

Industry Case Study Series on IP-Management

WILO HIGH EFFICIENCY PUMPS

By Alexander J. Wurzer & Markus Beukenberg

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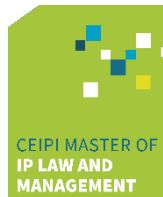


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Prof. Dr. Wurzer is Chairman of DIN committees DIN 77006 for quality in IP management and DIN 77100 for patent valuation. He is a member of the Board of Directors of "Deutsches Institut für Erfindungswesen e.V." (DIE), Spokesman of the Board of Trustees 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. Markus Beukenberg

Markus Beukenberg obtained a Master Degree in Mechanical Engineering with emphasis on aeronautics at the Technical University of Brunswick (Germany) in 1981. After several years of research activity at the Institute of Fluid Dynamics and the Institute of Flight Guidance and Control at the Technical University of Brunswick he completed his PhD on a interdisciplinary subject in the field of flight aerodynamics and flight controls with a an emphasis on energy savings.

From 1989 to 1997 he joined KSB AG, the biggest European Centrifugal Pump Manufacturer. He acted as manager of Design & Construction for electric and electronic control systems and was head of design and construction department of submersible electric motor pumps.

In 1997 Markus Beukenberg joined MAN Diesel & Turbo SE, where he was Vice President Gas Turbines until mid of 2011. His responsibility covered beside gas turbines the process gas expanders as well. Core engine design and calculation but also auxiliary systems and controls of gas turbine installations are executed in this division. Major activities were in the field of uprating and upgrading of the actual gas turbine programme and the development of new gas turbine engines.

Since mid of 2011 he joined Wilo SE a world market leader in pumps and pump systems located in Dortmund, Germany. Starting as Group Vice President Research & Technology he became General Representative and associated member of the Executive Board from May 2012 onwards holding the CTO position. Since April 2013 he was appointed full member of the Executive Board responsible for R&T, Quality, Production Technology and Electronics and Motors.

He is member of different associations e.g. AIAA, DGLR, VDI etc. and holds a board function in the VMDA for pumps and systems and he published more than 30 technical and scientific papers.

About Wilo

Not only has Wilo gone down in technological history as a pioneer in the field of pump technology for central heating systems, but the Dortmund-based group of companies has also set itself ambitious goals within the industry: it seeks to be both the first and the best to solve the challenges of our time within the competitive environment for high-tech pumps. Wilo has been at the forefront of developing innovative solutions for pumps and pump systems for heating, refrigeration and air conditioning, water supply, as well as wastewater disposal and treatment since 1872. Wilo deals with everything that moves water within buildings, water management, and industrial applications.

Wilo, which are the initials of company founder Wilhelm Opländer, began as a factory for brass goods. The group of companies from Dortmund is currently represented in more than 70 countries, employs over 7,500 people, operates in more than 60 locations and turned over more than EUR 1.2 billion in 2014. Wilo lives and cultivates the pioneering spirit from its tradition and innovative successes, and its understanding of customer requirements. The company's definition of progress includes anything that constitutes an improvement for the customer. This encompasses everything from great innovations and small details to accelerated processes, simplified handling and easier customer decision-making. Wilo products are intended to be particularly user-friendly, efficient and high-quality. Another measure

for Wilo's fundamental and progressive approach to innovation relies on the fact that Wilo has repeatedly provided solutions which constituted a benchmark for the market and have had a significant impact on policy development.

Wilo is divided into three product areas and competence centres: Building Services, Water Management and Industry:

- **Building Services** is the area that subsumes energy-efficient solutions for heating technology, air conditioning, water supply and wastewater disposal required for detached or two-family homes, public buildings, industrial or office buildings, hospitals or hotels. The aim here is to achieve an efficient use of buildings by means of highly energy-efficient integrated components.
- In the field of water management, this involves safe water purification and the supply of an increasingly valuable resource. In many regions of the world, this task is turning into a high-tech challenge with complex requirements for drinking water, water purification, water transportation, water treatment and wastewater disposal. Apart from technical performance, the efficiency and sustainability of the pumps and systems used are key concerns in this respect.
- The Industry unit focuses on process-related peripherals. For industrial clients, reliability, flexibility, efficiency based on a sophisticated range of products, and the ability to design customized solutions using pooled

knowledge and effective quality management, play a critical role.

Development, technology, and IP at Wilo

The development function at Wilo is the responsibility of the Research and Technology Center. The mission statement of the R&T Center also reflects the company's aspiration to technological market leadership: technological leadership in all market segments with innovative, energy-efficient, safe and sustainable products and systems. In order to achieve this goal, Wilo requires more than 350 employees in 14 location and some 3.5% of its turnover as a budget for R&T. The R&T Center organizes collaborations with universities in Germany, France, Korea, and India.

A particular challenge for Wilo's products and systems is the increasing complexity of the technologies the company is seeking to master. These technological fields currently comprise fluid mechanics, thermodynamics, acoustics, electrical drives and their control algorithms, as well as the corresponding materials sciences, electronics, surface treatment, mechanics, sensor technology and systems engineering. These topics must be mastered for pumps and solutions with a performance range from 1 W to 3,500 kW.

Compared to its Danish competitor Grundfos, which generates a turnover of approx. EUR 3.2 billion and its German competitor KSB with a turnover of nearly EUR 2.2 billion, Wilo is significantly smaller. Nevertheless, Wilo is highly competitive in terms of its

technologies and patent activity, and regularly emerges as technology leader. On average, the company registers about 30 patents each year. As far as the German market is concerned, Wilo is therefore on a par with its two larger competitors. Across Europe, Wilo's patent activity amounts to approx. 50% of that of Grundfos and a good 70% of that of KSB. As the complexity of products and the number of relevant technological fields show, IP activity within the competitive environment is generally relatively high and rising.

