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Towards a best-practice framework for strategic foresight: Building theory from case studies in multinational companies

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In many industries companies are faced with disruptions from emerging technologies, from the political and legislative environment, from alternative business models or from socio-cultural shifts. To be able to anticipate, identify and manage disruptions, companies are increasingly developing and experimenting with new strategic foresight (SF) practices. The research is currently limited to exploratory case studies and there is a need to broaden the knowledge and derive measures for measurement of SF practices.
Building on a literature review, data from 56 interviews in nine multinational companies (MNC) and data gathered at a practitioner conference on SF we identify new aspects in SF practices. Using clustering we develop a generic capability model that can be used for benchmarking.

Keywords: Strategic foresight, best-practice framework, capability model, technology intelligence, political foresight, consumer foresight, competitive intelligence.

Introduction

Companies are faced with disruption from emerging technologies, in the political and legislative environment from alternative business models as well as socio-cultural shifts (Christensen, 1999; Day and Schoemaker, 2005). In some cases these disruptions can prove life threatening even for multinational companies (Arnold, 2003; Winter, 2004).
One example of a company that was faced with drastic disruption is IBM. From the 70s to the 90s IBM was the dominant player in the mainframe business, holding a market share of 70% and making 95% of the industry's profit (Christensen and Raynor, 2003). In the 90s this situation changed dramatically leaving IBM close to bankruptcy. A mixture of overpricing and leaving customers unsatisfied lead to a push towards modularization of the formally integrated mainframe business and depriving IBM of its dominant market position as smaller rivals emerged and teamed-up. Fortunately IBM was fast enough to react by changing its business focus from manufacturing to consulting and thus achieved not only to escape bankruptcy but to move to a new hey-day (Garr, 2000).
Other companies had less successful experiences with disruptions. A recent example is the Siemens telecommunication division. Telecommunications is not only Siemens founding root but also used to be its core business and with 55,000 employees its largest business (Die Zeit, 2006). Although the telecommunication business is believed to be one of the most innovative industries, which yields much potential, Siemens was not able to maintain a competitive position. In consequence it had to sell-off its mobile phone business in 2005 and to joint-venture its network component business with Nokia in 2006.
In recent economic history telecommunication is probably on the industry faced with the most large scale disruptions. In the technology domain the most prominent disruptions are the introduction of mobile telephony and the switch from copper wire to all-IP networks. These technological disruptions have led to fundamental changes in demand patterns for communication services, especially through the introduction of mobile telephony. In the political domain the deregulation had equally strongest impact on the network component providers by multiplying the potential customers. All these disruptions have made it particularly challenging for

the established incumbents to be fast and flexible enough to adapt to the changes in order to maintain their competitive position.
In the quest to develop capabilities that will enable them to navigate through uncertain, complex and volatile environments large companies are exploring new methods and experiment with new practices. They aim at developing capabilities for identifying disruptions and emerging trends as well as triggering adequate and timely reactions. The resulting approaches have become known as Strategic Foresight (SF) practices.
In the light an increase of frequency of disruptions, it is not surprising that various studies have identified an increasing in the perceived relevance of SF in corporate management (Rauscher, 2004; Roll, 2004; Schwarz, 2007). At the same time the implementation of effective SF systems remains limited (Day and Schoemaker, 2004; Liebl, 1996; Roll and Weber, 2006). This suggests, that not much has changed from 10 year back when Lesca and Caron showed, that the usage of anticipatory information in strategic decision making is surprisingly low (Lesca and Caron, 1995). One possible explanation for this persistent gap between perceived importance and implementation could be the lack of applicable knowledge (Liebl, 2005).
This study aims at broadening the understanding and the knowledge by developing capability model for SF practices. This capability model can be used for benchmarking, which is recognized as a key element for advancing management practices in companies (Ransley, 1996). Our framework allows a better cross-company and cross-industry comparison of SF. The two research questions that guide the model development are:

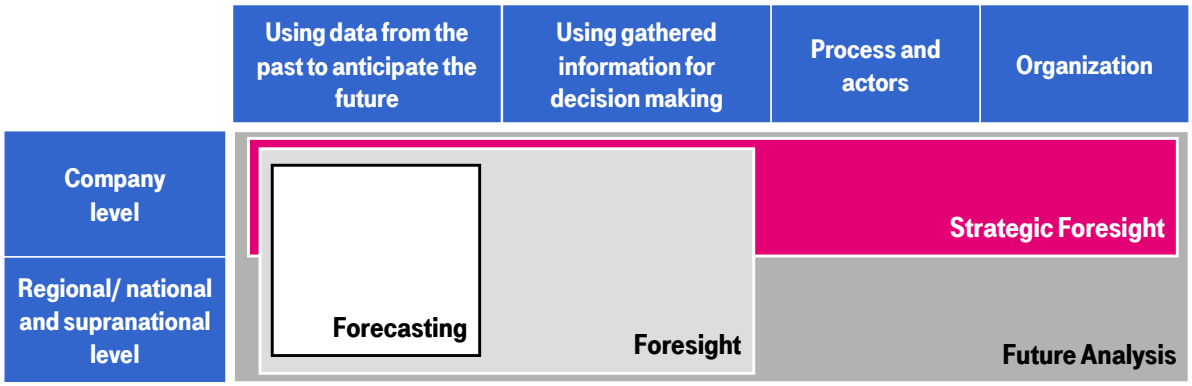
(i) **Q1:** What are the key capabilities within Strategic Foresight practices?
(ii) **Q2:** What kind of value contributions can be expected from Strategic Foresight?

Theoretical background

History of research

The research on the future and how to deal with it has evolved over time to include an increasing number of aspects. A classification of the research fields is shown in Figure 1.

Figure 1: Scientific classification of research on Future Studies



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In the 1970s, research conducted on the subject was termed *Forecasting* and focused on methods for predicting the future with modeling and econometric techniques, mainly using data from the past (Anderson, 1997). These methods included trend extrapolation, S-curves, trend curves, and patent and publication analysis. At this stage forecasting was restricted to a large extend to the technology perspective.

Foresight broadened the scope of research to incorporate methods that enable networking for information gathering, assessment and interpretation, and methods that support decision making (Cuhls, 2003). Furthermore, Foresight includes research on the capacity of organizations to cope with the future (Tsoukas and Shepherd, 2004). Both Forecasting and Foresight techniques have been investigated on a company level and on a regional, national and supranational level, such as economic areas.
In the 1990s, the scope of research was broadened by including the organization and the processes of the future investigation. The term *Strategic Foresight* was developed to refer to research focused on the company level. (Rauscher, 2004; Roll, 2004; Slaughter, 1997). Today, to a large extent, *Future Analysis* has substituted Strategic Foresight as the preferred term (Burmeister et al., 2002; Dürr et al., 2004; Kreibich, 2006; Porter et al., 2004). In this article we use the term Strategic Foresight to emphasize the focus on the company level only.

Definitions

Strategic Foresight

In the literature Strategic Foresight is defined as the ability to look forward and to use the insights in organizationally useful ways, such as shaping the strategy or defining new markets, products, and services (Slaughter, 1998). It is a process, which allows identifying future developments in science, technology, economy, and society systematically before these developments become trends (Blackman and Henderson, 2004; Martin, 1995; Reger, 2001; Slaughter, 1996; Tsoukas and Shepherd, 2004) or before the small problems turn into crisis (Day and Schoemaker, 2004). The process of SF involves methods and techniques to gather, asses, and interpret relevant information and to support decision-making (Andersen et al., 2004; Coates, 1985; Cuhls, 2003). Foresight is not forecasting; it does not predict the future, but prepares to meet future requirements and opportunities by anticipating a range of alternative developments (Anderson, 1997; Coates, 1985; Cuhls, 2003; Tsoukas and Shepherd, 2004).

Operational Foresight

It should be also noted that the Strategic Foresight should be differentiated against Operational Foresight (OF).OF deals with the assessment of threats and opportunities which are already known and can be linked closely to the concept of forecasting. OF is based on quantitative data and use indices for assessment of developments that are ongoing or indicators for the assessment of developments that are emerging (Krystek, 2007).

