
Competitive advantage through market-oriented innovation process – Applying the scenario approach to create radical innovations

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Abstract: The key questions in this paper involve the uncertainties concerning the future when dealing with the innovation process producing radical solutions with high business potential. In addition, in this paper it is examined how to improve the innovation process and its management with the help of future studies, scenario planning and risk management. The framework for the future-orientated innovation process comes from practical requirements in the business field: new ideas have to be conceptualized as soon as possible and the theory comes later when there are enough practical cases in the field. This connects the open innovation platform to the framework: network based relationships with trust is the key element in the multidisciplinary development work.

Keywords: Innovation process; radical innovation; futures research; scenario analysis; agility.

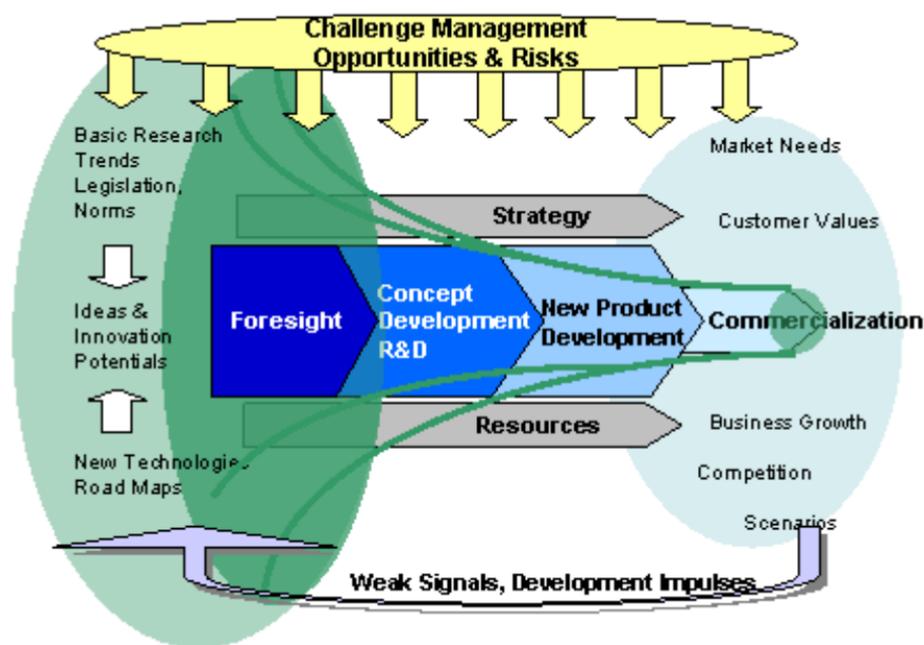
1 Introduction

When examining the innovation's evolution towards a profitable business the balance between technology push and market pull is essential. Market driven innovations are radical only when concerning new business models. In the case of technologically radical innovations (RIs) the period of technology push can time wise be long. In turbulent times the infrastructure for innovation might be lacking and the market needs might still be tacit. Successful timing of a company's strategic moves and business operations with networking are essential when creating market pull and thereby shorten the pay back time of the development effort. [1] Especially in the B-to-B business the structure of the value chain, finding proper partners and end user vs. customer issues should be considered when forming networks in the open innovation environment [2]. In addition, the rethinking of strategic positioning as a whole might be needed. The rationalization of the innovation process and complying it with the new business creation is important. Process innovation needs a lot of ideas but a very tight screening system related to the company's future view. It is not only important what to do, but how and how fast you can act compared to the competitors.

When enhancing the timing of actions and operations the companies need accurate information concerning the relevant future uncertainties. This consists of processing information of future scenarios, market needs, foresights and weak signals for the successful definition of novel concepts. Thereby, conceptualization makes new market needs concrete for further development. [3]

The framework for this paper is the INNORISK model which combines futures research, risk management and conceptualization when seeking for new business opportunities and solutions for the future market [1]. The six modules of INNORISK framework are 1) CHAMA (Challenge Management), 2) FUTU (Future Studies), 3) FORE (Foresight), 4) MARE (Market Research), 5) CONCE (Concepts, R&D) and 6) STRAFO (Strategic Focus). [4]

Figure 1 The INNORISK framework [4].



