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Technology Radar: Early Recognition of New Business Fields in Future Markets

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Purpose

New technologies are changing the market. All the more important it is for a company not to miss any relevant future technology. In the years 2009 and 2010, a global German high technology company used the support of the FutureManagementGroup AG to identify the ten most important emerging technologies in each of its four business units. The technologies should lie outside the current core technologies. The goal of the project was the early recognition of future markets in these technologies. For this purpose, we used a broad toolset in accordance with the Eltville Model of future management.

Future Management

The FutureManagementGroup AG (FMG), founded in 1991, is an international group of experts specialised in future management and the early recognition of opportunities in future markets. Using the “Eltville Model” and various future management methods and tools, we built a methodological bridge from management practice to futures research and back to daily business. Future management comprises the entirety of all systems, processes, methods and tools for early perception and analysis of future developments and their inclusion in strategy.

search as a resource for orientation and inspiration in a business context.

The Five Futures Glasses

We use the “Eltville Model”, which offers a set of five distinctive and clear views on the future. We call them “the five futures glasses”. Each of the five futures glasses has its own specific characteristics, principles and modes of thinking:

- **The blue futures glasses** look at the probable future → assumption analysis.
The guiding question is: How will our market(s), work and living environments change in the next five to ten years?
- **The red futures glasses** look at possible surprises in the future → surprise analysis.
The guiding question is: How should we prepare for possible surprising events and developments in the future?
- **The green futures glasses** look at the creatable future → opportunity development.
The guiding question is: Which opportunities for new markets, products, strategies, processes

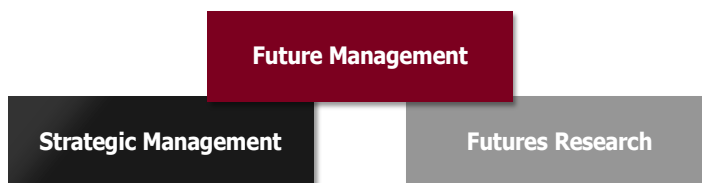


Figure 1: Future management as a bridge

Future management makes it easier, and in many cases possible at all, to use the results of futures re-



and structures will arise from these changes?

- **The yellow futures glasses** look at the desired future → vision development.
The guiding question is: What does our company need to look like in five to ten years time in the sense of a strategic vision?
- **The violet futures glasses** look at the planned future → strategy development.
The guiding question is: How do we need to design our strategy to realise the strategic vision?

The five futures glasses form the process model of the Eltville Model. You cannot wear all five futures glasses at the same time or the future will remain unclear and con-

fusing. You need to put your different futures glasses on one after the other to form an effective working process.

The second essential component of the Eltville Model is the results model, a semantic network of objects of thought that are used (future factors, assumptions, surprises, opportunities etc.)

The Eltville Model has been developed through research and in more than a thousand workshops and projects with leading corporations as well as with non-profit organisations around the world. It is a unique model that consistently resolves the confusion concerning the future, creates clarity and provides a productive way of working with sound insights and results.

Looking for Amazing Technologies

The most important goal of the project was to identify “amazing technologies” outside a client’s current capabilities but with a potentially high impact on the existing business of the client. We were asked to evaluate the exact relevance of these technologies for the client’s business to deduce new market opportunities of these technologies and evaluate their potential.

Our solution to accommodate these needs was a “future business radar”. The focus was on the blue futures glasses (assessment of technologies) and the green futures glasses (development of opportunities). Less focus had been given to the yellow futures glasses (assessment of opportunities and decision, which opportunities should be pursued). Not included were the violet futures glasses: With the completion of the project, the business units have individually taken responsibility for developing the strategy to enter the future markets that were identified as relevant to their business.

Technology Radar: the Project Process

Function Maps

After the definition of the project goals and the project timeline, the first step was the analysis of functions delivered by the four business units. In contrast to a product or a solution, a function describes the effects that a product is actually bought for. Questions to think about to identify the functions of a product are:

- What is it that your customers actually pay for when they purchase your product?
- What is the actual use that your customers would like to obtain from your product?