Technology Foresight

Technology Foresight as one search area of SF, which is aiming at identifying emerging technologies and predict future technology developments in order to support decision making concerning future R&D activities. It supports linking technology and corporate strategy (Andriopoulos and Gotsi, 2006; Lichtenthaler, 2002; Martin, 1995; Porter et al., 2004). The process consists of the identification (technology scanning) and observation (technology monitoring) of upcoming and existing technologies, assessment of their potential and relevance, and the storage and dissemination of the gathered information (Andriopoulos and Gotsi, 2006; Lichtenthaler, 2002; Martin, 1995). Technology scanning is the collection, analysis, and communication of external information on technological change (Raymond et al., 2001). Issues for monitoring can be international events concerning science and technology, the development of specific technologies, or activities of specific organizations (Ashton et al., 1996; Ashton et al., 1991). Technology Foresight can prevent technical surprises and prepare for new technical opportunities (Ashton and Stacey, 1995; Howell and Shea, 2001; Slaughter, 1998). To do so, it has to focus on very early indicators, often referred to as weak signals (Ansoff, 1976; Brenner, 1996; Huxold, 1990; Trommsdorff and Steinhoff, 2007).

Competitor Foresight

Competitor Foresight as another search area of SF. It has also a link to Technology Foresight, as it concerns among other things the technological movements of competitors (Ashton and Stacey, 1995; Lichtenthaler, 2005). Technology Foresight goes beyond information related to competitors, while Competitor Foresight reaches beyond technological aspects (Brenner, 1996; Brockhoff, 1991). It does not only aim at watching technological movements of competitors and assessing their technologies, but also at assessing the competitors' ability to gather and process information in order to benchmark with these competitors (Lackman et al., 2000; Makadok and Barney, 2001; Norling et al., 2000). The collected information allows determining the need to innovate, assessing own products (planned and existing ones), supporting decision-making concerning co-operation, and estimating the impact of innovations on competitive positions (Trommsdorff and Steinhoff, 2007).

Consumer Foresight

Consumer Foresight focuses on known and potential customers and deals with the collection of consumer related information as well as the early identification of consumers' needs (Trommsdorff and Steinhoff, 2007). Meeting the needs of consumers is essential for innovation success (Henard and Szymanski, 2001; Ruff, 2006; Slater and Mohr, 2006; Trommsdorff and Steinhoff, 2007). However, it is not sufficient knowing the current needs, but also future needs have to be identified. While building on customers' feedback rather leads to incremental innovations, identification of their future needs more often leads to disruptive innovations (Henderson, 2006; Slater and Mohr, 2006). To identify future consumer needs, Consumer Foresight estimates especially changes in values and lifestyles, since these influence customer behavior (Huston, 2004; Rosenberg and Shoemaker, 1980; Rosenthal and Capper, 2006; Ruff, 2006; Trommsdorff and Steinhoff, 2007).

Political Foresight

Political Foresight finally deals with changes and trends in legislation, regulation, and the political environment (Day and Schoemaker, 2005) as well as the public opinion, which eventually will influence the politicians agenda (Day and Schoemaker, 2004). Especially in highly regulated industries, such as transportation, telecommunication or energy, Political Foresight is a crucial element (Roll, 2004). Multinational organizations consider political and legal influences slightly more important than technological developments (Preble et al., 1988). Anticipating changes in legislation and regulation can lead to the identification of innovation needs. It enables the consideration of these changes in designing products and services (Huxold, 1990).

