Innovation and Intellectual Property Right

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1. Introduction

Continuing economic success depends on finding ever better solutions and having the courage to tread new paths.

This means that research and development has to play a key role in economic politics of a country in order to be competitive on the world market.

In many countries, even in highly industrialised countries not only the big and internationally organised companies are the trendsetters of newly developed products or processes, but the small and medium sized companies (SME) very often play a main role for inventing and creating new products.

There is no doubt that small and medium-sized firms are the most dynamic component in economic development, because of their internal flexibility, their adaptability to market change, and their ability to work at a high technological level.

Research and development and putting new products and processes on the market are very cost intensive processes and they need a lot of investment and, of course, highly specialised and motivated personnel. To tackle this, a highly qualified management is necessary.

The result is that all these cost intensive innovations have to be protected by intellectual property rights in order to earn the fruits of such an innovation exclusively for a longer period. Any mistakes that are made in this somewhat complicated procedure could mean the loss of exclusivity leading to competitors legally copying the products and selling them much cheaper because they had no costs for research and development.

Therefore, big companies do have a perfectly working research and development department which includes a patent department, in order to optimally protect their products and defend their intellectual property right.

SMEs normally do not have special research and development departments combined with a special patent department. Medium sized companies normally have contracts with patent attorneys outside the company that can also mean good innovation management if there is a good co-operation with the research and development personnel.

However, smaller and smallest companies involved in innovations do not have such special departments. Therefore, many mistakes are made to secure own inventions, such as

- No research to check the state of the art
- Poor description of the invention
- Patent applications without an external expert (patent attorney)
- Lack of patent knowledge
- No financial resources for patent applications
- Patent application is made too early or too late

These problems and how to avoid them will be treated later on. The results of these mistakes are mostly more expensive than professionally handled intellectual property rights.

2. Why should innovations be protected?

Often SMEs are complaining about problems when starting patent activities. Here are the most frequently stated arguments:

- Difficulties in creating a proper description of the invention and to formulate a legally correct patent application
- High costs of national, European and other international patents
- Tedious procedures at the patent offices until a patent is granted
- Lack of consultation in all relevant legal, strategic and financial patent problems
- Patent infringement

The first problem can be solved in co-operation with professional consultants and – when it comes to prepare an application – with a patent attorney.

It must be admitted that especially European and other international patent costs are high. The European Patent Office, however, is working on new rules to make it cheaper, especially to avoid high costs for translations. A good economic evaluation of the invention, preferably with an external expert and a professional patent strategy can reduce the costs partly considerably.

It is true that granting procedures of patent applications take up a great deal of time. On the other hand, a product is at least partly protected with the beginning of the filing date.

The last but one point was one of the reasons why EZN was founded by the Federal State of Lower Saxony. EZN deals with all questions referring to inventions, patent applications and patent strategy except legal advice which is done by patent attorneys only, due to German law. Legal advice includes preparing, filing and granting process of patents.

Patent infringement can often rejected in co-operation with attorneys before court. This should not be a reason to omit a patent application, because then imitation would be legal in any case.

Our opinion is that in spite of these mentioned disadvantages, which can partly be avoided it is of great importance to protect economically relevant innovations by patents. A protection containing some disadvantages is much better than no protection at all.

3. How to prepare applications for intellectual property right

Three main points have to be fulfilled when a patent application shall optimally protect an invention.

3.1 Description of the innovation

This part of work stands at the very beginning. It depends on the state of an invention that means whether you have only an idea or whether you have a prototype. If the managing director of an SME is not the inventor, the inventor himself has to make a clear and complete description, disclosing everything, even insignificant or apparently irrelevant parts of the invention have to be fixed in writing. In many cases these "unimportant" features

turned out to be relevant during the granting procedure at the patent office. The better and the more detailed the description the easier the research can be carried out and the easier the patent attorney can do his work. That means last but not least: saving time and money.

3.2 Research in appropriate data bases

The next step would be to check the state of the art and to compare it with the own invention.

This research is on the one hand necessary to prove the novelty, on the other hand it can show the innovative value of the invention, apart from patent conditions.

