

Innovation Strategy: An Approach in Three Levels

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Summary

In many management statements and articles on innovation, the importance of an innovation strategy is emphasized. In most cases it is not clarified what is exactly meant. In this context, one often refers to strategy objectives of the company. Here is an example: “We want to increase our sales volume by 40% with new products within the forthcoming ten years!” Such goals indicate that the top management is quite interested in innovations, but such objectives are not really helpful for the head of R&D or the innovation manager when deciding on R&D-projects. They need a more concrete orientation for exploring, evaluating and deciding on R&D projects.

This article is based on experience in consulting and contacts with innovation and R&D managers over a period of more than thirty years. It presents an approach bringing together the requirements of the top management on the one side and R&D/innovation management on the other side.

Comments about the presented concept of an innovation strategy in three levels are welcome.

Keywords: *Innovation strategy, approach in three levels, SWOT analysis, GAP analysis, scenario development, know-how innovation matrix*

STRATEGIES IN THE INNOVATION PROCESS

Most authors when describing the innovation process start as first phase with ideas generation and collection. In recent years several authors point out that an innovation strategy should be pursued which has to be derived from the company strategy; then examples from practice follow. Scanning the international innovation management literature we found only one author who defined a phase “Strategy Formulation” (Buijs, 2012, p.55 ff) derived from company strategy and strengths and opportunities in markets and society and ends up with determined search fields.

We came over the years to a similar conclusion:

The innovation process should not start with ideas but with an innovation strategy (see Fig.1). We call the first phase “Strategic Orientation”. It provides overall objectives for the purpose of innovations for the further development of a company and a specific guidance for idea generation, which is the first step of the second phase of the process.

A guidance for idea generation is effective as it avoids generating ideas that do not fit to the company or refer to unattractive markets or technologies.

The term “strategy” may be defined in two ways:

- A strategy indicates a goal that is aimed to be achieved in the future.

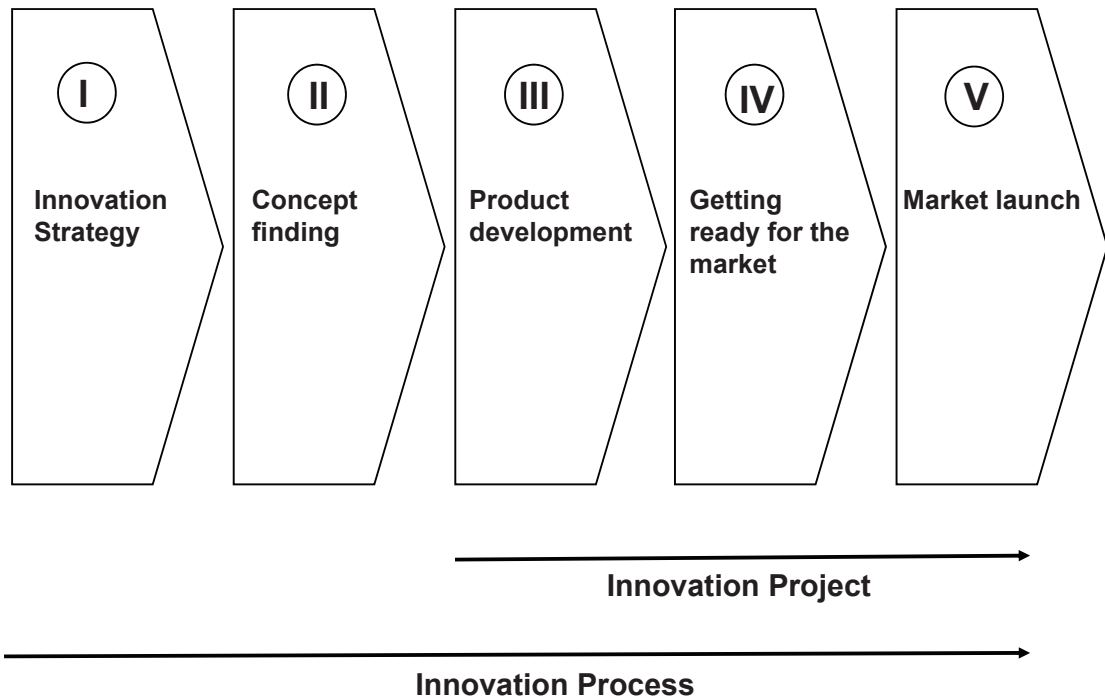


Figure 1: The Phases of the Innovation Process

Example: “We will become the provider of xy-products in Japan with the highest market share within ten years!”

Strategies of this type do not quantify on numbers or exact definitions. Often they refer to the position in the market or to financial terms.

- Strategy is also applied when a firm is carrying out certain activities always in a certain manner.

Example: “In general we buy our raw materials from the original producers instead from wholesalers!”

Both meanings express a specification to future activities: The first meaning refers to a long-range objective; the second one states to apply certain methods or structures and rules of activities in a given situation always in the same way, currently and in the future.

In the innovation process both types of strategy meanings can be found.

THREE STRATEGY LEVELS IN THE INNOVATION PROCESS

We can differentiate three levels of innovation strategies.