State-of-the-art in strategic foresight research

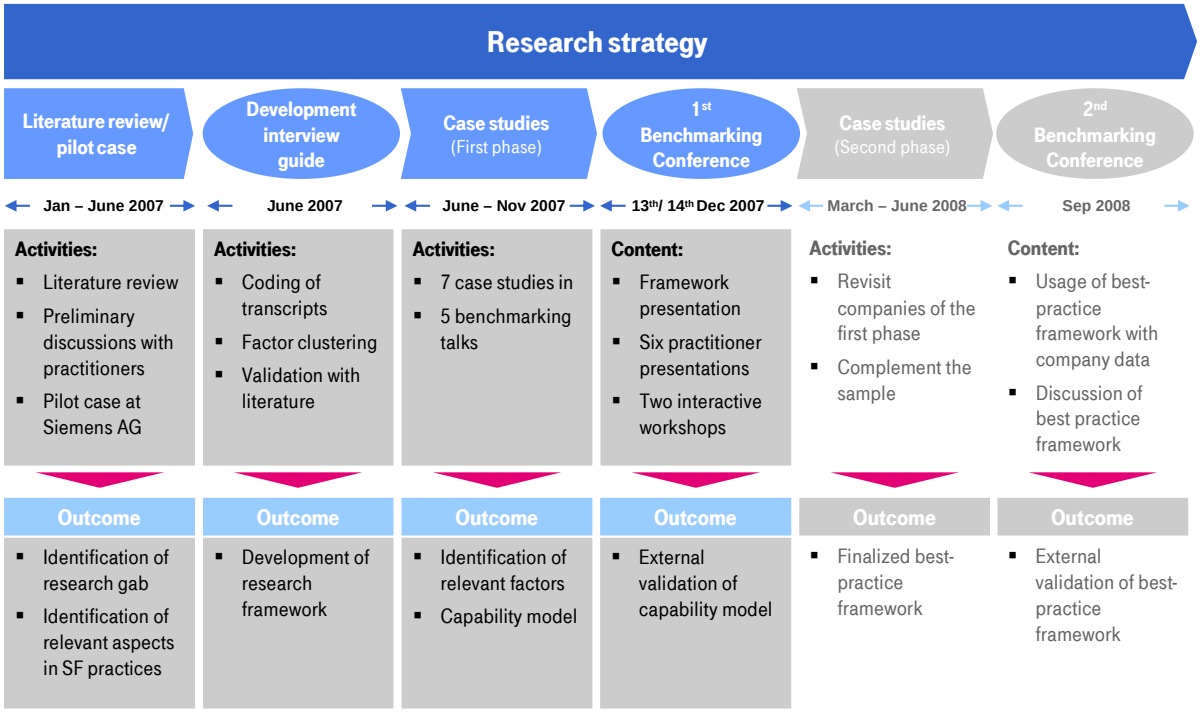
The research on strategic foresight is still a relatively young research field. Although various studies have been conducted in the field of technology foresight, as well as to a smaller extend on competitor, consumer and political foresight, the knowledge about how companies manage an integrated foresight, remains limited (Rohrbeck and Gemuenden, 2006). In consequence the studies that have been conducted on integrated SF practices have been exclusively explorative (Becker, 2002; Daheim and Uerz, 2006; Nick, 2008; Rauscher, 2004; Roll, 2004).

Research approach

Research strategy

In order to explore a field that is relatively new and about which the knowledge is comparably limited, case studies are recommended as the research method (Eisenhardt, 1989; Yin, 2003). Single case studies are particularly powerful in exploring a phenomenon in its context while keeping the richness of the studied incident and its context (Eisenhardt and Graebner, 2007). Multiple case studies will sacrifice some richness but will typically be able to develop theory which is more robust, more generalizable, and better testable. (Eisenhardt and Graebner, 2007). For this study a multiple case study design was selected, because there is already a general knowledge about strategic foresight in companies and therefore some richness could be sacrificed. In addition it was important to use different perspectives in order to ensure the identification of the widest possible scope of aspects.

Figure 2: Research strategy



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For the development of the SF capability model, we follow inductive research logic. Eisenhardt advises to engage in such research without assumptions or predefined hypothesis (Eisenhardt, 1989). Others argue that some theoretical background should help to focus and direct the research (Huberman and Miles, 2002; Yin, 2003). In research practice iterative cycles of inductive and deductive phase can be advisable (Emory and Cooper, 1991; Yin, 2003). This research used such an approach, which uses three iterative cycles to repeatedly refocus the research and ensure the external validity of the research results (see figure 2).

Sample and case selection

In case study research each case should be selected for a special purpose and contribute to answering the research question in different ways (Yin, 2003). The sampling is unlike to large scale statistical research not driven by achieving a representation of the whole population (Eisenhardt, 1989). The purposes for which the cases are chosen include replication, extension, contrary replication, and elimination of alternative explanation (Eisenhardt and Graebner, 2007). For that reason this study uses companies that are different from each other in terms of *industry*, *position in the value chain*, and from their primary *business driver*, which could be either *technology driven* of *market driven*. This gave us a total of four different clusters. In each cluster at least two cases were studied in order to recognize replication or contrary replication of the phenomenon (see Table 1).

