

A Scenario-based Approach to Strategic Planning – Integrating Planning and Process Perspective of Strategy

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ABSTRACT

For 20 years the conflict between the planning school and the process school of strategy has shaped the debate on strategy creation. In our paper, we argue that a scenario-based approach to strategic planning can serve as a management innovation in the field, thus having the potential to overcome the discrepancies between the two opposing schools of strategy. The scenario-based approach to strategic planning builds on the strengths of traditional scenario planning, i.e. its open and creative approach that considers multiple strategy options and takes multiple perspectives into account. Simultaneously, it overcomes the weaknesses of traditional scenario planning by offering a systematic process to scenario creation that is build on specific management tools and thus easy to implement. The outcome of this approach is a core strategy which is complemented by several strategic options that are derived from different scenarios. We illustrate the benefits of this management innovation on the basis of experiences collected in a consulting project in the German photovoltaic industry.

INTRODUCTION

In our paper, we address the question how a scenario-based approach to strategic planning can be used to overcome the conflict between the planning school and the (emergent) process school of strategy that has shaped the field for more than 20 years (Ansoff, 1991; Mintzberg, 1991, 1994a; Whittington and Caillaud, 2008). Strategic planning appeared on the scene in the 1960s. Its main aim was to create – on the basis of specific analytical tools – the one ‘best’ strategy that was then transformed into a catalogue of actions and executed (Ansoff, 1965).

Since a positive relationship between strategic planning and company performance could not be determined empirically (Boyd, 1991), however, and since growing environmental turbulence made strategic planning increasingly difficult, the field has faced growing criticism in the 1980s and 1990s. In his influential book ‘The rise and fall of strategic planning’ Mintzberg (1994a) laid the foundation for the (emergent) process school of strategy arguing that successful strategies cannot be analytically planned but rather emerge in a process that involves creativity, intuition and learning. In this context, (open) strategic thinking becomes more important than (formal) strategic planning (Mintzberg, 1991). Also other authors supported this view (Pascale, 1984; Hamel and Prahalad, 1994).

While seeing creative strategic thinking as the basis of successful strategy creation is theoretically appealing, it cannot be easily applied to practice since a clear set of tools and strategy frameworks is missing. This might be one of the reasons why top managers to date consistently rate (formal) strategic planning as one of the most important management tools (e.g. Rigby and Bilodeau, 2007). Nevertheless, the frequent changes in the practices of formal strategic planning, which have been observed in empirical studies, indicate that also

practicing managers are not fully content with current methods of strategic planning (Ocasio and Joseph, 2008; Grant, 2003).

What formal strategic planning seems to be lacking most, is the flexibility and openness which allows for responsiveness and improvisation that is needed in today's dynamic, complex and volatile environments. Mintzberg (1994a) argues that only open and creative strategic thinking will lead to the emergence of those innovative strategies that lay the basis for superior performance. He does not provide a clear set of tools, however, that fosters implementation of strategic thinking in companies. Thus, a synthesis is needed that combines the flexibility and openness typical of strategic thinking with the clear frameworks and application-orientation of strategic planning (Whittington and Caillaud, 2008; Grant, 2003).

In our paper, we offer such a synthesis by integrating scenario planning into strategic planning resulting in a scenario-based approach to strategic planning. Scenario planning originated in the 1970s (Phelps, Chan and Kapsalis, 2001). The main goal of scenario planning is to develop different possible views of the future and to think through their consequences for companies. Thus, scenario planning helps managers to challenge their assumptions and to be better prepared for possible future developments. The value of scenario planning does not lie that much in the creation of the scenarios but in the discussion of the consequences (Bishop, Hines and Collins, 2007). Therefore, we argue that scenario planning provides the flexibility and openness of strategic thinking which Mintzberg (1994a) postulated.

Nevertheless, traditional approaches to scenario planning are often criticized because of their complexity and the resulting high investments of time and other resources. This

weakness mainly results from the lack of standardization of traditional approaches to scenario planning (Bradfield, 2008). Thus, we argue that a modified, i.e. more standardized and tool-based approach to scenario planning has the potential to significantly improve strategy creation in companies. Our scenario-based approach to strategic planning leads to the formulation of a core strategy which is complemented by several strategic options that are derived from different strategic scenarios. With this approach, we offer a management innovation in the field of strategic planning that has the potential to revive management research and foster management practice in this field (Birkinshaw, Hamel and Mol, 2008; Whittington and Caillaud, 2008).

In order to develop the scenario-based approach to strategic planning, we first highlight the conflict that exists between the planning school and the process school of strategy as well as the requirements for overcoming this conflict. We then show to what extent traditional scenario planning fulfills these requirements before we finally develop the scenario-based approach to strategic planning including its benefits and pitfalls. We illustrate the benefits and pitfalls of this approach on the basis of experiences from a consulting project in the German photovoltaic industry.

Planning School vs Process School of Strategy- Requirements for an Integration

Strategic planning as a task and as an organizational unit first emerged in large American and European companies in the 1950s in order to develop and coordinate strategies of single business units. Around the same time, academic interest in strategic planning arose. By 1965 the first comprehensive textbooks covering the process as well as tools of strategy formulation had been published (Learned et al., 1965; Ansoff, 1965). In the following two decades, additional tools and frameworks for strategy analysis and formulation were

developed and the strategy process was refined (e.g. Ansoff, 1957; Porter, 1979; Porter 1980). Overall, strategic planning emerged as a systematic, formalized process of strategy creation, starting with the setting of guidelines and targets followed by the analysis of the environment and the company itself, the formulation and coordination of strategies as well as strategy implementation including the monitoring of targets (Grant, 2003). Main goal of strategic planning has always been to bring clarity and control into an environment that is characterized by increasing complexity and turbulence (Ansoff, 1965).

Since the 1960s several empirical studies have explored the impact of strategic planning on company performance. These studies have never been able to consistently show, however, that aspects of strategic planning, as e.g. its intensity or formalization, have a positive influence on company performance (Boyd, 1991; Ramanujam, Ramanujam and Camillus, 1986). This lack of a clear relationship between strategic planning and performance has led to growing criticism of the so-called planning or design school. In particular, Mintzberg (1994a) argued that successful strategies can never be planned, since planning is rather rooted in existing mental models and emphasizes analysis. Thus, it preserves the existing and – if at all – only allows for incremental change. Additionally, strategic planning aims at formulating the one 'best' strategy. This aim, however, is only achievable if strategic planners are able to predict future developments. In view of growing environmental turbulence, however, prediction seems hardly possible (Mintzberg, 1991).

