Integrated IP and Innovation Management in the Face of Digitisation and Industry 4.0

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The present piece has been taken from a longer article by Professor Wurzer dealing with the importance of different areas of IP management.

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Intellectual property (IP) has become a crucial factor and driving force in the knowledge-based economy. Due to digitisation, Industry 4.0, artificial intelligence and the digital transformation of business eco-systems, the economic development and competitiveness of companies depends more and more on the generation and exploitation of their knowledge. Intellectual property can convert investment in competitive advantages into economic benefits. Thus, IP-based appropriation strategies form the basis of creating value and beneficial competitive positions for companies to achieve sustainable success with business models and innovation activities.

Integrated IP and Innovation Management

The integration of innovation and IP management has received a rising attention over the last
decade. The general shift from an industrial economy into the direction of a knowledge economy makes IP increasingly important. The ongoing and widespread prevailing integration of software into physical products, the usage of IoT technologies and different major technological shift for example in mobility, energy and health care shows, how important IP management within innovation projects has become. The accelerating speed and steeply rising complexity in product development create a need for further professionalism within the integration of IP and innovation management. The systematic interaction between IP competencies and innovation teams is industry specific and depends on the company size, but the integration of R&D staff in the IP filing process is crucial for success.

Innovation is crucial for competitiveness of companies, so also the IP filing tactics have to be aligned with the innovation process. There is no secret formula for success, but there are important insights in patterns of failure and management challenges. “The Innovator’s Dilemma” is one of the most important concepts, which explains how innovation takes place and why market leaders and incumbents fail to seize the next wave of innovation in their industries. Clayton Christensen shows how the same (good) practices that lead to a business success can eventually lead to its demise – this is the dilemma in a nutshell. Another valuable concept comes from James Utterback and helps mastering the dynamics of innovation, it’s called “dominant design”. A dominant design is that one, which wins the allegiance of the marketplace, so that customers expect certain features and a specific architecture of a product. Competitors and innovators must stick to the dominant design if they hope to receive a significant market share. Dominant designs may not be better than other designs; they simply incorporate a set of key features that sometimes emerge due to technological path-dependence and not necessarily strict customer preferences. Obviously, this understanding of innovation has strong implication for IP strategies and practice.

An important and frequently used concept in the field of innovation is the integration of lead users into the proofs for developing innovative product concepts. Lead users are customers who think future orientated and can articulate challenges, which they would like to solve. With lead users it is possible to develop concepts and experimental solutions for generating new products. Social media has offered promising new possibilities for companies in terms of supporting lead user integration. The lead user approach was developed by Eric von Hippel and is used for developing breakthrough product. This method is applied in very successful and innovative companies like 3M and Hilti.

Innovation frequently translates into the creation of new markets forcing firms, which decide to enter a new market, to choose an appropriate strategy. Timing is a very important strategic tool for example when launching a new product. Companies follow different entry timing strategies for hitting the market. There are first mover and follower advantages and disadvantages, which have both strong implications to IP management. The timing of entry depends for example significantly on the demand and technology uncertainty of a new product. Creating a brand identity, finding the dominant design or crating a standard and a licensing program are means of IP management to support the timing strategy in innovation management.

Regarding the innovation process and the IP management processes the discussion leads to business process management (BPM). BPM is the discipline of improving a business process from end to end by analyzing it, modelling how it works in different scenarios, executing improvements, monitoring the improved process and continually optimizing it. A business process is an activity or a set of activities that will accomplish a specific goal like the FTO process, the trademark-enforcement process or the IP-design process. BPM allows organizations to understand the various processes that happen within an organization, analyze them from end to end and improve them on an ongoing basis. IP management as an integrated management system is based on a process landscape, which comprises all technology and market-relevant processes in addition to innovation- and
information processes. Optimizing this process landscape according to the IP strategy is the challenge of IP management. Here, also the use of modern IP management systems can help in the innovation process.

**IP in the Industry 4.0**

The evolution of digital business models follows constant patterns. By using the logics on which these patterns are based, digital business models can be systematically developed and optimized. Digital patents are used to protect digital business models. The structure of digital patents follows the logic of business models that are used in Industry 4.0 approaches. The basic principle here is the use of four distinguishable dominant logics, which are used to generate economic advantages in the business models:

- enabling logic,
- data and information logic,
- simulation and mapping logic as well as one networking logic.

These logics describe the cognitive map of companies that implement digital business models. This is the dominant logic that determines the relevant activities of the implementing companies, i.e. how customer needs are met. With these dominant logics, eight different technical concepts can be applied:

- success critical information preference systems
- assistance systems
- cyber-physical systems
- IoT systems for networked abilities
- Value-added networks
- infrastructure for collaboration
- data models and simulations
- integrated system architecture

The application of these concepts leads to various efficiency and effectiveness-based benefits for the customer and user groups in the digital business models:

- Increase people's ability (increase in effectiveness)
- Increase in ability of objects (increase in effectiveness)
- Horizontal networking in value creation networks (increase in efficiency)
- Vertical networking in the automation pyramid (increase in efficiency)

The increases in effectiveness work on the market side of the business model and influence the earnings mechanics, the increases in efficiency work on the resource side of the business model and influence the cost structure.

Digital patents are characterized by the fact that their protective effect means that elements of digital business models become exclusive. In order to actively generate such patents with IP design, it is necessary to think through digital business models conceptually and to describe the possible technical requirements and solutions. This process is highly individual and always related to the respective business model.
Using the example of a navigation system, the necessary transformation process from the description of a technology to a business model and the associated patents can be described as an example.

The Global Positioning System - GPS for short - is a satellite-based technology that can determine geographic points with the help of an electronic computing chip and a radio antenna. GPS technology is protected by many patents. However, GPS is not a business model, but a technology. GPS can be used in a variety of business models, such as a logistics company. On the basis of GPS, various optimizations on the resource and on the market-side can be realized in a logistics company and these optimizations can be protected by digital patents.

For example, route documentation to have automated route verification and thus make the billing process more cost-effective. Based on the GPS data, traffic jams can be avoided by an assistance system, thus improving the planning performance of logistics. The overall performance and planning security of logistics can also be improved through optimized route planning based on simulation and preference systems.

In the times of 5G and the development of new business eco-systems the development of IP strategies regarding industry 4.0 applications becomes even more critical than before through the ever-increasing complexity. So, questions about AI in IP, blockchain in industry 4.0, licensing in IT in times of open source in the IoT world, the best practices in IP to achieve a sustainable eco-system and the protection of data driven business models arise.

About the Author

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