Table 1 Sample

Clusters	*Cases*	*Industry*
Technology driven service companies	Deutsche Telekom AG	Telecommunication
	British Telekom	Telecommunication
	Telekom Austria	Telecommunication
Technology driven manufacturer	Philips	Electronics (Lighting)
	Osram	Electronics (Lighting)
Technology driven supplier	Continental	Automotive
	Thyssen Krupp Automotive	Automotive
Market driven service company	Vattenfall Europe	Utility (Electricity)
	EDP	Utility (Electricity)

Source: Own figure

Data collection instruments

For data collection multiple instruments were used. The amount of collected date per case studies varied as the research aim was not to compare the case studies but to ensure the identification of as many aspects as possible. Therefore in cases were concluded early, if a broadening of the aspect base was not expected. In table 2 an overview of the number of *data sets per cases study* is given. In addition the data sets are differentiated into the five *data collection instruments*.

The *questionnaire* consisted of questions on the context of the company only. These questions were selected from established measures used by Day and Shoemaker for deriving the need for corporate peripheral vision (Day and Schoemaker, 2005). These measures consist of the three major constructs nature of strategy, complexity of environment and volatility of environment.

The *interviews* were semi structured and supported by templates which were filled in with the informant. In total 56 interviews were conducted of which 66% have been recorded and transcribed. The interviews had duration of 1-2 hours. In each interview the research objective, the research framework and the key concepts were described in order to avoid misunderstanding.

The *templates* were used to visualize the answers of the informant within the interviews. The templates were refined and enhanced throughout the case study phase. The latest version consisted of the seven templates on the topics goals, actors, process, methods, organizational structure, information sources and value contribution. The templates were used to draw organisational charts, processes and actor networks. Methods were collected in the template as either technology or market oriented methods. The templates for goals and value contribution

were used for a first clustering of the answers. The usage of the template allowed validating the answers and the implication directly in the interview. This decreased the risk of misunderstanding and misinterpreting in the interviewer and informant exchange.
The *internal documents* consisted mostly of presentations on SF processes, SF results and working documents from SF projects. In addition organisational charts, annual report presentations and general company presentations were collected for analysis of the company's context.
In some cases the companies provided academic publications on their SF or innovation management practices. These were used pre-structuring of the interview, for clarification of SF processes and for understanding the logic behind their SF practices.

Table 2 Data collection instruments

	Data collection instruments				
Cases	*Questionnaire*	*Interviews*	*Templates*	*Internal documents*	*Publications*
Deutsche Telekom AG	0	22	9	6	4
British Telekom	0	2	0	3	2
Telekom Austria	0	11	11	2	0
Philips	0	3	3	2	2
Osram	0	5	4	2	1
Continental	0	3	3	1	3
Thyssen Krupp Automotive	0	2	2	1	0
Vattenfall Europe	2	8	8	2	0
EDP	0	0	0	0	0
TOTAL	2	56	39	19	12

Source: Own figure

Key informants

Informants were selected with the help of the activity responsible, who was in most case also the initial contact. He was asked to suggest further informants with complementary perspectives. Being able to capture different perspectives on the SF practices was achieved by defining four distinct roles. The number of informants per case and role is given in table 3.
The *initiator* is the person who identified the need for SF and started, promoted or requested the SF activity. This informant is expected to have rich knowledge about initial motivation, context of the company, initial goals and expected value creation. He is typically also capable of suggestion more key informants.
The *internal customer* is the person who should profit from the SF activity. He is the key informant for value creation. In addition he can report on the capabilities from a more objective perspective, i.e. he will most likely have a reduced fake-good bias, as he is not reporting on his results.
The *activity responsible* is the person in charge of the SF activity. He is not necessarily the person who executes the activity, but was so in 4 of the 9 cases. In the other cases he was delegating the work to the *activity team*. The activity responsible is the key informant to explain the motivation, goals and logic of the SF activity. He

might also be a good informant for the capabilities if he has enough knowledge of the actual execution of the activity.
The *activity team* is a person who is executing SF activities. He is the key informant for the capabilities. His reporting of value creation might be subject to the fake-good bias and was considered with care.