Concentrating on the functions opens up completely new business opportunities even for the combination of products with other products from outside the current portfolio. Functions can be described at three levels:

1. **Super-functions:** Functions that are indirectly fulfilled by a product or service, for example through integration into other products (e.g. personal mobility in case of all automotive parts)
2. **Primary functions:** Core functions of a product or service for which it was invented. The main reason for its existence (e.g. sealing).
3. **Secondary functions:** Additional functions the product or service fulfils beyond its core use. They often are the decision criteria of customers if sev-

eral products can fulfil the primary functions reasonably well (e.g. convenience, cost saving).

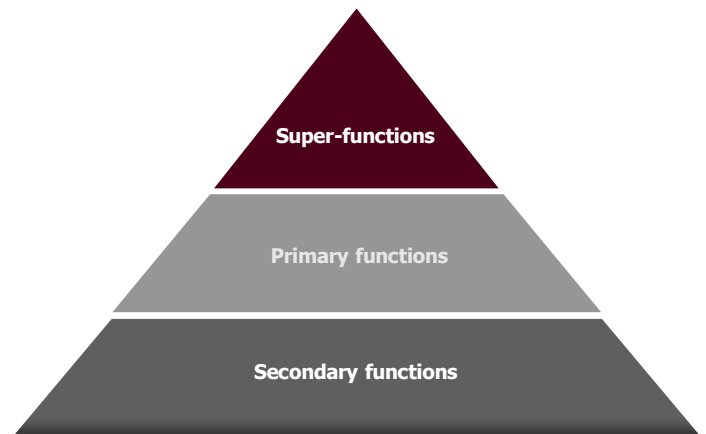


Figure 2: Levels of functions

The relevant functions were developed in a workshop with the project team consisting of representatives of all business units and enhanced through independent analysis by FMG. The functions were then transferred to visual maps, reviewed by the business units and jointly further developed by FMG and the project team.

Long List of Technologies: Which Ones Are Potentially Relevant?

The long list of technologies was developed from extensive secondary research. All technologies that are de-

scribed in current literature as emerging and/or as gaining importance in the future where considered for the long list. The single selection criterion for inclusion in the long list was the existence of a conceivable relation to a single function of one of the business units. The connection of a technology to a function is a valid indicator for its potential relevance. It shows that the technology can change the way in which the function is performed in the future. It can provide new solutions and products as well as change business models, thus changing value creation in the market. A total of 180 potentially relevant technologies have been identified.

An important source in the desk research was the FMG-FutureNet, a semantic database of futures knowledge. It is a knowledge network, modelled on the human brain, in which items of future information are saved and linked. We structure the available future knowledge and evaluate, summarise, substantiate and meaningfully link the individual items of futures information. In addition, we add information gained in our projects. As a result, the FMG-FutureNet has become a unique database of future markets.

For the technology radar project, we additionally evaluated websites, studies, books and magazines.

Short Lists of Technologies: Evaluation of Technologies

The technologies from the long list were evaluated along two criteria: "impact on industry" and "reasonable time horizon". The initial evaluation was done by representatives from the business units on a 9-point scale. A second evaluation was performed by FMG leading to some technologies with low rankings to be reconsidered. After a structured discussion process, each business unit selected ten technologies for deeper analysis. In total 32 different technologies were analysed and the results summarised in technology briefings.

Identification of Future Market Opportunities

A future market is a solution for important future problems or desires of certain people that develops or will generate significantly more revenue in the future. Examples of future markets include augmented reality glasses for smartphone users, robots that carry luggage and equipment for the military, or affordable space tourism for adventure travellers. The difference between a future market and a future trend or future technology is that one can additionally imagine which concrete solution people would actually be prepared to pay for and how you can make a profit out of it.

Future market opportunities were developed through analytical and creative thinking, including input like

future factors and methods like *meta-opportunities*, which we would like to introduce here briefly.

