Working Paper

Sensing Opportunities vs. Sensing Threats

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ABSTRACT

Drawing on dynamic capabilities theory, we examine the benefit of different environmental information sources concerning the sensing of threats in comparison to the sensing of opportunities, and their impact on a company's business performance. By analyzing data of 346 companies, this study provides extensive information about what kind of environmental source should be used by companies to sense opportunities as opposed to threats. The examination of these relationships further illuminates the still abstract "sensing capability" and hence the dynamic capabilities framework, which is the key to a company's sustainable competitive advantage.

The results of this study show that environmental sourcing is a key ingredient in the sensing capability, and that both sensing opportunities and sensing threats could be considered to be of high relevance to a company's business performance. In reflecting our results companies are enabled to choose the right environmental source for the right purpose, meaning either to identify opportunities or to identify threats. This study further demonstrates that a too strong focus on specific environmental sources rather leads to the recognition of opportunities than threats or vice versa

Keywords:

dynamic capabilities; sensing capability; business performance; environmental sourcing; environmental scanning; threats; opportunities

INTRODUCTION

Due to the increasing speed with which the world is changing, it is becoming more and more essential for companies to adapt in order to succeed. Consumer needs, technological innovations, and the activities of current and new competitors are changing constantly, leading to a business environment which moves fast. As a result of the rising competition and customer needs which are constantly evolving, one of the crucial factors in companies' success is their level of responsiveness to environmental change.

Therefore the question is how sustainable companies' competitive advantages are. According to Wiggins and Ruefli (2005), for example, companies are able to sustain their competitive advantage for increasingly shorter periods over time. Companies today have to be aware of how to deal with their resources more than ever so that they can make the best of opportunities arising from changes in their competitive environment, and remove threats (Hansen, Perry, & Reese, 2004; Kor & Leblebici, 2005; Lavie, 2006).

By doing so, the top priority is to recognize changes in the environment with the help of the right mechanism (Nastanski 2004). This activity of identifying and evaluating threats and opportunities is called "sensing". It is part of the Dynamic Capability framework and precedes the activity of "seizing", which focuses on the mobilization of resources. Teece (2007: 1322) describes the sensing capability as the "scanning, creation, learning, and interpretative activity" of market developments. There is still no clear and concrete picture of the framework dynamic capabilities including the sensing capability (Ambrosini & Bowman, 2009; Barreto, 2010; Di Stefano, Peteraf, & Verona, 2010, 2014; Helfat & Winter, 2011; Li & Liu, 2014), and we wish to address this in this paper.

Because environmental changes are often ambiguous (Ford & Baucus, 1987; Pfeffer & Salancik, 1978), the way in which they are interpreted plays a significant role in the actions (Barr, 1998; Barr et al., 1992; Dutton et al., 1990; Ginsberg and Venkatraman, 1992, 1995; Gioia et al., 1994; Sharma, 2000; Tripsas and Gavetti, 2000), the effectiveness, and performance of an organization (Ginsberg, 1994; Thomas et al., 1993, 1997; Lumpkin and Dess, 2006). Specifically, executives' perceptions seem to influence their organization's actions, as they filter, interpret, and categorize incoming information and make decisions based on these interpretations (Hambrick & Mason, 1984; Starbuck & Milliken, 1988; Thomas et al., 1993). However, almost no attention has been paid to the analysis of factors driving or forming the interpretation of market

information (Milliken, 1990; O'Reilly, 1983; Sutcliffe, 1997; Vandenbosch et al., 2006), especially not in regard to potential differences in sensing threats compared to sensing opportunities (Anderson and Nichols, 2007). We wish to address this issue by looking at various environmental information sources and their different effects on the sensing of threats versus the sensing of opportunities. These different effects are addressed in our study. Thereby, we are able to show how the perception of an environmental information from a specific environmental source affects the interpretation as an opportunity or as a threat. Furthermore a specific environmental source is characterized by the different aspects, too, which is to be taken into account.

Insights derived from this study will provide a guide for the management to focus the attention on the right environmental sourcing activities for either sensing opportunities or sensing threats depending on the circumstances and goals of the company. This provides companies with the know-how about what kind of environmental source should be used to identify opportunities compared to the identification of threats. We filled this research gap, by surveying top managers from 346 companies located in Germany.

This paper is organized as follows. The first section presents a brief introduction to the theoretical background of the model investigated. The second section presents a discussion of the hypotheses based on the expected behavior of the organization. The third section focuses on methods, while the fourth presents the results. The final section includes the discussion, conclusions, and limitations of our study.

THEORETICAL BACKGROUND

Dynamic Capabilities and their Dimensions

As we mentioned above, the dynamic capabilities framework attempts to find ways to deal with changes in the business environment. Teece and Pisano (1994) were one of the first researchers to investigate the concept of dynamic capabilities. (Teece, 2007: 1320) describes the aim of this framework as *"nothing less than to explain the sources of enterprise-level competitive advantage over time"*. Taking this framework as a basis, he suggests a combination of the critical capabilities (sensing, seizing, managing threats, and reconfiguring) which companies require to deal with environmental dynamics successfully. Recent empirical research reflects this activity-based understanding of dynamic capabilities (e.g., Ettlie & Pavlou, 2006; Kindström,

Kowalkowski, & Sandberg, 2012). Monitoring has also been added to this concept in the recent literature as ensuring the control and evaluation of the other activities (Barreto, 2010; Schreyögg & Kliech-Eberl, 2007).

On this basis, dynamic capabilities are determined as the organizational capacity of (1) sensing, (2) learning, (3) reconfiguring, and (4) monitoring. Research and management practice have increasingly demonstrated the need for and relevance of a dynamic approach which is incorporated in dynamic capabilities.

Day (2011: 194) showed "a real and expanding gap between the demands of markets and the ability of firms to address the complexity and velocity of change in their markets", which can only be dealt with by means of appropriate capabilities that are adapted to the new market reality. Like some other researchers, he concludes that resources are not sufficient because competition between companies usually decreases the value of resources over time. This finding has been addressed in the literature, although the analysis of it has remained superficial to a large extent, and there has been no precise analysis conducted in regard to dimension-related constructs (Ambrosini & Bowman, 2009; Barreto, 2010; Danneels, 2008; Di Stefano et al., 2014).