Table 3 Roles of key informants

	Roles of key informants			
Cases	*Initiator*	*Internal customer*	*Activity responsible*	*Activity team*
Deutsche Telekom AG	1	18	2	1
British Telekom	0	0	1	1
Telekom Austria	0	5	2	4
Philips	0	0	2	1
Osram	1	1	1	2
Continental	1	1	1	1
Thyssen Krupp Automotive	0	1	1	0
Vattenfall Europe	2	4	4	2
EDP	0	0	0	0
TOTAL	4	31	14	12

Source: Own figure

Data reduction and coding

For data reduction and coding a category system was developed. This was created both, inductively from interview transcripts and collected documents, and deductively from literature. The categories and sub-categories were then used as nodes, for the coding of the transcripts and documents (Richards, 2005). The coding was done on computer, supported by the NVIVO 7 software.

Drawing conclusions and verifying data

Following the replication logic, aspects of one category were identified within the coded text and compared to one another. These aspects were named both, by relying on “in vivo”-names, i.e. aspects which have been named in that way by the informants, and aspects that have been discussed under this name in literature. This allowed the identification of a set of 7 categories and 26 subcategories.
Within the subcategories the data was further analyzed to explore the intensity and extend to which the companies had activities in the subcategory. By comparing the data with literature 4 capability levels were defined. These are described by qualitative measures.
To validate the data the transcripts were sent back to the informants for validation and review. Furthermore presentations with individual assessments of each case were sent to the informants. These contained an evaluation of the SF capabilities for each participating company. The capabilities were rated based on the qualitative levels. The empirical data was presented to back-up the conclusions. The informants were asked to

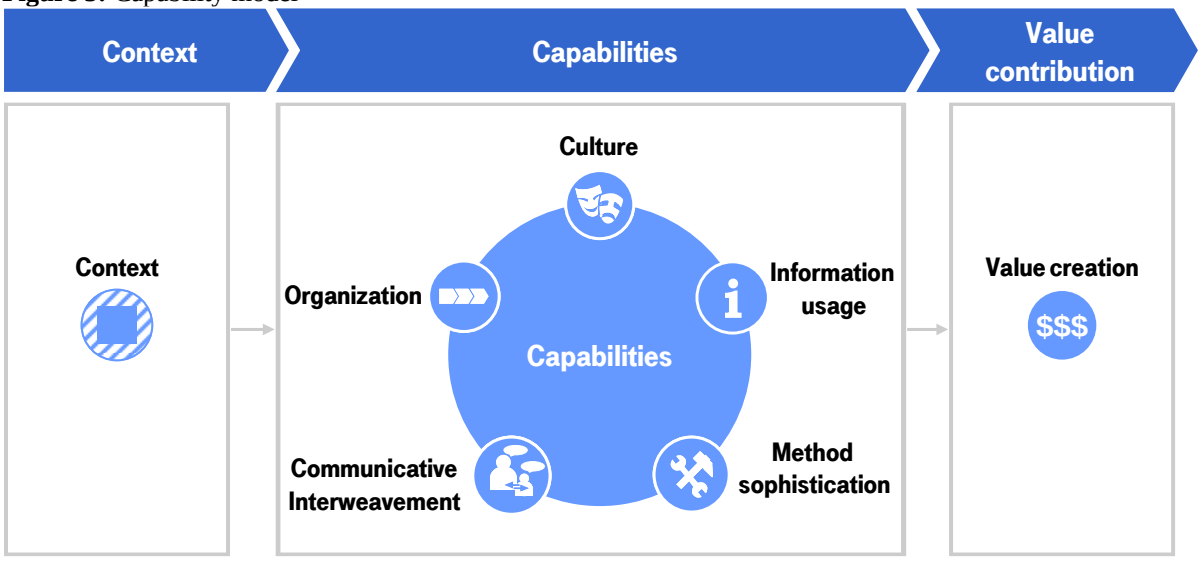
comment on the findings and the categories. In two cases the individual assessment was also presented and discussed with a larger panel of informants. This increased the external validity from a practitioner perspective. In order to further validate the findings from an academic perspective the capability model was presented at two academic conferences, in one lecture to an academic audience as well as discussed in detail three times within the research project.

