Industry Case Study Series on IP-Management

Stöbich
Fire protection for battery systems

By Alexander J. Wurzer & Jochen Stöbich

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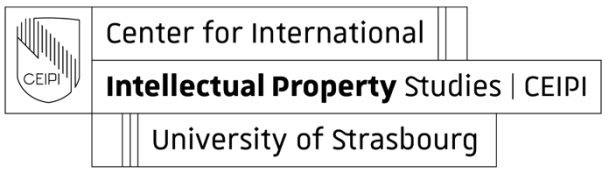

AUTHORS

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Dr. Wurzer is Adjunct Professor for IP Management at the Center for International Intellectual Property Studies (Centre d'Etudes Internationales de la Propriété Industrielle, CEIPI) at the University of Strasbourg, where he has been Director of Studies for the Master's degree in Intellectual Property Law and Management (MIPLM) since 2007. Prof. Dr. Wurzer is Director of the Steinbeis Transfer Institute for Intellectual Property Management at Steinbeis University Berlin. He is Managing Partner at WURZER & KOLLEGEN GmbH, a consulting firm specializing in strategic IP management.

Prof. Dr. Wurzer is Chairman of DIN committees DIN 77006 for quality in IP management and DIN 77100 for patent valuation. He is a member of the Board of Directors of "Deutsches Institut für Erfindungswesen e.V." (DIE), Spokesman of the Board of Trustees awarding the Diesel Medal and Fellow at the Alta Scuola Politecnica at Milan/Turin Polytechnic. He is also a jury member for the 2018 German Innovation Award of the German Design Council and a member of the group of experts of the European Commission.

Dr.-Ing. Jochen Stöbich

Dr. Stöbich is the founder and managing partner of Stöbich Brandschutz GmbH, a company of the Stöbich group which incorporates 11 companies in the field of fire protection and similar branches. In 1980 Jochen Stöbich invented the world's first conveyor system closure to prevent expansion of fire over separate production sections. This first innovation was patented in 1980 and formed the basis for meanwhile nearly 200 patents of the Stöbich group of companies.

Dr. Stöbich is member of the German standardization working groups of DIN: "Fire behaviour of building materials and structural elements" and "Smoke and heat control systems". Stöbich is also represented in the European Standardization organization CEN: TC 33 "Doors, windows, shutters, building hardware and curtain walling" and TC 127 "Fire Safety in Buildings".

About Stöbich

Founded in 1980 by Dr. Jochen Stöbich, the medium-sized company specializes in fire protection. A large fire at the Bahlsen factory in Hanover was what inspired Dr. Stöbich to found his company. The factory was equipped with a conveyor system running through several wall openings through which the fire was able to spread to the different parts of the factory. At the time, there were no solutions available to solve such a fire safety issue and Stöbich GmbH decided to focus on fire barriers for continuous conveyor systems. Stöbich soon managed to apply its expertise in solving technological challenges in the field of structural fire protection to other areas in the market for fire and smoke protection solutions, including fire curtains protecting e.g. whole theatres against fires on stage.

Due to a continuous stream of innovative solutions, the company now counts 400 employees and has an annual turnover of more than EUR 40 million. From its corporate headquarters in Goslar, Germany, Stöbich operates in more than 50 countries around the world. Experience, product maturity, systems expertise and reliability are key factors for the company's export success.

In addition to its expertise in mastering structural challenges, the company has also acquired competencies in developing materials related to fire protection. While fibreglass fabrics were traditionally used for components exposed to static loads only, Stöbich has managed to make this material durable for long-term use with dynamic loads, and to optimize its tightness against smoke and its resilience to thermal stress by making selective modifications. The company maintains collaborations with industrial manufacturers, textile research institutes and fire testing laboratories in order to develop new fire protection products.

Research efforts in this respect also included intumescent materials, which are used as sealing materials in fire protection as they increase in volume when subjected to heat. The expansion of the material has the additional advantage of heat being absorbed by the material, which results in the protection of the component in question from burning out.

The continuous focus on innovation and market performance of these innovative products earned the company an entry in the catalogue of the German World Market Leaders as well as the Innovation Prize for Architecture and Construction and the TOP Innovators Award of Manager Magazine in 2015. At the time, Stöbich had successfully established a total of 11 worldwide innovations in the market, making it one of the world's leading companies in the field of structural fire protection.

With this comprehensive spectrum of technical competencies, Stöbich experts operate in a stable market environment. In Germany, the market for fire, gas and smoke protection products and technologies is worth more than EUR 2 billion and has seen as steady growth by approx. 3% p.a. for many years

given the long service life of the solutions installed. There is a strong reliance on standards and regulations in the structural fire protection market. Compliance with these standards and regulations is a core competency of Stöbich and also constitutes an external market entry barrier against competitors (new entries). Simultaneously, the density of regulations also restricts the dynamics of the market.