Dynamic Capabilities and Sensing Activities

In a meta-analysis by Barreto (2010) and a review article by Eriksson (2014) it is shown that even though some empirical studies focus on examining the sensing capability, most studies remain rather superficial and do not operationalize the sensing construct or break it down into a measurable model with concrete activities.

According to Teece's (2007) findings, the sensing of risks and opportunities is an important component of sustainable competitive advantage, as the success of companies primarily depends on their detecting and developing threats and opportunities. Protogerou, Caloghirou, and Lioukas (2011) also see the capability to sense environmental challenges as being of the "utmost importance", as it provides the company with a basis for making market-relevant decisions and thereby enables the firm "to reconfigure certain capabilities before they become core rigidities" (Protogerou et al., 2011: 620). Pavlou and El Sawy (2011) regard these dynamic capabilities as the identifying and interpreting capabilities of market developments. The capacity to seek and identify opportunities or threats in the business environment is a significant issue in many management research fields (e.g., entrepreneurship, marketing, strategic

management). In order to fill the above mentioned gap of conceptualization of sensing, we draw from different sources of market information (Foss, Lyngsie, & Zahra, 2013; Harmancioglu, Grinstein, & Goldman, 2010; Jaworski & Kohli, 1993; Matsuno, Mentzer, & Rentz, 2000; Wang, Ellinger, & Wu, 2013) on an organizational level. By combining the sources from the intelligence generation MO construct by Matsuno et al. (2000) with the scanning and interpretation approaches from Aguilar (1967), and Daft and Weick (1984), and adapting this to fit in with the dynamic capabilities framework.,.

In case a company wishes to identify a new business opportunity, for example, it first has to know whether such an opportunity exists. The only way this can happen is if the company is informed about this new business opportunity and can then evaluate the significance of this information. In order to achieve this, the company has to tap the environmental information sources and analyze their output effectively. This leads to our concept of sensing (see Figure 1), which classifies the sensing activities into "environmental sourcing" and the "environmental gathering and analysis mode". Our concept differs from earlier concepts because we integrated the environmental sources as well as the way these sources are interpreted. Earlier research studies primarily focused either the one or the other. Furthermore, by modeling the relationships between environmental activites ("environmental sourcing" and "environmental gahtering and analysis") and the actual sensing of opportunities and threats. we present for the first time a complete sensing concept including the actual sensing success.

Insert Figure 1 about here

Previous research has examined and confirmed parts of the sensing concept in the form of environmental scanning activites and their causal effects on constructs such as adaptability (e.g., Fey & Denison, 2003; Goll & Rasheed, 1997; Nadler, 1998; Senge, 1990) or market orientation (e.g., Matsuno et al., 2000; Narver, Slater, & MacLachlan, 2004). As many researchers, such as Barney (1995), Teece (2007), or Ginsberg and Venkatraman (1995), concur that an adaptive company is one that adjusts to new environment conditions, identifies the threats and opportunities within a market, and recognizes market trends, we derived the hypotheses in our model from this. Sensing opportunities and threats are the basis for both the adaptability of a company and its sustainable competitive advantage (Barney, 1991, 1995; Porter, 1980; Teece,

2007), because if it did not identify any threats or opportunities, it would not even realize the necessity for it to adapt.

Differences in Sensing Opportunities and Threats

In dynamic and complex environments it is particularly vital for firms to interpret ambiguous information in a significant way (Thomas et al. 1993). Therefore, descriptive labels are attached to these events to enable a specific and effective evaluation of the equivocal data (White et al. 2003). In the matter of environmental changes, this information tends to be categorized as a threat or an opportunity (Dutton and Jackson 1987).

Barr (1998: 644) suggests that 'a key component in a firm's strategic response to unfamiliar environmental events is the interpretations managers develop about the event itself '. This is driven by the labeling of issues as threats or opportunities (Barr and Glynn, 2004; Jackson and Dutton, 1988; Kuvaas, 2002). Strategic issues are often interpreted using general labels such as "threat" or "opportunity". These labels represent the beliefs of top management concerning the potential effects of environmental events and trends (Edelman, 1977), and launch processes which drive an organization in a particular direction (Dutton et al., 1983). One example of a typical equivocal strategic issue is e-commerce. At the beginning of the new century, the implications of e-commerce seemed to be complex and unclear for companies, which found it hard to determine whether e-commerce was a threat or an opportunity (Anderson and Nichols 2007).

There are several definitions of threats and opportunities to be found in the literature. Singh et al. (1999) consider opportunities to be the perception of the potential for new profit, either by founding a new venture or by significantly improving an existing one. White et al. (2003) suggest that an opportunity is the extent to which the management perceives a market situation to be of advantage for the company's sales and/or profit. In contrast, they define a threat as the extent to which the management perceives a situation as one where the company could suffer a sales and/or profit deficit. Threats often emerge as the consequence of adverse environmental conditions, such as scarce resources, competition, or reduced market size (Staw et al. 1981), whilst opportunities frequently come in the form of innovations and show themselves as new ideas or the recognition of customer needs (Wang et al. 2013).

Categorization theory describes the acquisition and application of labels to words that identify cognitive categories—for sets of persons, things, situations, and issues that resemble one another (Cantor, Mischel, & Schwartz, 1982). Jackson and Dutton (1988) found that issues labelled as positive, controllable, and involving potential gain were more likely to be seen as opportunities, while those characterized as negative, uncontrollable, and involving potential loss were seen as threats. While it has been shown in the literature that interpreting issues as being threats or opportunities has a significant effect on the actions and performance of companies (Dutton et al., 1990; Ginsberg and Venkatraman, 1992, 1995; Gioia et al., 1994; Sharma, 2000; Thomas et al., 1993), there is little research examining what information or information sourcing leads to the perception of a situation or condition representing a threat or an opportunity.

Previous research has shown that the top management's perception of a strategic issue affects the range of solutions considered in an organization (Billings, Milhurn, & Schaalman, 1980), influences the volume of resources dedicated to a particular project (Staw & Ross, 1978), and has an effect on the steps made toward organizational change (Dutton & Duncan, 1987, Dutton, Fahey, & Narayanan, 1983). Therefore, we assumed that the way the top management interpreted a strategic issue would systematically influence action at the organizational level. Once a label has been attached to a strategic issue or a major environmental event or change, the cognitive processes of key decision makers work in this direction, which, in turn, affects organizational processes, and in some cases this could even mean a strategic shift for the company (Dutton and Jackson 1987). In addition, the perception of the strategic issue respectively the environmental event and its interpretation has also a direct impact on the allocation of resources (White et al. 2003).

