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A Scenario-based Approach to Strategic Planning

– Integrating Planning and Process Perspective of Strategy

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Abstract

For 20 years, conflict between the planning and process schools of strategy has shaped the debate on strategy creation. Here we argue that a scenario-based approach to strategic planning can serve as an innovative management tool in the field with the potential to overcome discrepancies between the two opposing schools of strategy. The scenario-based approach to strategic planning builds on the strengths of traditional scenario planning. It is an 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 built on specific management tools and is thus easy to implement. The outcome of this approach is a core strategy that is complemented by several strategic options derived from different scenarios. We illustrate the benefits of this management tool using experience gained in a consulting project in the German photovoltaic industry.

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1. Introduction

Here we address the question of 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 first emerged 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).

A positive relationship between strategic planning and company performance could not be determined empirically (Boyd, 1991) and since growing environmental turbulence made strategic planning increasingly difficult, the field faced increasing 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). Other authors also supported this view (Pascale, 1984; Hamel and Prahalad, 1994).

Although viewing 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 consistently rate (formal) strategic planning as one of the most important management tools (e.g. Rigby and Bilodeau, 2007). Nevertheless, frequent changes in the practices of formal strategic planning, as observed in empirical studies, indicate that 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 that allow for the responsiveness and improvisation required in dynamic, complex and volatile environments. Mintzberg (1994a) argues that only open and creative strategic thinking will lead to the emergence of innovative strategies that lay the basis for superior performance. However, he does not provide a clear set of tools to foster 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 Caillaet, 2008; Grant, 2003).

Here we offer such a synthesis by integrating scenario planning with strategic planning to provide 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 analyze their possible 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 so much in the creation of scenarios, but in the discussion of consequences (Bishop, Hines and Collins, 2007). Therefore, we argue that scenario planning provides the flexibility and openness of strategic thinking postulated by Mintzberg (1994a).

Traditional approaches to scenario planning are often criticized because of their complexity and the resulting high requirements for 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 approach to scenario planning that is more standardized and tool-based 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 that is complemented by several strategic options derived from different strategic scenarios. With this approach, we offer a management innovation that has the potential to revive management research and foster management practice in the field of strategic planning (Birkinshaw, Hamel and Mol, 2008; Whittington and Caillaet, 2008).

To develop a scenario-based approach to strategic planning, we first highlight the conflict that exists between the planning and process schools of strategy and the requirements to overcome this conflict. We then show to what extent traditional scenario planning fulfills these requirements before describing the scenario-based approach to strategic planning, including its benefits and pitfalls. We illustrate the benefits and pitfalls of this approach using experiences from a consulting project in the German photovoltaic industry.

2. 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 to develop and coordinate strategies for single business units. Around the same time, academic interest in strategic planning emerged. By 1965 the first comprehensive textbooks covering the process and tools for 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 (Ansoff, 1957; Porter, 1979, 1980). Overall, strategic planning emerged as a systematic, formalized process for strategy creation, starting with the setting of guidelines and targets and followed by analysis of the environment and the company itself, the formulation and coordination of strategies, and strategy implementation, including the monitoring of targets (Grant, 2003). The 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. However, these studies have never been able to consistently show that aspects of strategic planning, such as 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 increasing criticism of the so-called planning or design school. In particular, Mintzberg (1994a) argued that successful strategies can never be planned, since planning is rooted in existing mental models and emphasizes analysis. Thus, it preserves the existing and only allows for incremental change, if at all. In addition, the aim of strategic planning is to formulate the one 'best' strategy. This aim, however, is only achievable if strategic planners are able to predict future developments. However, in view of increasing environmental turbulence, prediction seems hardly possible (Mintzberg, 1991).

From Mintzberg's (1994a) point of view, successful strategies instead emerge in a messy process. He therefore postulated that strategic thinking should be emphasized 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 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 have even increased the emphasis on strategic planning by introducing a Chief Strategy Officer responsible for corporate strategic planning at the board level (Breene, Nunes and Shill, 2007). Finally, 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 does not seem to be in decline at all. 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, many top managers are not and have never been fully satisfied with the development state of strategic planning. Ocasio and Joseph (2008) and 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 and the (emergent) process schools of strategy, some authors have already called for research that aims to overcome the conflict between the different strategy perspectives (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 strategy creation concepts that incorporate creativity and allow for intuition, thus leaving room for innovative strategies that challenge existing assumptions and overcome inertia. To fulfill these requirements, strategy creation processes should not focus on just one 'best' strategy option, but rather should consider multiple options (Grant, 2003). In addition, 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 that incorporates specific strategy tools and they need to be adaptable to environmental changes (Ghobadian et al., 2008).

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

- *Multiple options:* An integrative strategy framework needs to explicitly consider different strategy options 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 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 easy and quick application to practice is possible.
- *Flexibility:* An integrative strategy framework needs to be adaptable to different environmental conditions to facilitate application.

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

3. 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 better handle the 1973 oil crisis, to which Shell reacted 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 the perceptual bias of managers (Porter, 1985; Wack, 1985; Schoemaker, 1995). Scenario planning is based on 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 (Shell International, 2003) and the consulting company Global Business Network (GBN; Schwartz, 1996). Millet (2003) even calls these the 'gold standard of corporate scenario generation'. The two academic approaches most often cited are those by van der Heijden and Schoemaker (Chermack, Lynham and Ruona, 2001).