First level: Strategic principles or guidelines for innovations are part of the company strategy. They express the expected contributions of innovations to the overall strategic goals.

Examples are:

- “Our strategy is to provide hairdressers the best possible products for their profession.”
- “We want to achieve a market share through innovations in order to be one of the three biggest providers in our relevant markets worldwide.”
- “We apply our competence in nano technology for new applications in medicine.”

In most cases such strategy guidelines reveal that higher management has ambiguous expectations from innovations. (In many firms innovations are still not mentioned in the company strategy!) It indicates that innovations have importance. Thus R&D or innovation managers can ask for support

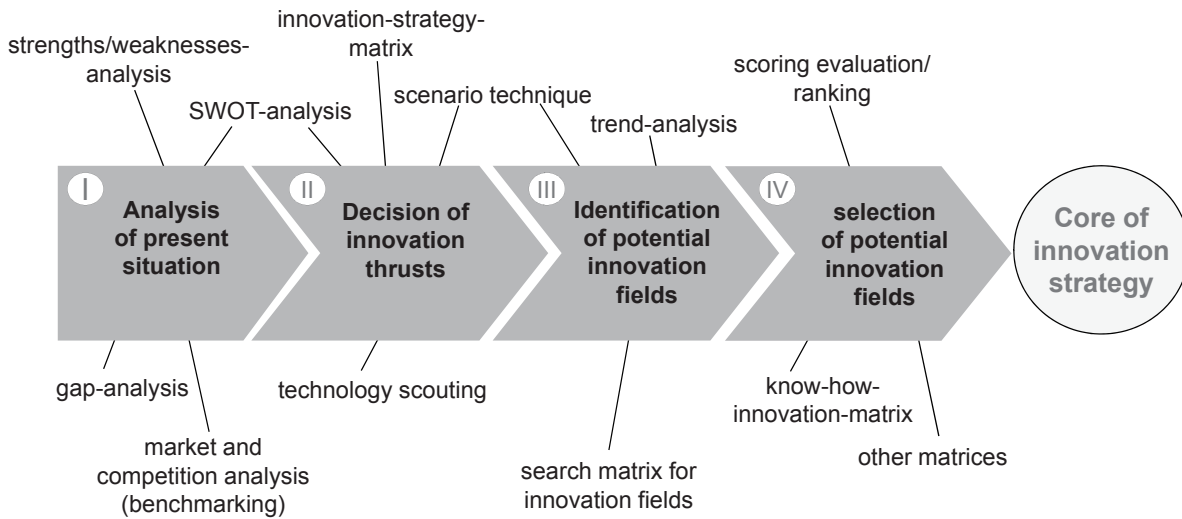


Figure 2: Search Process for Innovation Fields

of any kind. However such statements do not help for the search of the required ideas.

Second level: Search fields or search directions for idea collection or generation are worked out. They give concrete orientation for discovering and generating innovation ideas.

Examples are:

- “We explore applications of the nanotechnology in medicine!”
- “We will develop devices and systems to help and care for weak patients by their relatives at home.”
- “We search for new applications of the spray technology outside our present market segments.”

The first two search statements are built as a combination of a technology and a market segment; it has two dimensions. The third example has only one dimension: new applications of a technology. In most cases search fields (two dimensions) are drawn up. (Following we only speak of search fields also including one-dimensional search guidelines.)

Search fields serve as entrance specifications for the second phase of the innovation process, the “concept finding” (see Fig. 1): They provide a clear focus on problem exploration, idea finding and selection compatible with the company’s strategy and strengths.

Third level: In carrying out innovation projects

also certain strategies may be followed on. They are derived from positive experience in the past in performing innovation projects. (Phases III to V in the innovation process; see Fig. 1)

Examples are:

- “Whenever we explore a technology new for us we collaborate with a competent institute of applied research.”
- “Whenever possible we apply the lead-user approach to identify the real needs and specific preferences of potential customers.”
- “When launching a new product we generally introduce it first in our home market and extend the introduction step by step into other countries using gained experience.”

It is obvious that the second level—the definition of search fields—is most important; we consider this search strategy as the *core of innovation strategy*. The other two levels are necessary and helpful but not decisive for the success of innovations.

HOW TO DEVELOP THE CORE OF THE INNOVATION STRATEGY

As stated in the preceding paragraph the second strategy level is the most important for an effective innovation process. Therefore, in this section a procedure for working out a search strategy is presented.