From Mintzberg's (1994a) point of view, successful strategies rather emerge in a messy process. He therefore postulated to emphasize strategic thinking instead of strategic planning. Strategic thinking is directed at synthesis instead of analysis and it involves intuition, creativity and learning. Thus, it allows successful strategies to 'appear at any time and at any place in the organization, typically through messy processes of informal learning that must necessarily be carried out by people at various levels who are deeply involved

with the specific issues at hand' (Mintzberg, 1994b, p. 108). Mintzberg's view – the so-called (emergent) process school – is shared by a number of other researchers. Pascale (1984) showed, for example, that it was exactly the absence of planning that led to successful strategy creation at Honda. Similarly, Hamel and Prahalad (1994) observed that large companies in the 1990s started to downsize their strategic planning departments. This criticism of strategic planning has also led to a sharp decline in the research activity in this area (Whittington and Caillaud, 2008).

In practice, however, the planning school still plays a dominant role. Strategic planning is, for example, consistently rated by top managers as one of the most influential management tools (Rigby and Bilodeau, 2007). Several companies even increase the emphasis on strategic planning by introducing a Chief Strategy Officer responsible for corporate strategic planning on the board level (Breene, Nunes and Shill, 2007). Last but not least, Caillaud, Rose and Whittington (2005) have observed an increase in the number of job advertisements for strategic planners in Great Britain. Thus, in practice, strategic planning seems to be all but on the decline. One reason for its popularity in practice might be that strategic planning – in contrast to strategic thinking – offers a systematic, tool-based approach to strategy creation that can easily be applied in practice. Nevertheless, also many top managers are not and have never been fully satisfied with the development state of strategic planning. Ocasio and Joseph (2008) as well as Grant (2003), for example, observed significant changes in the strategic planning systems of major companies over the last decades as a reaction to weaknesses of previous systems.

In view of these arguments for and against both, the planning as well as the (emergent) process schools of strategy, some authors have already called for research that aims at overcoming the conflict between the different strategy perspectives (e.g. Grant, 2003; Brown and Eisenhardt, 1997). Such integrative research needs to develop concepts for

strategy creation that on the one hand take the more academic view of the process school into account and on the other hand cater to the requirements of corporate practice concerning a systematic, tool-based approach to strategic planning.

Specifically, the (emergent) process school requires from concepts of strategy creation that they incorporate creativity and allow for intuition, thus leaving room for innovative strategies that challenge existing assumptions and break inertia. In order to fulfill these requirements, strategy creation processes should not focus on just one 'best' strategy option but rather consider multiple options (Grant, 2003). Additionally, the process school requires managers to broaden their perspectives and to challenge existing assumptions and mindsets (Hodgkinson, 1997). This can best be achieved by integrating multiple perspectives and viewpoints from inside and outside the organization into the strategy creation process (Schoemaker and Day, 2009; Kahneman and Lovallo, 1993).

The planning school sets different requirements for strategy creation processes as it stresses application-orientation. Thus, frameworks for strategy creation need to follow a systematic process which incorporates specific strategy tools and they need to be adaptable to environmental changes (Ghobadian et al., 2008).

Overall, frameworks for strategy creation which integrate the planning and the process perspectives of strategy have to fulfill four major requirements:

- Multiple options: An integrative strategy framework needs to explicitly consider different strategy options in order to account for environmental turbulence and prepare the company for the diversity of possible future developments.

- Multiple perspectives: An integrative strategy framework needs to consider viewpoints and information from diverse stakeholders in order to challenge existing assumptions and overcome inertia.
- Systematic, tool-based process: An integrative strategy framework needs to be based on a clear process for which specific strategy tools are defined so that an easy and quick application to practice is possible.
- Flexibility: An integrative strategy framework needs to be adaptable to different environmental conditions in order to ease application.

To our best knowledge, an integrative framework for strategy creation which fulfills these four requirements has not been developed to date (Grant, 2003). Thus, a management innovation is necessary in order to further develop both, theory and practice of strategic planning (Birkinshaw, Hamel and Mol, 2008). We believe that the integration of scenario planning into strategic planning has the potential to lay the foundation for such an innovative, integrative concept of strategy creation.

Scenario Planning as the Basis for an Integration of Process and Planning Perspectives

Scenario planning was first introduced in the 1970s at Royal Dutch Shell as a planning technique that replaced traditional forecasting tools. The new method helped the company to e.g. better handle the 1973 oil crisis to which Shell could react significantly earlier and more successfully than its competitors (Wack, 1985).

Scenario planning is a method for developing and thinking through possible future states on the basis of different scenarios (Schoemaker, 1995). The aim of the technique is not to accurately predict the future but rather to develop better strategies by overcoming perceptual biases of managers (Porter, 1985; Wack, 1985, Schoemaker, 1995). Scenario planning is based upon the assumption that future developments are largely uncertain. Thus, the basic idea of scenario planning is to force managers to acknowledge this uncertainty and to translate it into thinking in multiple options (Wack, 1985).

Several different approaches to scenario planning have been developed over the last 40 years (Bishop, Hines and Collins, 2007). Among the most influential approaches are those by Royal Dutch Shell (2003) and the consulting company GBN (Schwartz, 1996). Millet (2003) even calls these the 'gold standard of corporate scenario generation'. The two most-often cited academic approaches are those by van der Heijden and Shoemaker (Chermack, Lynham and Ruona, 2001).

Even though all of these approaches differ in their details, a comparative analysis of a different scenario approaches reveals certain characteristic process steps that many of them share. Altogether, we have been able to identify six different process steps – hardly ever, however, as part of one approach (Bishop, Hines and Collins, 2007; Millet, 2003; Phelps, Chan and Kapsalis, 2001; Chermack, Lynham and Ruona, 2001). These six process steps have different denominations across the diverse approaches to scenario planning. Nevertheless, with regards to goals and contents they are similar in most approaches. These six process steps are:

- Definition of scope: The first common process step defines the scope of the scenario project. This phase, also called 'Define the Scope' (Schoemaker, 1995) or 'Preparation' (Shell, 2003), sets the foundation for the analysis and strategy definition

phases by specifying important characteristics for the scenario planning project such as the time frame, scope of analysis or the participating team. It thus generates a common ground for the project (Schoemaker, 1995, Van der Heijden, 2005, Shell, 2003, Schwartz, 1996).