Although all of these approaches differ in their details, a comparative analysis of different scenario approaches reveals certain characteristic process steps that many of them share. We have been able to identify a total of six different process steps,

although hardly ever 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 regard to goals and content, 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 International, 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 and the participating team. It thus generates a common ground for the project (Schoemaker, 1995; van der Heijden, 2005; Shell International, 2003; Schwartz, 1996).
- *Perception analysis:* The approaches of Shell, GBN and Schoemaker integrate an analysis step called ‘Pioneering’ (Shell International, 2003) or ‘Identifying the Major Stakeholders’ (Schoemaker, 1995) following definition of the project scope. The aim of this process step is to analyze the perception of the executives participating in the scenario project. This is done by first identifying the existing mental models of the company’s management and challenging them in a second step by including external opinions. By benchmarking their own assumptions against external perceptions, managers both learn about the interests and expectations of external stakeholders as well as their own assumptions and obtain a holistic view on possible maps of the future (Schoemaker, 1995; Shell International, 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 phase, 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 and their importance and potential impact for the company to identify the most crucial environmental drivers the

corporation has to consider in its planning (Schwartz, 1996; van der Heijden, 2005; Shell International, 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 a specific picture of the future (Schwartz, 1996; Shell International, 2003). Scenario creation opens the perception of the participants and sets the foundation for the subsequent strategy definition phase in which possible consequences and action plans for each scenario are developed (Schoemaker, 1995, Shell International, 2003).
- **Strategy definition:** In this phase, also called ‘Implications’ (Schwartz, 1996) or ‘Option Planning’ (van der Heijden, 2005), companies can test decisions and strategic options against the multiple scenarios that 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 what happens in the future.
- **Monitoring:** A few approaches, such as those of GBN and Royal Dutch Shell, include a sixth phase called ‘Selection of Leading Indicators and Signposts’ (Schwartz, 1996) or ‘Reconnaissance’ (Shell International, 2003). In this phase, several indicators are first defined and then monitored to check if strategic changes are needed. Schoemaker (1995) and van der Heijden (2005) also mention the importance of continuous scanning of the environment and repetition of the scenario process if the environment changes drastically.

Most scenario approaches follow these process steps in one way or another. However, there is hardly an approach that contains all six steps. Nevertheless, scenario planning projects generally take perspectives and viewpoints of multiple stakeholders into account to create different scenarios comprising 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 integration and alignment of 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 for strategy creation. According to anecdotal evidence, companies such as 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 for major oil companies.

Nevertheless, traditional scenario planning suffers from a number of weaknesses related in particular to the complexity of traditional scenario planning projects. Most scenario projects require a substantial investment of time and other resources (Bradfield, 2008). Practical experience shows that scenario projects usually take a minimum of 5 months and can last as long as 1 year (Shell International, 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, very few scenario approaches offer standardized tools and even then 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 International, 2003). In addition, many scenario experts are reluctant to fully disclose their methodologies (Chermack et al., 2001). Thus, traditional scenario planning techniques are hard to replicate and scenario processes are highly variable 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 for time ranges beyond five years (Wack, 1985; Moyer, 1996; Schwartz, 1996).

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

4. Design of a Scenario-based Approach to Strategic Planning

4.1. Overview of the approach

The scenario-based approach to strategic planning presented here builds on 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. By following this process, we ensure 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 lies in standardization. Our approach follows a clearly structured procedure that reduces the complexity of scenario planning projects and allows for quicker and easier application in practice. The approach is organized into six clearly defined steps, each of which is connected to a standardized tool (Figure 1). These tools can be easily applied, which guarantees that the process can be repeated with low variability. Our experience shows that the approach decreases the time needed to carry out the planning process to 4–6 weeks, a duration that is typical for the initial, more strategic phase of planning processes (Ocasio and Joseph, 2008; Grant, 2003).

