolio analyses. The intellectual property department later helps with the drafting of the collaboration and development agreements and of secrecy agreements to safeguard know-how. Lastly, at the end of a project, project reviews are carried out and final statements on the state of the art, third-party property rights, the enterprise's own property rights position, the contract situation and standards are once again recorded.

Patent management at DaimlerChrysler has nine elements:

- Early integration of the intellectual property department in the innovation process.
- Support for R&D projects from the intellectual property department, including major project reviews in particular.
- Definition of the key points of strategy.

- Support for developers on the spot.
- Monitoring of competitor activities.
- Avoidance and minimization of risks.
- Safeguarding outcomes that can be protected.
- Review of the transferability and marketability of development outcomes.
- Enforcement of own property rights relative to third parties.

The importance of proactive patent management proved itself when the brake assist system BAS was launched. In 1989 DaimlerChrysler began to develop its own brake assist system. Starting from a basic German patent application, the intensive project support given by the intellectual property department led thereafter to the generation of over 30 further patent applications relating to the BAS function, switch-on and switch-off criteria, the braking system, and vehicle characteristics.

Nearly a decade later, the crucial importance of these early patent applications to DaimlerChrysler became apparent. In 1997, Toyota approached DaimlerChrysler and requested a license for Daim-

lerChrysler's basic patents for the series launch of a brake assist system. It also emerged that in 1990 Toyota had likewise filed a basic patent application in Japan for a brake assist system—but five days later. DaimlerChrysler agreed to award the license. So Toyota paid royalties for the basic patent for Germany and the USA and for the follow-up patents in France, Italy, the United Kingdom and even Japan. In return, however, DaimlerChrysler also acquired a license for Toyota's basic patent for the Japanese market.

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Source: Gassmann and Bader (2007).