- Perception analysis: The approaches by Shell, the Global Business Network and Schoemaker integrate an analysis step called 'Pioneering' (Shell, 2003) and 'Identifying the Major Stakeholders' (Schoemaker, 1995) respectively following the definition of the scope of the project. The aim of this process step is to analyze the perception of the executives participating in the scenario project. This is done by firstly identifying the existing mental models of the company's management and challenging them in a second step by including external opinions. By benchmarking own assumptions against external perceptions, managers both learn about the interests and expectations of external stakeholders as well as their own assumptions and get a holistic view on possible maps of the future (Schoemaker, 1995; Shell, 2003).
- Trend and uncertainty analysis: All major approaches to scenario planning include an analysis of the most important industry trends and uncertain elements. This process stage is sometimes conducted in two distinct steps as in Schoemaker's phases 'Identify basic Trends' and 'Identify Key Uncertainties' (Schoemaker, 1995) or combined into one 'Data Analysis' (Van der Heijden, 2005) step. In this analysis phase of the scenario planning process, the scenario team analyses the most important driving forces that affect the company or industry. These factors are then ranked by their degree of uncertainty as well as their importance and potential impact for the company in order to identify the most crucial environmental drivers the

corporation has to consider in its planning (Schwartz, 1996; Van der Heijden, 2005, Shell, 2003, Schoemaker, 1995).

- Scenario building: The scenario building phase is the core element of the traditional approaches to scenario planning. In this 'Scenario Development' (Van der Heijden, 2005) step the previously identified key uncertainties are converted into distinct scenarios that describe different future states of the world. These basic scenarios are then complemented by other driving forces to create consistent and plausible stories about the future as well as possible developments that link the present to the specific picture of the future (Schwartz, 1996; Shell, 2003). The scenario creation itself opens the perception of the participants and sets the foundation for the following strategy definition phase in which possible consequences and action plans for each scenario are developed (Schoemaker, 1995, Shell, 2003).
- Strategy definition: In this phase, also called 'Implications' (Schwartz, 1996) or 'Option Planning' (Van der Heijden, 2005), companies can test or 'wind tunnel' (Van der Heijden, 2005) decisions as well as strategic options against the multiple scenarios, which have been generated. This makes the company's strategy more robust and applicable in several possible future situations (Schwartz, 1996). This process step enables managers to act more flexibly and prepare for different strategic alternatives depending on how the future turns out to be.
- Monitoring: Very few approaches, e.g. those by Global Business Network and Royal Dutch Shell, include a sixth phase called 'Selection of Leading Indicators and Signposts' (Schwartz, 1996) and 'Reconnaissance' (Shell, 2003) respectively. In this phase several indicators are first defined and in a second step monitored to check if strategic changes are needed. Schoemaker (1995) and Van der Heijden (2005) also

mention the importance of continuously scanning the environment and repeating the scenario process if the environment changes drastically.

Most scenario approaches follow these process steps in the one way or the other. There is, however, hardly an approach that fully contains all six steps. Nevertheless, one can summarize that scenario planning projects generally take perspectives and viewpoints of multiple stakeholders into account in order to create different scenarios, i.e. multiple pictures of future states and developments. Thus, traditional scenario planning fulfills two main requirements of an integrative framework for strategy creation. Namely, it enables managers to plan for multiple options and it allows integrating and aligning external and internal perspectives to challenge existing assumptions and mindsets. For this reason, scenario planning has great potential to serve as a conceptual foundation for an integrative framework of strategy creation. Anecdotal evidence shows that companies like Bayer, Henkel and Siemens – partly driven by the current financial crisis – increasingly try to integrate scenario planning into their strategic planning processes. Grant (2003) has made similar observation at major oil companies.

Nevertheless, traditional scenario planning suffers from a number of weaknesses. These weaknesses relate in particular to the complexity of traditional scenario planning projects. As a matter of fact, most scenario projects require a substantial investment in time and other resources (Bradfield, 2008). Practical experience shows that scenario projects usually take a minimum of five months and can last as long as one year (Shell, 2003; Moyer, 1996). A major reason for this complexity seems to be the lack of standardization of most scenario approaches. Many scenario experts share the belief that scenarios cannot be created from recipes (Schwartz, 1996). Accordingly, only very few scenario approaches offer standardized tools – and if they do, only for selected process steps (Schoemaker, 1995, Van der Heijden., 2005). In most cases, however, scenario planning approaches rely on

unstructured interviews and workshops (Shell, 2003). Additionally, many scenario experts are reluctant to completely disclose their methodologies (Chermack et al., 2001). Thus, traditional scenario planning techniques are hard to replicate, scenario processes have a high variability and their quality significantly depends on the people involved in the process (Schwartz, 1996). As a result of this lack of a systematic, standardized approach, scenario planning has almost exclusively been used in long range planning processes so far, i.e. for time ranges beyond five years (Wack, 1985; Moyer, 1996; Schwartz, 1996).

Thus, in order to serve as the basis for an integrative framework of strategy creation, traditional scenario approaches have to be modified. In particular, such a scenario approach needs to be built upon a systematic process. Additionally, clear management tools have to be defined for the single process steps in order to ease application. Such an approach is presented in the following and illustrated on the basis of experiences which we made in a consulting project in the German photovoltaic industry.

Design of a Scenario-based Approach to Strategic Planning

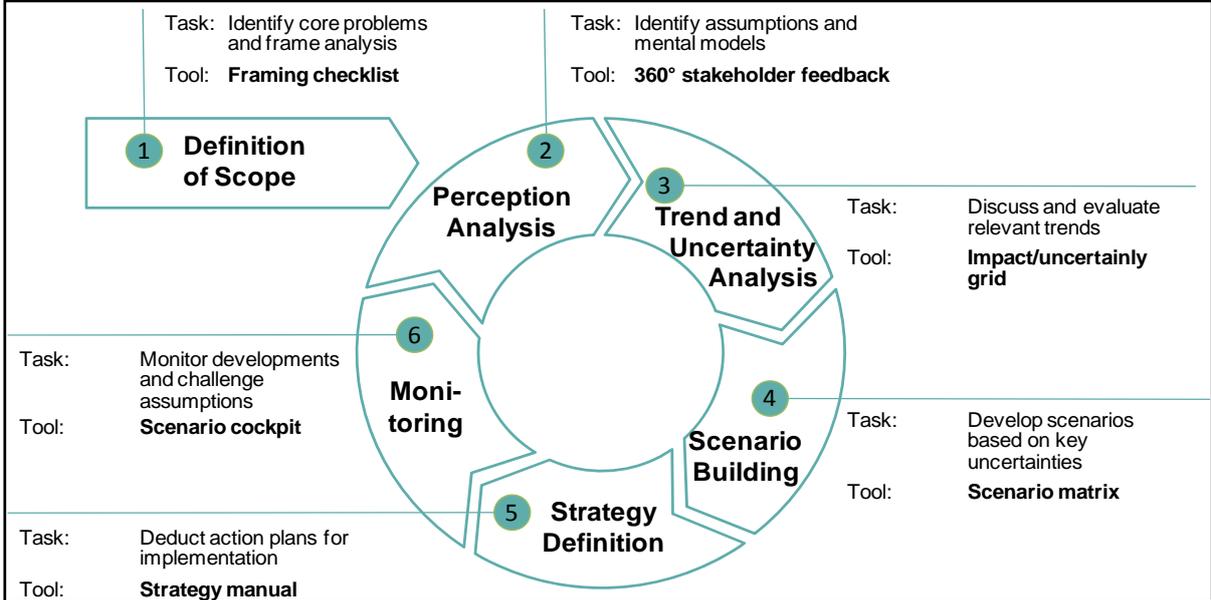
Overview of the approach

The scenario-based approach to strategic planning, that we present in the following, builds upon the strengths of traditional scenario planning approaches and simultaneously overcomes their weaknesses. We have based our approach on the characteristic, six-step process of traditional scenario planning described above which we derived as a synthesis of different scenario approaches. By following this process, we make sure that our approach enables managers to plan for multiple options and to simultaneously integrate external and

internal perspectives into the strategy development process – two core requirements for the generation of innovative strategies.