Major losses due to fires in Germany, spread across some 150 incidents, amount to over EUR 0.5 billion a year. The average loss in the event of a fire amounts to approx. EUR 4 million. Typical causes of fires include spontaneous combustion, explosions, overheating, electricity and human errors. Based on these experiences, Dr. Stöbich was looking for new expansion opportunities for the company to use its fire protection expertise in more dynamic market environments.

The challenge

As at the time when the company was founded, fires once again attracted the attention of Stöbich experts. This time, however, the reason were modern energy storage systems such as batteries and rechargeable batteries rather than industrial conveyor systems. The mass-market introduction of such storage systems for electrical energy in products such as notebook computers, digital cameras and mobile phones has also coincided with a proliferation of evidence that they constitute a potential fire hazard. In addition to their ignition when installed in end devices, their storage also poses a hazard. Lithium-ion batteries are the product of choice for various applications because of their high energy density of 180 Wh/kg and their comparatively low weight. But ever since the introduction of such products, the problems associated with them have become increasingly apparent. As early as in 2003, 340 cases were reported in which Li-based batteries had burnt out, smoked or even exploded, and since that time, the energy density in modern batteries has increased significantly.

OEMs affected by quality issues with Li-ion batteries have even included well-known brands like Dell and Apple. In 2006, the US Consumer Product Safety Commission (CPSC) recalled 4.1 million batteries after becoming aware of six cases in which laptop batteries had caught fire. During the same year, Apple had to replace 1.8 million batteries because of fire hazards.

The large-scale use and diverse applications of these energy storage devices has also brought about new challenges in the field of logistics. Large quantities of such high-performance Li-ion batteries are stored along the global value chain, for example in warehouses. The US National Fire Protection Association (NFPA) responded to this phenomenon no sooner than in 2013 by conducting a number of studies and preparing safety instructions on how to handle and store Li-ion batteries based on the findings from these studies. The NFPA's findings provide clear evidence that, in real-life storage scenarios, Li-ion cells pose a significantly greater fire hazard than traditional rechargeable batteries. In transport law, Li-batteries are treated as hazardous goods, meaning that they must be packaged in small units and require special handling and separate storage in fire-protected facilities. A fire on a UPS cargo plane in Philadelphia in February 2006 demonstrates the urgency of such a procedure: the aircraft was carrying Li-ion batteries.

The larger the batteries become, the higher the potential risk, for example with stationary battery systems for energy storage. The energy stored in a 13 KWh Li-ion battery as used for storing photovoltaic electricity, for example, is equivalent to the energy released by 4 kg of dynamite. This makes it evident that appropriate fire protection for such batteries and the premises where they are stored is needed.

The novelty and lack of knowledge about such a hazard can be measured by the fact that the German Federal Solar Industry Association only published a brochure containing instructions for firefighters on how to handle fires of lithium-ion batteries as late as in January 2015, even though lithium-ion batteries are the second most widely used technology for storing solar power apart from lead batteries. The three main hazards include the toxic gases produced when a Li-ion battery is on fire, the potential leakage of chemicals as well as the electricity stored in the battery itself.

Fire incidents are also known from battery manufacturing. A production facility for Li-batteries used as starter batteries and in stationary applications, for instance, burnt down in Germany's Saarland region. One of the reasons for such incidents is the high degree of sensitivity of the electrolyte used in Li-batteries, which causes a strong chemical reaction with moisture and water.

Besides burning premises, Stöbich is also interested in burning vehicles. There have been nearly 280,000 fire incidents involving cars with conventional drive systems and causing more than 400 casualties in the USA in recent years. Since electric mobility is still in its infancy in the United States, the volume of fires in electric vehicles is still comparatively low, but reports of first cases already exist.

Li-ion batteries are a key functional element in electric mobility. Thermal runaway of a Li-ion cell is triggered by an exothermic reaction inside the cell. This may lead to fires or even

explosions, as was the case last year with three electric cars manufactured by Tesla in the USA and Mexico. The chain reaction is triggered by the release of energy, which in turn strongly accelerates the speed of the reaction. This snowball effect leads to a self-acceleration of the overall process. If this process is not stopped, it can lead to a degradation of the cells and spread to neighbouring cells causing the same self-acceleration of the chemical reaction. Triggers of such processes include an internal or external short circuit, overcharging, total discharge, mechanical deformation or overheating due to environmental influences.

The severity of the fire hazard in electric mobility in the eyes of the automotive industry is evident in the fact that Renault-Nissan, for instance has introduced new crash test procedures in order to ensure that, in a similar way to what is the case in racing cars, all electricity circuits are shut off immediately in the event of an accident.

Li-ion batteries are not only used in electric cars, they are also the source of energy of electric bikes. These so-called pedelecs are becoming an increasingly common sight on our streets, but the high-performance batteries of these vehicles can also cause fires. Incidents and product recalls have also been reported here.