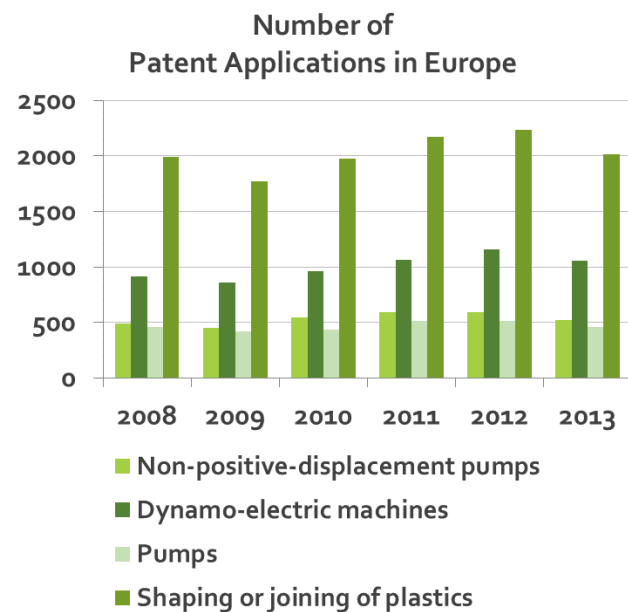


Fig. 1: Patent applications in technological fields of relevance to Wilo

The challenge

Global trends within the pump industry

Due to its business activities and product range, Wilo is affected by various long-term developments to which its strategy must be aligned. These include: globalization, urbanization, water scarcity, energy shortage, climate change, technological change. These developments have an impact on society, the economy, the natural environment and technological reality, today and in the future. These impacts must be reflected in Wilo's strategic behaviour.

Globalization means that today's emerging markets are evolving rapidly from an economic point of view, and that they are becoming industrialized nations in terms of their production and resource consumption patterns. This leads to a further increase in global competition for raw materials and resources. The simultaneous increase in urbanization (for the first time in human history, more people have been living in cities than in rural areas since 2008) poses enormous challenges for planners. By 2020, more than 60% of the world's population will be living in cities. Globally, there are more than 63 cities with over 3 million inhabitants. Water supply is one of the biggest challenges with not only households but also industry and agriculture requiring rising amounts of fresh water. Being a vital and scarce resource, fresh water is becoming increasingly precious. In addition to the basic problem of water scarcity, the issue of energy supply is becoming

more and more pressing in the light of climate change.

These change processes result in the right framework conditions for a highly positive growth scenario for Wilo. Wherever there is pressure to invest, combined with a need for maximum efficiency and resource conservation, Wilo is well positioned.

Wilo is operating in one of the most versatile sectors of the mechanical engineering industry with a production volume of nearly EUR 4.6 billion. Buildings constitute the largest sub-sector of this sector. As pumps are also sold for other industrial and process engineering applications, pump sales are comparatively stable and crisis-resistant. The prospect of significantly improving the energy-efficiency of buildings by making comparatively small investments leads to a continuous demand for high-efficiency pumps, which sometimes even goes against economic trends. In this product category, the short payback time and therefore the long-term profitability of the investment beyond amortization is a key selling point. Legal and regulatory frameworks also lead to a continuous sale of high-efficiency pumps, especially in the field of building services.

Positioning of the pump industry in the light of the energy transition

Germany's Federal Environment Minister Altmaier has described the energy transition as "the greatest challenge for economic policy since post-war reconstruction and the greatest challenge for environmental policy

of all time". The pump industry plays an essential role in this transition. Pumps consume 10% of all electrical energy available worldwide. According to the plans of the German Federal Government, greenhouse gas emissions are to be reduced by up to 95% vs. the 1990 benchmark. The use of renewable energies is expected to rise to 80% of gross electricity consumption, with a special focus being on building services which bear the greatest saving potentials. This area which accounts for 40% of Germany's energy consumption and one third of its CO2 emissions.

Potential savings result mainly from existing installations. Some 13 million of the approximately 21 million heating systems that are currently in use throughout Germany are running on outdated oil and gas boilers. A heating pump causes about 10% of a household's annual electricity consumption and therefore more than a refrigerator or freezer, which are also in constant use. By using high-efficiency heat circulation pumps, energy savings of up to 80% (average: 30%) can be achieved. The relevant legislative measures have a strong impact on the market situation. Since 2013, 95% of all previously available uncontrolled heat circulation pumps can no longer be sold on the market.

Legal regulations with similar objectives, such as for specific applications in drinking water supply and treatment, or in wastewater disposal, are already underway and will lead to significant energy savings in coming years. The regulations differ for different types of drives. New regulations for

the allowable hydraulic efficiency of gland pumps, for instance, will be coming into effect within the next two years. With glandless pumps, there is a savings potential of 23 TWh or EUR 4 billion in electricity costs and 11 million tonnes of CO2 in Europe. The savings potential is significantly higher (61 TWh per annum) due to the widespread use of inefficient technology. The lower demand for electric power would render 6 nuclear power plants obsolete.



Positioning of building services as part of the energy transition

Making buildings more energy-efficient is one of the main objectives of building services trends. As a result of urbanization, efficiency measures amortize much faster given that three quarters of all energy are consumed in cities. Existing buildings account for 40% of today's global energy consumption, with industrial energy consumption

and transport accounting for only 32% and 28%, respectively. The lion's share of efficiency gains in buildings must be sought in heating systems, as about 75% of all heating systems are not energy-efficient. Residents, on the other hand, are increasingly looking for comfort and safety in buildings. This explains the general trend in the demand for energy-efficient and (supply) security technology as well as an interaction between different systems. Generally speaking, the more intelligent a building (keyword: Smart Building), the sooner it can meet the above-mentioned requirements. From a building automation perspective, complexity increases with functionality. In response to this complexity, investments in IT infrastructures in buildings are on the rise. Basic communication problems have meanwhile been resolved and the industry has reached consensus on a number of standards for products, actuators such as sensors, and systems. However, the question of how the various components such as a pump network and the building control systems should interact is yet to be addressed via technology, market requirements, and IP positions.