Research findings

Capability model

The capability model consists in total of 7 categories, of which 1 is the *context*, 5 are *capabilities* and one is the *value creation* (see figure 3). It is implied that the capabilities contribute either in the group or individually to the value creation. A higher capability level should increase the likelihood that the activity will create value. The context is used to compare companies to one another. It is expected, that a different context will command a different set of capabilities and thus also influence the value creation of a certain set of capabilities.

Figure 3: Capability model



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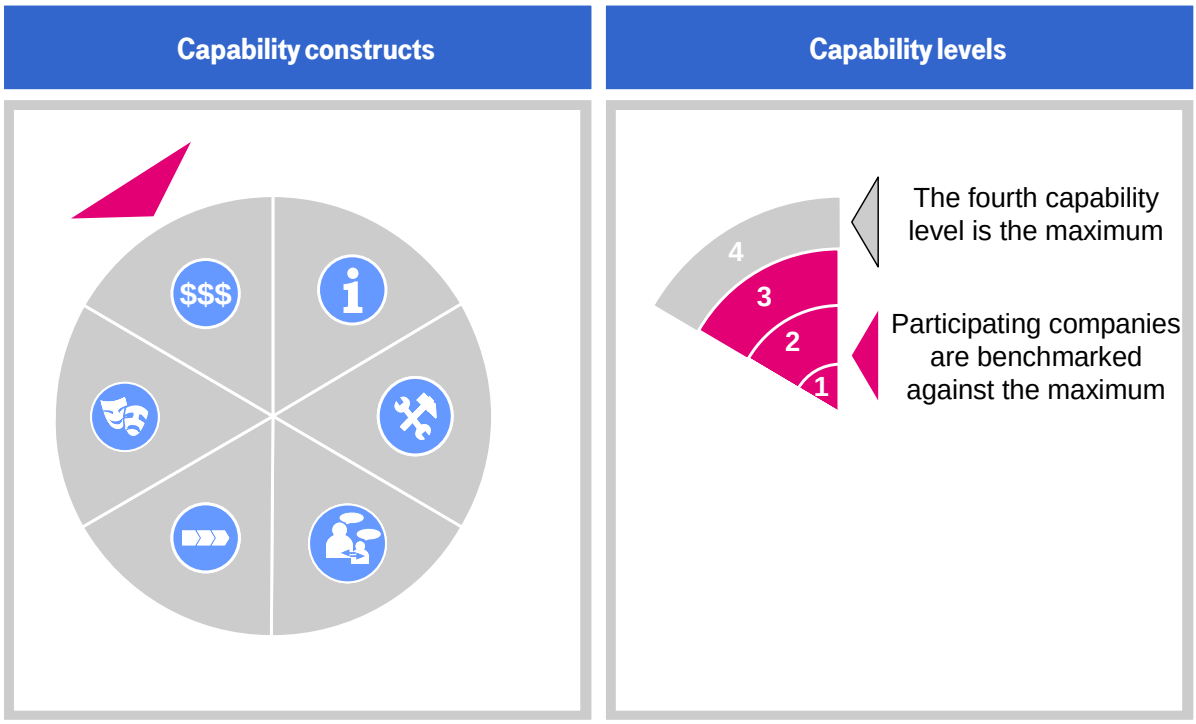
Context

For the analysis of the *context* we use the model of Day and Shoemaker which consist of three major constructs: Firstly the *nature of the strategy*, secondly the *complexity of the environment* and thirdly the *volatility of the environment (Day and Schoemaker, 2005)*. These constructs consist of 24 items, which are measured with a 7-point Likert-scale.

Capabilities

Using the data from the case studies, 5 major constructs were developed in a way that they are mutually exclusive and collectively exhaustive. The 5 constructs consist of 21 items and in each item 4 capability levels were identified. The fourth capability level can be seen as the maximum effort a company can use within the capability field (this logic is depicted in figure 4). It should be noted that the 5 capability constructs are joined in this figure by the value creation, because the same 4 level logic is used to measure the amount of output, or value creation of SF practices.

