CREATIVE CROSS-SECTOR THINKING
IN THE EARLY INNOVATIONS PHASES

FIND AND USE INNOVATION POTENTIAL
IN OTHER SECTORS

SABINE BRUNSWICKER AND ULRICH HUTSCHEK
DIRECTED SEARCH AND UTILIZATION OF FOREIGN-SECTOR INNOVATION IMPULSES

A trendsetting buzzword in the current discussion about innovation management is “open innovation”. The most well-known example for the successful application of the open innovation approach from pioneering innovators like P&G or IBM show that external know-how can contribute to innovation success. Representatives of all company sizes have recognized the value of external innovation sources and are starting initiatives to look for impulses outside of the company’s boarders. A series of successful innovations, for example the “iDrive” from BMW, show that the impulses and know-how from other disciplines and sectors was decisive for the success of new products or services. In practical terms there are multiple questions to be answered by the innovation manager:

• How can the organizational blindness be overcome?
• How can the opening up towards foreign-sector innovation sources be realized in practice?
• How can external possibilities be integrated into the innovation process from the beginning?
• Which search strategy will find the appropriate source of innovation?
• How can one identify successful new concepts which are based on approaches and know-how from foreign sectors?

The INNOWAVE-approach offers answers to these questions which are accountable for innovation. With the help of a strategic decision making model, you can maximize the potential of cross-industry innovation in the early phases and develop the search strategy systematically. INNOWAVE supports the systematic selection of foreign sector know-how mediums as well as the identification and the conveyance of approaches from foreign sectors and competency fields.

ADVANTAGES OF THE INNOWAVE APPROACH

INNOWAVE offers companies the possibility to implement creative cross-sector thinking systematically. The basic idea of this approach, which is based on established and proven external innovation approaches, is to identify and develop new product functionalities or new ideas for one’s own company. With INNOWAVE companies can fill their innovation pipeline and simultaneously minimize the costs, time and risks of the innovation process. This approach is not only concentrated on finding solutions to clearly defined technological problems. The possibility to systematically exhaust potential cross-industry innovations starts already in the early phases.
The unrecognized innovation potential of foreign sector know-how

Many product innovations owe their success to know-how or well-established methods from foreign disciplines or sectors. This is how, for example, the magnetic mixer of the milk frother “Aeroccino” from Nestlé originated from laboratory techniques where it is known as the “mix-fish”. Substantial innovations are often generated through a simple combination or reinterpretation of functions that already exist. Examples show how it is possible to open up one’s own horizon and increase one’s own innovation potential through the know-how from other technology fields. In hindsight the innovation step is obvious; however in reality many companies have difficulties to open up intentionally and to identify potential solutions. Up until now there have only been very few systematical approaches to realize cross-industry innovation. Current approaches, like those of Grassmann (2008), concentrate on specific technological problems, which often come up in the concept development phase. At this point, analogous problems in foreign sectors are looked for, and their solutions are copied. Up until now, cross-industry innovations have only arisen when they were already limited to technological problems. The potential of foreign sector know-how is not being fully exhausted.

Paradigm change in innovation management

Rapid technological change, the shortening of the product life cycle, consistently increasing development costs, intensification of the labor division and an increasing global competition force companies to reconsider their innovation and growth strategies. They must forge new paths in order to increase their innovation potential. Large international companies like P&G, IBM or Henkel rely on new innovation models which offer a solution to this innovation dilemma. These new innovation models include features such as opening up the innovation process and the utilizing the outside world actively and strategically in order to increase one’s own innovation potential. Instead of controlling all innovation activities in a hierarchical manner and shutting out other companies, one will recognize the value of external innovation sources for one’s own innovation success. According to Chesbrough (2006) open innovation strategies are a change in the innovation management paradigm, which have been verified to have a positive effect on the performance of the company. P&G were able to more than double their success rate for new products and increased their R&D productivity by approximately 60 percent through the strategic opening of their innovation model. (Huston 2006).

An open innovation model implies that innovation impulses and ideas are searched for in a targeted manner and consequently the place where ideas are generated and the place where the development and commercialization of those ideas takes place need not to be the same anymore. One of the reasons why a glance over the boundaries of one’s own sector is worthwhile is to get a fresh new view of the problems which have only been looked at from one perspective in the past. Frequently technologies and methods from one sector, which have been established in their own application fields, are a source for new applications in another sector. Cross-industry innovations often lead to large progresses in innovation. The particular allure of such cross-sector thinking is that foreign sector know-how can usually be used without competition conflicts. Cross-industry innovations are a win-win situation: the impulse provider gains an new commercialization channels and additionally appropriation possibilities from technologies and intellectual property (IP). At the same time the “searcher” receives access to established technologies that pose a unique selling proposition for him.
Cross-industry innovation does not currently have a specific systematic, because there is no appropriate process model or methods to integrate companies from foreign sectors. The available methods are not widespread and are based upon a "reactive" logic: They look for concrete technological problems in other branches with analogous solutions and implement it only after a detailed product concept plan has been created. Why should companies use the possibilities of foreign sector know-how transfer that have already been restricted to technological problems? Why should one forgo the creative potential of other sectors in the early development phase?