The key difference between our approach and traditional approaches to scenario planning, however, lies in its standardization. Our approach follows a clearly structured procedure that reduces the complexity of the scenario planning project and allows for a quicker and easier application in practice. The approach is organized into six clearly defined steps and each step is connected to a standardized tool (Figure 1). These tools can be easily applied which guarantees that the process is repetitive with a low variability. Our experience shows that the approach decreases the time needed to carry out the planning process to four to six weeks – a duration that is typical for the initial, more strategic phase of planning processes (Ocasio and Joseph, 2008; Grant, 2003).

FIGURE I: Overview of the scenario-based approach to strategic planning



In the following we will describe in more detail the six steps of the scenario-based approach to strategic planning including the management tools that guide each process step. We use

a case study of a consulting project in which we conducted a scenario-based strategic planning process for a medium-sized company in the German photovoltaic industry in order to illustrate the application of our approach. A case study from the German photovoltaic industry seems to be particularly adequate because over the last two years the industry has faced tremendous volatility as well as structural changes triggered by shifts in the technological, political and competitive landscape. New technologies like thin film cells and solar thermal power plants are evolving imposing substitution threats to existing technologies. Furthermore, the future of the global as well as the German regulatory environment is very uncertain which raises questions about the future development of subsidies and trade barriers. In addition, competition in the photovoltaic sector has intensified as Asian companies increasingly push into the world market. Today, these companies can produce their modules at up to 30 percent lower costs compared to German manufacturers. Following the description of our approach as well as its case-study-based illustration, we show how the approach can be effectively integrated into the strategic planning process of a company.

Process Step 1: Definition of Scope

The first process step aims at defining the overall frame of the scenario-based strategic planning project. For this purpose, we developed the *'Framing Checklist'*, a tool that specifies the goal, involved persons as well as other key characteristics of the process. The checklist consists of answers to five simple questions which need to be agreed upon before the start of the scenario-based strategic planning process (Figure 2):

FIGURE II: Framing Checklist

Goal of scenario project Definition of the question to be solved: Focus of the scenario analysis	
Strategic level of analysis Shall the strategic planning process be conducted for the corporate or business level?	Definition of Stakeholder Which key stakeholder shall be involved in the 360° Stakeholder Feedback
Participants How closely is the top management involved in the process? Which members of the respective departments participate in the workshops?	Time horizon What time horizon is the planning process catered to (1,2,5 years or longer)?

The framing checklist ensures that all involved persons, particularly corporate and business unit management as well as strategic planners, are aligned towards the same goals for the strategic planning process.

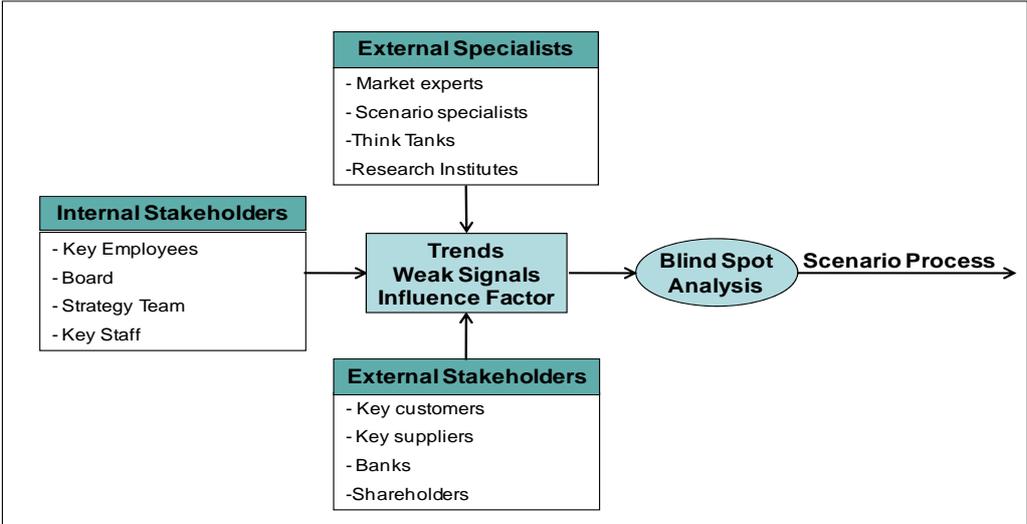
We have used this framing checklist to prepare a scenario-based strategic planning process for a medium-sized company in the German photovoltaic industry. To help the company plan for the future, we – together with the top management – defined the goal of the scenario-based strategic planning project to be the development of four distinct scenarios for the future of the German photovoltaic industry and the analysis of their strategic implications for the company. We furthermore decided to focus on corporate level strategic implications for the company and a time horizon until the year 2015. The top management team agreed to participate in the scenario building phase as well as in the perception analysis in which they provided the internal view of the company. As external stakeholders to participate in the perception analysis we selected key competitors as well as independent research institutes.

Process Step 2: Perception Analysis

The second process step aims at identifying and challenging the perception, i.e. the assumptions and mental models, of the participants involved in the planning process. Overall, three main goals drive this process step. The first goal is to establish a comprehensive list of factors that potentially influence the future of the company. The second goal is to evaluate these factors according to their potential performance impact and their degree of uncertainty. The third goal is to benchmark perspectives of different stakeholder groups concerning these influencing factors. Particularly the latter goal is to make top management more receptive for external developments by helping them identify so called blind spots, i.e. developments that they knowingly or unknowingly oversee, and weak signals, i.e. first indicators for future changes in the environment. In order to achieve these goals we have developed a tool called '*360° Stakeholder Feedback*'.

At the core of the '*360° Stakeholder Feedback*' is a survey instrument – available online and offline – that contains open as well as closed questions concerning factors which might have an influence on the company in the future. Different stakeholder groups are selected and asked to answer this questionnaire. Among these stakeholders are externals, as e.g. the top three suppliers and the top three customers or even a member of the workers' union, internals such as top managers and strategic planners, but also employees in key operational positions like marketing, sales or R&D, and external specialists as e.g. consultants, business or industry experts. These four groups combine a comprehensive knowledge pool and allow the scenario team to combine and compare the different perspectives on and perceptions of the future. The outcome of this process step is an extensive, evaluated list of factors that potentially have an impact on the company. Simultaneously, the 360° stakeholder feedback sheds light on blind spots and weak signals (Figure 3).

