

## Supporting Innovation with Knowledge Management

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Knowledge management forms the basis for an effective and efficient innovation management. In line with the Basic Model of Knowledge Management this involves the interaction between three different levels: a project level, a knowledge level and a data level. The incorporation in the innovation process must be supported on different levels by using modern information and communication tools. As far as products and services are concerned it may well take several years from knowledge development to a response from the target market. Organizing this process is one of the tasks of professional innovation management. Effective innovation management steers the process from knowledge development to realization and commercial exploitation of the results. Collected experiences have been presented in the Knowledge Management handbook published this year.

### INTRODUCTION

Nowadays, businesses operate in a rapidly changing and demanding world which is dictated by a competitive market. As a result, the business environment is changing dramatically on a global scale. The business environment of today is characterized by rapid scientific and technological progress, extreme reductions in product life-cycles, dynamic market changes, growing competition, complexity of business environment, development of information technologies, ecology, the emergence and establishment of new industrial countries, communication networking, globalization of the world market, change of personal values etc. It goes without saying that during the past 15 years, the process of permanently adjusting businesses to the environment has been reflected in the development of management theory which pursued solutions that would ensure the constant growth and development of a business (Willfort 2001). Enterprises are facing the challenge of grabbing the attention of customers who are flooded by similar products which they expect to be cheap on the one hand, but of high-quality on the other. It is, therefore, crucial that product marketing is well-timed. In order to develop a product, a systematic approach needs to be taken, which ensures a

company's integrated competitive advantage. Product development in an enterprise does not merely refer to meeting time schedules but also to providing suitable product quality and managing the costs of its development and manufacture. Set objectives can be achieved by applying any of the methods available such as the FMEA (Failure Modes and Effects Analysis), FTA (Fault Tree Analysis), the AUDIT method, QFD (Quality Function Deployment), i. e. the House of Quality, value analysis, simultaneous engineering, knowledge management etc. (Leber 2003). To survive against fierce competition governing tough world markets, businesses have to update their scientific and technological achievements and introduce state-of-the-art technologies – resulting in enhanced automated and computer-aided operations – and, eventually, adopt new product management principles such as just in time and total quality management. However, the mere introduction of modern technologies is insufficient as such, because any company must survive in this era of unimaginable scientific and technological progress intensified by global competition.

#### INNOVATION MANAGEMENT AND COMPETITIVENESS OF BUSINESSES

21st century innovation dynamics will significantly influence development through the following factors:

- rapid marketplace changes together with the globalization process,
- shorter product life cycles,
- individualization of customers' needs,
- emergence of new forms of businesses,
- technological progress, in particular in the area of innovation technologies.

Innovation technologies conditioned by these factors will be the key concept of a company's future management. Companies' capacities are limited and this is why outsourcing is being integrated into in-house innovative processes and thus gained importance. The growing complexity of tasks using innovative components requires innovation culture and innovation management to become harmonized. This can be truly beneficial in view of the organizational, economic and technical aspects (Wissensmanagement Forum 2002). The innovation management market is a market of both product and process innovation. These are developed by adopting the project approach and present-day methods such as the FMEA (Failure Modes and Effects Analysis), QFD (the House

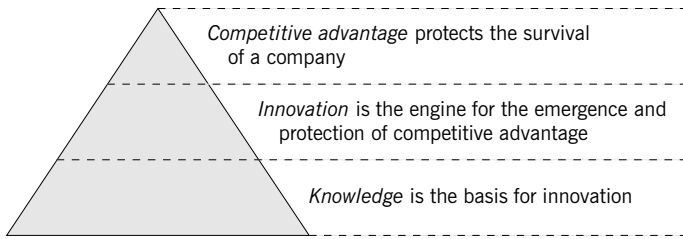


FIGURE 1 Knowledge as the basis for achieving competitive advantage (Leber et al. 2001)

of Quality), TRIZ (Theory of Innovative Problem Solving), project management, value analysis, the KVP method, benchmarking, MINT (Managing the Integration of New Technologies), knowledge management, BUNT (Business Development Using New Technologies) as well as other creative ways of problem-solving through planning and projecting techniques.

In developed countries, innovation management has increasingly been gaining importance in companies across industries as well as in commercial businesses. In line with this process, more and more significance has been attached to knowledge which is useful for the process of creating an organization's value and crucial to the implementation of innovative management methods (fig. 1).