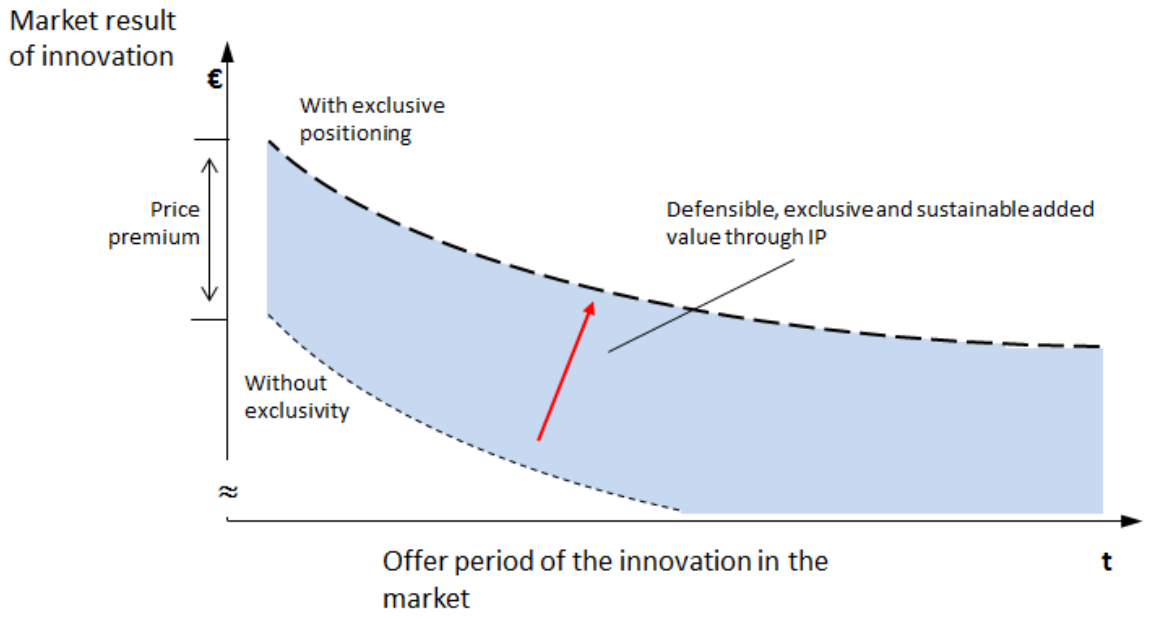
There is enormous market potential for Li-ion batteries for vehicle applications alone. Within the next few years, the global market is expected to grow from USD 1.5 billion to USD 15 billion and more than USD 50 billion by 2020.

These significant market dynamics, paired with considerable fire hazards and unsolved problems, have inspired Stöbich to investigate the issue of fire safety in energy storage systems as a future-oriented field requiring innovative solutions and offering new business models for the company.

The entrepreneur Dr. Stöbich is faced with the strategic challenge of expanding his business and making it more dynamic on the one hand, and making up for his company's limited competency and experience in this field on the other. In addition, the investment in the new business model is to be kept as low as possible.

The use of intellectual property is an attractive prospect for entrepreneurs as long as it improves the expected innovation yield. This is the starting point for more specific administrative considerations: What is the role of IP for innovation success from a business administration point of view?

The effect of IP within a business model like the one intended by Stöbich, i.e. the sale of a product within a value chain with a customer benefit for which customers are willing to pay a margin-determining price, is shown in the figure below. In a best-case scenario, intellectual property designed by taking the customer as a starting point should result in an exclusive market position for Stöbich. This would put Stöbich on the upper dashed curve. Due to the prohibitive effect for a product feature which is relevant to the customer, Stöbich is in a position to charge customers a premium price as opposed to what would be the case without any enforceable exclusivity. The prohibitive effect provides Stöbich with sustainable added value and the enforceability of prices remains more stable over time compared to the situation without exclusivity. The overall financial result of using IP in the innovation scenario is indicated as a profit margin by the area between the two curves.



IP strategy for protecting the business model

Along with the decision of entering the fire protection market for energy storage systems, Dr. Stöbich also initiated a systematic investigation of the innovation project with the aim of achieving a market position for the new business idea that offers maximum exclusivity. The use of IP plays a crucial role in reaching this objective.

Among technology companies, blocking the competition from using entire business models by means of IP is common practice. IP results in higher profits and even higher market entry barriers