But what does actually influence whether you recognize or perceive information as a threat or an opportunity? The classification of environmental information depends on a variety of reasons, such as the diversity of the information gathered, the time spent searching for data (Anderson and Nichols 2007), or the perceived controllability of a market situation (White et al. 2003). Therefore, the question to ask is whether the environmental source or the information from the environmental source has such a characteristic and therefore tends to have a different effect on whether it is sensed as being an opportunity or a threat. Up to now, the literature on scanning as part of the sensing activities, for instance, has mostly considered environmental events to be one category (Anderson and Nichols 2007; Thomas et al. 1993; White et al. 2003).

Considering the above-mentioned differences in perception of, interpretation of, and response behavior toward threats and opportunities, it seems evident that the categorization of an environmental change as a threat or an opportunity evokes a different sensing approach. These assumptions are supported by many researchers, who suggest that the way a problematic situation is interpreted has a substantial effect on subsequent information processing, decision making, and behavior (Dutton & Duncan, 1987; Dutton & Jackson, 1987; Kilmann & Mitroff, 1979; March & Simon, 1958; Pounds, 1969; Tversky & Kahneman, 1981).

What has not been forthcoming is an empirical investigation of sensing activities and their varying impact on the actual evaluation of an event or fact as an opportunity or a threat. There has evidently been some investigation into the perception of threats and opportunities, but to the best of our knowledge there has not yet been an examination of a comparison of different environmental sourcing acitivities on the sensing of opportunities compared to the sensing of threats of a company.

In this study, we aim to analyze the effects of environmental sourcing on sensing threats and sensing opportunities. If there are any effects, we know that environmental sourcing must be a part of the sensing capability and therefore part of the dynamic capabilities framework, which makes this framework, which is based on continuous activity streams, more tangible. Here, we might also see whether literature or research on environmental scanning has also overseen relevant activities and their respective roles in the sensing field. The related characteristics and their implications are discussed in the following section.

HYPOTHESES

The above-mentioned research deficits concerning the sensing of opportunities and threats give reason to expect that substantiating and operationalizing the sensing capability to its specific activities in the respective sensing field (sensing threats or sensing opportunities) will lead to new insights for science and management practice. This approach provides a more tangible sensing capability and hence sheds light on the dynamic capability framework, which still remains "abstract".

In this study, we define environmental sourcing as the tapping of internal and external information sources to gather relevant information about the business environment or environmental changes. Most of these sources (customer, end user, competition, networks, media

and internal research) are mentioned by Kohli, Jaworski, and Kumar (1993) in their MARKOR scale. Matsuno et al. (2000) also add macro-economic elements and suppliers as relevant sources. Kohli et al. (1993), and Matsuno et al. (2000) found positive causal relationships between these sources and the market orientation of a company. We derived an effect on sensing threats and sensing opportunities based on this proven market orientation effect (Barney, 1995; Ginsberg & Venkatraman, 1995; Teece, 2007). The literature on dynamic capabilities also introduces institutions and complementors into the field to include a more complete picture of the facets of environmental sourcing (Teece, 2007).

Value chain partners and the sensing of opportunities and threats. According to Kohli et al. (1993), and Matsuno et al. (2000), customer exchange, end user exchange, and supplier exchange lead to a higher market orientiation. Due to the knowledge generated and the increased understanding of value chain partners like this, new business opportunities or business threats such as new customer preferences could be identified, indicating a better sensing capability, which means a better sensing of opportunities and threats (Harmancioglu, Grinstein, & Goldman, 2010; Hurmelinna-Laukkanen, 2012). We do not learn from the literature whether the effects of sensing threats or sensing opportunities are different in regard to supplier exchange and end user exchange. Looking at the classification criteria for threats and opportunties, we did not find any specific manifestation in information richness, controllability, or information diversity in these sources. Since literature (Kohli et al. 1993, Matsuno et al. 2000) suggests that an exchange with end users or suppliers lead to a higher market orientation and market orientation implies a close contact to environmental changes, we assume that this will also lead to a higher sensing capability, meaning a better sensing of opportunities and threats.

The only source which might have a different effect and potentially even stronger effect in regard to sensing opportunities than sensing threats is *customer exchange*. Customers are one of the most important information sources, especially during the generation of new and innovative ideas (Harmancioglu et al. 2010; Hyland et al. 2006; Robbinson and Stubberud 2011). Lukas and Ferrell (2000) found that a customer-oriented firm launched more "new-to-the-world" products and thus had a greater amount of breakthrough innovations, which indicates the discovery of opportunities. The more frequently the partners interact, the more they can develop an understanding for each other's needs, and thus interpret the tacit knowledge (Cavusgil et al. 2003)

residing inside the company's system (information about cultural values, for example) (Harmancioglu et al. 2010). With information like this, the company is able to gain insight into the latent needs and decision processes of customers, and can therefore discover new market opportunities (Harmancioglu et al. 2010). Since the customer segment is considered a reliable source (in comparison to the competitor sector, for example) (Auster and Choo 1993), the perceived controllability is high, which also leads to the tendentially greater perception of a situation as an opportunity rather than a threat (White et al. 2003).

We therefore assume the following:

Hypothesis H1a. Customer exchange is positively associated with a company's sensing of opportunities.

Hypothesis H1b. Customer exchange is positively associated with a company's sensing of threats.

Hypothesis H1c: Customer exchange is much more positively associated with a company's sensing of opportunities than a company's sensing of threats.

Hypothesis H2a. End user exchange is positively associated with a company's sensing of opportunities.

Hypothesis H2b. End user exchange is positively associated with a company's sensing of threats.

Hypothesis H3a. Supplier exchange is positively associated with a company's sensing of opportunities.

Hypothesis H3b. Supplier exchange is positively associated with a company's sensing of threats.

Complementors and the sensing of opportunities and threats. According to Teece (2007), there has been considerably less attention paid to a further relevant market participant for exchange: the provider of complementary goods. As many companies experience dependency in this area, a regular exchange with these "partners" might be of benefit. Making simple changes to complementary goods could render related products redundant immediately unless products are adapted. Moreover, a complementary goods provider might be a source of information on changes in the market. This information might help companies to identify new developments in

their business environment more easily, indicating a better sensing capability, which means a better sensing of opportunities and threats (Teece, 2007).