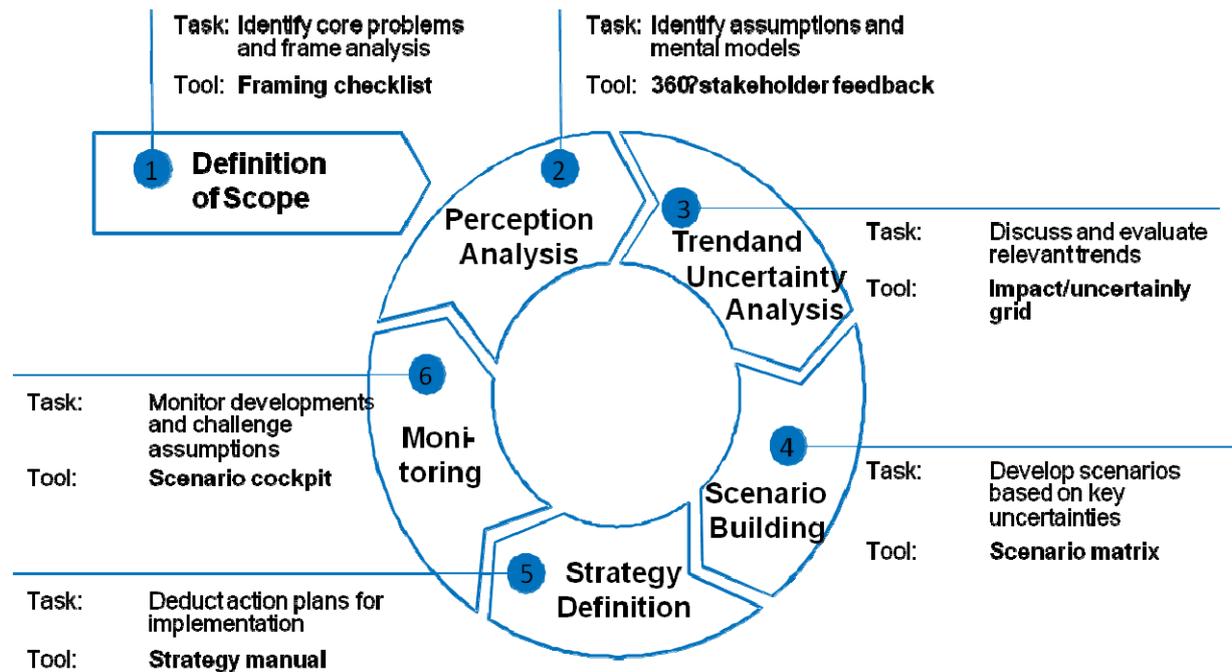


Figure 1: Overview of the scenario-based approach to strategic planning

In the following we 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 illustrate the application of our approach using 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. This case study is particularly relevant because this industry has faced tremendous volatility and structural changes triggered by shifts in the technological, political and competitive landscape over the last 2 years. New technologies such as thin-film cells and solar thermal power plants are evolving, posing substitution threats to existing technologies. Furthermore, the future of both the global and 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. These companies can produce their modules at up to 30% lower costs compared to German manufacturers. Finally, we show how the approach can be effectively integrated into the strategic planning process of a company.

Process Step 1: Definition of Scope

In the first process step, the overall frame of the scenario-based strategic planning project is defined. For this purpose, we developed the framing checklist, a tool that specifies the goal, the people involved and other key characteristics of the process. The checklist consists of answers to five simple questions, which need to be agreed on before the start of the planning process (Figure 2).

Goal of scenario project Definition of the question to be solved: Focus of the scenario analysis	
Strategic level of analysis Shall the scenario planning process be conducted for the macro, industry, 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)?

Figure 2: Framing Checklist

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

We 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 liaised with the top management to define the goal of the planning project as the development of four distinct scenarios for the future of the German photovoltaic industry and analysis of their strategic implications for the company. We decided to focus on corporate-level strategic implications for the company and a time horizon up to the year 2015. The top management team participated in the scenario building phase and the perception analysis, in which they provided the internal view of the company. We selected key competitors and independent research institutes as external stakeholders.

Process Step 2: Perception Analysis

In the second process step the perception (assumptions and mental models) of the participants involved in the planning process are identified and challenged. Three main goals drive this process step. The first goal is to establish a comprehensive list of factors that can 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. In particular, the aim of the third goal is to make top management more receptive to external developments by helping them to identify so-called blind spots, which are developments that they knowingly or unknowingly oversee, and weak signals, which are first indicators of future changes in the environment. To achieve these goals we 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 both open and closed questions concerning factors that might affect the company in the future. Different stakeholder groups are selected and asked to answer this questionnaire. Among these groups are external stakeholders (e.g. the top three suppliers and top three customers or even a member of the workers' union), internal stakeholders (e.g. top managers and strategic planners), employees in key operational positions (e.g. marketing, sales and R&D), and external specialists (e.g. consultants, business or industry experts). These four groups provide a comprehensive knowledge pool and allow the scenario team to combine and compare different perspectives on and perceptions of the future. The outcome of this process step is an extensive evaluated list of factors that can potentially have an impact on the company. Simultaneously, the 360° stakeholder feedback sheds light on blind spots and weak signals (Figure 3).