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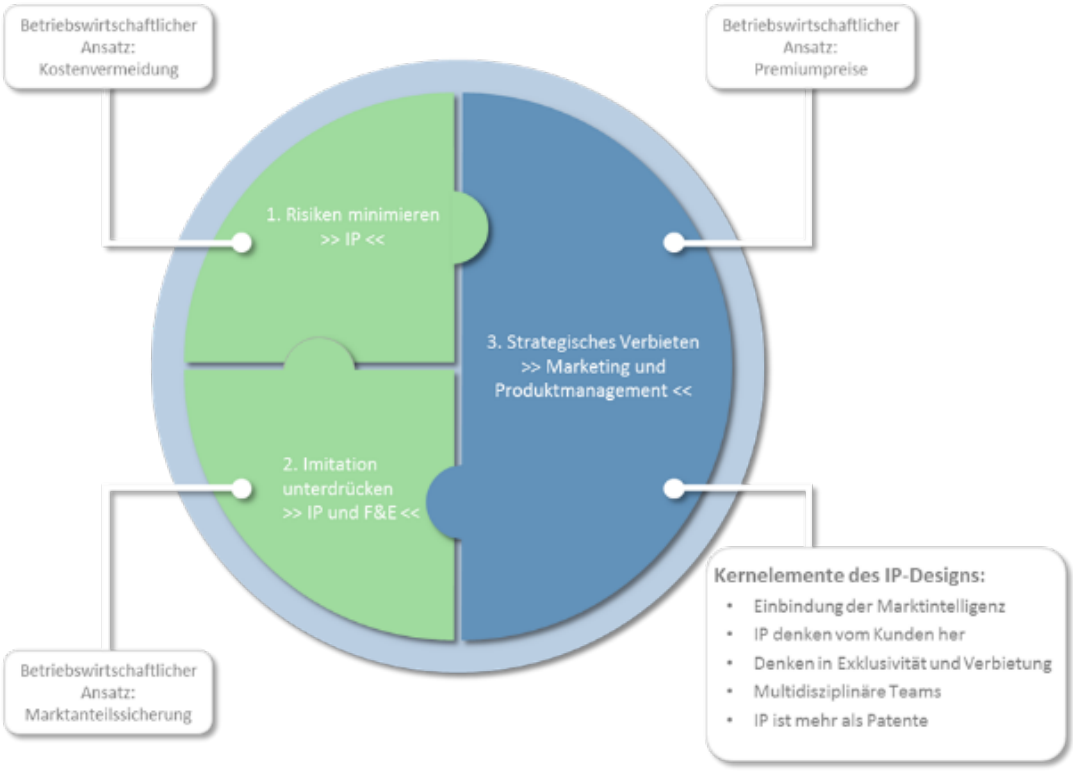
Among medium-sized companies, however, this way of using patents is often met with disbelief. The opinion prevails that a business model cannot be protected. However, modern IP strategies are no longer aimed at merely suppressing imitations of a company's proprietary technical solutions, but rather at creating sustainable differentiation advantages against the competition and thereby improving the yield of their innovative performance. Consequently, the aim must be to optimize the prohibitive claim of a prohibitive right from an economic perspective. That is, the business model must state what others should be prohibited from doing.

The IP management function at Stöbich takes a very modern approach. Stöbich invests a substantial six-figure amount in research and development every year and protects its inventions by means of IP. Patents have successfully been enforced against competitors in the past and there has been a dedicated Innovation Manager since 2010, whose main task is IP management. Since the company was founded, it has registered 148 patents and several trademarks. In 2014, Stöbich received an award for its IP management.

With the planning of its market entry in the fire protection sector for energy storage systems, Stöbich wanted to complement its traditional IP activities related to risk prevention and suppression of imitation by adding strategic prohibition.

From an entrepreneurial point of view, Stöbich was immediately convinced of the strategic prohibition approach as a means of creating USPs for business models. Time was



also a decisive factor for Stöbich. A key success factor of the approach is patenting potential future solutions that could provide customer benefits as early as possible. Patent law is very helpful in this respect. Since there is no obligation to exercise patent rights, applicants are not required to put their technical solutions into practice. Economic considerations are of no relevance to patent law. This means that prohibitive rights for solutions and customer benefits can be acquired which may or may not be implemented in the remote future but provide a barrier to market entry for the competition with immediate effect. This coincides with a typical corporate strategy.

Stöbich has not just developed its own technology and production methods, and subsequently applied for patents, but rather defined its own future market claims based on its budding business model at a very early stage. This approach eliminates the risk of Stöbich's competition developing alternatives that offer the market similar customer benefits to those offered by the company's own solutions – potentially even at a lower price. This would cause a severe disruption to Stöbich's business model and the targeted innovation yield would be at risk.

In order for a company to claim its own patent position as early as possible in the business development process, and without having to rely on its actual product developments, a profound understanding of the market environment and the associated technological developments is required.

A systematic analysis of the different influencing factors on a potential future business model for Stöbich was performed in collaboration with experts in the field of objection-oriented innovation strategy from the WOIS Innovation School of the University of Coburg.

To this end, the key processes along the battery lifecycle – from production, transport, charging and operation to potential damage and recycling – were analyzed.

In various usage scenarios for mobile and stationary applications, the corresponding fire protection requirements were identified and the resulting customer benefits were defined.

The exclusivity needs for the future business model were then derived from the expected customer and market reactions. The decisive factor here was to determine what features customers would be willing to pay a price premium for and what conditions would have to be met in order for Stöbich to gain market shares in this future market. Especially complementary vendors and value chain partners such as kitters of battery systems, providers of photovoltaic systems and others play an important role in this respect.

What followed was an analysis of the core elements of the future business model, including:

- the development of technological relevance for batteries,
- the requirements of different applications of battery systems,

- likely battery technologies, and
- the functional USPs Stöbich intends and is able to derive the necessary prohibitive rights for the business model from.