2 Radical innovation – definitions and research questions

Innovation is by definition a new idea which has been taken into use in the market place because of its superior ability compared to the previous solutions. RIs differ from conventional ones by obtaining a wide range of applications in different fields of business, society and technology. Good example of generic RI is the zipper. RIs usually have consequences which are not possible to foresee or estimate. These include not only the consequences in the specific field of application, but also unforeseeable new applications and, of course, the timing of the outputs. [5, 6, 7]

RI is relative to the business environment. What is radical to one company might be everyday practise to another, especially for companies in other business branches. In its context, RI is by definition unique. It gives the company a competitive position without competition - at least for the short period of time, before the competitors will follow and adopt the RI in their use. At this point, it is no more a RI but only a part of the normal business environment. For a certain period of time a RI can provide a unique position in the market and give an exceptional profit to the player having it as a competitive advantage. A notable issue is that a RI is not necessarily technically the most advanced but is by nature a solution combining customer- and social needs as well as usability and easy access. RIs seem to be a result of many aspects, which are sometimes fuzzy set with no rational phases or path from beginning to the end. [8, 9, 10] In this paper the research questions are as follows:

1. RIs – can they be an output from a systematic innovation process or are they more accidental by nature?
2. Are analogy models powerful in RIs (for something in the market)?
3. What is the role, if any, of scenarios when producing and seeking RIs?

In the next chapters, the readiness for RIs as well as the concept of market oriented innovations are discussed especially in the context of scenario applications.

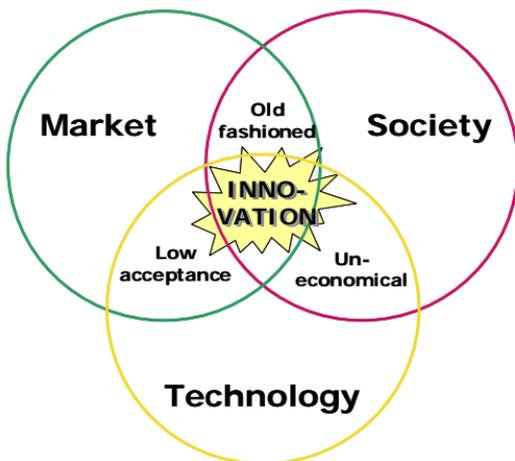
3 Process for radical innovations – where do they come from?

In order to create breeding ground for RIs, systematic foresight on the future developments of the operational environment is needed. Future-oriented scenario building is valuable methodology for mapping the future opportunities. The methods presented here are Scenario Filter Model, back casting from future to the present and the usage of extreme scenarios as a source for RI.

The Scenario Filter Model is a method for systematic description and follow-up of alternative scenarios. In the model the scenarios are constructed using a tripartite approach incorporating analyses of market, technology and society perspectives. Subsequently, these three dimensions form filters for scenarios. [11]

When identifying the driving forces for scenarios the holistic view is assured by taking into account all possible perspectives of the development i.e. PESTE. When working with scenarios the time frame of the activity should be long, at least 10 – 15 years. The reason is not only to get out the improbable trends and surprises but also to reserve time to create the concepts needed for RIs. Of course, in a fuzzy creation process they can be developed more rapidly in practice. [11]

Figure 2 The tripartite approach of innovative action. [Adapted from EIRMA Interim report, 1976].



The future development of the operational environment is formed by the interaction between market, society, and technology. Therefore, the Scenario Filter Model could be used to find the sources of RIs as they also have to fulfil the requirements of the market-, society- and technology dimensions. If new solution is done with only market and society factors in mind, it is old fashioned. This is the case very often, for example, in healthcare or in education. When only market and technology are considered the solution might be practical, efficient and economical but customer acceptance is low and it will not succeed. A typical example of this is nuclear power. In the third case, only technology and society is interacting, therefore, the solution is uneconomical (for example military applications). In order to generate a successful innovation, all of these factors are to be taken into account simultaneously. [11]

Examining the development from the future to the present, i.e. backcasting, is a useful way to find sources of RIs. By visioning a scenario with high potential and abundant opportunities it is possible to have ambitious guidelines for the current innovation development efforts. Backcasting connects the vision of the future to the decision making of today.