The INNOWAVE approach developed by the Fraunhofer Institute for Industrial Engineering and Organization IAO closes these gaps and offers companies the possibility to utilize the potential of innovation from foreign sectors in the early stages. The methods follow the principle of exhausting creative cross-sector thinking systematically and proactively. In doing so the know-how from other sectors will be used with a high degree of interaction and creativity.

The strategic principle of INNOWAVE is a decision making model. The model enables the company to develop an appropriate cross-industry sourcing strategy while taking strategic factors into account. With the help of the model, an innovations manager can answer essential questions: In which innovation search field should the company be opened up to? In which sector would it be appropriate to search? How should the search be designed?

The two step process of INNOWAVE is based on a bilateral search strategy in a specific innovation field in the context of a cross-industry innovation project: The definition phase defines the project subject and the foreign sector target company, so that in the following interaction phase transfer-ideas are generated and further developed.
INVOLVE is based on a four dimensional decision making model, which supports the development of a cross-industry sourcing strategy. Those responsible for innovation and strategic decision makers can use this model in the planning phase to pose the pivotal questions and upon this basis develop a systematic search strategy for foreign sector innovation contributions.

**TRANSFER AND SEARCH FIELD:**
The question in which topic the company should open itself up in is central to the strategy. The decision should orient itself on the technological competencies and the market attractiveness of the topic. In this way the innovation areas can be prioritized and an appropriate search field can be identified. Innovation fields which have high market attractiveness but which are not “answered” by the technological competencies of the searching company are suitable for opening. In this way the business model of the searching company can be coordinated with the potential target company.

**INNOVATION SOURCE:**
"In which sector is it appropriate to search for potential innovation sources?" is a question that is connected to the selection of the search field. An essential decision criterion is the technological distance of the sectors to each other. If the sectors are far from each other, then the probability of generating completely new ideas is high. Otherwise there is a risk of the potential foreign sector know-how will not be recognized or cannot be transferred. The further the sectors are from one another, the more difficult the transfer of ideas will be. The appropriate target sector will be determined strategically with these factors, the chosen search field and the "optimal technological distance”.

**MATUREITY OF THE INNOVATION INPUT:**
In In the early phases of innovation it must be determined what kind of innovation input from foreign sectors is transferable. This spectrum can range from rough ideas to market ready products. The choice of the desired maturity is dependent on criteria like risk, costs of searching and speed and costs of the transfer. The model enables one to determine the desired maturity. In this context the INVOLVE approach is not limited to technological ideas, but connects these ideas with new product functionalities that will be identified in the early phases of the innovation process through the integration of foreign sector companies.

**CONTROL AND DEGREE OF INTERACTION:**
The correct structure of the search plays an important role in the search for methods and possible product functionalities in foreign sectors. The company addresses an unknown community when it uses open announcements and competitions; that means that very little direct interaction takes place in the idea generation phase. The INVOLVE approach recommends more control for complex problems: In such cases the searching company should actively search for new ideas with the target company.
1. PHASE: DEFINITION

TREND ANALYSIS
First innovation search fields will be identified that are attractive for your company. Relevant future value propositions will also be included in the analysis.

Involves sales and strategy departments!

COMPETENCY ANALYSIS
The technological competencies of your company will be examined with respect to the identified search fields. Upon these findings, the areas in which an opening up should occur will be determined.

Involves R&D department!

ABSTRACTION
The concrete search field requirements will be identified and will be matched with their sector through the abstraction of typical branch characteristics. The resulting search field will no longer have a relation to the context of the sector or market.

Determine the optimal degree of abstraction!

DOMAIN
Potential partner sectors will be chosen with the help of "optimal technological distance".

Choose innovation intensive and "open cooperation friendly" sectors!

SYSTEM ANALYSIS
The products of the partner will be analyzed jointly and the connection between technology, functionality and customer value will be established. Motivation will be based on pivotal questions.

Build a project team composed of experts with various competencies!

FUNCTION ANALYSIS
Relevant technologies will be examined on the basis of the abstracted requirements of the innovation search field and the underlying functions will be prescribed.

Describe the functions exactly!

GENERATING IDEAS
New applications will be generated, using the new technologies as input. These will mean innovative added value for the product of one’s own company.

Use individual creativity and group dynamics!

ASSESSMENT
The generated ideas will be evaluated with respect to technology, finance and market. The implementation of the successful decision on.

Call in internal experts!