Based on these analyses and strategic considerations, Stöbich has developed a holistic, passive fire protection concept, which has also been successfully tested. The test scenario simulates the case that the thermal runaway of a single cell cannot be prevented and requires intervention despite all protective devices in place in battery management systems. The protection system developed for this purpose intervenes at three different levels. At cellular level, contamination between cells is prevented by special protective layers. In addition, an explosion of the emitted gases is prevented by means of textile filter systems. The third level of the protection system minimizes the risk of personal injury by the emitted toxic gases by subjecting them to after-treatment and extracting them via a specific mechanism.

This concept was outlined in the patent portfolio and forms the core of Stöbich's new business model in the field of fire protection of energy storage systems.

Following the analyses and targeted patenting of the core concept of the business model, Stöbich designed solutions by focusing on the four most relevant core processes of the lifecycle in relation to fire protection:

Development:

Test container for Li-ion batteries. Li-ion batteries are tested prior to volume production and while in serial use. The energy cells are continuously charged and discharged at temperatures from -40 °C to +80 °C. This often occurs in separate climate chambers placed inside fire protection containers for additional safety. The solution developed by Stöbich in this respect consists in providing a container which is integrated into a system and possesses both fire protection and air chamber features.

Production (volume production):

Fire protection for end of line tests. There used to be a gap in the market for systems for serial testing of Li-ion batteries with rapid charging and discharging offering effective fire protection.

Stöbich has developed the following solutions in this respect:

I. A system that shuts down in the event of fire and shuts off the end of line test rig for fire protection.

II. A safety lock with a high-speed function which shuts off the end of line test rig for fire protection.

Transportation and storage

Fire protection is essential when transporting or storing batteries. In addition, a chain reaction must be prevented in the event of fire.

Stöbich has developed the following solution in this respect:

A textile, fire-proof and insulating packaging solution for transportation and storage. This provides the company with access to the following areas of application:

- Transportation of batteries from plant A to plant B
- Removal of electric vehicles which have been involved in accidents
- Transportation of pedelec batteries (Li-ion) for electric bikes
- Storage for electronic devices on aeroplanes.

Recharging

Lithium is a highly reactive metal. Overcharging a lithium battery can cause overheating or ignition of the battery. Although internal protection circuits and systems are in place to make charging safer, this continues to be the most dangerous process when handling lithium batteries.

The Stöbich solution consists of a bag for storing lithium batteries, especially with regard to making the recharging process safer from a fire protection point of view.

Deployment and organizational implementation of the IP strategy

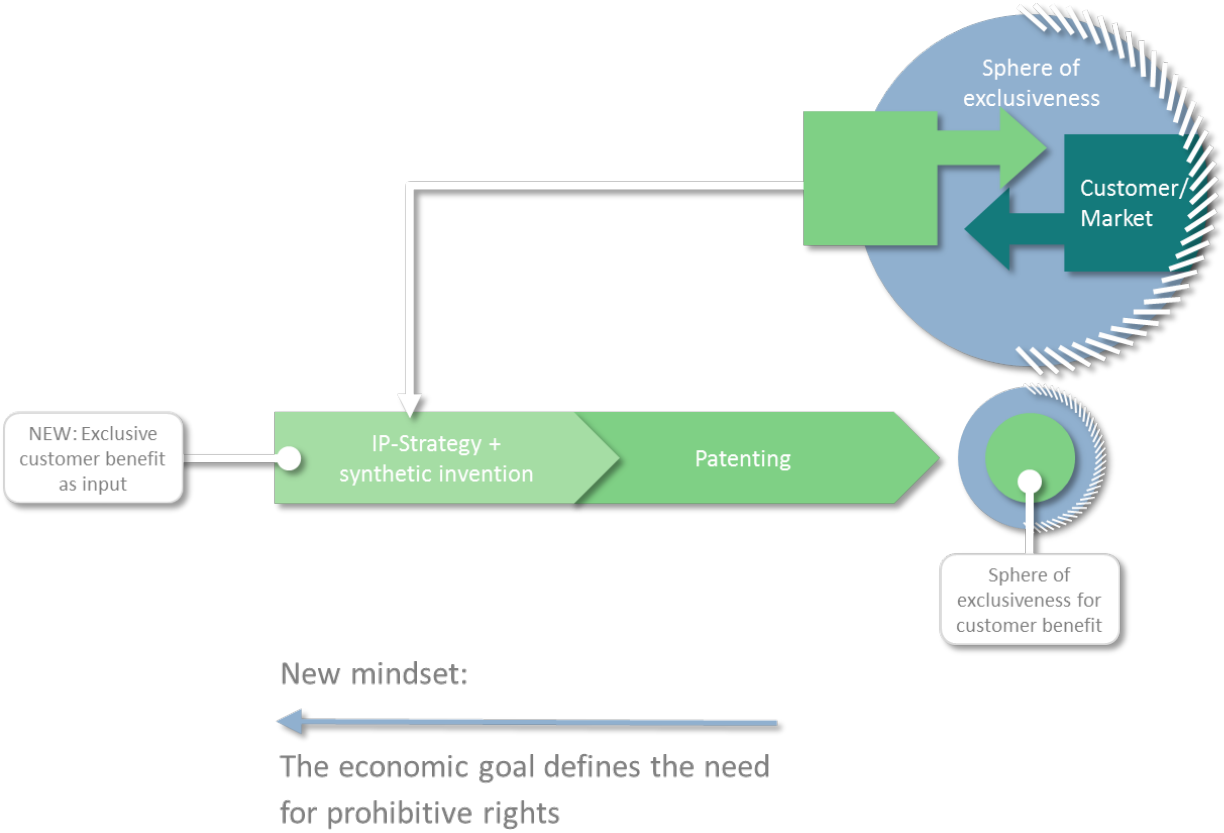
From his entrepreneurial perspective, Stöbich attaches great importance to ensuring the success of his company's innovations in order to protect its future business model from imitation. This requires identifying the perceived benefit to the customer, which ultimately defines the market share and margin, as early as possible. This approach is part of innovation management. What makes Stöbich's case so special is the systematic approach applied within a medium-sized enterprise. When the IP strategy for protecting the business model was developed, an inventive solution for which a patent application could have been filed had not been developed yet. Rather, the company used possible scenarios from which it derived the exclusivity requirements for a successful business model. These requirements were subsequently analyzed for options of achieving a customer benefit, in this case: a multi-stage passive fire protection concept for the chemical absorption of the heat emitted by a single cell during thermal runaway, the filtering of the emitted gases and the filtering out of hot particles from the gas which could act as additional potential sources of ignition. These customer