Sources for RIs could also be explored by building extreme scenarios. In view of the market dimension extreme scenarios mean for example changes in market behaviour. In the field of technology they could mean revolutionary development and killer applications in some field of technology. In society an extreme scenario could be related to legislation, regulatory conditions or NGOs.

Besides future scenarios, sources for RIs could also be found from new arts and sciences or by examining old impossibilities like patent data (for example ceramic materials in steam turbines). Among the impossibilities of yesterday some could prove out to be RIs of the future.

4 Readiness for radical innovations

A typical character for RIs is haziness of the development process. In most cases the time period from idea to market is relatively long. This does not suit with short-term profit seeking, which is typical for today's business environment. Another issue is the difficulties in calculating risks; if the idea is unique, so are the risks in the market. The history of the Concorde is a characteristic example of this. The more radical the innovation is, the less we have experience on its applications by definition. The major investors prefer therefore productivity investments. This is especially typical for process and energy industries, where many radical processes are still waiting for a pioneer. [12]

Corporate culture is important in addition to RI. If the company has never done anything before the competitors, its structure and values are not suitable for commercialization of RI ideas. It often happens that another company with more aggressive tradition takes the ideas of the slow movers. In connection with mergers, it is found that the merged companies may have left valuable RI ideas idle in the lack of courage. Operational agility, tolerance and rapid correction of errors are characteristic for innovative companies. Today they use more and more the open innovation approach. The knowledge portfolio is broad and it is typical to take new arts and sciences in use before competitors. The innovation culture on country and even on continent level is an

interesting issue. It is said that US companies are looking for opportunities while Europeans concern for hazards. [12]

Society has a double role in connection to RIs: in public. Politicians are talking about benefits of innovation, but the legislation and bureaucracy are often the main constraints in the commercialization of RIs. NGOs are often against anything new. In some areas, e.g. logistics and infrastructure, corruption might have a strong role.

The competitors' role in connection with RI commercialization is interesting. A very typical mode is to improve own products or services in order to narrow the gap to the newcomers. Another possibility is to join the bandwagon as an early adopter. Thereby, the temporary monopoly of the original innovator is weakened. This cuts the earning time especially in product innovations. [12]

5 Conclusions

In this paper we have examined the application of the scenario approach for creating RIs. We found that there are several advantages of applying the scenario approach in the RIs process. The scenario process in itself creates readiness to respond to the future challenges both on organisational and individual level. The outcomes of the scenario process –scenarios- work as a source for innovations. Especially extreme scenarios produce valuable information and ideas for RIs. [3, 13]

One challenging problem in creating innovations is that future market needs are unclear at the moment. The scenario approach offers a method to illustrate future development also in respect to market needs and therefore tacit demand is able to get more visible. In market oriented innovations it is essential to get information from end users as early as possible. In order to get that end user information it is important to pilot applications and utilise that piloting information in further development work.

We also found that RIs differ remarkably from the conventional ones. RIs are very often invented by accident and the early phases of the RI process are partly unclear. That's why it is also called to fuzzy front end. Because the RI process is not fully manageable it is important to focus in alertness and agility.

The INNORISK-model in the developing process is a proactive process model, which combines futures research and risk management into innovation process. It consists so far of 6 key modules, of which three define the future opportunities to the actor in the long run (FUTU, FORE, MARE) and the next two (CONCE, STRAFO) specify these opportunities more concretely through commercialization and strategic positioning. [4] Finally, the modules are combined by the challenge management process (CHAMA). Our research work with the concept of RIs show that the INNORISK model in its present form is more suitable for conventional innovations and for RI purposes it should be developed further. At least, the modules of piloting (PILOT) as well as competition (COMP) should be added.

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