2. PHASE: INTERACTION

THE INNOWAVE PROCESS
The INNOWAVE process is made up of two main phases, which are each divided into five sub-steps. The definition phase is about determining the project subject as well as to define target companies in foreign sectors. In the following identifications phase the central aspect is the generation and formation of transfer ideas. Both phases run similarly: a broad solution field will be narrowed down so that it can be opened in the abstraction step in order to increase the number of promising solutions. As a result of both stages one receives the alternatives with the richest potential. The special advantage of using the INNOWAVE process is captured in expanding the solution space twice.

TARGET
A target company will be chosen with the help of technological, cultural and business oriented criteria.

Choose a technologically diversified company!

INTEGRATION
Further activities will be determined. These activities can range from licensing technologies to co-development projects.

Attain support and endorsement through the management team!
Background and Motivation

The Dr. Ing. H.c. F. Porsche AG is a successful German car manufacturer in the premium segment. The strategy of Porsche is influenced not only by awareness of tradition, but also by innovation. Porsche creates distinguishing features through innovation in the sense of core market values. It’s not just about classical car features, like driving performance. Rather it’s about a holistic understanding of the product. The customers as well as the current global challenges of the sector demands new impulses again and again.

Porsche took new paths in order to break through known thought patterns of one’s own sector-doctrine, and started a project with the goal to identify innovative ideas in other branches together with Fraunhofer IAO. This conscious opening of the innovation process and the involvement of foreign sector companies according to the INNOWAVE approach of Fraunhofer IAO lead the project partners into medical technology, and more precisely the operation room.

Cross-industry Innovation According to the INNOWAVE Principle: From the Automobile Sector to Medical Technology

When Porsche started to open up their innovation process, they began with the selection of relevant sectors for their search for new ideas. Their goal was to analyze and evaluate forward-looking trends for the automobile sector (especially for Porsche AG). The interaction between the driver and the vehicle was a focal point due to its increasing importance; the challenge was to design these features in a simplistic and intuitive way despite the increasing functionality.

In order to find the connections to other sectors, the concrete driver and passenger demands, which pertained to the interaction between the user and the system, were abstracted. Thereupon an analysis of similar structural characteristics was carried out in other sectors. The project partners found what they were looking for in the medical technology sector. Surgeons have high demands on the intuitiveness and usability of information systems, instruments and devices in the context of “Working in the operating room”. The only difference was in the context, in this case in contrast to “driving” it was “operating”.

Olympus was an extremely interesting and competent project partner for creative cross-industry thinking. Known for its cameras, Olympus is a global leader supplier in minimal invasive surgery. The main business fields are urology, gynecology, surgery, HNO and arthroscopy. Olympus developed and produced therapeutic and diagnostic system solutions for these application fields.

INNOWAVE IN THE PRACTICE: FROM THE OPERATING ROOM TO THE SPORTS CAR
Olympus offers the ENDOALPHA with the OP-System, which is a visionary solution for the central management, communication and documentation in the operating room. The doctor can manage all of the medical devices as well as peripheral systems centrally with ENDOALPHA. He or she can access important information directly on the operating table and communicate world-wide via video telephony. In the system analysis ENDOALPHA was central point. Colleagues of both companies were able to identify and abstract the relevant functions of ENDOALPHA on the basis of the initial demands with the help and methodical support from the Fraunhofer IAO team. These abstracted functions constitute the basis for further application ideas for the automobile sector.

The new ideas are quickly convertible and must “only” be adjusted to the automobile setting. Neither Porsche nor Olympus experienced significant development costs. The technological risk is low because the technology in the medical field has already been tested.

The colleagues of both companies were able to supplement their product through their individual technological know-how. The INNOWAVE approach enabled the systematic and creative cross-sector thinking to be achieved.

THE RESULT: EFFICIENT GENERATION OF NOVEL KONCEPT-IDEAS WITH LITTLE RISK

The project team developed some concepts with the motivation from the OR environment that, when correctly implemented, also depicted new product utility from the view of the sport car manufacturer. For example, the picture processing technology from the OR lent itself for new product functionalities with regard to the recognition of road conditions. Furthermore the intelligent adaptation of the OR screen to the different tasks served as an impulse for new concepts in the area of “cockpit variability”.

The advantages of the INNOWAVE approach emerged for both companies in multiple and complementary aspects. The incentive of further commercialization possibilities for Olympus made it easier for Porsche to access foreign sector technology.


THE FRAUNHOFER-INSTITUT FOR INDUSTRIAL ENGINEERING AND ORGANIZATION IAO

The Fraunhofer-Institut for Industrial Engineering and Organization IAO deals with all current questions concerning working people. The institute especially supports companies in recognizing potential innovative forms of organization and forward-looking information and communication technologies and to implement them according to their needs. The bundling of management and technological competencies allows for the equal consideration of economic success, colleague interests and social consequences.

CONTACT PERSON
Sabine Brunswicker
Fraunhofer-Institut for Industrial Engineering and Organization IAO,
Nobelstraße 12, 70569 Stuttgart,
Telephone +49 711 970 - 2035
sabine.brunswicker@iao.fraunhofer.de