For the core of the innovation strategy a

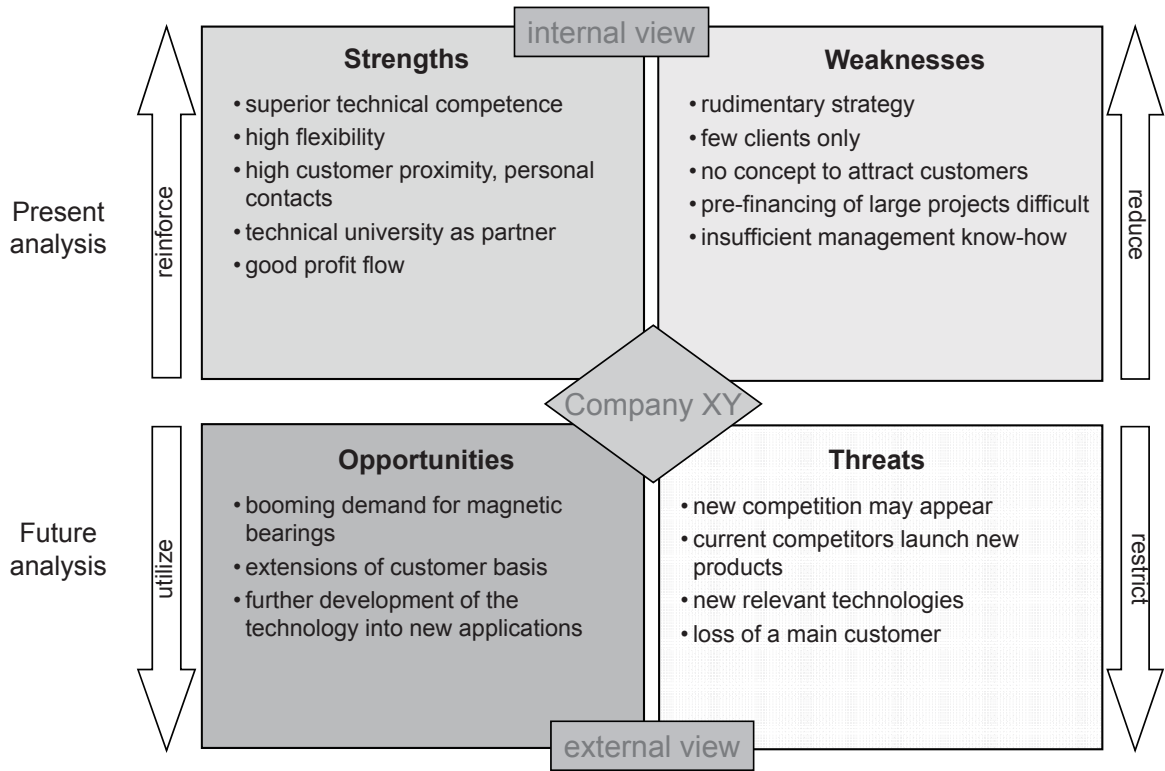


Figure 3: SWOT-Analysis: Concept and Example

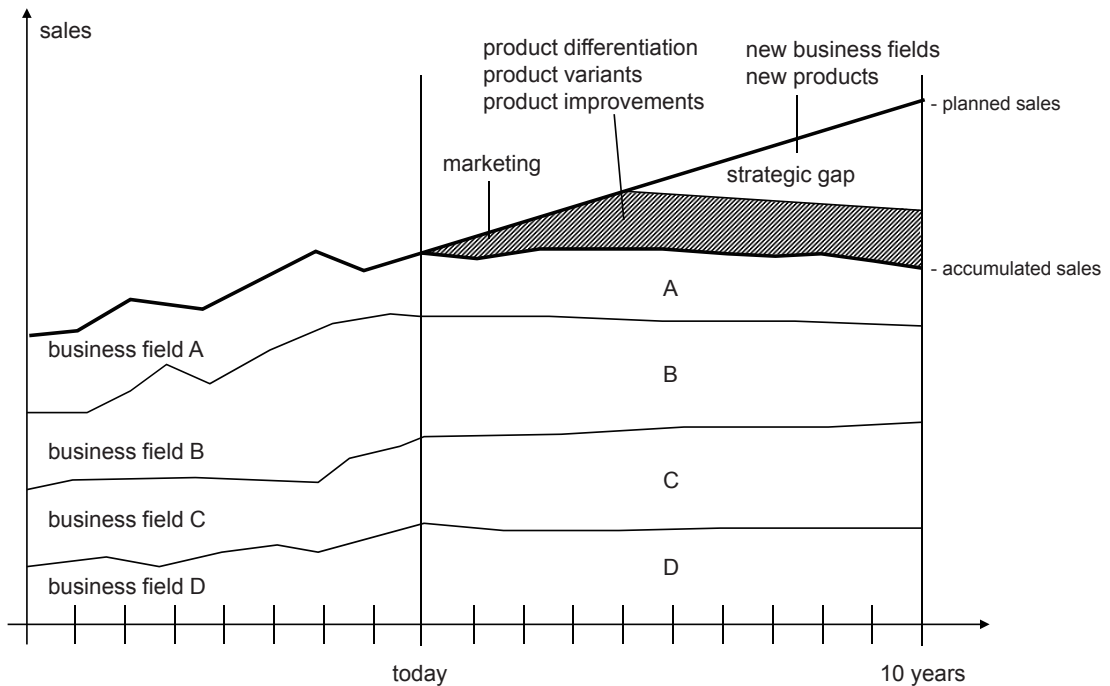


Figure 4: Strategic Gap Analysis

four-step procedure has proven effective (see Fig. 2):

1. Analysis of the present situation
2. Stipulating thrusts
3. Identification of search fields
4. Evaluation and selection of search fields

Analysis of the present situation

It seems necessary to start the process with an analysis of the present situation:

Key statements for company strategy

In any case the company strategy has to be analyzed:

- What is included directly or indirectly in the overall strategy about innovation?
- How to interpret the statements on innovation in strategic papers?
- Can we find out personal views and requirements of the responsible top managers on innovations?