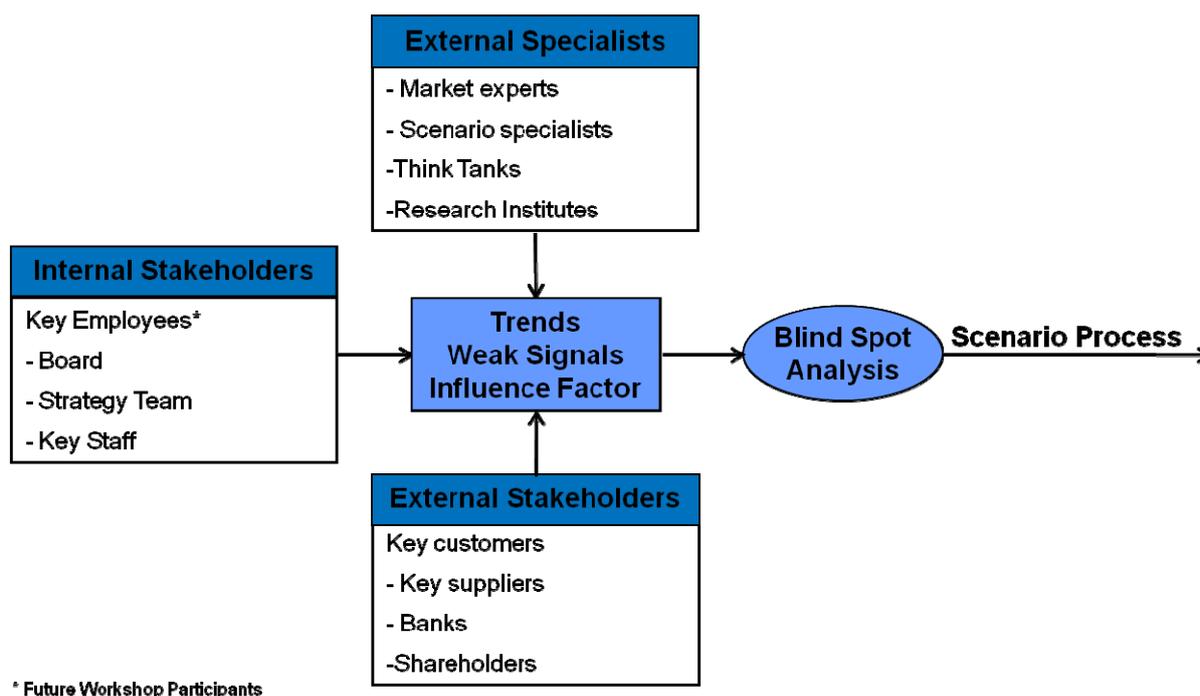


Figure 3: 360° Stakeholder Feedback

We applied this 360° stakeholder feedback to assess factors influencing the photovoltaic industry in Germany up to 2015. For this purpose, we asked the management of our partner company, top managers of key competitors and independent research institutes to fill in a questionnaire. The outcome was a comprehensive list of 29 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 is 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 the important trends and critical uncertainties that can potentially have an impact on the future of a company? Our 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 that can potentially have an influence on the future development of an organization identified using 360° stakeholder feedback. The impact/uncertainty grid is a matrix in which all identified factors are located according to their potential

performance impact and their degree of uncertainty for the future. The higher the potential performance impact of a factor, the higher is its place in the grid. The higher the uncertainty, the more a factor is moved to the right-hand side of the grid (Figure 4).

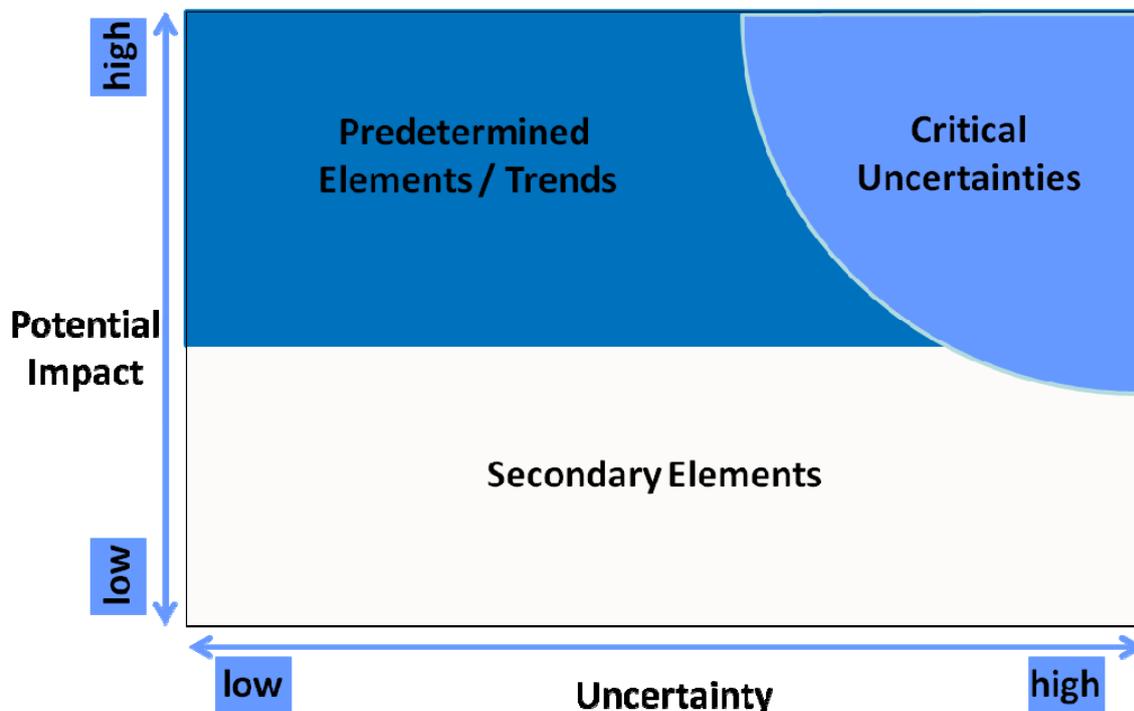


Figure 4: Impact/Uncertainty Grid

The impact/uncertainty grid is divided into three sections. The bottom section contains factors that have a relatively low performance impact. They are called secondary elements and are not further considered in the scenario planning process. The upper-left section contains factors that have a comparatively high performance impact and are relatively predictable. These factors are called trends. They are important for the description of scenarios in the following step of the scenario-based approach to strategic planning (Schwartz, 1996). Factors located in the upper-right section are called critical uncertainties. They are factors that have a high performance impact for which future development is rather uncertain. These critical uncertainties serve as the basis for identification of two key uncertainties, which 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 planning approach and are used in the development of scenarios in the subsequent step (van der Heijden, 2005).

The impact/uncertainty grid was first introduced in the 1970s by Kees van der Heijden, who developed the tool for better structuring of the large number of input variables normally used in scenario planning processes. The tool was first applied for scenario development at Royal Dutch Shell, the first company to extensively use a scenario approach to cope with future uncertainties (van't Klooster and van Asselt, 2006).