The Wilo brand

Wilo wants to be perceived as an innovative systems partner for customized solutions in water management projects, who develops these solutions and implements them. As a result, Wilo's value proposition goes far beyond supplying pumps as mere machines. Wilo stands for innovation, reliability, and systems expertise for everything related to pumps. Its brand positioning is designed directly from the perspective of the customer's requirements and the resulting tailor-made solutions are based on partnership in order to offer the customer straightforward processes and high levels of predictability.

In two respects, so-called pump intelligence plays a critical role in Wilo's brand positioning as well as the company's positioning within the value chain of the industry: in terms of Wilo's know-how and expertise regarding pumps on the one hand and in the sense that the pump as such is supposed to be a product that offers greatest possible intelligence on the other.

Wilo attaches great importance to the actual product conveying its intelligence in this respect, i.e. to the intelligence claim being communicated by the external design of the product and to it being protected by IP. In its high-efficiency pumps, Wilo implements the highest standards of innovation, technology, ergonomics, and design. They are regarded as image bearers and are protected from imitation, and in particular from plagiarism, by a comprehensive portfolio of trademarks and

designs. There are design guides for the electrical connection module, the user interface containing the display unit (Companel), the operating controls, the motor housing, the nameplate holder, the hydraulic housing, the insulation, and the use and application of the company logo, to name but a few.

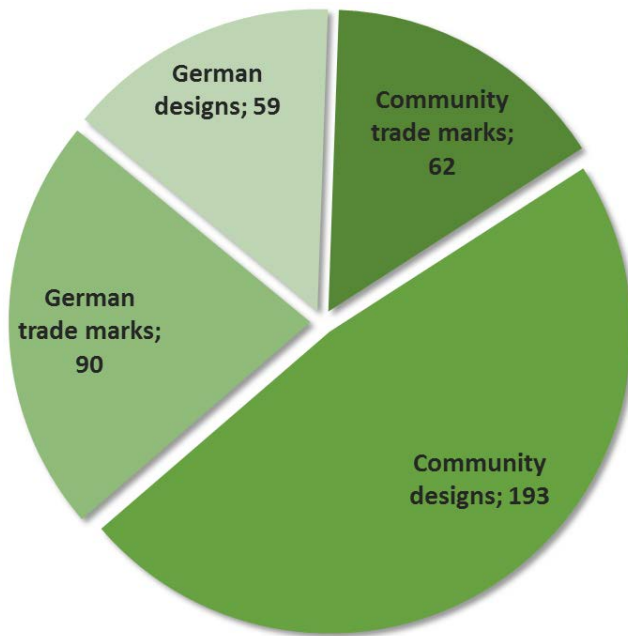


Fig. 2: Overview of non-technological IP rights at Wilo

Wilo attaches great importance to brand consistency: from communication (awareness, familiarity, consideration) to the fulfilment of the brand promise at every touch point (purchase, recommendation, preference).

To this end, comprehensive analyses of Wilo's brand value proposition were conducted based on market research in 20 countries with approximately 1,700 employees, 28 focus groups and customers in 7 countries, as well as a customer satisfaction survey with 3,500 interviews in 21 countries worldwide.

The strategic value proposition was derived from the outcomes of these analyses. The aim was to align the Wilo brand with customers' needs in order to create even more goodwill and to achieve a clear differentiation within the company's competitive environment as well as continuous growth for Wilo.

The strategic value proposition is more than just a marketing message or a campaign. It defines how the brand should be perceived by future customers and other stakeholders (claim), it guides all employees to work towards a common, defined goal, and it highlights unique characteristics intended to make the brand stand out from its competition.

It has been found that, even in a technological B2B environment, 70-90% of all decisions are made emotionally. Rational arguments are needed in order to justify the decision. "But rational reasons justify emotional decisions. We decide emotionally and justify our decisions rationally." (Dan Hill, neuromarketing expert)

Rational arguments for purchasing high-efficiency pumps include: premium quality, German engineering, technology, sustainability, high efficiency, and the range of solutions available to the customer as a whole. Emotional reasons include: ultimate comfort, ease of use, proactiveness, activity, solution orientation, and the general trustworthiness

of solutions. The rational and emotional arguments combined provide the perceived customer benefit.