In the literature we found no indication that there might be a different effect of complementor exchange on the sensing of threats or the sensing of opportunities. Since information quality, reliability, and scope from a complementors' exchange may vary in any direction, we cannot assign a clear differentiating effect to this exchange channel (White et al. 2003). That is why we assume that complementor exchange affects both the sensing of threats and the sensing of opportunities to the same extent. Hence:

Hypothesis H4a. Complementor exchange is positively associated with a company's sensing of opportunities.

Hypothesis H4b. Complementor exchange is positively associated with a company's sensing of threats.

Competitors and the sensing of opportunities and threats. On the basis of our literature review, we also considered it appropriate to include the effect of competition exchange in our model. In the literature, there are contradictory views as to whether the relationship between competition exchange and the sensing of opportunities and threats is positive or negative, because cooperation with competitors brings with it a certain potential for conflict. On the one hand, contact with competitors could enhance know-how in the organization, and may therefore help identify threats or opportunities (Hurmelinna-Laukkanen, 2012; Jung-Erceg, Pandza, Armbruster, & Dreher, 2007), but on the other hand, information on market developments, such as new customer segments or new regulations emerging, might lead to a competitive advantage and result in the competition being reluctant to share this information. In turn, this might lead to protective behavior between competitors, which would cast doubt on the value of the information exchanged (Hurmelinna-Laukkanen, 2012). Since companies do not, for their part, wish to disclose sensitive information that is related to success but would like to get that information from their competitors, we assume that companies taking part in a strong competitive exchange might fail to recognize relevant market developments, and that their sensing capability might therefore be diminished by a reduced sensing of opportunities and threats.

We have to wonder whether this effect might be different depending on whether it is a question of a threat or an opportunity. Sector competitors have a particularly large perceived

uncertainty (Daft et al. 1988). In general it is difficult to obtain reliable information from or about competitors (Auster and Choo 1993; Montgomery et al. 2005). This deficit would lead to the management seeing a strategic issue as less controllable and hence tending to categorize upcoming issues from competitive exchange as threats rather than opportunities (Jackson and Dutton 1988). The availability of information could reduce this effect (White et al. 2003), but firms would not be able to gather enough information from the competition. Consequently, the perceived controllability would decrease and the probability of the management categorizing an ambiguous issue as a threat would increase. This conclusion is supported by what is known as the "threat bias", where managers tend to see issues as a threat unless there is strong evidence for seeing them as an opportunity[1] (Jackson and Dutton 1988).

By combining the general decreasing effect of competitor exchange on the sensing of opportunities and threats with the fact that information from the competitor is considered more of a threat than an opportunity, we were able to conclude that there might be a less negative influence on the sensing of threats than on the sensing of opportunities. As far as we know, this has never been empirically proven before, and will be shown by our results.

Following the above arguments, we suggest the following hypotheses:

Hypothesis H5a. Competitor exchange is negatively associated with a company's sensing of opportunities.

Hypothesis H5b. Competitor exchange is negatively associated with a company's sensing of threats.

Hypothesis H5c. Competitor exchange is much more negatively associated with a company's sensing of opportunities than a company's sensing of threats.

Institutions and the sensing of opportunities and threats. Clusters like the Silicon Valley Cluster show how *research institutions* (universities or institutes, who work independently and generate scientific or new practical know-how) and the surrounding companies can collaborate effectively. Today, it is not only IT firms which have discovered the value of institutional relationships, but other industries as well, such as the automobile industry. The large majority of institutional cooperations are formed with universities. These cooperative relationships are a

[1] To convince managers to see an issue as an opportunity, one has to highlight the characteristics of an opportunity, such as the chance of potential gain, etc. (Jackson and Dutton 1988).

source of knowledge for both small and large companies (Lorenzoni & Lipparini, 1999; Jung-Erceg et al., 2007). As opposed to competitors or suppliers, research institutes like universities tend to share their knowledge because of their scientific ethos. Firms and universities make more of an effort to take an active part in such relationships because they have no need to feel defensive about losing potentially important information due to a competitive advantage (Fey & Birkinshaw, 2005; Möller & Rajala, 2007). The reasons given above show how an exchange with research institutions could bring companies a competitive edge due to a noticeable advantage in regard to knowledge. In their qualitative study, Ellonen, Wikström, and Jantunen (2009) note that companies that work together closely with universities have a good sensing capability, which means are successful in sensing opportunities and threats. Since the exchange with research institutions is mainly geared toward generating new ideas or interesting business opportunities, the sensing effect might be mainly derived from the sensing of opportunities, which implicates an effect of research institution exchange on the sensing of opportunities and probably no significant effect on the sensing of threats.

Teece (2007) suggests that supporting institutional structures have a major impact on the market as they may support innovation and thus influence the competition. He also suggests that the assets and knowledge of *supporting institutions* (e.g. country's development institution, state-owned promotional institutes, funding establishments) could be integrated into new value-added combinations, thereby shaping the market (Teece, 2007). Therefore, supporting institutions might play a relevant role in market analysis and, because of their purpose, the exchange with these institutions might primarily help with the discovery of opportunities, which probably means just a higher sensing of opportunities and no effect on the sensing of threats. Based on these arguments, we assume the following:

Hypothesis H6a. Research institution exchange is positively associated with a company's sensing of opportunities.

Hypothesis H6b. Research institution exchange is not associated with a company's sensing of threats.

Hypothesis H7a. S*upporting institution exchange is positively associated with a company's sensing of opportunities.*

Hypothesis H7b. S*upporting institution exchange is not associated with a company's sensing of threats.*

Internal sourcing and the sensing of opportunities and threats. People within the company could be valuable information sources in the business environment. Particular individuals who are in direct contact to external constituents, such as purchasing managers, public relations directors, or customer service employees, may be relevant for this purpose (Rosenkopf & Nerkar, 2001). Matsuno et al. (2000) also attach great importance to internal sources for keeping track of external developments, which might also drive a company's sensing capability and therefore the sensing of opportunities and threats. According to the richness and diversity of the information from this information source, we assume that companies are more likely to sense opportunities than threats by using this environmental sourcing channel. Hence:

Hypothesis H9a. Internal sourcing is positively associated with a company's sensing of opportunities.