Analysis of the competition

- What strategies of competitors can be perceived? (What are the competitors' strategies?)
- Do competitors possess patents on technologies relevant for our market?
- Are there newcomers entering our markets?
- Are there serious providers of products with same or similar functions as our products?
- Can we see substitution tendencies?
- et cetera

Technology Check

- What are further potentials of the technologies we use?
- Are there indications of new competing technologies (patents, exhibitions)?
- Are there quite different technologies which might be of interest for our company?

SWOT-Analysis

The well-known SWOT-analysis is an adequate method in this step of analysis. It captures the actual company strengths and weaknesses and allows a view into future opportunities and threats (see Fig. 3).

Important for exploring innovation search fields are the strengths of a company on the one hand and the outside future opportunities on the other hand. The weaknesses and threats are of minor relevance when elaborating innovation search fields. They may be considered as a countercheck for selected innovation opportunities.

GAP-Analysis

Another method may also be applied in this step: Analysis of the gap between the planned turnover growth and the continuation of the present level of turnover (see Fig. 4). In most cases there is a gap between planned sales volumes and a realistic estimation. The gap can be filled in short or middle term by marketing actions and product extensions. In long-term considerations however new products or services have to be brought to the market.

This analysis does not give hints for interesting market segments or new technologies but it makes obviously clear when innovations have to be ready for the market. It allows a very convincing argument for a targeted innovation search. It also shows the necessary size of a new business. Or: Do we have to develop even several new products or businesses?

Stipulating thrusts

In the analysis phase no deep studies or elaborate methods are applied. The insights from the analysis provide appropriate needs for specific studies. We explain two adequate methodologies in short.

Technology Scouting

New technologies are important for defining innovation fields. It is not enough having read in a technology journal about a new technology or having found a respective patent. Rather one has to find an appropriate technology and consider a way to contact the respective scientists, inventors or patent owners.

An approach of three stages is helpful (see Fig. 5): In a search effort one scans quite a number of new technologies open minded without a direct objective. The aim is to find out a few technologies that might be of interest. Next step is to follow-on investigating these few technologies. Evaluations and selections are carried out. A few technologies