FIGURE III: 360° Stakeholder Feedback



We applied this 360° stakeholder feedback to assess factors influencing the photovoltaic industry in Germany until 2015. For this purpose, we asked the management of our partner company, top managers of key competitors as well as independent research institutes to fill in a questionnaire. The outcome was a comprehensive list of twenty nine influence factors and important trends ranging from political factors such as the ‘development of subsidy programs in Germany and the European Union’ to technological influences as the ‘impact of the DESERTEC project’ which constitutes a rival technology. We did not identify any blind spots as part of the 360° stakeholder feedback. Thus, we could conclude that no important trends or influence factors were disregarded or misperceived by top management.

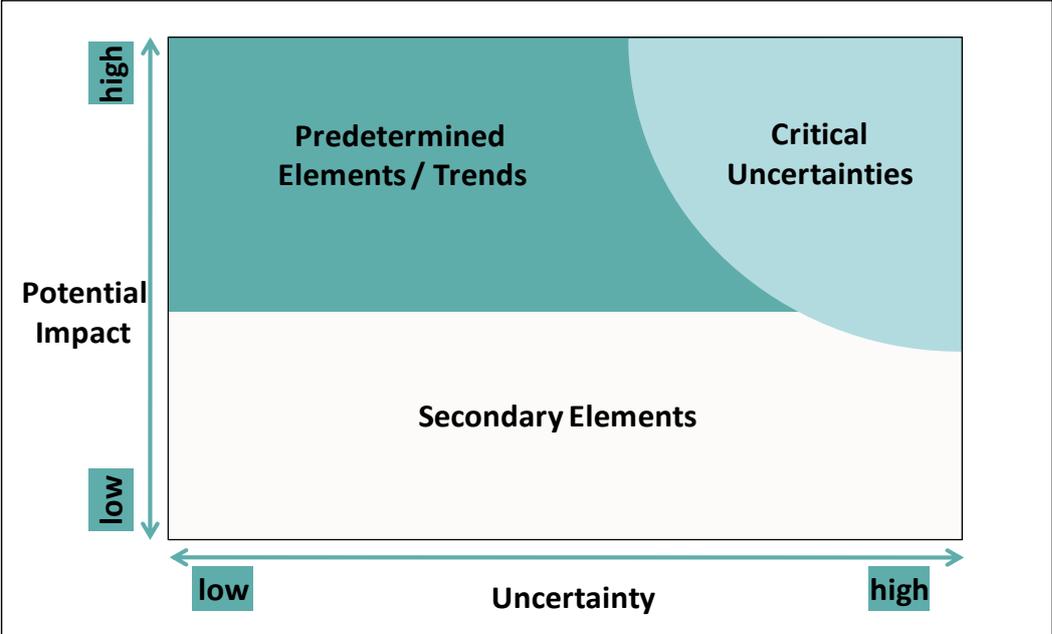
Process Step 3: Trend and Uncertainty Analysis

The third process step addresses the question: What are important trends and critical uncertainties that potentially have an impact on the future of a company? The so-called ‘Impact/Uncertainty Grid’ serves as a tool to facilitate this step.

The Impact/Uncertainty Grid helps to visualize and structure the exhaustive list of factors which potentially have an influence on the future development of an organization. These

factors have been derived in the second step of the scenario-based approach to strategic planning using the 360° Stakeholder Feedback. Essentially, the Impact/Uncertainty Grid is a matrix which allows for a positioning of all identified influencing factors according to their potential performance impact and their degree of uncertainty for the future. The higher the potential performance impact of a factor is, the higher it has to be placed in the grid. The higher the uncertainty is, the more the factor will move to the right hand side of the grid (Figure 4).

FIGURE IV: Impact/Uncertainty Grid



Overall, the Impact/Uncertainty Grid is divided into three sections. The bottom section of the Impact/Uncertainty Grid contains all factors that have a relatively low performance impact. They are called secondary elements and are not further considered as part of the scenario planning process. The upper left part contains all those factors which have a comparatively high performance impact and are simultaneously relatively predictable. Those factors are

called trends. They become important for the description of scenarios in the following step of the scenario-based approach to strategic planning (Schwartz, 1996).

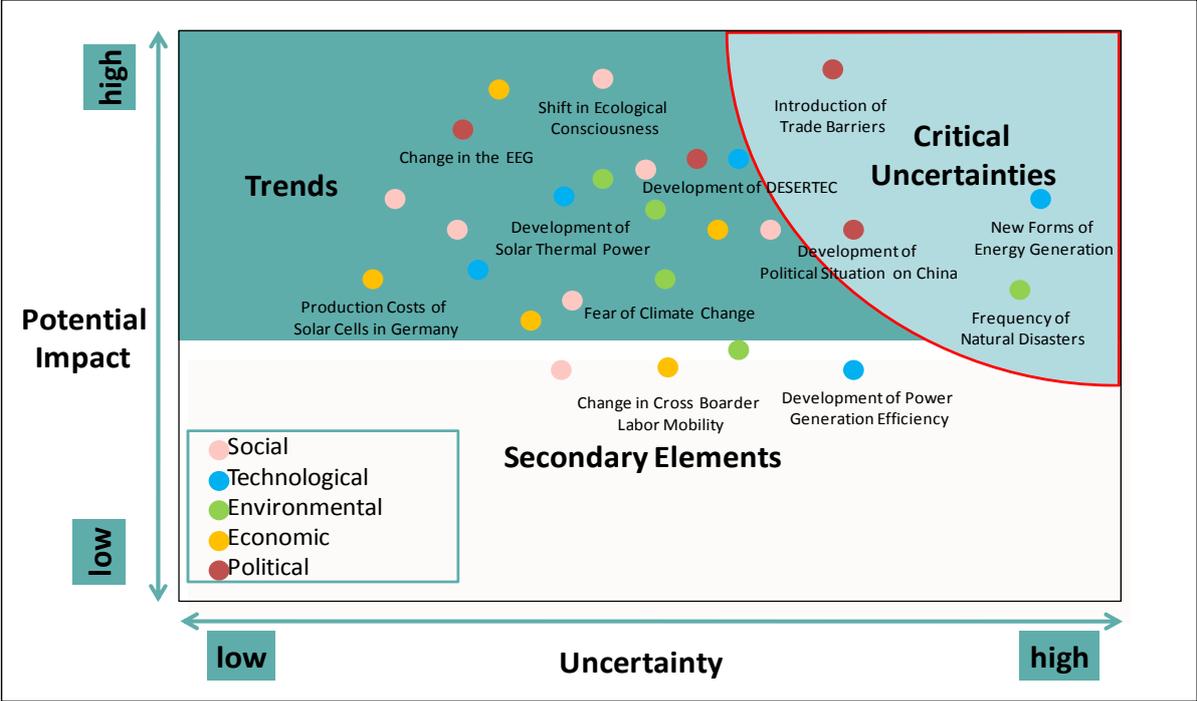
The elements that are located in the upper right corner of the Impact/Uncertainty Grid are called critical uncertainties. They are defined as factors which not only have a high performance impact, but for which also the future development is rather uncertain. These critical uncertainties form the core of the Impact/Uncertainty Grid since they serve as the basis for the identification of two key uncertainties. These key uncertainties are either single critical uncertainties or – in most cases – the result of a combination or clustering of closely related critical uncertainties. They are the major outcome of this step of the scenario-based approach to strategic planning and lay the basis for the development of scenarios in the following forth step (van der Heijden, 2005).