Hypothesis H9b. Internal sourcing is positively associated with a company's sensing of threats.

Hypothesis H9c. Internal sourcing is much more positively associated with a company's sensing of opportunities than with a company's sensing of threats.

External networking and the sensing of opportunities and threats. Hitt, Ireland, Camp and Sexton (2001) suggest that external network contacts could be particularly rich sources of information on the environment. Business clubs and industry associations, which are covered by our variable "external network exchange", are the most common professional network platforms. Networks create continuity in social contacts and dialog, and can supply the latest information on market developments (Hitt et al., 2001), and thus increase the sensing capability and therefore the sensing of opportunities and threats of an organization.

In their study on the behavior of "champions"[2], Howell and Shea (2001) found that the personal network can be seen as the most effective source when scanning for new ideas. The results of the research by Cavusgil et al. (2003) suggest that due to the intensive use of the

[2] Champions are defined as informal emerging individuals who make a significant contribution to innovation by actively driving improvements in the organization, and they are therefore important for the success of a product innovation (Howell and Shea 2006:15).

network and the associated tacit knowledge, opportunities are identified more quickly and efficiently, which in turn can lead to more innovations (Cavusgil et al. 2003). These findings provide the first indication that networks are suitable for sensing of opportunities. Another argument in favor of the preferred sensing of opportunities is the diversity of information in a network, which goes hand in hand with an increasing sensing of opportunities (Anderson and Nichols 2007). Although Anderson (2008) found no correlation between the strength of connections and the diversity of information, he was able to demonstrate that managers with a larger social network can gather a greater diversity of data. This could be explained by the fact that an actor can easily switch to another personal source (Anderson 2008; Cross and Sproull 2004). In summary, it can be said that companies that maintain intensive connections in the network might have a stronger effect on the sensing of opportunities than on the sensing of threats.

In line with the above reasons, we may assume the following:

Hypothesis H8a. External networking is positively associated with a company's sensing of opportunities.

Hypothesis H8b. External networking is positively associated with a company's performance in regard to sensing a threat.

Hypothesis H8c. External networking is is much more positively associated with a company's sensing of opportunities than with a company's sensing of threats..

Impersonal sourcing and the sensing of opportunities and threats. Many companies seem to use the obvious external information source of *impersonal sourcing,* including media such as newspapers, trade publications, and magazines. However, Hills and Shrader (1998) found that successful entrepreneurs focus primarily on personal contacts rather than the classical media, as the information provided by personal sources is richer than that of written sources (Daft & Lengel, 1986; Holland, Stead & Leibrock, 1976). On this basis, one could deduce that media sourcing does deliver less valuable information as regards recognizing opportunities or threats in the business environment, and might therefore provide not much support for a company's sensing capability. Since impersonal sources only provide limited feedback and low information richness (Auster and Choo 1994; Daft and Lengel 1986), and according to the "threat bias" theory (Jackson and Dutton (1988), whereby managers perceive ambiguous issues as more of a threat

unless there is strong evidence for them to do otherwise, members of the organization might interpret an issue from this source more as a threat than an opportunity. Therefore, the increased use of impersonal sources, and the low diversity of the data gathered could contribute more to the detection of threats and less or even not at all to the identification of opportunities.

In line with the above reasons, we may assume the following:

Hypothesis H10a. Impersonal sourcing is not associated with a company's sensing of opportunities.

Hypothesis H10b. Impersonal sourcing is positively associated with a company's sensing of threats.

Sensing Performance and Business Performance

Although Teece (2007) mentions that some firms discover opportunities but still do not manage to exploit them and consequently fail in their performance, the majority of the literature suggests that sensing in its various facets impacts company performance (e.g., Daft et al., 1988; Tseng & Lee, 2014; Yang & Liu, 2012). According to these findings, successful firms understand their environment better due to their increased sensing capabilities, and can therefore adapt to market changes more easily. Tseng and Lee (2014) examine dynamic capabilities and find a specific link between sensing and a company's business performance. According to their findings and those of other researchers, a company that has a good capability to sense opportunities and threats is more able to detect the dynamics in the market, which creates the foundation for all management decisions and thus means that the company responds to environmental changes more effectively and more efficiently. In turn, this leads to a good business performance (Tseng & Lee, 2014; Yang & Liu, 2012). After having illustrated the effect of a sensing capability on the business performance, a further question arises as to whether sensing threats and sensing opportunities might each have a different impact on business performance.

Dutton (1992) deals extensively with the issue of opportunity recognition or construction and its effect on organizational change. She shows that the assessment of a situation or condition as an opportunity has a psychological impact on managers and members of an organization. She postulates, for example, that individuals who see an issue as an opportunity receive more support to exploit it, because other people are inspired by positive emotions and values as well (Dutton 1992). In her study, this indicates that employees in the organization are ready to perform and

contribute to an improvement in performance when an opportunity is detected. Further, she argues that an "opportunity"-label leads to a more future-oriented attitude and even if the company was less successful in the past, a positive new beginning could be signaled, which is collectively motivating. The future orientation also gives the individuals a greater degree of freedom in thought and action, which leads to the enhancement of individuals' willingness to invest resources (Dutton 1992). If we also take a look at the results of Ngo and O'Cass (2012), who postulate a positive relation between marketing resources and the company's performance, we can see that greater commitments of corporate resources lead to better business performance. These aspects might also suggest that the discovery or interpretation of opportunities within the company promotes the motivation of the members of the organization and their willingness to support strategic issues. In turn, this could lead to better business performance.

Concerning the response to a threat there is a divergent perspective that has been widely discussed in the literature (see Anderson and Nichols 2007; Chattopadhyay et al. 2001; White et al. 2003, for example). First, the prospect theory assumes that losses are weighted more than gains, and that individuals are willing to take more risks when they are confronted with possible disadvantages (Kahneman and Tversky 1979). Therefore, the responses to risks are more extreme than the responses to gains (Tversky and Kahneman 1986). This would lead to a manager committing more resources, for example, if confronted with an issue related to a risk (or threat) (White et al. 2003). Consequently, the willingness to make a risky response could also result in greater commitments for the company resources and thus lead to better business performance.