The growing complexity of tasks with innovation-components requires the innovation culture and innovation management to become harmonized. As such, they can be truly beneficial in view of the organizational, economic and technical aspects. The basic strategy of providing innovation management services is to define innovation as a crucial combination between the novelty, processes, and results, which eventually take the form of a new product, procedure, or service. There are four steps leading to the final result (Leber 2003):

1. Generation of ideas
2. Testing of ideas
3. Implementation of ideas
4. Evaluation of ideas

#### INNOVATION PROJECTS IN A COMPANY

The impetus for innovation projects can come from two different sources (fig. 2): unplanned innovation which occurs directly in day-to-day business activities and is often the incremental result of a new customer

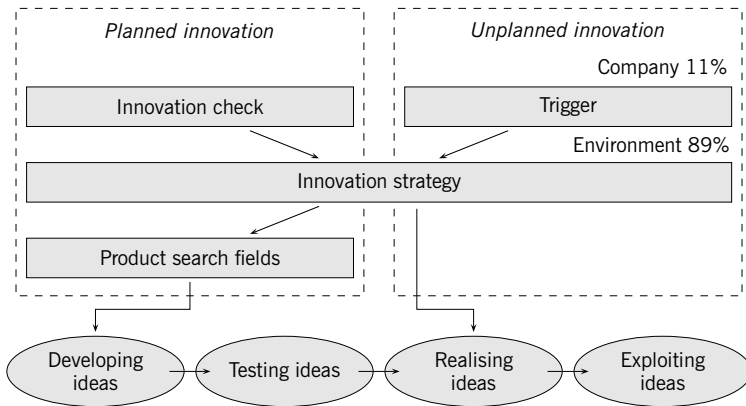


FIGURE 2 Different innovation activities in a company (Leber et al. 2004)

project; and planned innovation which actively utilises the knowledge resources available to the company in developing new value-creating projects.

Periodic innovation checks serve to analyse the status of a company's core competence tree, as well as relevant trends and developments in its environment. The results can then be used to develop or modify an innovation strategy and define the scope and aims of innovation projects. In practice, it has proved effective to split an innovation process/project into the following phases:

- Developing ideas
- Testing ideas
- Realising ideas
- Exploiting ideas

The development phase focuses on applying creativity methods (e.g. brainstorming) to identify or unlock creative potential. The most promising ideas (success rate approx. 12%) are then filtered out in the testing phase. The ideas should now be researched in detail to ensure they are not already covered by existing intellectual property rights. New knowledge can be protected by strategic patenting (Willfort 2001).

Promising ideas that pass the testing phase are then developed in the subsequent realisation phase. Project management knowledge logistics, business planning and innovation marketing activities are all key elements in this phase. In the exploitation phase, the new products, services or licences must be turned quickly into profits.

Knowledge management forms the basis for an effective and efficient innovation management. In line with the Basic Model of Knowledge Management (Wissensmanagement Forum 2002), this involves the interaction between three different levels. The project level must be clearly structured into the four innovation phases described above. The experts (with their professional and methodological knowledge and social skills) are located on the knowledge level and communicate directly with the project level. All the data and documents relevant to innovation are collected at the data level. These can be made available throughout the innovation process using modern information and communication tools. A smooth integration between the knowledge and data levels is a key factor for successful innovation projects.

#### LINKING INNOVATION AND KNOWLEDGE MANAGEMENT

Innovation means renewal and change, but in today's business world it has come to mean the development of new corporate services, products, processes and structures. The development and application of new knowledge is the basis for innovation, emphasising the strong links between innovation and knowledge.

The core competence of a company can be divided into several levels (fig. 3). Activities at a knowledge domain level focus on the continued development of the core knowledge domains. In general, this involves a variety of different knowledge holders and can also include external knowledge domains and expertise from cooperation partners. By combining the factors of production (including knowledge) a development of core competences, core products and, ultimately, end products is possible. In other words, returns are generated from any knowledge created.

This can be a long process and it may well take several years from knowledge development to a response from the target market for the products and services. Organising this process is one of the tasks of professional innovation management. Effective innovation management steers the process from knowledge development to realisation and commercial exploitation of the results.

The market therefore acts as an external evaluator of innovation and knowledge management. An internal evaluation can be carried out by visualising the development of the company's core competences and culture in form of a core competence tree. Ideally, the core competence tree should be constructed in such a way that the same knowledge can be used to realise a number of different customer solutions (Willfort and