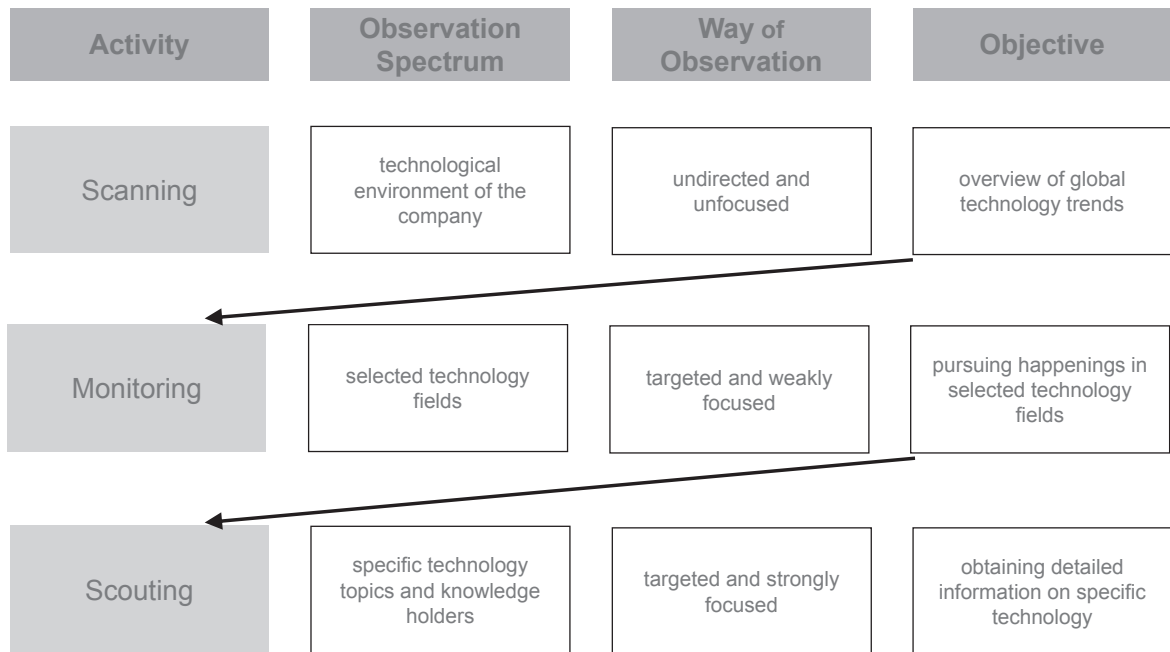


Figure 5: Process of Technology Exploration

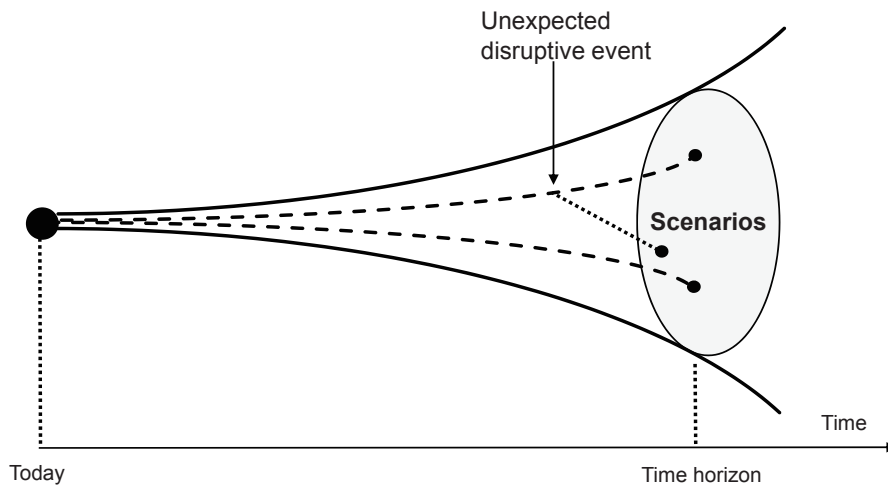


Figure 6: Model of Scenarios

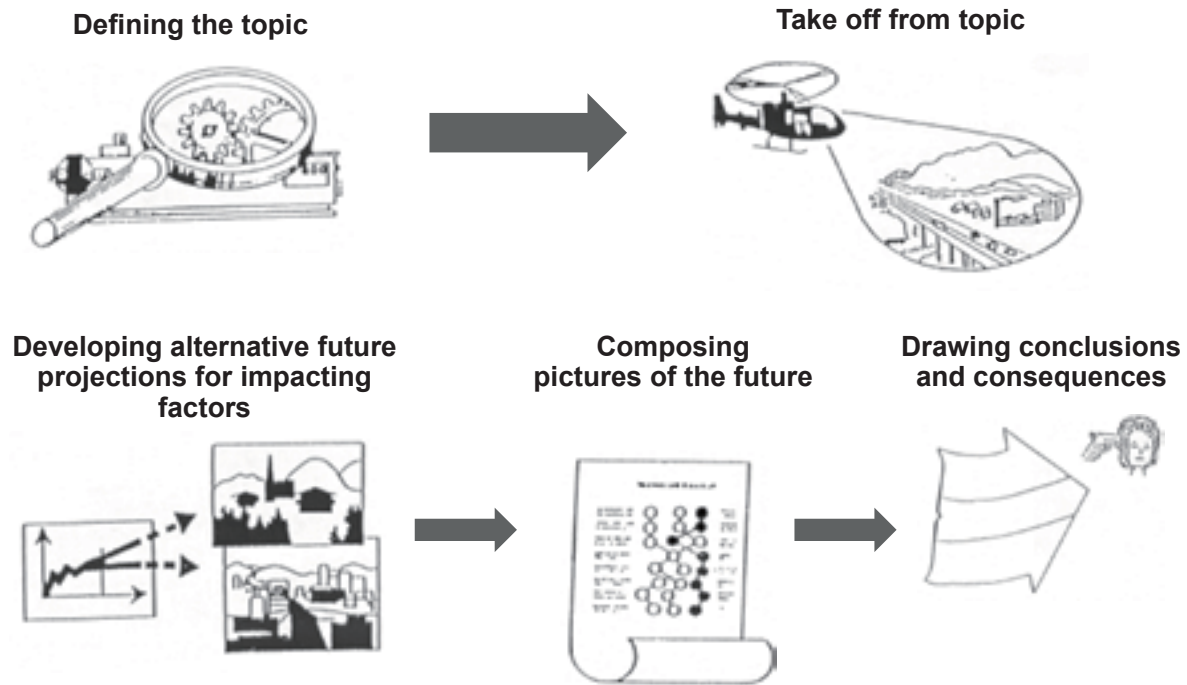


Figure 7: Philosophy of the Scenario Technique

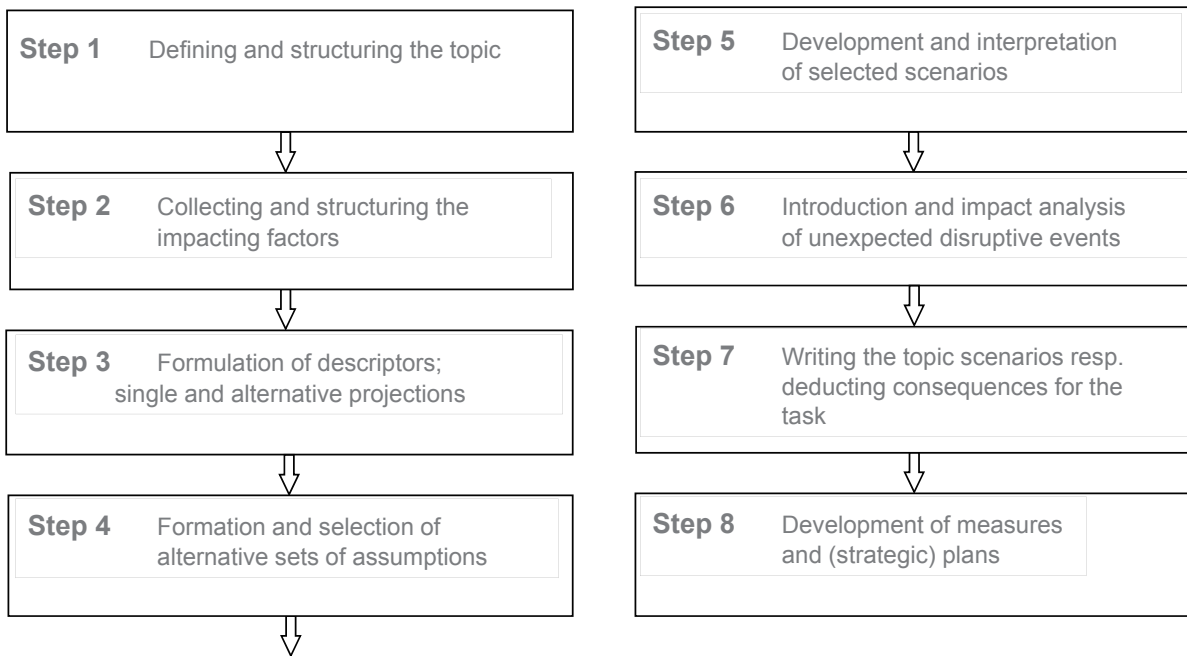


Figure 8: The Eight Steps of the Scenario Technique

- Sulfur lamp development for large light applications
- Light conduits for daylight in compact large buildings
- High-frequency lamps for households (mass production)

Figure 9: Innovation Fields derived from a Light Technology Scenario

Markets Products	present	related	new
present	innovative product improvement 1	adaptive development of related applications 2	adaptive development of new applications 3
related	similar products for existing customers 4	technologically similar products for related industries 5	technologically similar products for different industries 6
new	new products for existing customers 7	new products for related industries 8	new products for new industries 9

Figure 10: Innovation-Strategy-Matrix

are intensively explored; first contacts with the respective experts, inventors or start-up firms are established. Property rights to apply the technology will be concluded.

Scenario development

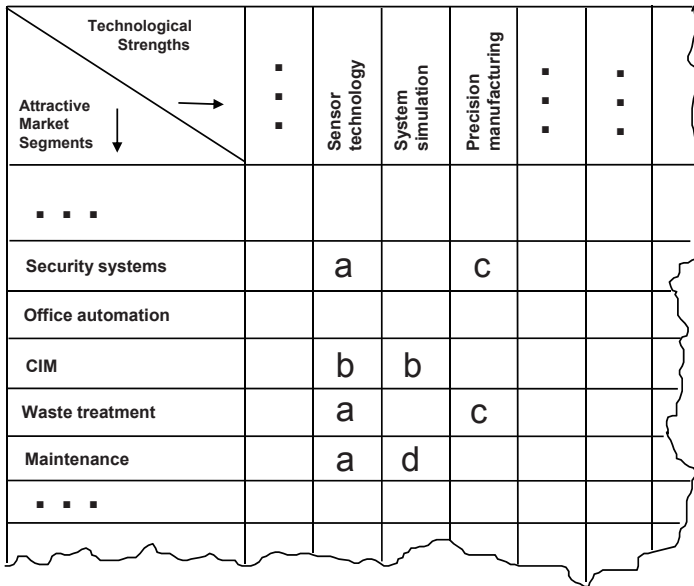
Scenarios show a picture of a topic or of a company at a future point in time. The general approach of the scenario technique is shown in figure 6: There is not only one possible future, but alternative pathways into the future may be depicted. As considerations of future developments are always insecure to a certain degree, it makes sense to consider a few alternative, but probable scenarios.

To elaborate a scenario a complex methodology has to be applied (Geschka, Hahnenwald, Schwarz-Geschka, 2010). A basic presumption of the sce-