The Impact/Uncertainty Grid was first introduced in the 1970s by Kees van der Heijden who developed this tool in order to be better able to structure up the large number of input variables which are normally used in scenario planning processes. The tool was first applied for scenario development at Royal Dutch Shell, the first company that extensively used a scenario approach to cope with future uncertainties (Klooster and Asselt, 2006).

We applied the Impact/Uncertainty Grid in order to cluster influencing factors in the German photovoltaic industry. As shown in figure 5, we identified factors including a 'Change in Cross Boarder Labor Mobility' or 'Development of Power Generation Efficiency' as secondary elements, which have a relatively low impact on the company. Aspects like changes in 'Production Costs of Solar Cells in Germany' or 'Changes in the EEG' law in Germany were defined as trends. Finally, together with top management we determined several critical uncertainties and clustered them to two key uncertainties. Four political uncertainties as e.g. 'Introduction of Trade Barriers' formed the key uncertainty

'Development of the Regulatory Environment'. The second key uncertainty 'Development of Substitutes' resulted from a cluster of three technological uncertainties including the 'Development of New Forms of Energy Generation'. These key uncertainties were used in the following step of the scenario-based approach to strategic planning for scenario creation.

FIGURE V: Impact/ Uncertainty Grid for the German Photovoltaic Industry

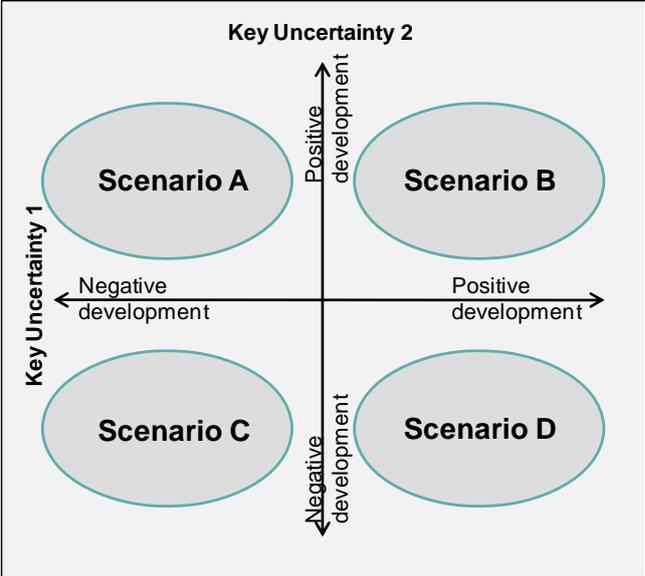


Process Step 4: Scenario Building

The objective of the fourth step of the scenario-based approach to strategic planning is the development and description of specific scenarios for a company or industry. The major tool that we propose for this process step is the so called 'Scenario Matrix'. Like the Impact/Uncertainty Grid the Scenario Matrix was first developed in the 1970s by Kees van der Heijden, who used this tool as a visual aid and logical scenario baseline at Royal Dutch Shell (Klooster and Asselt, 2006).

The Scenario Matrix is a visual framework for deriving scenarios, i.e. end-states of corporate development. The two key uncertainties which have been identified in the previous step of the scenario-based approach to strategic planning serve as the dimensions that span the matrix. Those key uncertainties are also called scenario dimensions (van der Heijden, 2005). For each scenario dimension two extreme values have to be defined. Accordingly, the matrix consists of four quadrants that reflect four distinct future scenarios (Klooster and Asselt, 2006) (Figure 6).