We applied the impact/uncertainty grid to cluster influencing factors in the German photovoltaic industry. As shown in figure 5, the factors identified included a change in cross-border labor mobility and development of power generation efficiency as secondary elements with a relatively low impact on the company. Factors such as changes in production costs of solar cells in Germany and in the EEG law in Germany were defined as trends. Finally, we identified several critical uncertainties and clustered them into two key uncertainties. Four political uncertainties such as the introduction of trade barriers formed one 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 next step of the process

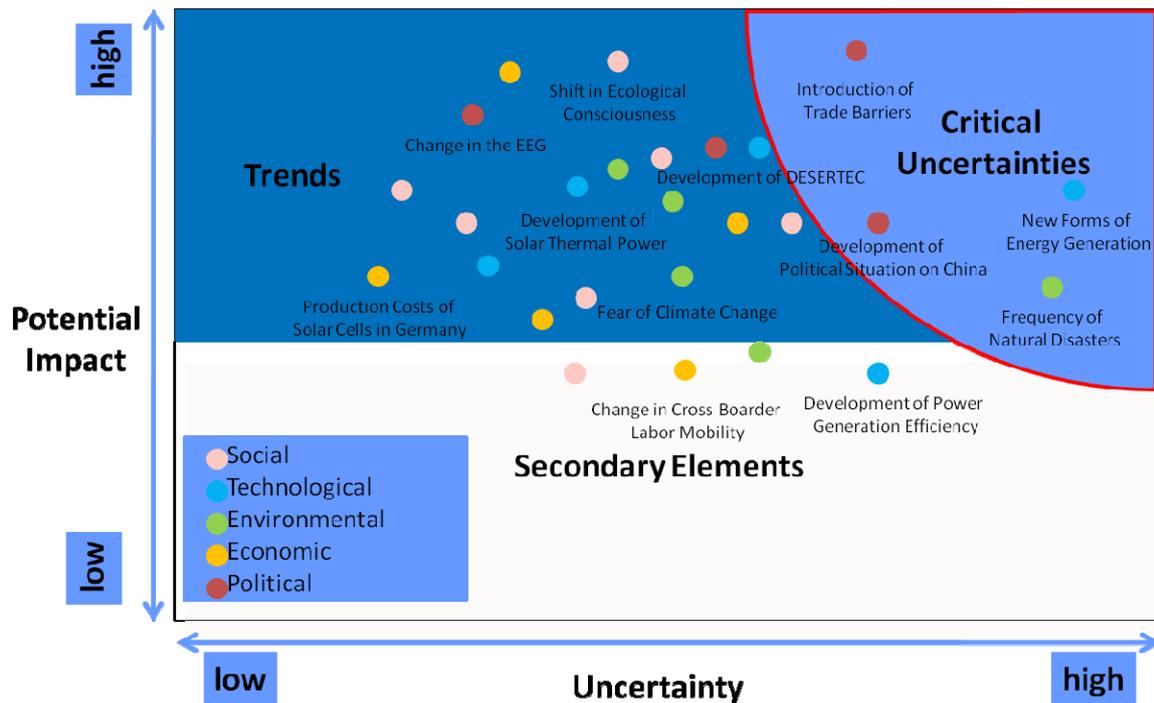


Figure 5: Impact/ Uncertainty Grid for the German Photovoltaic Industry

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 tool used for this step is a scenario matrix. Like the impact/uncertainty grid, the scenario matrix was first developed in the 1970s by Kees van der Heijden, who used it as a visual aid and logical scenario baseline at Royal Dutch Shell (van't Klooster and van Asselt, 2006).

The scenario matrix is a visual framework for deriving scenarios or end-states of corporate development. The two key uncertainties identified in step 3 of the process serve as the dimensions that span the matrix. These 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 (van't Klooster and van Asselt, 2006) (Figure 6).

Figure 6: Scenario Matrix

After having broadly determined the four scenarios using the two scenario dimensions, these scenarios have to be described in more detail in three steps: First, an influence diagram is developed for each scenario; this is a cause–effect chart that determines the path towards each of the four scenarios. Both trends and critical uncertainties identified in the previous step serve as the causes and effects in this diagram. Then a storyline for each scenario is developed using the influence diagram. Finally, the scenarios are described in full detail.

We applied this scenario matrix to derive and describe scenarios for the German photovoltaic industry. We first developed the scenario matrix using the two key uncertainties mentioned above. For this purpose, we defined the extreme values ‘favorable to German producers’ and ‘unfavorable to German producers’ for the key uncertainty ‘development of the regulatory environment’, and ‘slow development’ and ‘fast development’ for the key uncertainty ‘development of substitutes’. This yielded four scenarios for the German photovoltaic industry that we called ‘Phoenix’, ‘Survival of the fittest’, ‘Icarus’ and ‘Go green’. To further develop these scenarios into consistent stories, we created an influence diagram and integrated the important trends and critical uncertainties identified in the previous process step (Figure 7).