nario technique is that the future situation of a topic is dependent of the state of the influencing factors on the topic at the same time. Scenarios are derived from influential developments of the impacting factors on the topic. The results of the methodology are consistent pictures of future situation. From these descriptions of alternative futures of the topic strategic consequences and guidelines are then derived (see Figure 7).

Figure 8 presents the steps of the scenario technique. It is a sequence of eight steps, requiring some effort and expert knowledge to end up with a meaningful analysis of the future of a topic or a company. The consequences of such a company-specific future analysis are used to define strategic guidelines and also innovation fields.

From targeted scenarios strategic thrusts for



A search-field is formed by one (or more) technology-market combination(s). It is supposed to be promising as it combines company strengths with attractive markets. A search-field is a potential new business line.

- Search-field a: advanced warning systems
- Search-field b: flexible manufacturing systems
- Search-field c: special locking systems
- Search-field d: forecasting machine lifetimes

Figure 11: Search-Matrix for Innovation Fields

innovations and innovation fields can be derived (see examples in Fig. 9).

Applying the innovation-strategy-matrix

The innovation-strategy-matrix is an approach helping to make a decision for the general direction of innovation search. (It is not yet a decision on an innovation search field!) The results of the foregoing analyses are the bases of such a directive decision (see Fig. 10).

Going through the matrix to make a decision on a certain field should be done in a group including members of higher management. One can make a decision on one field only, or decide a priority sequence worked through one after the other.