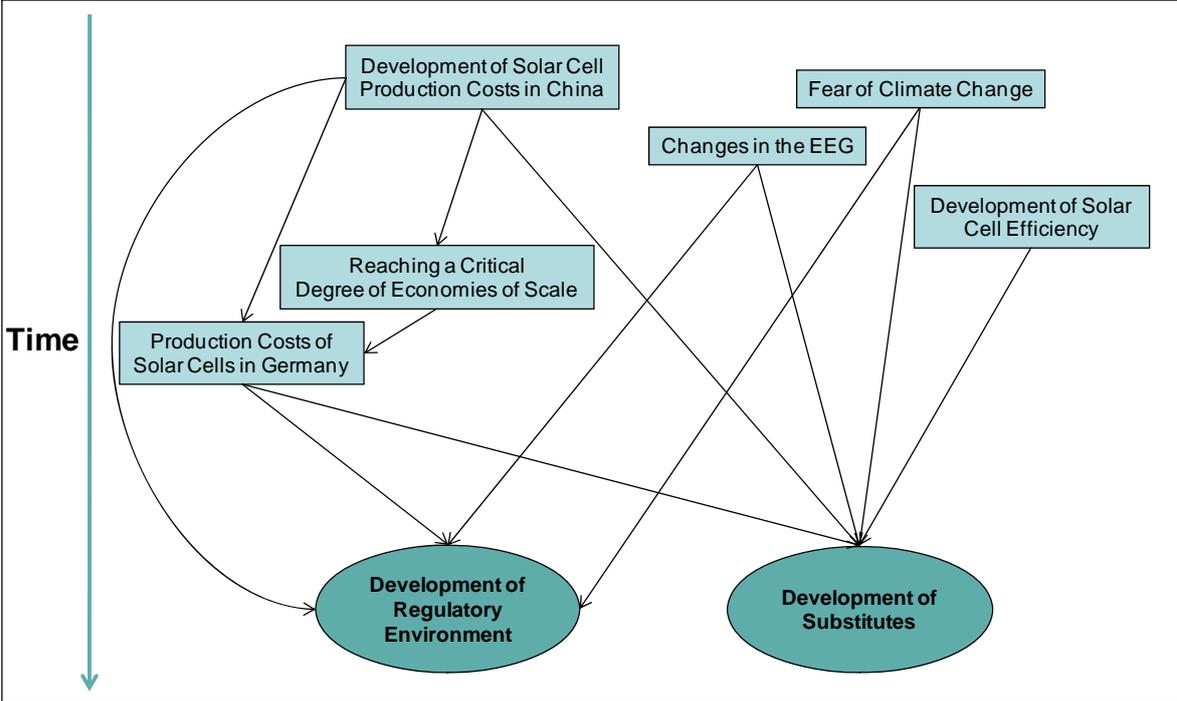
FIGURE VI: Scenario Matrix



After having broadly determined the four scenarios on the basis of the two scenario dimensions, these scenarios have to be described in more detail. This happens in three steps: First, an influence diagram is developed for each scenario, i.e. a cause-effect chart that determines the path towards each of the four scenarios. Trends as well as critical uncertainties, as derived in the previous step, serve as causes and effects in this diagram. In a second step, a storyline for each scenario is developed on the basis of the influence diagram. Finally, the scenarios are described in full detail.

We have applied this scenario matrix to derive and describe scenarios for the German photovoltaic industry. We first developed the scenario matrix on the basis of the two key uncertainties mentioned above. For this purpose, we defined the extreme values for the key uncertainty 'Development of the regulatory environment' to be 'favorable to German producers' and 'unfavorable to German producers' and for the key uncertainty 'Development of substitutes' to range from 'slow development' to 'fast development'. Thus, we arrived at four scenarios for the German photovoltaic industry that we called 'Phoenix', 'Survival of the Fittest', 'Icarus' and 'Go Green'. In order to further develop these scenarios into consistent stories we created an influence diagram and integrated important trends as well as critical uncertainties that we had identified in the previous process step (Figure 7).

FIGURE 7: Simplified Influence Diagram for the German Photovoltaic Industry



Finally, we described the scenarios in full detail and arrived at four plausible and consistent future states of the industry:

- *Phoenix* is a world that is dominated by German photovoltaic producers. 80 percent of the photovoltaic systems produced are thin-film-modules, in which European companies have a strong advantage compared to their Asian competition due to their leading position in research and development. Global trade is free of barriers and the emerging markets for photovoltaic modules are well accessible.
- *Survival of the Fittest* is a highly competitive world in which German subsidies for the industry have been cut significantly. Asian manufacturers account for three quarters of the extremely price-driven world market that is characterized by protectionism in China and the United States.
- *Icarus* is a world in which all German photovoltaic companies have disappeared from the world market. While both China and the United States rely on 'buy domestic' clauses to protect their industry, the EU does not follow this trend. Thus, the European market is left open to competition from overseas. Furthermore, solar thermal energy, not photovoltaic systems, is expected to be the main energy provider for future years.
- *Go Green* is a world in which European producers cannot meet the production costs and prices of their Asian competitors. Additional pressure is caused by cuts in subsidies and the fear of a technological paradigm shift towards solar thermal power plants that promise a safe, reliable and cheap energy supply for Europe and the world.

Process Step 5: Strategy Definition

The strategy definition phase aims at both testing existing strategies against the multiple scenarios that were created and developing new strategies that can be applied in one or

several scenarios. It thus builds the bridge from thinking about the future to deriving concrete strategy alternatives and action plans.

The tool which we developed for this process step is the so called '*Strategy Manual*'. The Strategy Manual foresees three steps to strategy creation. In a first step, it structures the strategy discussion around four important elements – (1) developments in the macro-environment, (2) potential behavior of competitors and customers, (3) the intended positioning and competitive strategies of one's own company and (4) the respective design of the value chain and action plans. These elements have to be determined for each scenario.

In a second step, based on the above mentioned elements for each single scenario, the planning team needs to determine those developments of the macro-environment, those behavior patterns of competitors and customers, those elements of the positioning as well as those elements of the value chain and the action plans that are shared by all scenarios. Our experience shows that the shorter the planning cycles, the more elements are common to all scenarios. These common elements form the basis for a core strategy that the company can implement immediately since it is independent of future developments. All strategy elements that differ between the single scenarios become strategy options which complement the core strategy. Dependent on the state of the environment, i.e. dependent on which of the scenarios is currently most likely to come true, some of these strategic options need to be executed immediately, for others (small) initial investments are necessary whereas again others remain strategy white papers which might be executed later. Real options reasoning helps in creating core strategies and complementary strategy options. Particularly, determining the potential value of growth, insurance and learning

options is valuable in defining the size of potential investments as well as their timing (Copeland and Keenan, 1998; McGrath, 1999; Trigeorgis, 2000).

In a last step, the Strategy Manual requires that the core strategy and the complementary strategy options including milestones for the execution of these options are described in detail and compared to the existing strategy. This serves also as the basis for decisions on strategic change.

The outcome of the strategy definition phase is one robust strategy that is applicable in all possible future states. This core strategy is accompanied by several strategic options that are measure made to the requirements of each specific scenario. The unique integration of real options in our approach to scenario based strategic planning changes the mindset of managers from one dimensional strategic plans towards thinking in multiple strategy options. This makes managers more receptive to an increasingly dynamic, complex and volatile environment. By increasing the number of strategy alternatives available to the company, the strategy manual enables executives to react more quickly to environmental changes and to outpace competitors.

In our project for a photovoltaic company we designed a strategy manual by first assessing environmental and strategy implications for the four single scenarios and by then comparing them. Based on this comparison, we identified a core strategy that focuses on research and development. As a matter of fact, it is beneficial in all four scenarios to invest in making the photovoltaic technology more efficient and thus more affordable for its customers. By offering a technologically advanced product that generates higher output in terms of power generation, the company not only protects itself against potential substitutes but also against low price competition as its products offer a higher output/cost ratio. This strategy

needs to be accompanied by lobbying efforts in order to safeguard the important German subsidies for the industry as well as to prevent trade barriers from being established.

This core strategy has to be complemented by a scenario-specific strategy option which we briefly exemplify for the scenario 'Go Green'. In this scenario subsidies in Germany have been reduced and competitive pressure by low-cost Asian manufacturers are high. For these circumstances two strategic options promise positive results. The first option is to build up production capacities on a large scale in Asia in order to meet or even undercut the cost base of rivals. The second strategy option consists in establishing joint venture agreements with technology leaders in the area of solar thermal energy to be able to quickly restructure the product portfolio in case a technological shift towards this technology materializes. Already today, the company can take first steps towards investing in Asia and towards establishing joint ventures.

Process Step 6: Monitoring

The last process step of our approach to scenario-based strategic planning aims at constantly benchmarking the created scenarios against real world developments. This offers companies an early warning system that enables them to analyze if the world is moving into the direction of a particular scenario and thus indicates which strategy option needs to be executed.