As a result there are three main possibilities:

- The invention seems to be new, there are no equal patents or other literature to be found.
- The invention is not new, all found patents or other literature are state of the art and can be used by everybody. This means that a new patent application would only be possible if the own invention has fundamental differences.
- The invention is not new and one or more patents are still efficient. This means that it is strongly recommended to finish all activities, because otherwise patent infringement would approach.

These points impressively confirm the importance of a research before applying for a patent.

There are several databases available run by different hosts. The most important international patent database is WPINDEX (World Patent Index) e.g. run by STN. In Germany PATDPA is the database for German patents.

During these days research via the internet cannot be recommended as the only source, because many patents are not available and it is not possible to comfortably make a search via a menu consisting of elementary words out of the description of the invention.

For many inventions in the field of mechanical engineering it is important to complete the research by visiting a patent library where older patents are available as published printings. It is not an exception that older innovations were forgotten and return back after many years.

3.3 No application without an expert (patent attorney)

The purpose of a patent is to protect an invention as perfectly as possible. So a sound formulation of the claims as legal demands cannot be estimated highly enough. Only a patent attorney or a similar expert with a special education is able to do this responsible work. Therefore, saving money at this time can mean a disaster for the patent and for the complete innovation.

The work of a patent attorney is not only important for the application, furthermore this person also is an expert for the examination procedure at the patent office, and last but not least, when it comes to patent infringement or objection against the granting.

Furthermore, a patent attorney is responsible to keep an eye on all important dates, e.g. the end of priority, payment of annual fees etc. He constantly has to inform the applicant

of everything around his patent or patent family and to carry out the decisions of the patent owner (applicant).

Patent attorneys can only act within their own country at the national patent office. For actions in other states a co-operation with patent attorneys in these countries has to be established. There is one important exception. At the European Patent Office all registered patent attorneys of the member states of the European Patent Agreement can carry out all necessary legal actions.

4. How to protect innovations

4.1 Patent

A patent is the most efficient way to protect an innovation and to ensure exclusivity for a long time. A patent in any case is proved by an examination for novelty, inventiveness and applicability, then it is granted, provided that these points are fulfilled. A patent can be in power for 20 years from the filing date on, but one has to pay increasing annual fees. Although nearly every country has its own patent law, nearly all conditions to grant a patent are very similar and partly comparable. This is especially the case in European countries, Japan and China, whereas the patent law of the United States of America differs in some points.

4.2 Utility Model (Gebrauchsmuster)

This kind of intellectual property right is a special German one. There are only a few countries in the world where this kind of protection is known. A utility model is also called a "small patent" in Germany.

The utility model is only registered, and normally it is not examined like a patent. So the novelty of it is unknown. This disadvantage can be improved by an own research before the application and additionally by an official research carried out by the German Patent and Trademark Office by special application and extra payment. If this official research turns out to be positive it is almost unlikely that the invention is not new.

It is not possible to apply for a utility model if the invention is a process.

The lifetime of a utility model is 10 years maximum. Fees have to be paid after three years, another three years and another two years. The fees are very low compared to the annual fees of a patent (300 to 600 DM or 150 to 300 \in).

4.3 Design Patent

A design patent only protects – as it is said – the design (shape, colour etc.) of a product. If a competitive product differs even in small parts, this will normally mean no infringement. However, in some cases a design patent combined with a registered trademark can be an optimal protection for an innovation if a patent or a utility model would not be possible for certain reasons.

4.4 Trademark

A trademark – better: Registered Trademark ® is a special name for a product or a process. This name must not be used by other people except the owner of this "brand". A registered trademark can be as useful and protective as a patent. Many trademarks are well known all over the world, e.g. Aspirin, Coca Cola, Mc Donald's.

4.5 Plant Protection

Newly bred plants can be protected exclusively like a patent. The breeder can apply for a plant patent at the national office (in Germany it is the so called Sortenschutzamt located in Hannover) or at the European plant patent office, located in The Hague, The Netherlands. Of course, many other countries know plant protection, especially the USA. At the German plant patent office an application will be examined for about 18 months whether there are no changes or mutations of the plant during breeding. After the plant patent is granted – the plant has to be given a name before application – nobody else is allowed to breed and sell this specific plant.