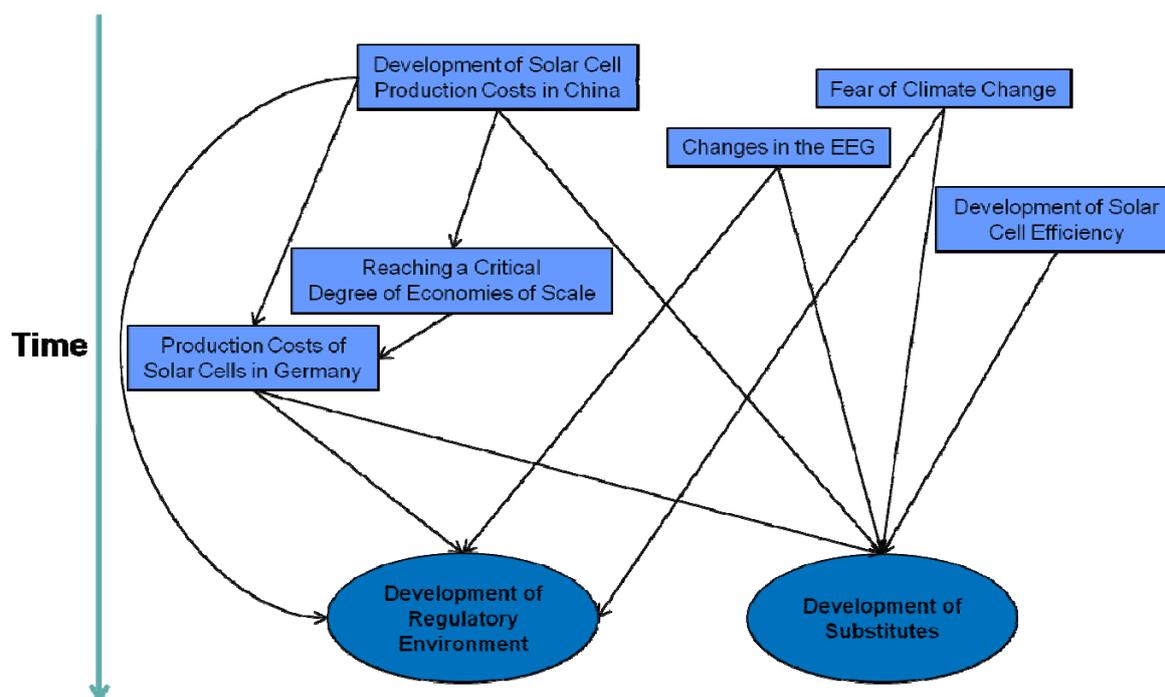


Figure 7: Simplified Influence Diagram for the German Photovoltaic Industry

Finally, we described the scenarios in full detail and obtained four plausible and consistent future states of the industry.

- *Phoenix* is a world that is dominated by German photovoltaic producers. Some 80% of the photovoltaic systems produced are thin-film-modules, for which European companies have a strong advantage over Asian competitors owing to their leading position in research and development. Global trade is free of barriers and emerging markets for photovoltaic modules are very 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 price-driven world market, which 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. Whereas 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 open to competition from overseas. Furthermore, solar thermal energy rather 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, which promise a safe, reliable and cheap energy supply for Europe and the world.

Process Step 5: Strategy Definition

In the strategy definition phase, existing strategies are tested against the multiple scenarios that were created and developing new strategies can be applied in one or several scenarios. This step thus builds the bridge from thinking about the future to deriving concrete strategy alternatives and action plans.

The tool we developed for this process step is a strategy manual comprising three steps for strategy creation. In the first step, the strategy discussion is structured around four important elements: (1) developments in the macro-environment, (2) the potential behavior of competitors and customers, (3) the intended positioning and competitive strategies of the company, and (4) the design of the value chain and action plans. These elements have to be determined for each scenario.

In a second step, the four elements for each scenario are used to determine which strategy elements 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 that complement the core strategy. Depending on the state of the environment (which of the scenarios is most likely to come true), some of these strategic options need to be executed immediately. For other options, (small) initial investments are necessary, whereas the other options remain possible strategies that might be executed at a later date. Real-option reasoning helps in creating core strategies and complementary strategy options. In particular, determining the potential value of growth, insurance and learning options is valuable in defining the size of potential investments and their timing (Copeland and Keenan, 1998; McGrath, 1999; Trigeorgis, 2000).

In the final step, the core strategy and complementary strategy options, including milestones for execution of these options, are described in detail and compared to the existing strategy. This serves as the basis for decisions on strategic change.

The outcome of the strategy definition phase is a robust strategy that is applicable in all possible future states. This core strategy is accompanied by several strategic options that are fitted 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 terms of 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 then comparing them. Based on this comparison, we identified a core strategy that focuses on research and development. In fact, for all four scenarios it is beneficial to invest in making 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 protects itself not only against potential substitutes, but also against low-price competition as its products offer a higher output/cost ratio. This strategy needs to be complemented by lobbying efforts to safeguard the important German subsidies for the industry and to prevent the establishment of trade barriers.

This core strategy has to be complemented by a scenario-specific strategy option, which we exemplify for the scenario Go green. In this scenario, subsidies in Germany have been reduced and competitive pressure from low-cost Asian manufacturers is 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 to meet or even undercut the cost base of rivals. The second option consists of establishing joint venture agreements with technology leaders in the area of solar thermal energy for rapid restructuring of the product portfolio in case a technological

shift towards this technology materializes. The company can immediately take the first steps towards investing in Asia and establishing joint ventures.

Process Step 6: Monitoring

In the final step of our approach to scenario-based strategic planning, the scenarios created are constantly benchmarked against real-world developments. This offers companies an early warning system that enables them to analyze whether the world is moving in the direction of a particular scenario and thus indicates which strategy option needs to be executed.

For this process step, we developed a tool called scenario cockpit, which 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 the second step, value ranges for these indicators are determined. Benchmarking of these ranges against actual values for the indicators reveals which scenario is closest to real-world development. The third step is constant monitoring of the indicators defined. This step is conducted by the planning team. The results are then visualized and periodically presented to decision-makers.

The scenario cockpit closes the continuous loop of our approach to scenario-based strategic planning. On the one hand it determines which strategic options need to be executed at what time, depending on the state of the environment. On the other hand, the scenario cockpit helps in assessing 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 the production costs of photovoltaic modules in Asia and the absolute level of subsidies paid to consumers on the basis of the German renewable energy law, are now regularly monitored to ensure rapid implementation of appropriate strategic options.