benefits result in a minimized risk for users in various applications.

Stöbich has defined its intended sphere of exclusivity based on the requirements for its future business model, and subsequently designed the necessary prohibitive rights. A schematic representation of this approach can be found in the figure below. Compared to the conventional patent development process, the starting point was not the inventive idea, but the requirement for exclusivity in the future business model.

This approach requires an inverse way of thinking, a perspective which is also consistent with the approach of the WOIS logic for the targeted positioning of innovations. It requires a profound understanding of the current situation of a business, its strategic direction, its capabilities and rules. Future developments must be identified in order to evaluate future opportunities and potential threats to a company's future as early as possible.

The delta between the current business situation and future changes in the world must be clearly described and the limitations of today's business logic must be critically mapped by means of objections. The following questions must be asked: "Which new strategic directions should the company pursue in its current situation in order to close the delta?" and "What are the barriers to these potential developments in each pillar of the business?" The answers to these questions lead to the central exclusivities the company should develop by using prohibitive rights.



The IP strategy which resulted from this approach provided Stöbich with the necessary support in venturing into a whole new business segment by establishing what needed to be invented in order to generate the all-important exclusivity for the company's business model.

A particular challenge for Stöbich was to find a balance between the breadth of competencies needed, the variety of potential applications and the strong limitation of in-house resources. Stöbich's engineers initially lacked expertise in the new field and had to study patent applications from other industries intensively and extensively. The lack of relevant regulations and standards and the uncertainty about the future development of the market constitute a considerable risk in relation to an investment in innovation. This is why the conceptual approach of multi-stage passive fire protection was chosen for the central patent application.

Benefits for Stöbich

It took Stöbich nine months to identify the need for exclusivity for its future business model and submit the central patent application: a timeline that could not have been met by using the traditional approach of developing marketable products. The Stöbich approach resulted in an immediate first mover advantage for the company in the targeted market segment. Stöbich benefited greatly from its systematic approach which enabled the company to use its resources in a targeted manner and to develop a precise business model in a highly complex and diverse field of innovation: “When trying to enter new markets, we don't believe that developing products and applying for patents at random is quite enough. We would definitely opt for the systematic approach again.” Dr. Stöbich.

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What is the MIPLM?

The 21st century marks a new era as our economies increasingly rely on knowledge-based production processes and services. Consequently, the institutions responsible for education and research in the field of intellectual property law in Europe must provide appropriate training for staff from the respective professional environments to acquire or reinforce their ability to initiate, control, protect, exploit and increase the value of intangible assets. The knowledge-based economy integrates research and development activities, innovation, industrialization and the marketing of products and services including intangible assets and completely revolutionizes enterprise management. It creates new professions specialized in dealing with intangible assets: this branch of law attracts consultants and intellectual property experts from among managers, jurists and lawyers. Indeed, every innovation process generated by new economic activities assumes the intervention of the law, the installation of tools and structures for developing or planning in order to control the intangible assets and to optimize their valorization. It has therefore been the duty of CEIPI, University of Strasbourg, as a leading center for Intellectual Property Studies in Europe, to propose a master program on "IP Law and Management" (MIPLM) since 2005, which complements the existing training course for engineers, scientists and lawyers. This "European" master program features a continuous training scheme aimed at experts in the field of intellectual property. It provides a genuine education program based on an investigation carried out in large enterprises in Europe. The teaching staff comprises academics and experts from various countries, renowned for their work and competence in dealing with the impact of intellectual property on the policy of enterprises.