However, the threat-rigidity thesis assumes that problems lead to stress and anxiety for individuals, and that they are also aware of the probability of loss. As a result, the actions of an organization are less flexible and less diverse, because the controllability is limited under these circumstances, and the power is more concentrated or lies at higher levels of the company. Here, the decision makers often rely on very familiar responses and more rigid structures to improve the controllability. Since flexibility is very important in response to environmental changes, this rigid behavior can be a disadvantage for the performance of the organization. As a consequence the performance of the firm could decline by an increasing sensing of threats (Staw et al. 1981).

This diverse argumentation based on the two theoretical strings "prospect theory" (Kahneman & Tversky, 1979) and the "threat-rigidity" theory (Staw et al., 1981) shows best the multidimensionality of threats and opportunities (Jackson & Dutton, 1988; Thomas et al., 1993).

Although a very few researchers have integrated these two theories into their multidi-mensional conceptual models examining the effects of threats and opportunities on organizational actions (Ocasio, 1995), to the best of our knowledge, no empirical test of such a model has been reported until now (Chattopadhyay et al. 2001). Though both views have their justification, we will follow the prospect theory perspective because this study fits better the context of the prospect theory because we examine the relation between "sensing opportunities and threats" and "business performance" and not between implementation intentions and business performance. Building on this, our hypothesis is as follows:

Hypothesis H11a. Sensing opportunities is positively associated with a company's business performance.

Hypothesis H11b. Sensing threats is positively associated with a company's business performance.

Hypothesis H11a. Sensing of opportunities is more positively associated with a company's business performance than with a company's performance in regard to sensing threats.

METHODS

Sample Selection and Description

To conduct our study, we contacted members of the executive board and top management of exporting German companies. They were required to have the ability to assess environmental sourcing activities, the company's sensing of opportunities and threats, and business performance. Even if top management do not perform all the examined activities directly, their position means that they are still involved and well informed about such activities, as changes related to these have an impact on the firm's performance. Consequently, the data is provided by a single, informed source. Each person we contacted represented his or her respective company (Day & Lord, 1988). It is assumed by researchers that people in top management serve as key informants on this issue, so we followed the methods used in previous studies, where the top managers of companies served as the main informants (e.g., Danneels, 2008).

We used the DAFNE company database as our sample. First, the sample was narrowed down on the basis of company size (> 100 employees). The organizational structures of smaller companies are less formal, which makes it quite difficult for the respondents to provide a clear

and valid assessment of sensing practices used throughout the organization (Foss et al., 2013). We also restricted our sample to manufacturing industries, resulting in a final sample of 5,225 companies.

Survey Development and Measures

We generated our questionaire based on the procedures recommended by Churchill (1979), and Gerbing and Anderson (1988). Our method of investigation evolved through a combination of exploratory qualitative interviews, a review of the literature on sensing, and a survey pretest.

As far as possible we used existing measures to develop the items and scales. As only a few empirical studies have been carried out directly in regard to the sensing topic as part of the dynamic capabilities framework, we integrated existing items from related research contexts, and adapted them to fit to our concept. See Appendix A for information on the measurement items. All of the relationships in our model were measured according to the respondents' subjective assessment based on a six-point Likert scale. According to Fuchs and Diamontopoulos (2009) we used a single-item measurement for most constructs, since most constructs are specific and unidimensional in terms of Rossiter (2002) and even if some constructs might own some ambigouity, we leave the evaluation of potential various facets of the construct to the respondents.

We conducted the qualitative interviews with 10 corporate executives from 10 different German companies of different sizes and from different sectors. These companies with contrasting characteristics were selected so that we could identify potential differences concerning the aspects investigated. This method is also supported by Eisenhardt (1989). The main aim of the interviews was to match the practical viewpoint with the literature-based model, and also to gain perspectives from different firms and sectors. The interviews were conducted according to typical case study approaches (Yin, 2014) in order to explore and examine the theory, a method supported by many researchers (e.g., Eisenhardt, 1989).

Here, we do not aim to create case studies, but wish to implement these methods as a professional analysis tool to verify our theory. The results that emerged helped us to make the main survey more practical and focused. By employing this approach, we can therefore correctly transfer literature-based concepts, constructs, or items which have been examined under different

conditions from those of our study (other regions or countries, or specific industries, for example) to the context of our study. This adapted, structured questionnaire was subsequently pretested by various academic research experts and top managers who were representative for our sample. We aligned the experts' remarks with the theory and past research outcomes, and were thus able to draw up a suitable and unequivocal questionnaire.

To conduct our survey, we invited the top executives personally by email to respond to the questions online. To provide them with an incentive to participate, we promised to send them a summary of the results. We received a total of 346 usable questionnaires. When we compared the return rate to the original sample, we found no relevant non-response bias or incentive effect. Furthermore, by guaranteeing absolute confidentiality, we were able to prevent socially desirable response patterns.

***Environmental sourcing measures*.** To examine a company's sensing capability, we have to measure the activities affecting the ability to sense opportunities and threats. To be as specific as possible, we decided to focus on the field of "environmental sourcing" as a potential main driver for sensing threats and opportunities. To capture the sourcing activities, we used items from the MO and MARKOR scale (Kohli et al., 1993; Matsuno et al., 2000). We reformulated and adapted these items fit the understanding of and perspective on sensing prevalent in the literature (Barreto, 2010; Teece, 2007, 2012). Furthermore, we also included other relevant items regarding the concept of sensing which we derived from suggestions found in the research on dynamic capabilities (Ambrosini & Bowman, 2009; Barreto, 2010; Teece, 2007, 2012).

In this survey, we measure the "environmental sourcing" dimension with thirteen items. The first questions are derived from the MARKOR and MO scale, and relate to the exchange with the typical market players (customer, supplier, end user, and competitor). We also derive the aspects of external network exchange, internal sourcing, and impersonal sourcing from Matsuno et al.'s (2000) framework (questions 8-10). The literature on dynamic capabilities and, above all, Teece (2007) also suggest focusing on complementors and institutions as environmental information sources in order to gain a sustainable competitive advantage over time (questions 4, 11, and 12). As we wished to obtain actionable results, we decided to use a six-point Likert scale so that respondents would commit to one side of the scale.