Identification of possible innovation fields

On the basis of the analyses and studies one is already able to define innovation fields. As it is usual in such decision processes of importance one should develop several alternatives and then make a selection and decision.

For this purpose the search-matrix is especially suited. It is composed of two dimensions: technical know-how-strengths on one axis and attractive market segments on the other axis (see Fig. 11).

The innovation group goes through the matrix field by field asking the question: “Has the combi-

nation of a specific technological knowledge with a given market segment a potential for innovations?” All fields are worked through one after the other. The identified innovation fields are recorded. Normally a few dozens of potential innovation fields are discovered in these sessions.

Evaluation and selection of innovation search fields

By a certain method or laid down in discussion a number of innovation search fields can be listed. The final step is a selection of those fields that are suited to be followed on in the innovation process. Again one should select more innovation fields than needed as the one or the other may turn out to be not worth pursuing.

Evaluation and selection with a scoring model

With a scoring model as shown in figure 12 search fields can be evaluated by weighted criteria. This method allows setting up a ranking of the innovation fields. Having the fields ranked one can start with the most promising fields and proceed successively along the rank order.

Applying the know-how-innovation matrix

This matrix is formed by combining market attractiveness with the technological know-how needed

Criteria	Weight	Field A		Field B		Field C	
		Score	benefit contribution	Score	benefit contribution	Score	benefit contribution
Market volume	1,00	3	3,00	5	5,00	2	2,00
Intensity of competition	0,85	4	3,40	1	0,85	4	3,40
Market growth	0,70	2	1,40	2	1,40	3	2,10
Investment volume	0,65	1	0,65	3	1,95	4	2,60
Synergetic usage of existing know-how	0,50	3	1,50	2	1,00	4	2,00
Awareness level (customer)	0,30	3	0,90	3	0,90	3	0,90
Scoring scale: 1, 2, 3, 4, 5		$\Sigma =$	10,85	$\Sigma =$	11,10	$\Sigma =$	13,00