4.2. 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).

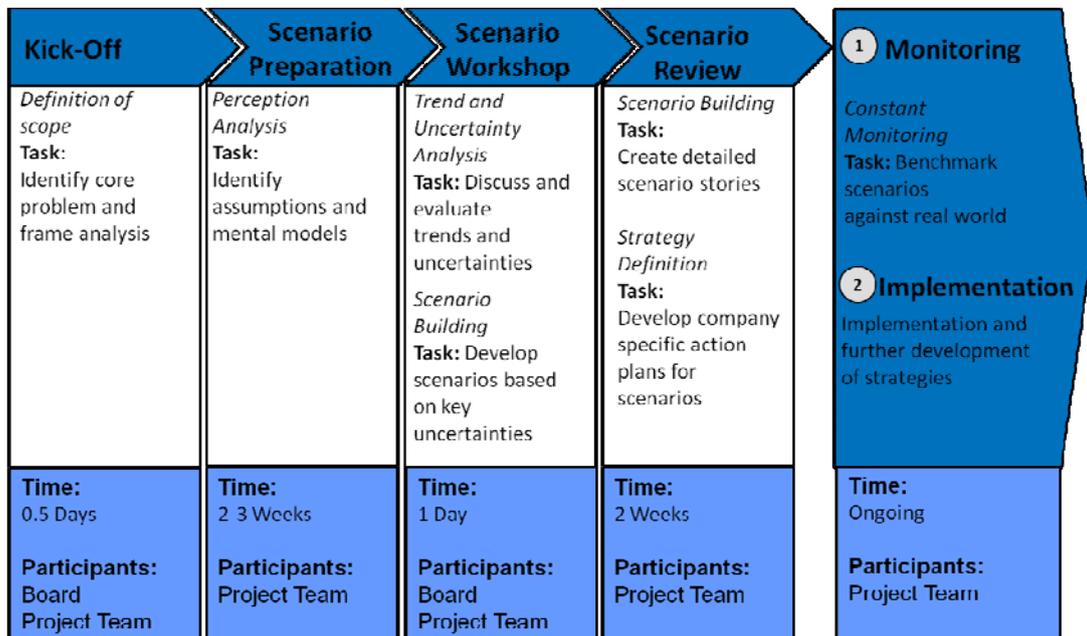


Figure 8: Scenario-Based Strategic Planning Process

The strategic planning process is mainly conducted by the planning team, which coordinates the process and conducts the necessary analyses. The company board or top management team and business unit heads should attend the kickoff meeting and the 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 the 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 the corresponding strategic options and summarizes them in the strategy manual. The strategy proposal is again presented to the board, which decides which strategy and action plans to pursue before these are implemented in the next step. Strategy implementation goes hand in hand with constant monitoring of real-world developments using the scenario cockpit. This enables the planning team to adjust the chosen strategy depending on environmental developments.

4.3 Evaluation

Overall, the scenario-based approach to strategic planning fulfills all the requirements of a framework for strategy creation that is supposed to integrate planning and process perspectives of strategy. By building on the six steps commonly used in traditional approaches to scenario planning, our approach facilitates management of the uncertainty and complexity of the current 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 identify weak signals and blind spots. Because of its tool-based design, our approach can be performed quickly and flexibly, which facilitates 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 are apparent in the illustrative case study presented.

Thus, we are convinced that our approach takes into account the problems that managers face in strategic planning today. By combining traditional scenario planning, strategic thinking, real-option reasoning and strategic planning, this approach makes the complexity, dynamics and volatility of the current business world manageable. Moreover, the approach can be applied for different time horizons. Our project experience leads us to believe that the approach increases the effectiveness and efficiency with which strategic planning can be conducted in practice. Nevertheless, the approach has only been applied in a few companies to date. Therefore, research on a larger scale is necessary to determine the performance of the scenario-based approach to strategic planning.

5. Conclusion

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

For future research directions, it would be sensible to further develop and extend strategy creation frameworks that integrate different strategy perspectives (Grant, 2003; Brown and Eisenhardt, 1997). In addition, further research on the performance implications of strategic planning is necessary to account for new and improved strategy creation frameworks that have been developed (e.g. Ghobadian et al., 2008). Finally, to move strategic planning from its one-dimensional focus, the integration of real-option reasoning into strategic planning seems promising (e.g. McGrath, 1999).