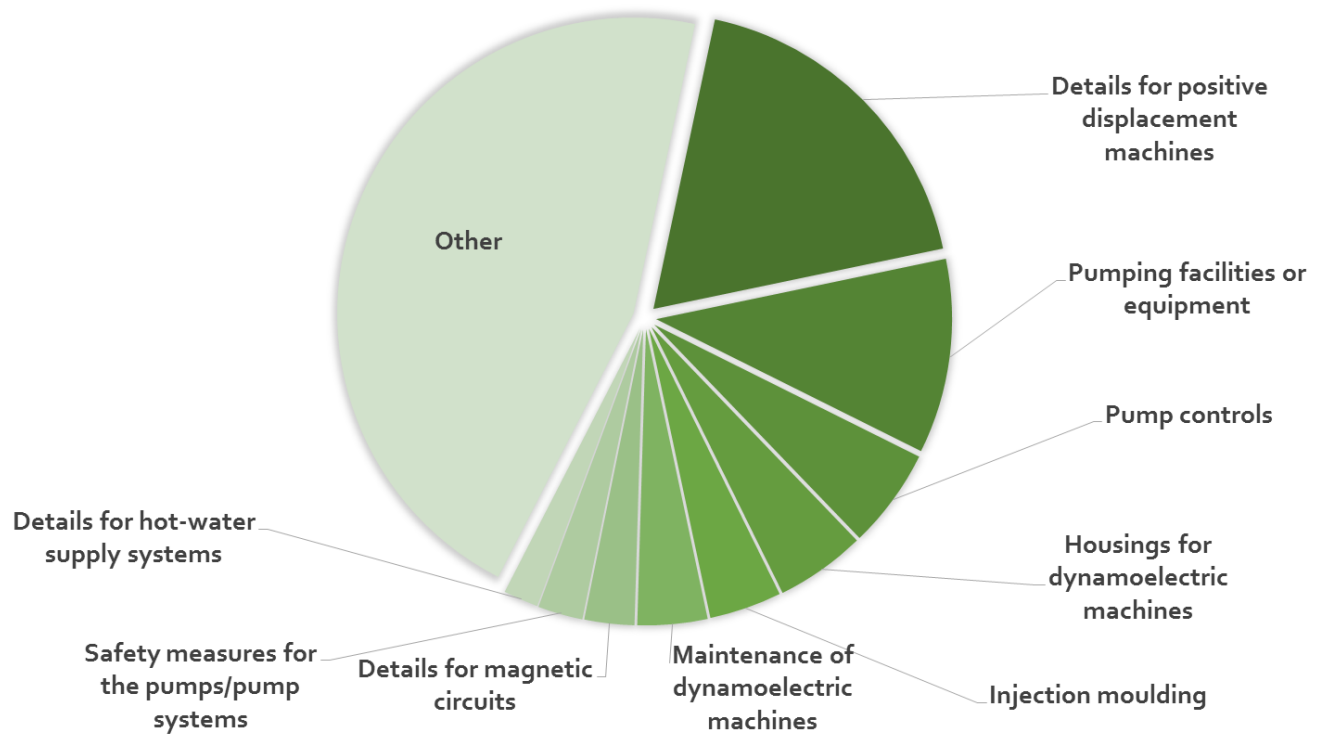


Fig. 3: Composition of Wilo's patent portfolio by technologies

Differentiation strategy, differentiation arguments

At the core of Wilo's differentiation strategy is pump intelligence. From the perspective of top management, the strategic focus of IP was to be aligned in such a way that it would support this differentiation strategy. As part of new product development and the product launches of two high-efficiency pumps (Yonos and Stratos Maxo), a master IP strategy was to be created and implemented to set an example.

With Wilo traditionally being a technologically driven company, IP used to be primarily considered a tool for protecting proprietary inventions made within the scope of the company's original development efforts. The purpose of the actual IP strategy was to protect the company's own inventions and to avoid any infringement of third-party IP rights. With the appointment of the new CTO, this passive-reactive strategy was abandoned, and a proactive IP strategy aimed at the market and the competitive environment was developed. In addition to the company's brand positioning, the starting point for this was its technological competence. An additional objective within the context of the sub-projects for Yonos and Stratos Maxo was to convey an understanding of modern IP strategies to the members of the project team. The Management Board attached great importance to ensuring that the central aspect of Wilo's future IP culture was understood by project participants in order

to turn Wilo into a knowledge-based high-technology business:

Intellectual property is not a by-product of proprietary marketing, design, and development work. It is rather to be understood as a natural return on investment of the company's own creative efforts, which directly provides a positive value contribution due to its protective effect. The Management Board understood that, due to the complexity of the products, intense competition, global value chains, and the enormous challenges within the industry, such a traditional view of IP no longer provided the right answers for the future.

Instead, the new CTO sees the purpose of Wilo's IP efforts in creating the company's own IP culture based on its services, products, and market position, and as a competence for the future. The central aspect in this respect is that Wilo considers IP an independent asset. This view has profound consequences for the way in which Wilo operates. From a lifecycle point of view, this asset must be created independently, it must have an independent role in corporate strategy, and it must be budgeted for from a managerial perspective based on return on investment rather than from a mere cameralistic perspective.

As a starting point, four distinct focus areas were defined in order to establish the IP culture at Wilo. Subsequently, project objectives were derived from these focus areas:

- **Focus I: IP culture – Definition of IP objectives:**

Prohibitive rights at Wilo used to be registered at random and without specific targets in the past. IP management was not an integral part of the company's corporate culture outside of the patent and development departments. Only in individual cases was IP included in corporate strategy considerations, and in order to optimize returns on investment.

- **Focus II: IP as a competitive tool:**

It is important to identify opportunities for creating spheres of exclusivity around innovative ideas in order to design sustainable, legally defensible unique selling propositions. The exclusivity provided by IP must be used in a targeted manner in shaping the market and influencing customers' decisions.

- **Focus III: Configuration of the IP portfolio:**

The IP portfolio must be constantly reviewed going forward and, if necessary, adapted to changes in the business model, the competitive situation, and the value chain (e.g. in line with Industry 4.0 developments). As is the case with all other production factors, Wilo must align its IP with its business model in the most optimized way.

Focus IV: Value creation by means of IP:

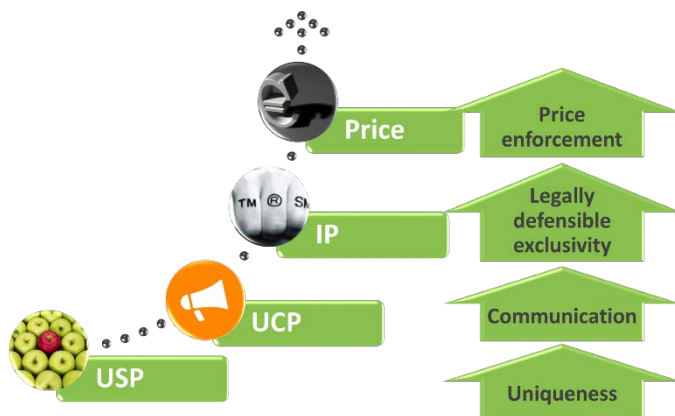
The costs and benefits of IP are continuously monitored, and the IP portfolio is adjusted accordingly. This is to keep the costs of IP within reasonable limits compared to the benefits that can be achieved with it.