4.6 No Protection

There are some exceptions where it can make sense not to apply for any intellectual property right, although the product or the process would pass all examinations for a patent. The reason is that some special processes can only be used inside a company. If it comes to a patent application, it will be published 18 months later and everybody can be informed about the process and copy it. Actually, this would mean patent infringement, but as this would be done within a company nobody could prove it, as long as you cannot demonstrate it at the products which are manufactured by means of this process.

As an example we had to deal with a new process of coating plastic materials with zinc. This process has some interesting advantages compared to common processes, but it is not possible to distinguish the new from the old process by the readymade product. So the company decided not to apply for a patent but to keep the new procedure as secret know how.

5. Timing for protection

It is very difficult to find the right time for a patent application. No general rule can be given, as the proper time for a patent application depends on what has to be protected. In some cases an application should be made as soon as possible, otherwise one of the competitors would do it. On the other hand, if an invention is far away from the state of the art, it is recommended to wait until a prototype or at least a function model is built. It must not be forgotten that in the latter case everything has to be treated strictly as confidential, and nothing can be published or even demonstrated, for example on an exhibition or fair. Then, no patent application would be possible. If it cannot be avoided to show the prototype to a potential customer or licensee, a well prepared non-disclosure agreement has to be signed by the other party before demonstration and negotiations.

6. Patent strategy

Patent strategy differs very much from the legal work of preparing a patent and to apply for it at the different patent offices. This work is done by patent attorneys. Patent strategy means something different: it deals with questions like

- Does it make sense to apply for a patent
- Timing for patent protection
- Decisions for a national application or international applications
- An appropriate way for international patent applications
- Time planning
- Financial resources
- Lifetime of patents or does it make sense to pay high annual fees

These important points should be discussed with patent experts, who are special consultants with years of experience in this complicated field of activity. In Germany for example there are some consultants who are specialized for patent strategy

The standard patent strategy of EZN is:

6.1 National Patent Application

The cheapest and easiest way for protection of innovations is a national patent application. In Germany we recommend to apply for an examination simultaneously, although according to German patent law you can start the examination procedure within 7 years. The advantage for an immediate examination is that the first examination report will normally appear 9 or 10 months after the filing date. This report is a very important support for a decision to make international patent applications. In most cases this examination report clearly shows the chances for a national patent to be granted. If the report turns out to be negative it would not make sense to spend money for cost effective international patent applications which probably would not survive international examination procedures.

6.2 International Patent Applications

Before filing international patents some questions have to be answered by the company concerning their innovation:

- Are there regional main fields of the market besides the home market?
- Which markets can be opened up without help?
- Is licensing out a realistic alternative?

If the majority of these questions can be answered positively, the following items should be considered:

- Production procedures should be protected only in those countries where competitive producers are located. It is easier to forbid a production than to forbid a large number of customers the use of the product. In these countries a licensing out is to prefer.
- In all countries with a representation or where a representation for distribution (or production) is planned to be founded, patent applications are necessary.
- So called "basic innovations" should be filed at least in Europe sometimes in

the United States of America and Japan as well. To reduce the costs at the very beginning of international applications, which must start 12 months after filing of the national patent, it is recommended to make a PCT application for Europe, the USA and – if necessary – for some more countries. The complete costs could be higher, but one can save 18 months of time for a final decision. During these 18 months the innovation can turn out as a success – then it is easier to pay higher patent costs or it could turn out as a flop – then it is possible to drop the planned international filings partly or completely, thus saving money.

7. Patent Costs

These costs can only be roughly estimated because they depend on several items:

- Contents of the application
- Fees of the patent attorney
- Fees of the patent offices
- Examination and reply costs
- Translation costs for international patents

The average costs for a national patent application in Germany are approximately 4,000 to 6,000 DM or 2,000 to 3,000 €

The price of a PCT patent application lies in between 7,500 to 10,000 DM or 3,750 to $5,000 \in$. The same price has to be paid for a European patent application provided that the national application has not to be changed and was made in English, German or French.