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

References

- Ansoff, H. Igor.** 1957. "Strategies for Diversification". *Harvard Business Review*, **35**(5): 113-124.
- Ansoff, H. Igor,** 1965, *Corporate Strategy*. New York: McGraw-Hill.
- Ansoff, H. Igor.** 1991. "Critique of Henry Mintzberg's 'The design school: reconsidering the basic premises of strategic management'". *Strategic Management Journal*, **12**(6): 449- 462.
- Birkinshaw, Julian, Gary Hamel and Michael J. Mol.** 2008. "Management Innovation". *Academy of Management Review*, **33**(4): 825-845.
- Bishop, Peter, Andy Hines and Terry Collins.** 2007. "The Current State of Scenario Development: An Overview of Techniques". *Foresight*, **9**(1): 5-25.
- Boyd, Brian K.** 1991. "Strategic planning and financial performance: a meta-analysis". *Journal of Management Studies*, **28**: 353-374.
- Bradfield, Ronald M.** 2008. "Cognitive Barriers in the Scenario Development Process". *Advances in Developing Human Resources*, **10**(2): 198-215.
- Breene, R. Timothy S., Paul F. Nunes, and Walter E. Shill.** 2007. "The chief strategy officer". *Harvard Business Review*, 85-93.
- Brown, Shona L. and Kathleen M Eisenhardt.** 1997. "The art of continuous change: linking complexity theory and time-based evolution in relentlessly shifting organizations". *Administrative Science Quarterly*, **42**: 1-34.
- Cailluet, Ludovic, T. Rose and Richard Whittington.** 2005. *The rise and rise of strategic planning*. Paper presented at the British Academy of Management Conference.
- Chermack, Thomas J., Susan A. Lynham and Wendy E. A. Ruona.** 2001. "A Review of Scenario Planning Literature". *Futures Research Quarterly*, **17**(2): 7-31.
- Chesbrough, Henry W.,** 2003, *Open Innovation. The New Imperative for Creating and Profiting from Technology*, Boston: Harvard Business School Press.
- Copeland, Thomas E. and Philip T. Keenan.** 1998. "How Much is Flexibility Worth?". *The McKinsey Quarterly*, **2**: 38-49.
- Ghobadian, Abby, et al.** 2008. "Formal strategic planning, operating environment, size, sector and performance". *Journal of General Management*, **34**(2): 1-20.
- Grant, Robert M.** 2003. "Strategic Planning In a Turbulent Environment: Evidence from the Oil Majors". *Strategic Management Journal*, **24**: 491-517.

- Hamel, Gary and Coimbatore K. Prahalad**, 1994, *Competing for the Future*. Boston: Harvard Business School Press.
- Hodgkinson, Gerard P.** 1997. "Cognitive inertia in a turbulent market: the case of UK residential estate agents". *Journal of Management Studies*, **34**: 921-945.
- Kahnemann, Daniel and Dan Lovallo**. 1993. "Timid choices and bold forecasts: A cognitive perspective on risk and risk taking". *Management Science*, **39**: 17-31.
- Learned, Edmund, C. Roland Christensen, Kenneth R. Andrews and William D. Guth**, 1965, *Business Policy: Text and Cases*. Homewood: Irwin.
- McGrath, Rita Gunther**. 1991. "Falling Forward: Real Options Reasoning and Entrepreneurial Failure". *Academy of Management Review*, **24**: 13-30.
- Millet, Stephan M.** 2003. "The Future of Scenarios: Challenges and Opportunities". *Strategy & Leadership*. **31**(2): 16-24.
- Mintzberg, Henry**. 1991. "Learning 1, planning 0: reply to Igor Ansoff". *Strategic Management Journal*, **12**(6): 463-466.
- Mintzberg, Henry**, 1994a, *The Rise and Fall of Strategic Planning*. New York: The Free Press.
- Mintzberg, Henry**. 1994b. "The Fall and Rise of Strategic Planning". *Harvard Business Review*. **72**(1): 107-114.
- Moyer, Kathy**. 1996. "Scenario Planning at British Airways-A Case Study". *Long Range Planning*. **29**(2): 172-181.
- Ocasio, William and John Joseph**. 2008. "Rise and Fall- or Transformation? The Evolution of Strategic Planning at the General Electric Company 1940-2006". *Long Range Planning*, **41**: 248-272.
- Pascale, Richard T.** 1984. "Perspective on strategy: the real story behind Honda's success". *California Management Review*, **26**: 47-72.
- Phelps, R., C. Chan and S. C. Kapsalis**. 2001. "Does scenario planning affect performance? Two explanatory studies". *Journal of Business Research*, **5**(1): 223-232.
- Porter, Michael E.** 1979. "How Competitive Forces Shape Strategy". *Harvard Business Review*. **57**(2): 137-145.
- Porter, Michael E.**, 1980, *Competitive Advantage: Techniques for analyzing Industries and Competitors*. New York: The Free Press.
- Porter, Michael E.**, 1985, *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: The Free Press.

- Rigby, Darrell and Barbara Bilodeau.** 2007. "Selecting management tools wisely". *Harvard Business Review*, **85**(12): 20-22.
- Ramanujam, Vasudevan, N. Ramanujam and John C. Camillus.** 1986. "Multiobjective assessment of effectiveness of strategic planning: a discriminant analyses approach". *Academy of Management Journal*, **29**(2): 347-472.
- Schoemaker, Paul J. H.** 1995. "Scenario Planning: A Tool for Strategic Thinking". *Sloan Management Review*, **37**(2): 25-40.
- Schoemaker, Paul J. H. and George S. Day.** 2009. "How to Make Sense of Weak Signals". *Sloan Management Review*, **3**(50): 80-89.
- Schwartz, Peter,** 1996, *The Art of the Long View. Planning for the Future in an Uncertain World.* New York: Doubleday Publishing.
- Shell International,** 2003, *Scenarios: An Explorer's Guide.* London: Shell.
- Trigeorgis, Leons,** 2000, *Real Options: Managerial Flexibility and Strategy in Resource Allocation.* (5th ed.). Cambridge: MIT Press.
- Van der Heijden, Kees,** 2005, *Scenarios: The Art of Strategic Conversation.* (2nd ed.). Chichester: John Wiley & Sons.
- Van Klooster, Susan A. and Marjolein B. A. van Asselt.** 2006. "Practicing the scenario-axes technique", *Futures*, **38**: 15-30.
- Wack, Pierre.** 1985. "Scenarios: Uncharted waters ahead". *Harvard Business Review*, **63**(5): 73-89.
- Whittington, Richard and Ludovic Caillaet.** 2008. "The Crafts of Strategy". *Long Range Planning*, **41**: 241-247.



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