These focus areas were used as a starting point in order to achieve a more precise definition of the project objectives. Management was relying on the following aspects in order to establish an IP culture at Wilo:

1. Demonstrating the potential contribution of IP to Wilo's business model.
2. Demonstrating how IP can strengthen the market position based on the strategic value proposition of the Wilo brand, and deriving Wilo's IP needs from it.
3. Identifying the methodological basis for a systematic coverage of the demand for IP and designing the required IP.
4. Defining and supporting the implementation of the IP strategy from an organizational point of view within the scope of an integrated IP management system, identifying and closing any gaps in the system, and establishing a sustainable IP culture within the company.

Under the leadership of Marc de Wolff, a dedicated project was initiated in the Big Circulators business segment in order to align IP with the development of the Stratos Maxo. Project members included Prof. Mehnert's product designers, the marketing director, the director of the patent department, product and project managers, as well as IP strategy consultants. The project was classified as an A project and given top priority by the Management Board in order to highlight the importance of setting the course for a modern approach to IP management.

The IP strategy was developed and implemented as a vertical support function for all Function Project Leaders (hydraulics, engine, etc.) in line with the vertical functions of the quality and systems architecture. This was to ensure a continuous information flow towards the IP strategy and from the IP strategy to the project.



Based on the strategic value proposition, a 4P concept was used in order to define the tasks of IP for Wilo. The strategic value proposition forms the basis for the unique selling proposition, which is communicated to the relevant target groups within the scope of the company's marketing efforts based on the positioning of the brand (unique communication **proposition**). By means of IP, the unique selling proposition becomes legally defensible, is safeguarded in a sustainable manner and helps to achieve premium prices in the marketplace.

The 4P concept embeds the IP strategy in the business model and defines its role within a differentiation-based competitive environment. The next step was to implement the 4P

concept and develop a more precise definition of the positive contribution of IP to the economic value added.

A more precise definition of the differentiation approach – the contribution of IP within the scope of Wilo's business model

Wilo's competitive strategy is based on differentiation. The control variables of the IP strategy must be aligned with the strategic value proposition and, at the same time, be implemented in the product. Four performance indicators were identified, each of which represents a range of customer benefits.

1. Quality:

Reliability and service in a wide range of applications are of great importance to Wilo. Many individual characteristics and individual customer benefits pay into the quality of Wilo's products. These include a smooth run, availability, durability, and the coverage of many special fields of application.

2. Energy efficiency:

As Wilo understands itself as a technology leader in the field of high-efficiency pumps, energy efficiency, i.e. the optimized balance of performance and energy use, is of central importance. This includes the characteristics of automatic control, the sustainability of the solutions for the customer, and low operating costs resulting from low energy consumption.

3. Ease of use:

Pumps are a “low involvement” product which customers expect to be as easy as possible to use. From the customer's perspective, this ease of use should span the entire lifecycle of the pump, from installation and commissioning through to continuous control and simple replacement.

4. Surprise element – an inspiring user experience (“joy of use”):

The brand promise of “Caring every day to make your life easier” also means that Wilo wants customers to be excited about the product and its incorporated intelligence, which was designed to make their lives easier. These elements include the human-machine interface, the design, the prevention of operating errors, and the high level of systems integration.

The unifying feature behind these performance indicators is pump intelligence. Intelligence, in this context, means that the product is reliable, efficient, and designed in such a way that ease of use is guaranteed. A product creates enthusiasm if it is so intelligent that it takes the customer by surprise. The task of IP with respect to these performance indicators is to achieve greatest possible exclusivity in the customer's perception.

It should be noted, in this respect, that Wilo is facing a highly complex decision-making structure for its products. Among others, Wilo pumps are installed in the products of other companies without the end user being aware of their existence. For strategic reasons, no “reach-through” mechanism (as

known from “Intel Inside”, for example) can be implemented in these cases. Taking the decision-making and benefit structure along the product lifecycle as a starting point, a distinction must be made between the planning phase, installation, operation, replacement and updates, upgrades and maintenance. Decision-makers and influencers include wholesalers, facility managers, planners, investors, installers, and end customers or users. It is important, in this respect, to define a value proposition that is as clear as possible, is perceived positively by different decision-makers and influencers, and communicates a sufficiently great individual benefit. Providing more exclusive benefits to the customer by means of IP and creating a unique communication proposition therefore serves to influence decision-makers in favour of Wilo's products.



Along these IP-strategic reference variables, Wilo subsequently had to scrutinize its existing IP within the competitive environment

for high-efficiency pumps and determine its IP needs on the basis of this analysis.

The following questions were dealt with in order to characterize the demand for IP as a competitive tool for high-efficiency pumps.

How important is it for Wilo to ensure returns on innovation by means of IP?

With Wilo being a company which relies heavily on R&D and claims to be a technology and innovation leader who generates unique customer benefits, the amortization of its R&D expenditure by means of returns on innovation is a critical success factor. The customers' willingness to pay must be fully leveraged. To this end, IP can be used in order to achieve legally defensible and sustainable exclusivity in terms of customer benefits.

Does the market offer customers a choice between Wilo's product and service offers and those of the competition?