***Business performance measures*.** In line with Anand and Ward (2004), and Richard, Devinney, Yip, and Johnson (2009), we used market share, sales growth, and profit as the

organization's outcomes for business performance. We decided to investigate the performance development over the last three years, as this represents the success of a company better than current year figures. It also means that we can compare large and small companies more easily. We measured each aspect of the company's business performance as a single item. We believed that the respondents answer truthfully concerning the business situation of their companies, as we guaranteed the absolute confidentiality of our survey.

***Control variables*.** We included company size and risk-taking as controls to ensure that the examined relationships were not guided by distortion effects. As a control variable, company size might particularly have an influence on the sensing of opportunities and threats, as larger organizations may tend to be more successful at sensing threats or opportunities because of their greater slack resources, and the fact that they have more specialists, such as risk management officers. Company size was controlled further in terms of business performance, as it has been suggested by many researchers that size can have an impact on organizational practices because it often stands for organizational complexity (e.g. Smith, Collins, & Clark, 2005).

As several studies have shown that risk-taking might have an impact on sensing relations, as companies which are more willing to take risks might be able to sense opportunities more easily, this was also measured (Jambulingam, Kathuria & Doucette, 2005).

Validity and Reliability Measures

We tested the convergent validity of the multi-item constructs by conducting a principal-axis factor analysis for all exogenous and endogenous variables. The standardized factor loadings exceed the recommended minimum value of 0.4 for all items (Ford, MacCallum, & Tait, 1986). In the next step, we performed a confirmatory factor analysis to finally confirm the validity of our model relations (Jöreskog & Sörbom, 1993).

Cronbach's alpha for all tested constructs is equal or above the recommended minimum level of 0.7 (Nunally & Bernstein, 1994). We also tested the average variances extracted, which should lie above 0.5 (Fornell & Larcker, 1981), or at least above 0.45 (Netemeyer, Bearden, & Sharma, 2003). Our model also confirmed these criteria. We compared the average variance extracted with the squared correlation between the constructs to test for discriminant validity of the multi-item constructs. The average variance extracted for all constructs tested is greater than the squared correlation (Fornell & Larcker, 1981).

Concerning the data collection in our study, we assumed that there might be a common-method bias because the same respondents were used as a source for both exogenous and endogenous variables (Podsakoff, P. M., & Organ, D. W. (1986) Podsakoff, P. M.; MacKenzie, S. B.; Lee, J. Y.; Podsakoff, N. P. (2003)). According to Podsakoff, P. M., & Organ, D. W. (1986), this bias needs to be excluded to ensure construct validity. The only reliable possibility for preventing common method variance is to use an alternative information source, especially for the endogenous variable (Chang et al. 2010). We addressed this issue in our investigation by comparing the development of the company's value and profit in the last three years as given in the DAFNE database with the answers of the respective respondents to the value and profit development in the last three years in our survey. High significant corelations between the actual business performance development and the reported business performance in our survey show that our measurement is valid and no common-method bias exist.

Altogether, we can say that the constructs are valid and reliable.

We examined whether there was a potential non-response bias by employing a t-test to examine significant differences in the response behavior of early and late respondents, respectively. The reasons for this are that the responses given by late respondents tend to be more like those of non-respondents (Armstrong & Overton, 1977; Jansen, Simsek, & Cao, 2012). However, the t-test results do not show any signficiant differences between these groups, indicating that non-response bias does not play a role in this study.

RESULTS

We examined our hypotheses by employing a structural equation modeling with maximum likelihood estimation. We decided us to use therefore the statistical program AMOS (Arbuckle, 2011). AMOS is considered superior to tradtional statisticial methods such as regression analysis or factor analysis because it is able to simultaneously measure a number of latent and observed variables and their complex relationships (Shook et al., 2004; Weston and Gore Jr., 2006). Furthermore, I applied the co-variance-based appraoch to structural equation modeling that accounts for random measurement errors as all of the variables are of reflective nature.

By using the following recommended indices, we assessed the fit of data to the hypotheses from our model. First of all, the Chi² probability should be higher than the

recommended minimum level of 0.05 (Bagozzi, 1980). Second, the comparative fit index (CFI) should be above or near 0.90 (Barrett, 2007). Third, the cut-off point for the standardized root mean square residual (SRMR) is below 0.08 (Hu & Bentler, 1999), and finally, the root mean square error of approximation (RMSEA) has to be less than 0.08 (Browne & Cudeck, 1993). We did not use the goodness-of-fit index (GFI) or the adjusted goodness-of-fit index (AGFI) because the usefulness of these criteria is questioned by current simulation studies (Sharma, Mukherjee, Kumar, & Dillon, 2005). As presented in Table 1, the model-fit criteria mentioned above are all met, which means that the analyzed model (see Figure 2) is acceptable.

Insert Table 1 about here

The results for the overall sample are reported below in Figure 2.

As shown in Figure 2, environmental sourcing has a strong significant effect on the sensing of threats and the sensing of opportunities. In particular, the exchange with customers (H1a, H1b,) and suppliers (H3a, H3b) positively drives the sensing of opportunities and threats. By comparing the effects in regard to sensing opportunities and sensing threats, respectively, we can further suggest that the customer exchange impact on sensing opportunities is much higher than on sensing threats (H1c). While the end user exchange (H2a, H2b), the complementor exchange (H4a, H4b) the supporting institution exchange (H7a, H7b), the external networking (H8a, H8b, H8c), and the impersonal sourcing (H10a, H10b) have no significant impact on the sensing of opportunities and threats, competition exchange (H5a, H5b, H5c), research institution exchange (H6a), and internal sourcing (H9b) show significant path coefficients to the sensing of opportunities and threats. The competiton exchange effect has a negative impact on both sensing opportunities and sensing threats, and a higher negative impact on sensing opportunities than on sensing threats (H5c). Concerning the research institution exchange, only Hypothesis H6a can be confirmed, meaning that there is a positive impact on sensing opportunities and no impact on sensing threats (H6b). Internal sourcing is also only a predictor for sensing threats (H9b), and not for sensing opportunities (H9a). Further, sensing opportunities and sensing threats can both be confirmed as a predictor for business performance (H11a, H11b), while the effect that sensing opportunities has on business performance is slightly stronger than the effect that sensing threats has on business performance (H11c).

The parameter estimates for the control variables show that risk-taking and company size have a significant effect on the model's relationships.