The procedure costs in Europe until the granting of the patent are approximately 4,000 to 5,000 DM or 2,000 to 2,500 \in .

When the European patent is granted for nearly every country a translation has to be worked out. For eight different countries (average) the costs come to 20,000 to 25,000 DM or 10,000 to 12,500 €

The cost for a US patent until granting can be estimated to 13,000 DM or 6,500 €.

For a Japanese patent application 13,000 DM or 6,5000 € are the average price.

The average price for an application for all other countries – if a patent is necessary – is about 7,000 to 8,000 DM or 3,500 to 4,000 € depending mostly on translation costs.

All prices include the fees of the national patent attorney at home and the patent attorney in the relevant country, and they are based on German prices.

8. Help and financial support for Small and Medium Sized Companies (SMEs)

8.1 Why help and financial support for SMEs?

In Germany many innovations are made by SMEs. Whereas big companies have their own departments for research and development, for patents, for financial and project

planning, these facilities are mostly unknown in SMEs, especially in small companies. Management consultants for financing and project planning have been known for a long time, but there were no consultants for evaluation of inventions, for patent strategy and innovation management. Furthermore, many SMEs did not make any patent applications because of the high costs or they tried to avoid these costs and made patent applications by themselves. This very often means failure of the protection and sometimes failure of the whole innovation.

So independent help and financial aid for innovation management and patent strategy including partly costs of patent applications should be supported by the state, in order to increase and stimulate innovations and patents made by SMEs.

8.2 EZN as a German Regional Example for Help and Financial Support

The Erfinderzentrum Norddeutschland (EZN) provides support services to inventors and innovative firms. It is a private limited company, but began as a public initiative.

It was founded in 1981 by the Ministry of Economics, Technology and Transport of Lower Saxony (Niedersachsen).

Since January, 1987, EZN has been run as a private limited company, all the shares in the company being held by EZN staff.

This is a very important aspect, as this way EZN maintains its complete independence which is very important to our clients.

The state government of Lower Saxony continues to finance the evaluation of innovative ideas put forward by private inventors, academics and smaller firms (with up to 5 million € annual turnover).

This support has been done with the intention of promoting developments coming from small and medium-sized enterprises and protecting good ideas through patents. In this way they also aim to encourage technology transfer between research and industry. Last but not least the Federal State of Lower Saxony is keen on attracting interesting technologies from other parts of the world.

EZN has a staff of 12, including 8 graduates in the fields of natural sciences or engineering. It also uses the services of about 60 external consultants. The annual budget is about 1.3 million \in , including 400,000 \in financial aid for patents.

The EZN structure has a relatively strong technical bias. Although the EZN staff has experience of legal and economic matters, it is not sufficient to give qualified consultations in these areas. Besides, legal consultancy in Germany is subject to very strict rules. Neither does EZN's own staff cover all scientific fields. For this reason EZN delegates assignments to its approximately 60 external consultants in the area of:

- patent law
- general law
- business consultancy and
- specific sciences, such as human medicine and chemistry

Over the years EZN has:

• undertaken 30,000 interviews;

- assessed approximately 11,000 inventions submitted in writing;
- accepted to progress about 550 inventions;
- financed some 1,500 patent applications, nationally and internationally;
- followed through approximately 100 applications to the market or premarket stage (5 being inventions in basic technologies).

8.2.1 Evaluation of Inventions

The first step of an innovation should be an invention and an evaluation of it to answer the question about the current state of the art, technical feasibility and economic cost-benefit. This work is done by EZN. EZN evaluates

- the scientific foundations of inventive ideas
- the technical feasibility of new technologies
- the novelty value of new products and processes
- the economic cost-benefit of new technologies
- the business feasibility of new ideas.