In the field of high-efficiency pumps, Wilo competes on the basis of differentiation. The key competitors are Grundfos, KSB, abs, ITT, and Flowserve. In communicating the benefits of their products, competitors strongly rely on the features of "innovation", "sustainability" and "efficiency". Special features provided by Wilo, such as "quality", "simplicity" and "joy of use" provide a benefit-oriented differentiation potential and can be rendered exclusive by means of IP.

Does success largely depend on achieving a premium price with the customer?

Wilo is positioned as a premium supplier of high-technology products. Therefore, Wilo relies on enforcing its prices in a highly competitive environment with a very complex decision-maker and influencer structure. IP-based exclusivity claims related to customer benefits are used in order to achieve a premium price, maintain margins, and ensure business success.

Does Wilo use a customer benefit proposition in order to sell its own products and services?

The strategic value proposition of Wilo is defined on the basis of the customer benefit. Pump intelligence is not an end in itself, but serves the direct purpose of allowing customers to use the product better. The claim "Caring every day to make your life easier" is based on an understanding of the customer benefit and carries the central brand message. Making the fulfilment of this claim exclusive can lead to sustainable brand loyalty.

Does the competition also use customer benefit and/or price propositions?

Despite different proposition patterns among competitors, the range of individual propositions is similar. Wilo can achieve a unique selling point by shifting towards alternative propositions. Selecting the right performance indicators for the IP strategy in order to be able to communicate exclusive

customer benefits to decision-makers and influencers is therefore of crucial importance for the economic success of IP.

In summary, Wilo's need for IP is based on achieving greatest possible exclusivity along those performance indicators which are oriented at customer benefits. The brand can convey this exclusivity to the target groups and leverage their willingness to pay. Once the requirements had been identified and precisely defined, the organization had to be enabled to meet these requirements in each individual project and to develop the general ability to design synthetic inventions in order to achieve exclusivity in the eyes of the customer.

Following discussions of the IP strategy and the resulting need for IP with top management, a decision was reached to set an example by deploying and systematically implementing the strategy.

Deployment and organizational implementation of the IP strategy

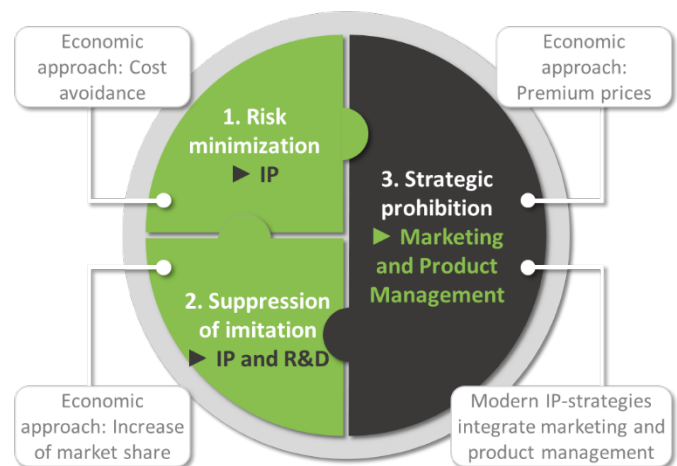
The deployment took place in five consecutive steps:

Step 1:

Incorporation of the company's market intelligence into its IP design.

The conventional IP activities of preventing risks by creating freedom to operate and suppressing imitations were complemented by strategic prohibition. The suppression of im-

itations takes a proprietary technological solution for a technical problem as a starting



point and suppresses the imitation of that solution by means of IP. If appropriate, additional patent applications relating to alternatives to the technological solution (so-called workarounds) may be filed. Strategic prohibition based on market intelligence takes the customer benefit as a starting point. Strategic prohibition is not necessarily based on a technological solution, but rather on the company's intention to offer an exclusive customer benefit. The prohibitive effect of future patents will then be based on the inability of the competition to offer the same customer benefit. An integration of R&D, product management, and marketing within multidisciplinary teams is necessary in order to define the exact exclusive customer benefit and to identify the precise technological means of achieving it.

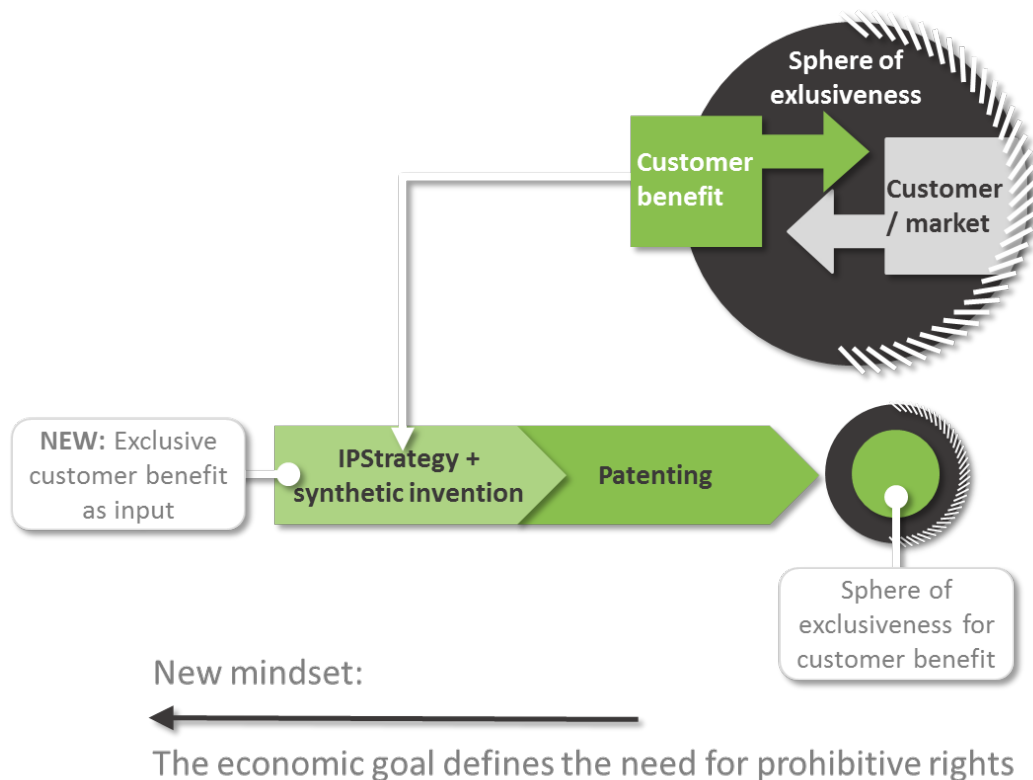
Step 2:

Adjustment of the IP process

In order to design the desired prohibitive rights in line with the customer benefit, Wilo had to adjust its IP process. From the patent department's point of view, the IP process traditionally begins with the submission of an invention report. This invention report is

the product of the cognitive process of the inventor who made the invention. The starting point of the traditional IP process is therefore the invention.

In IP design, the starting point of the IP process is not the invention report, but rather an assessment of the customer's needs as described above.



That needs assessment assumes that the company is able to offer a unique selling proposition related to a customer benefit. IP creates a legally protectable sphere of exclusivity around this unique selling proposition, i.e. the strategic value proposition, in order to provide sustainable protection against the competition. Upon clarification of the requirements, the desired prohibitive right is designed by means of synthetic invention.

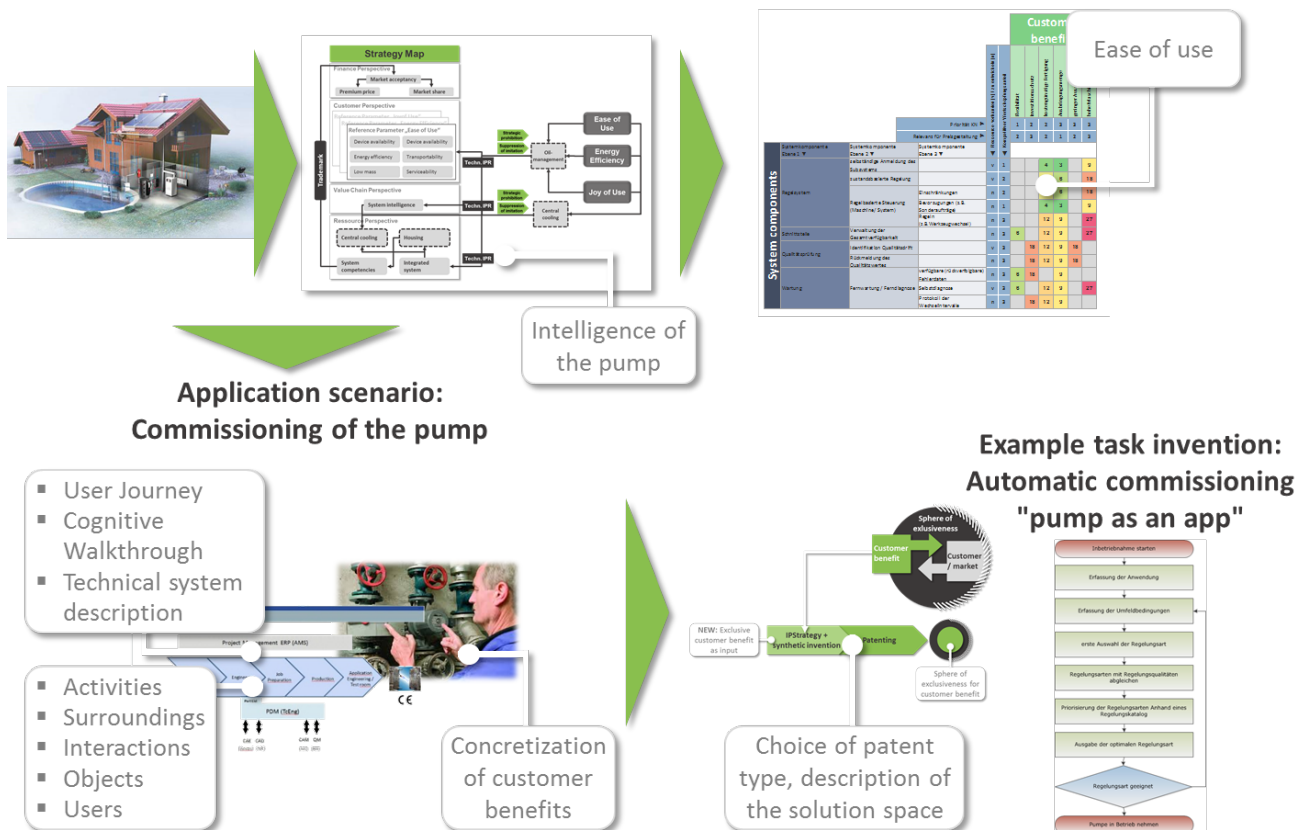
This approach requires an inverse way of thinking compared to the traditional IP process. IP design is the product of the desired result and determines the prohibitive claims, whereas the traditional IP process starts with an invention and seeks to protect the resulting patent claims for the future.

Step 3:

Designing of prohibitive rights along the customer benefits of Wilo's propositions by means of synthetic invention.

With synthetic inventions, all legal efforts are focused on an area in which there are no readily available proprietary R&D results yet. Patents designed in this way can therefore no longer be derived as a "by-product" from ongoing F&E efforts, but are deliberately created assets. This is why we speak of a synthetic invention process in this respect. Using tools from product design, technical deliberations are put into terms which are so concrete that they represent an improvement over the prior art.