M. Yann Basire
Director General of CEIPI.

Intellectual property has become a crucial factor and driving force in the knowledge-based economy. The economic development and the competitiveness of companies increasingly depend on the generation and exploitation of knowledge. Intellectual property can convert investment in corporate knowledge creation into economic benefits. Thus IP-based appropriation strategies form the basis for creating wealth and competitive advantages for companies from their R&D and innovation activities. The development and implementation of sustainable strategies for IP exploitation require a concerted integration of the disciplines involved in order to achieve an interdisciplinary perspective on IP. In a knowledge-based economy, companies can only achieve a competitive edge by combining the economic, legal and technological sciences. IP management within such a holistic approach provides optimized appropriation strategies and thus essentially contributes to the creation of wealth within a company. Accordingly, IP management needs skilled managers who can combine the economics of intangible assets in an intellectualized environment with multidisciplinary knowledge in order to maximize the benefits of IP. A new type of competencies, skills and underlying knowledge enters the arena of management and management education. The increasing impact of intellectualized wealth creation by investment in knowledge, R&D and innovation followed by its exploitation and IP-based appropriation calls for seminal new education concepts. The CEIPI program "Master of IP Law and Management" offers such a new type of management education. It follows an intrinsically multidisciplinary approach to meet the challenges and requirements of the knowledge-based economy. This master program combines legal, economic and management sciences and includes lectures from leading scholars in the field of IP law and management. Its ultimate objective is to qualify experienced IP professionals for acting as practically-skilled IP managers with a sound knowledge of the principles of wealth creation in our knowledge-based economy.

Alexander J. Wurzer
Director of Studies, CEIPI | Adjunct Professor
Director of the Steinbeis Transfer Institute Intellectual Property Management

Concepts of the Studies

Intellectual property and economics in the present context are two disciplines that exist in parallel.

Experts are found in each discipline, but with a lack of mutual understanding and training. Both "worlds" are nowadays bridged by experts, called IP managers, who link both disciplines through knowledge and experience. The CEIPI studies pursue a holistic approach and engage experts for the developing market of an IP economy. They are experts for basic economic management processes with specific assets. Management is understood in the broad sense of an overall company management and accordingly divided into six general functions:

- 1. Strategy
- 2. Decision
- 3. Implementation
- 4. Organization
- 5. Leadership
- 6. Business Development

On the basis of this differentiation skills should be allocated to management functions, and relevant knowledge to the functions and skills. The teaching concept focuses on both areas, skills and knowledge, as relevant to business with intellectual property.

Skills can be allocated to the specific management functions as relevant to the practical work within IP management. The skills are thus determined by the daily challenges and tasks an IP manager encounters.

For example, the "Decision" function includes skills such as "valuation and portfolio analysis techniques", and "Organization" as a function requires skills to manage IP exploitation and licensing including economic aspects as well as contractual design and international trade regulations with IP assets.

Special knowledge of economy and law is required in order to implement and deploy these skills in business. This includes knowledge of economic basics such as function of markets and internal and external influence factors. Additional management knowledge is also included such as value-added and value-chain concepts.

The legal knowledge includes contractual and competition law, and special attention will be paid to European and international IP and trade law, e. g. litigation, licensing, dispute resolution. Following this concept, IP law and management can be combined in clusters formed of specific skills and knowledge defined within each management function.

The lectures have a high international standard; the lecturers possess a high reputation and long experience in the teaching subject with academic and practical backgrounds.

The top-level experts come from the fields of law, economics and technology. The experts and the students work closely together during the seminar periods. Exchange of experience and, as a consequence, networking are common follow-ups.

Participants & their Benefits

This European master's program was designed especially for European patent attorneys, laywers and other experienced IP professionals.

Its ultimate objective is to qualify experienced IP professionals to act as IP managers with the practical skills and knowledge to deal with the new challenges of wealth creation and profit generation. Participants acquire first and foremost a new understanding of how intellectual property works in business models and are conveyed the necessary skills to achieve the systematic alignment of IP management and business objectives.

The course provides an international networking platform for IP managers and in addition enables participants to build long-lasting relationships and to further develop relevant topics within the field of IP management. Being part of this international alumni network also offers new job opportunities and publication possibilities.