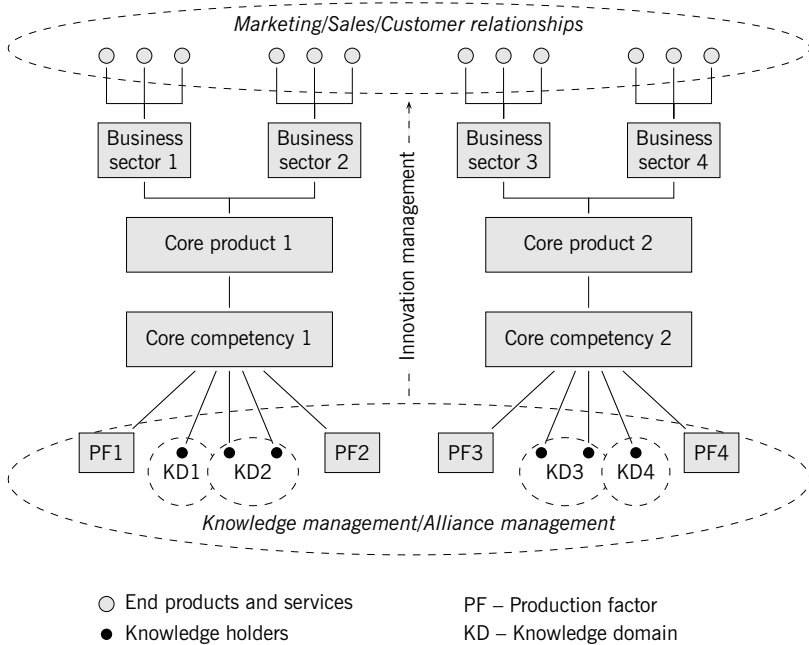


FIGURE 3 Innovation management turns knowledge into profit (Willfort 2001)

Wohinz 2000). Individual customer demands and requirements can be taken into consideration through customisation and diversification at an end product level. This can only really be achieved by focusing on a standardised, modular range of core products. Many companies neglect this factor and are instead forced to invest heavily in new development to meet customer orders.

### CONCLUSION

Businesses aspiring to have a competitive edge in today's world markets must go for the principle of achieving business excellence. Of course, this requires flexibility but it also enables a rapid response to changing situations and an adjustment to evolving customers' requirements. Fierce competition among bidders, being the result of fast scientific and technical progress connected with an extraordinarily efficient growth, places customers within the focus of producers' attention. In addition, when developing a new product or streamlining the existing one, there is often a lack of cooperation between technical and marketplace areas. When offers are being prepared, the product is often dealt with separately. Conse-

TABLE 1 The use of IM methods (Leber 2003)

Method	Slovenia	Germany
Conjoint analysis	0.5	6
FTA	13	18
FMEA	38	45
DOE	4	–
QFD	12	9
Value analysis	18	30
Target costing	8.5	30
SPC	34	17
TRIZ	0	12
Delphi	0	–

TABLE 2 Main fields of IM methods' potential

Increasing customer satisfaction	40%
Reducing fault costs	39%
Shortening of development time	13%
Practicability of knowledge	8%

quently, production fails to be cost effective, delivery times are exceeded, and orders are no longer placed.

In 2002, an opinion poll about the knowledge and practicability of innovation and quality management was conducted in 52 Slovene businesses (Leber 2003). The results were compared to the findings of an opinion poll conducted in 2002 for Germany by WZL Institute researchers from Aachen (table 1).

Table 2 shows the fields having IM methods' potential according to Slovene businesses.

Generally speaking, Slovene businesses do not tend to create competitive advantages through the development and manufacture of new products with environmentally-friendly attributes and innovative components (Bastič 2002). Although the number of companies with ISO, QS, VDA, TS and other certificates is increasing, their policy is to seek the competitive advantage by striking the most favourable balance between benefit and a new project price. Interestingly, the survey reveals that businesses in transitional countries tend to develop their competitive advantage by reducing prices rather than developing new innovative products

and production processes. Therefore, their added value significantly lags behind that created by developed EU countries. This can be attributed mainly to obsolete technological equipment and the excessive costs of raw materials, components and energy which these businesses have to supply. If Slovene companies are to boost added value, they should invest in new methods of innovative and knowledge management. Moreover, they should train their personnel for the implementation of these methods. By applying the relevant principles, they will be able to capitalize on their own potential and integrate innovative components into their products, as well as streamlining their operations. Naturally, successful and sound businesses will invest in new technologies that will enable minimal use of raw materials, components and energy for the production of the existing or new products.

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#### REFERENCES

- Bastič, M. 2002. Analiza slovenskih novih izdelkov z okoljskega vidika. *Naše gospodarstvo* 48 (3–4): 249–60.
- Leber, M. 2003. A model for dynamic introduction of products. Doctoral diss., University of Maribor.
- Leber, M., A. Polajnar, B. Buchmeister, T. Rojs, and N. Vujica-Herzog. 2001. *Priročnik menedžment znanja*. Maribor: Fakulteta za strojništvo Maribor
- Leber, M., A. Polajnar, B. Buchmeister, K. Pandža, N. Vujica-Herzog, I. Palčič, T. Fulder, and K. Tominovič. 2004. *Priročnik menedžment znanja*. 2. del. Maribor: Fakulteta za strojništvo.
- Willfort, R., and J. W. Wohinz. 2000. *Innovationsdienstleistungen: Ein Outsourcing-Ansatz im Innovationsprozess*. Wien: JDR.
- Willfort, R. 2001. *Wissensmanagement mit Innovationsdienstleistungen*. Wiesbaden: Deutscher Universitäts-Verlag.
- Wissensmanagement Forum. 2002. *Praxishandbuch Wissensmanagement Teil 2*. Graz: WMF.