Future factors are trends, issues and technologies that act as the driving forces of future change and allow us to collect knowledge about the future. They are based on existing knowledge of experts and futurists on possible and probable future developments. Future factors give indications on what, why and how the future is changing. Two types of future factors are important for the early recognition of future markets:

1. Future factors in nature, society, business and politics that change the needs of end consumers. Examples are climate change, feminisation, entrepreneurialisation, flexibilisation or globalisation
2. Future factors in technology and science that will change processes and methods as well as products, services and solutions. Examples are nanotechnologies, dematerialisation, informatisation, micro-system technology, robotics or neurotechnologies.

Future factors primarily represent the view through the blue futures glasses but can also be used as a technique to support creative thinking. This is especially fruitful when future factors have no direct relation to the client's industry.

Meta-opportunities are repetitive patterns that are recognisable in many future opportunities. These patterns are recipes and shortcuts for opportunity recognition. They illustrate models of best-practice thinking and stimulate the search for opportunities. Through the use of meta-opportunities, productivity and the value of opportunity development can be increased considerably.

Subsequently, the identified and developed future market opportunities were set in relation to the business units and to the functions fulfilled by the business units in particular. In addition, the technologies were analysed for the interrelations among each other. From 98 raw future market opportunities, ten were selected for each business unit to be described in a short portrait. The criterion of choice was the estimated market potential. The selected future markets were described following four main questions:

1. Which problem is solved? Which desire is fulfilled?
2. What is the solution?
3. Whom is the solution delivered to?
4. How is the solution special?

Finally, the time horizon of the future markets was evaluated from a technical and a demand perspective; the markets were classified in terms of their distance from current capabilities.

A Strong Case for Function-based Technology Assessment

An important goal of the project was not to miss any relevant technology. This was ensured by an overview scan and the analysis of the results of futures research concerning the emergence and further development of new technologies. Simultaneously, the technology radar served as a future business radar, as it identified the most promising future markets that lie in the most important technologies. Out of 180 technology candidates that were included in the long list, we created 41 differentiated and in-depth future market portraits.

The project has shown how function-based technology assessment can contribute to identify relevant technologies outside current competencies and businesses – an essential requirement to recognise potentially profitable future markets.

The most promising of the recognised future markets needed to be explored in more detail. Future markets can only be considered as realistic if there are enough arguments for their future market potential. Therefore, the next step for each business unit was to do detailed future markets research for selected markets. The future

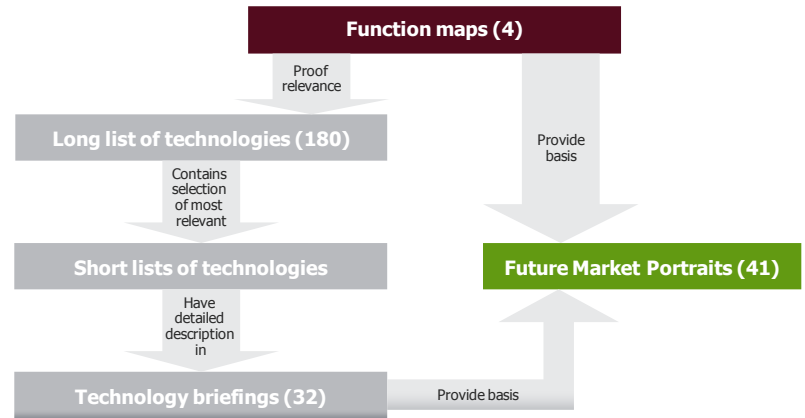


Figure 3: Map of results

markets research provides a solid analysis of market prospects, key challenges and possible business models. It thus allows sound investment decisions for the development of a future market.

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For further information on future management, the Eltville Model and the Five Futures Glasses, please visit: <http://www.futuremanagementgroup.com/en.html>

About the EFP: Policy professionals dealing with RTD, innovation and economic development increasingly recognize a need to base decisions on broadly based participative processes of deliberation and consultation with stakeholders. Among the most important tools they apply are foresight and forward looking studies. The EFP supports policy professionals by monitoring and analyzing foresight activities and forward looking studies in the European Union, its neighbours and the world. The EFP helps those involved in policy development to stay up to date on current practice in foresight and forward looking studies. It helps them to tap into a network of know-how and experience on issues related to the day-to-day design, management and execution of foresight and foresight related processes.