Past lecturers and academics

Prof. Jacques de Werra,
University of Geneva

Prof. Estelle Derclaye,
University of Nottingham

Prof. Christoph Geiger,
University of Strasbourg

Prof. Jonathan Griffiths,
School of Law, Queen Mary,
University of London

Dr. Henning Grosse Ruse-Kahn,
Faculty of Law, University of Cambridge

Prof. Christian Ohly,
University of Bayreuth

Prof. Christian Osterrith,
University of Constance

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CERNA, École des mines de Paris

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University of Maastricht

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University of Liege

Prof. Alexander Peukert,
Goethe University,
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Prof. Jens Schovsbo,
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Prof. Martin Senftleben,
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Prof. Guido Westkamp,
Queen Mary University London

Prof. Alexander Wurzer,
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Prof. Estelle Derclaye,
University of Nottingham

Prof. Ulf Petrusson,
Göteborg University

Past lecturers and speakers, practitioners and institutions

Arian Duijvestijn,
SVP BG Lighting Philips

Kees Schüller,
Nestlé S.A.

Thierry Sueur,
Air Liquide

Heinz Polsterer,
T-Mobile International

Dr. Fabirama Niang,
Total Group

Philipp Hammans,
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Dr. Lorenz Kaiser,
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Leo Longauer,
UBS AG

Nikolaus Thum,
European Patent Office

Bojan Pretnar,
World Intellectual Property Organization

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Peter Bittner & Partner

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BASF Construction Chemicals
Boehringer Ingelheim Pharma
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Danisco/Dupont
DSM Nederland
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Nestec Ltd
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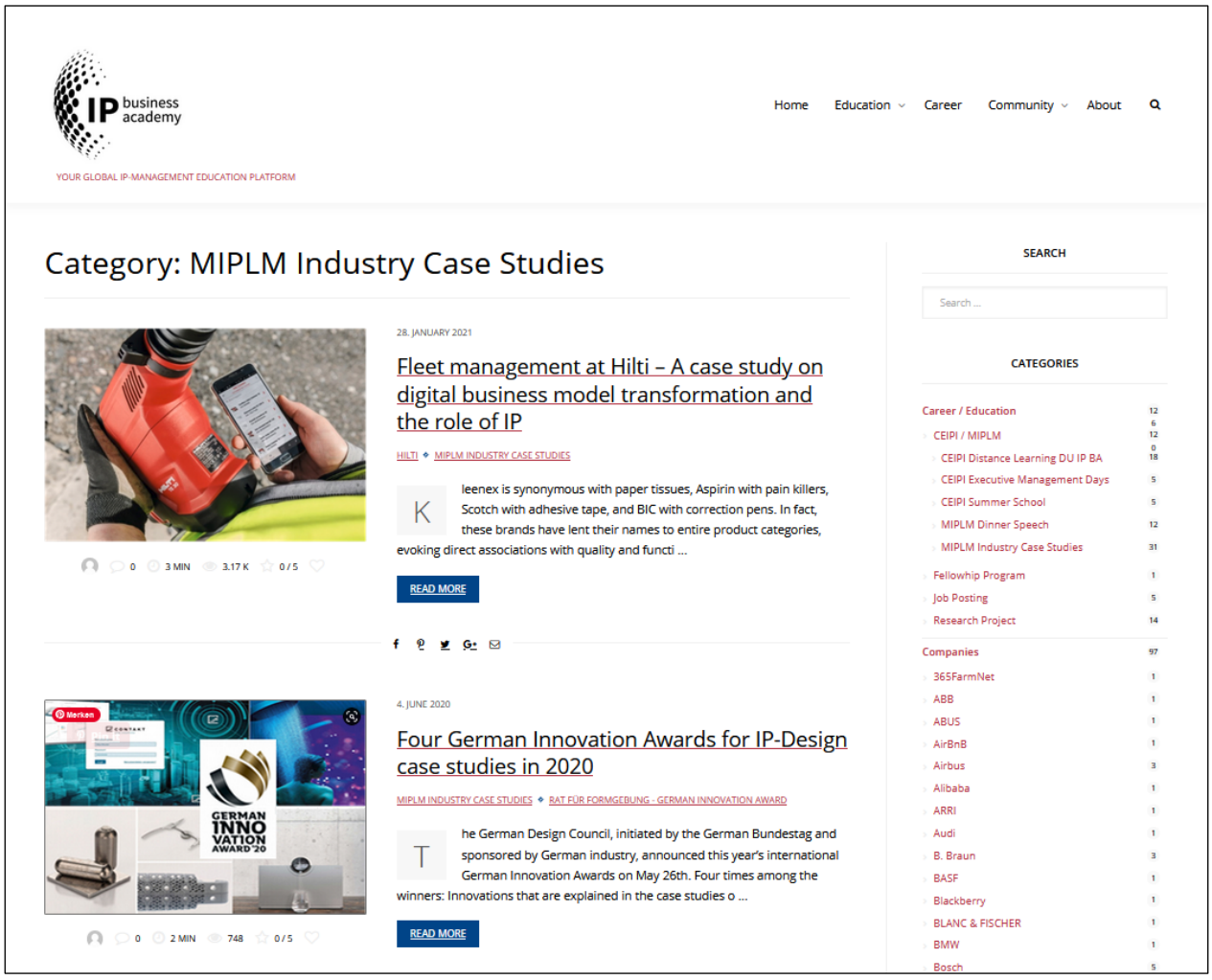

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