C is the relatively best field

Figure 12: Evaluation Scoring Model for Innovation Fields – an Example

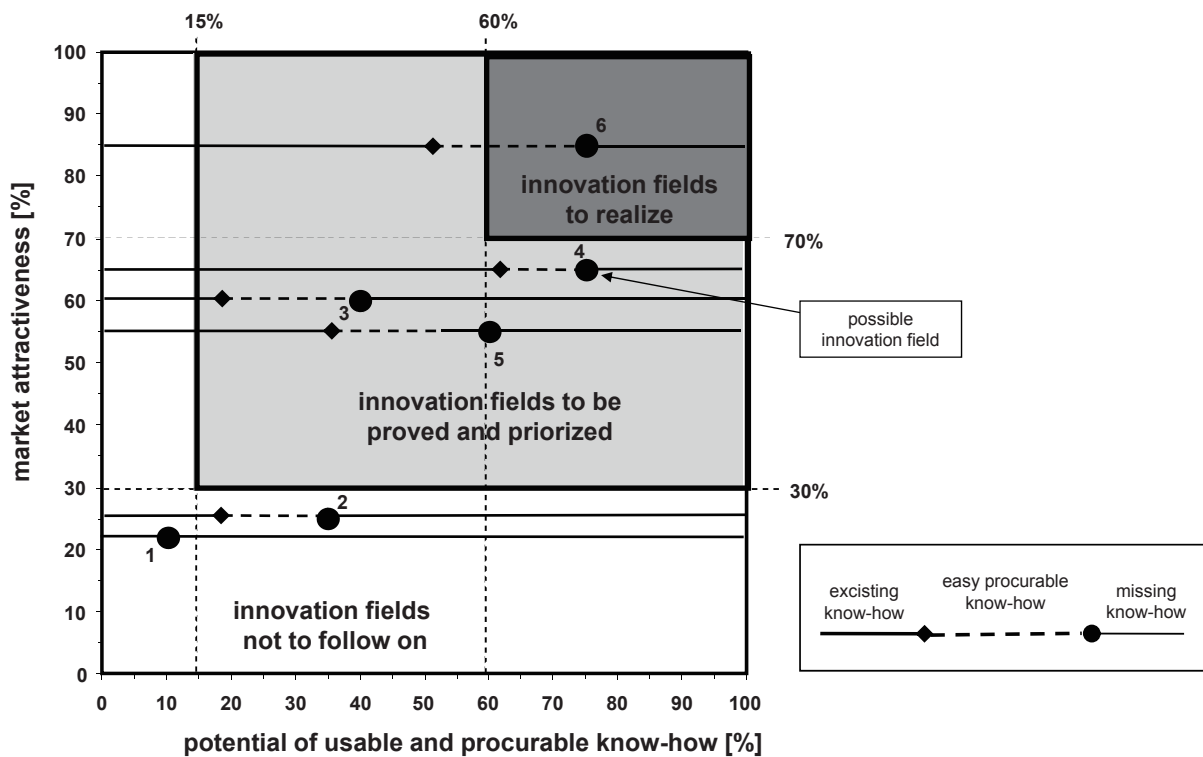


Figure 13: Know-how-Innovation-Matrix

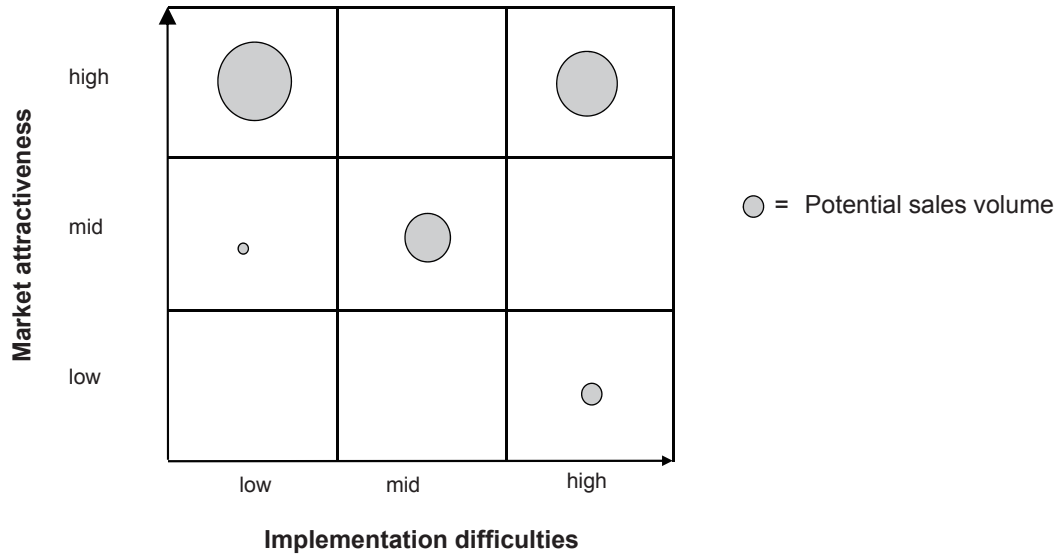


Figure 14: Evaluation Matrix for Innovation Fields (Example 1)

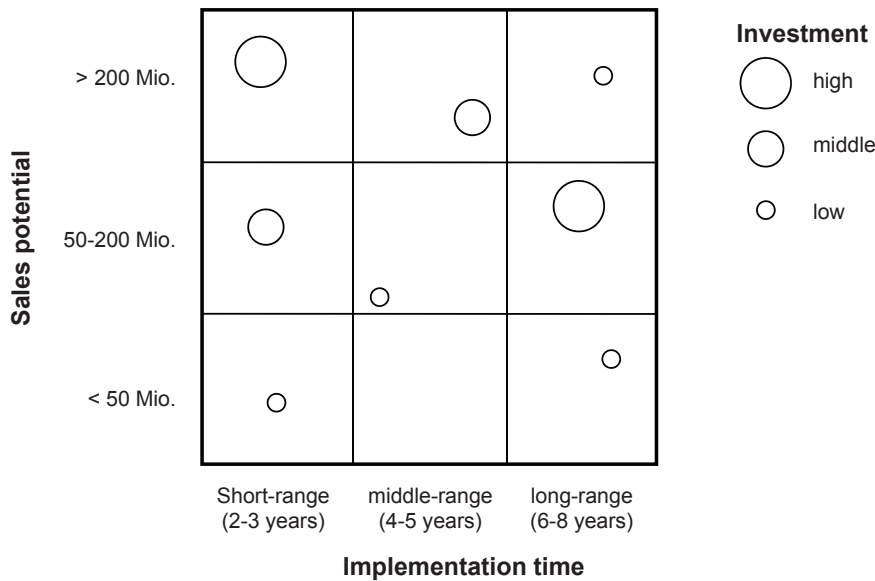


Figure 15: Evaluation Matrix for Innovation Fields (Example 2)

to realize the innovations. The knowhow dimension consists of the knowledge available in the company and external knowhow that can easily be acquired (see Fig. 13).

Three sections are to be considered:

- A: Upper right section: Innovation fields should be followed on.
- B: Middle area: Decision should be checked carefully.

C: Left and down sections: Fields in this area should be rejected.

From experience we have divided area A by lines of 60% know-how availability and 70% market attractiveness. Thus, area C is delimited by 30% market attractiveness and 15% available know-how.

These divisions have proved to make sense. Of course other lines can be defined as well.

Other evaluation matrices

Depending on the company situation and objectives other matrices can be built as well. Quite a number of criteria may be used for a matrix design:

- Market attractiveness
- Sales potential
- Conformity with company strategy
- Investment volume
- Time to market
- etc.

Two examples are presented: In figure 14 the parameters have a more general character, while in figure 15 the axes of the matrix are quite specific.

CONCLUSIONS

In this article we have shown that an innovation strategy may be considered in three levels. All three levels make sense and are helpful, but the second level, the identification of innovation fields, is most important for successful innovation management. We consider this level as the core of an innovation

strategy.

Therefore we have to put the focus on this core of the innovation strategy. A proved four-step procedure to find out innovation fields with a success potential systematically is presented. The four steps are explained and adequate methods are described. The methods and procedures are a collection based on experience; it does not mean that all methods should be applied in one project.

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