Figure 4: Capability levels



Source: Own figure

The first capability construct is the *information usage*. This construct is described by 3 items:

(i) The *reach* of information, which indicates the information gathering reach, which captures if information are used only from current markets and technologies, or extend to adjacent markets and technological fields or if even information from white spaces (beyond current and adjacent areas) are taken into account.

(ii) The *scope* of information, which consists of the areas of the environment: technologies, political environment, consumer and competitors.

(iii) The *time horizon*, were information are differentiated into short, medium and long term. To increase the comparability in cross-industry benchmarks we normalize the time horizon by using product life cycles. Short term are defined as current and next product life cycle, medium term is defined as 2-3 and long term as beyond 4 product life cycles.

The second capability is the *method sophistication*. In this case 4 items are used:

(i) The *integration capacity* describes to what extend the used methods are capable of integrating information with different levels of reach, from different areas and different time horizon

(ii) The *communication capacity* is used to measure how well the methods can be used for internal and external communication.
(iii) The *match with problem* item describes the capability of the company to use methods that correspond with the task or problem at hand.
(iv) Finally match with context measures the capacity of the company to select the correct method for the context in which it is situated.

The third capability was called *communicative interweavement* and is described by 5 items.
(i) The level of *actor identification* is used to describe to what extend the SF responsible and the internal customer are known to each other and among themselves.
(ii) The *network scope*, measures the reach of the SF network. Such a network could include SF actors from different divisions or different functions as well as internal experts and external partners.
(iii) The *accessibility* captures how fast and direct a SF insight can be communicated from the SF actor to a high-level internal customer, such as the CEO.
(iv) The *institutionalized communication* on SF issues, measures the degree of formal communication, which might take place in working groups, boards or projects.
(v) The *informal communication* on SF issues, measures the degree of informal communication taking place in lunch or coffee breaks, social events, outside the work environment or through the informal network to outside the company.

The fourth capability construct is the *organization* which is captured through 5 items.
(i) The *integration with other processes* identifies the interweavement with other management functions and their processes. Such functions include strategic and innovation management, corporate development, controlling and mergers & acquisitions.
(ii) The *mode* is used to describe the diversity of SF approaches. These can be continuous, such as in early-warning systems, or project bases.
(iii) The *trigger* analyses if the SF activities are initiated triggered top-down, bottom-up or both.
(iv) The *accountability for sensing and acting on weak signals*, measures the degree to which responsibility and accountability is defined with the SF network.
(v) And finally it is analyzed if a company has put in place *incentives to encourage and reward wider visions*.

The fifth construct has to a large extend been adapted from the Day and Shoemaker measures for peripheral vision which consist of 4 items (Day and Schoemaker, 2005).
(i) The *willingness to share across functions*,
(ii) the *readiness to listen to scouts and external sources*,
(iii) the *willingness to test and challenge basic assumptions*,
(iv) and the *Organization's attitude towards the periphery*.

Value creation

For the measurement of the value creation only 3 but comparably broad items are used:
(i) *Reacting to threats and opportunities* is proposed by most informants as the major value of SF systems. This holds especially true in companies that have a history of disruptions in their industry.
(ii) The *reduction of uncertainty* is a cluster which combined various suggested value contributions that allow to "clear the fog", but which are not aiming at identifying specific issues, such as opportunities and threats.
(iii) *Shaping the future* was perceived to be the ultimate goal of SF. Various case study participants shared examples, where they were able to influence external entities by developing compelling visions or publishing future scenarios.

Discussion and conclusion

Practical contributions

Management practice on SF in many companies leaves still much to be desired, particularly when it involves the need for paradigm changes (Prahalad, 2004). Although many companies have developed general and specialized sensors the usage of the signals and insights remain limited (Winter, 2004). The presented capability model provides a consistent framework that can be used for benchmarking of SF practices. Companies willing to improve their peripheral vision and their capability to react upon these changes can use the model to benchmark with other companies.

Theoretical contributions

The results of this study are several theoretical contributions, which extend our current knowledge. Based on the inductive reasoning this study revealed new aspects of SF practices and developed qualitative measures. Particularly the extension of the different types of value contributions through SF supports the hope that constructs for quantitative research can be developed. A further comparison of the findings with literature should yield additional potential for the development of a consistent framework for quantitative research.

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