EZN advises and assists

- small and medium sized enterprises (SME) up to 5 million € annual turnover
- scientists at Universities and other higher education research institutions
- independent inventors

For these persons or companies the Federal State of Lower Saxony covers the cost of this detailed advice and assistance so as to guarantee evaluations of innovative technologies which are absolutely objective and of high quality.

8.2.2 Financing of patent applications and patents

If all the above mentioned evaluation criteria are fulfilled (app. 5 per cent of all invention proposals we have received) EZN provides financial assistance up to 75 per cent for

- costs of intellectual property protection
- construction and operation of functional models or prototypes

The money has only to be paid back if the innovation turns out to be successful. Then, the inventor has to pay 10 per cent of his royalties starting at 10,000 DM ($5,000 \in$) or 1 per cent of his turnover with the product, starting at 100,000 DM ($50,000 \in$). No interest rates have to be paid.

8.2.3 Assistance for exploitation of intellectual property rights

Besides financial assistance many SMEs and inventors EZN advises and assists in the field of exploitation of intellectual property rights. This work is normally done in co-operation with external experts in the areas of

- patent law
- general law, especially licensing law

- business consultancy and
- specific sciences, such as medicine, chemistry and biotechnology

This co-operation has been led to several very interesting license contracts or to some remarkable turnovers for SMEs when marketing their own products. The variety of our service is large and generally adapted to the specific demands of the innovation and the company or the inventor.

This part of our services is not paid by the government, the client has to pay for it. As we know, inventors and small companies normally have financial problems before they can earn money with their new innovations, so we normally do not charge any money before there is a financial success. Precisely: In the very beginning EZN works free of charge, take over a certain risk as the company does, and we share the success. This means that we get 20 to 25 per cent of the royalties if a license contract was agreed on or 2 per cent out of the product's turnover in case the company sells their products on their own responsibility.

9. Conclusions

- Many small and medium sized companies are innovative.
- They can act very flexibly when it comes to new solutions for solving problems.
- Intellectual property rights are very important for SMEs to protect their technologies.
- SMEs have several difficulties to handle innovations and intellectual property rights.
- SMEs should have consultancy during the whole innovation process, especially for evaluation, patent law, patent strategy, marketing, licensing negotiations and international licensing laws. These items should be offered by reliable and independent external experts.

10. Final remarks

Help, especially financial help, for SMEs is a political decision. If such support is wanted by the government it is to consider that an independent institution should be founded that can offer a complete variety for help with innovations. This work can be carried out by some specialists in co-operation with reliable external experts.

During the first years (at least five years) this institution should be financed completely by the state (preferably ministry of economics).

Then, only the costs for advise and evaluation of innovations should be covered completely by the government.

There should be an annual budget given by the state for a support of intellectual property right, spent by the institution on their own responsibility as a result of their evaluations.

All other services e.g. market help, licensing, participation in special fairs, co-operation with other companies, research and development in co-operation with universities should be paid by SMEs. Payment can consist of an agreed and fixed price or payment by expenditure or by participation of the institution in the success of the innovation.

In Germany there are only a few organisations working like the Erfinderzentrum Norddeutschland. The Fraunhofer Gesellschaft has done it for more than 40 years, but

especially for scientists and individual inventors. We have done it for 20 years now, and there is an Erfinderzentrum Sachsen-Anhalt that has been working now for 10 years in the former East Germany. They took over our know-how and established their own innovation centre in Magdeburg. There are a few more institutions helping SMEs founded during the last years. Nearly all of them including our institution are co-operating to help small and medium sized companies with their innovations, even in an early stage to secure their legal rights. Our work and our success in the fields of technology evaluation, patent strategy and technology transfer has also been accepted by the Central Association of the German Crafts Sector (Zentralverband des Deutschen Handwerks, ZDH). We are now running the second part of a project called "Inventor's Support for Craftsmen's Companies", directed by the ZDH and partly financed by the German Federal Ministry of Economics and Technology. Aim of the project is to establish an "innovations in craftsmen's companies: "From the idea to the market." This "chain" would effectively help SMEs with their innovations.

Many of these items should be suggestions for your countries to improve inventiveness of small and medium sized companies. I thank you for your attention.