For this process step, we have developed a tool called '*Scenario Cockpit*'. The Scenario Cockpit uses a three-step approach. First, important indicators for each scenario are defined. In most cases, these indicators can be directly derived from the influence diagram described in step four of our approach. In a second step, value ranges for these indicators

have to be determined. By benchmarking these ranges against the actual values for the indicators, one can determine which scenario is closest to the real-world development. The third step consists of a constant monitoring of the defined indicators. This step is conducted by the planning team. The results are then visualized and presented to decision makers periodically.

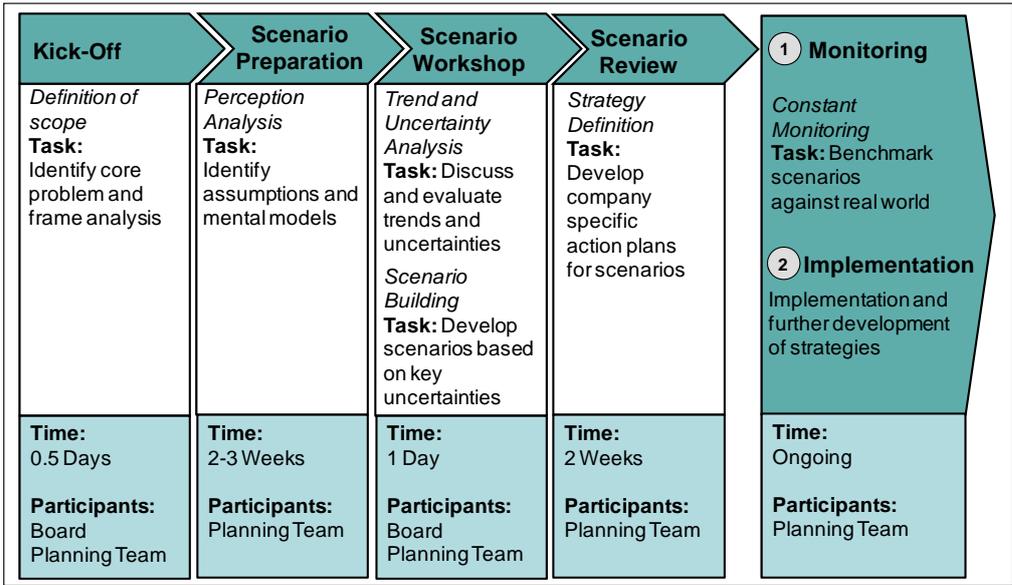
The Scenario Cockpit closes the continuous loop of our approach to scenario-based strategic planning. It on the one hand determines which strategic options need to be executed at which time – dependent on the state of the environment. On the other hand, the Scenario Cockpit helps assess if the scenarios are still valid and plausible or if they have to be renewed.

In our project in the photovoltaic industry we defined indicators based on a more detailed version of the influence diagram presented above. These indicators including e.g. the ‘production costs of photovoltaic modules in Asia’ or the ‘absolute level of subsidies paid to consumers on the basis of the German renewable energies law’ are now regularly monitored to insure a quick implementation of appropriate strategic options.

Integration of the approach in the strategic planning process

Because of its systematic structure, its short completion time and the close integration of top management in the process our approach can be easily implemented as a standard process for strategic planning in practice. Our experience shows that the process described above can be conducted in five consecutive steps complemented by a strategy implementation stage (Figure 8).

FIGURE VIII: Scenario-Based Strategic Planning Process



The strategic planning process is mainly conducted by the planning team that coordinates the process and conducts the necessary analyses. The presence of the company’s board or top management team as well as of business unit heads is necessary in the kickoff meeting and the scenario workshop in which the scenarios are created and all major decisions are taken. The scenario workshop is comprehensively prepared by the planning team. This preparation includes particularly the conduct of a 360° Stakeholder Feedback. The results are then presented at the beginning of the workshop to start the discussion. After the scenario workshop, the planning team defines the core strategy and respective strategic options and summarizes them in the strategy manual. The strategy proposal is again presented to the board that decides which strategy and action plans to pursue before these are implemented in the next step. The following strategy implementation goes hand in hand with constantly monitoring real world developments using the scenario cockpit. This enables the planning team to adjust the chosen strategy depending on environmental developments.

Evaluation

Overall, the scenario-based approach to strategic planning fulfills all requirements of a framework for strategy creation that is supposed to integrate planning and process perspectives of strategy. By building upon the six steps commonly used in traditional approaches to scenario planning, our approach allows managing the uncertainty and complexity of today's globalised world by considering multiple strategic options. In addition, the approach integrates internal and external perspectives which helps to overcome cognitive inertia and increases the ability to spot weak signals as well as blind spots. Because of its tool-based design, our approach can be furthermore conducted quickly and flexibly which significantly eases its application in practice. The approach can thus be used in an extremely flexible way to account for the increasing volatility of environmental developments. These advantages of our approach have also become apparent in the illustrative case study which we presented.

Thus, we are convinced that our approach accounts for the problems that managers face in strategic planning today. By combining traditional scenario planning, strategic thinking, real options reasoning and strategic planning, it makes the complexity, dynamics and volatility of today's business world manageable. Moreover, the approach can be applied for different time horizons. As a result, our project experience leads us to believe that our approach increases the effectiveness and efficiency with which strategic planning can be conducted in practice. Nevertheless, the approach has only been applied in few companies yet. Therefore, research on a larger scale remains necessary in order to determine the performance effect of the scenario-based approach to strategic planning.

CONCLUSION

We have developed the scenario-based approach to strategic planning in order to revive research and foster management practice in the field of strategic planning. With this approach, we have shown that the integration of the seemingly opposing views of the planning school and the process school of strategy can be integrated. Thus, our research opens several future avenues for research and practice in the field of strategic planning.

As far as future research directions are concerned, it seems sensible to further develop and extend frameworks of strategy creation that integrate different strategy perspectives (Grant, 2003; Brown and Eisenhardt, 1997). Additionally, further research on the performance implications of strategic planning seems to be necessary in order to account for new and improved strategy creation frameworks which have been developed (e.g. Ghobadian et al., 2008). Finally, in order to take strategic planning away from its one-dimensional focus, the integration of real options reasoning into strategic planning seems promising (e.g. McGrath, 1999)

Our scenario-based approach to strategic planning also contains implications for corporate practice. Particularly, the approach shows that scenario planning which has long been neglected by practitioners can serve as a valuable tool for strategy creation. Additionally, the approach requires strategic planners to rethink their one-dimensional approach to strategic planning and it urges them to also consider viewpoints of external stakeholder groups in strategic planning. In an increasingly complex, dynamic and volatile world this seems promising as also the practice of open innovation has shown (Chesbrough, 2003).

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