The approach itself relies on the usual tools for systematic inventions (also known as "invention on demand"). The starting point is crucial in this respect. As shown in the figure below, a reference variable such as "ease of use" is used in order to compare the necessary technological system elements and gain clarity on how to implement them from a technological point of view. The intention to offer an exclusive customer benefit results in a search for all possible solutions which could provide that customer benefit. It is particularly important, in this respect, to look for inventive solutions, which offer opportunities beyond their in-house implementation, and are of competitive relevance. Various invention methods are available for the actual inventive step. In essence, an objection is



drafted in order to characterize the inventive task in such a way that it fulfils two generally contradictory claims. The outcome of this process is an overview of possible solutions to the technical problem, which must then be compared against the prior art.

Step 4: Wilo is in a position to design prohibitive rights at the very early and the very late stages of the innovation process

Wilo plans the development of its products and services long before the start of the actual development activities. The competition often works on solutions which offer a similar benefit in the eyes of the customer and/or communicate a similar value proposition to the customer in close temporal proximity.

The field of high-efficiency pumps has become so competitive that patents from within the industry can, at times, impede the implementation of proprietary ideas. To systematically prevent this, Wilo begins with its patent work in the early conceptual phases of the innovation process in order to secure comprehensive spheres of exclusivity.

Likewise, existing exclusivity positions are reviewed against developments in the market and, if necessary, the company's own IP portfolio is complemented by additional prohibitive rights. Both the very early and the very late registration of intellectual property rights requires specific expertise in IP design, which Wilo is gradually developing within its project teams.

Step 5: Use of response data in order to continuously improve the IP design

IP controlling provides Wilo with transparency over the company's achievement of its objectives and enables active portfolio control. IP controlling establishes a connection between market success and the IP portfolio, thus providing relevant and interpretable information.

The formulation of concrete objectives as part of the IP strategy and the prioritization of specific areas of exclusivity leads to an IP portfolio structure which is aligned with customer benefits. This ensures that the required resources are used in meaningful ways. The formulation of concrete objectives and the monitoring of goal achievement leads to a targeted integration of IP into the business model and therefore the maximisation of its beneficial effect.

A continuous monitoring of IP-related costs and benefits, their documentation, and their analysis permits Wilo to design/optimize the IP portfolio and the necessary budgets in a targeted manner based on effectiveness criteria.

Benefits for Wilo

The development of an IP culture is an important competitive factor for Wilo. In an industry in which complex high technology is used in order to generate the greatest possible customer benefit with intelligent products, the targeted use of intellectual property offers a competitive advantage that cannot be overestimated. The main priority of Wilo's top management is to achieve a company-wide culture of thinking in IP-based exclusivities along the entire innovation process and among all process stakeholders. The combination of a unique selling proposition which leads to customer benefits, which, in turn, are protected by legally enforceable IP, leads to price penetration, and sustainable margins in a highly competitive market environment and a customer-centric IP design. This expertise enhances the competitiveness and efficiency of Wilo – a key success factor in an increasingly knowledge-based industry.

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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, lawyers 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

Prof. Yann, Ménière,
CERNA, École des mines de
Paris

Prof. Cees Mulder,
University of Maastricht

Prof. Julien Penin,
University of Strasbourg, BETA

Prof. Nicolas Petit,
University of Liege

Prof. Alexander Peukert,
Goethe University,
Frankfurt/Main

Prof. Jens Schovsbo,
University of Copenhagen

Prof. Martin Senftleben,
University of Amsterdam

Prof. Bruno van Pottelsberghe,
Solvay Business School

Prof. Guido Westkamp,
Queen Mary University London

Prof. Alexander Wurzer,
Steinbeis University Berlin

Prof. Estelle Derclaye,
University of Nottingham

Prof. Ulf Petrsson,
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,
Jenoptik AG

Dr. Lorenz Kaiser,
Fraunhofer-Gesellschaft

Leo Longauer,
UBS AG

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European Patent Office

Bojan Pretnar,
World Intellectual Property
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Romain Girtanner,
Watson, Farley & Williams

Peter Bittner,
Peter Bittner & Partner

Prof. Didier Intès,
Cabinet Beau de Loménie, Paris

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Köllner & Partner Patentanwälte

Dr. Dorit Weikert,
KPMG

Keith Bergelt,
Open Innovention Network

Selected companies

3M Europe S.A.

ABB Corporate Research Center

ABB Motors and Generators

AGC France SAS

Agfa Graphics

Air Liquide

Airbus Defence and Space

Akzo Nobel NV

BASF Construction Chemicals

Boehringer Ingelheim Pharma

British Telecom

Clyde Bergemann Power Group

Danisco/Dupont

DSM Nederland

Fresenius Medical Care

Groupe Danone

Jenoptik

Kenwood

Nestec Ltd

Novartis AG

Philips

Plinkington

PSA Peugeot Citroen

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3. Dezember 2019 Alexander J. Wurzer Luqel, MIPLM Industry Case Studies, Publication




LUQEL revolutionize the way people drink water, thanks to sustainable products that individually adapt to the digital lifestyle and requirements of each person – with fascinatingly precise and user-friendly technology and design. The LUQEL digital eco system consist of a water station, a smart bottle and an app. With the LUQEL Water Balancer App, users can create their individual water recipes at home, mobile or in the office.

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2. September 2019 Alexander J. Wurzer Heraeus, MIPLM Industry Case Studies



Heraeus is one of the world leaders in putting to work material and technology know-how for industrial purposes. With Heraeus Amloy, the company is becoming pivotal in shaping the digitization of materials science. With IP-design Amloy creates new digital business models and protect them with IP.

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