Insert Figure 2 about here

DISCUSSION, CONCLUSION, AND LIMITATIONS

We developed and examined a dynamic-capability-based theory to investigate organizations' sensing behavior in terms of environmental sourcing. The main contributions of our study are as follows:

(1) Our study provides a deeper understanding of the dynamic capabilities framework by empricially examining concrete activities affecting the sensing capability, thereby responding to numerous calls for future research that have suggested that this abstract concept be broken down into concrete and manageable aspects.

(2) A further theoretical contribution lies in the integration of different theoretical concepts and research results (behavioral science, psychology, strategic management, marketing, entrepreneurship, organizational science) to investigate the differences between sensing threats and sensing opportunities (Anderson, and Nichols 2007).

(3) By providing a large sample support in testing environmental sourcing as part of the sensing activities in regard to sensing opportunities and sensing threats, we again respond to numerous requests for future research, emphasizing that more empirical studies should be conducted to gain a better understanding of dynamic capabilities, and its dimensions like the sensing capability.

(4) This study provides a more complete conceptualization of environmental scanning through the inclusion of all relevant environmental information sourcing channels, supplemented by those of the dynamic capabilities framework, than has been recognized in prior strategic management studies.

(5) In this study a clear and very concrete practical implications for how to use environmental sources for sensing opportunities and threats is derived. We first show what effects specific environmental sources have on the sensing of opportunities and

threats. Thereby we go beyond earlier market orientation or environmental scanning research studies, which mainly used these environmental sources as parts of large constructs. Thereby these studies missed to analysis concrete effects of these activities. If sources were focus of a research inquiry they had been investigated mainly regarding their relation to the number of ideas/innovations or business performance but not regarding their actual impact on sensing opportunities or threats.

Sensing Opportunities and Threats, and Business Performance

Ambigous research results and theories with respect to the impact of sensing threats and sensing oppportunities on the business performance of companies, requested further research to figure out, if it is more relevant for companies to sense threats or to sense opportunities (Chattopadhyay, Glick, and Huber, 2001). In terms of our specific results, we found that sensing opportunities and sensing threats both have a significantly strong positive relationship with business performance. Here, we provide empirical evidence to support the importance of a sensing capability, thus advancing the literature on dynamic capabilities.

Environmental Sourcing and Sensing Opportunities and Threats

Insert Table 2 about here

Table 2 highlights the effects of environmental sourcing on the sensing of opportunities and threats. This is potentially important because prior research has not focused on sensing activities like environmental sourcing in conjunction with the sensing of opportunities and threats.

Our results also show differences in the importance of various environmental sourcing channels. The *exchange with customers* plays an especially key role in companies' sensing of opportunities and threats. Although this is not surprising, the much stronger significant effect of customer exchange on sensing opportunities as opposed to sensing threats might not have been obvious. This is potentially important because prior research has focused more on environmental scanning or sensing in general and less on the potential differences regarding the sensing of

threats versus opportunities. The sensing of opportunities like new product ideas is enhanced by an intensive exchange with customers which is in line with our argument that a deep understanding of customer needs and latent needs is therefore necessary (Harmancioglu et al. 2010).

It should be noted that in this study we find a significant positive relationship between an *exchange with suppliers* concerning market developments and the sensing of opportunities and threats. Interestingly, as assumed and proposed by the open innovation literature, the exchange with suppliers mainly serves as an idea generation tool for creating innovations based on sensed opportunities. The almost identical effect values of supplier exchange on both the sensing of opportunities and the sensing of threats, however, might indicate the dialogue with suppliers can also be used for the identification of threats, which is a new insight for science and management practice.

Our study makes another important contribution by clarifying ambiguous research results, and reasoning concerning the relevance of *competitor exchange* for the identification of opportunities and threats. Our results show that the effect of competiton exchange on the sensing of market developments is very low in contrast to some findings of coopetition studies. Furthermore, we prove that the greater the intensity of managers' communication with their competitors, the fewer threats and opportunities they or their organization are able to identify. This leads to the recommendation that managers and companies should avoid the exchange with competitors concerning market developments and competition exchange should not be regarded as an essential part of the sensing capability.

Interestingly, though market information processing literature covers network exchange as an essential part for a company's market orientation, the causal link between *external network exchange* and sensing opportunities and threats can not be confirmed. This supports our hypothesis that external networks might be used and useful more for individual purposes or opportunities and not for organizational goals or the sensing of organizational opportunities and threats. This proves that the "external network exchange" activity is not an essential part of the sensing capability, and therefore not an essential part of the dynamic capabilities.

With respect to the factor of *"research institution exchange"*, we note the positive significant effect on the sensing of opportunities, and no effect on the actual sensing of threats. This is in line with our argument that according to the setting of goals, such as generating new

ideas, which go hand in hand with research institute cooperations, it is the sensing of opportunities which is focused on, and not the sensing of threats. For the company management, this, in turn, might mean that spending time with research institutes might lead to their failing to recognize strategic issues, which could threaten the company's business.

Surprisingly, and contrary to our hypothesis, we found that when companies engage in an *internal exchange* about market developments, it is threats rather than opportunities that are sensed. Due to the richness and diversity of information provided by colleagues within the company, we assumed that putting more energy in the internal exchange would increase the likelihood of opportunities being identified. One potential explanation for this contradictory result might be that even if this information exchange is rich and diverse, the time to talk about market developments within the company is by nature tendentially higher than the time one spend with external sources on discussing on market developments. Hence, according to Anderson and Nichols (2007) findings this increases the probability of seeing the issue as more of a threat than an opportunity. Maybe the diversity of information, which we assumed might be a charactersitic of the internal sourcing, is not given either, because one strong internal opinion could drive the whole impression the company has about specific market developments and thereby no diverse views come up within the company. One potential practical implication might be that internal discussion about market developments will not help the company to identify new opportunities and thereby are not part of a company's sensing capability.

While this study provides a great deal of new insights, like all research, it has some limitations. If one were to study the concept of sensing capability comparing different countries, in non-manufacturing industries, or in companies with fewer than 100 employees, we might find variations in the relationship between the different environmental sourcing activities and the sensing of opportunities and threats. This study focused on environmental sourcing as one field driving the sensing capability. Future studies might want to investigate the method of gathering and analyzing environmental information, and its effects on the sensing of opportunities and threats. Despite these limitations, we have shown factors driving the sensing capability, and were therefore even able to show differences in driving sensing opportunities in comparison to sensing threats. With this study we have made a significant contribution toward explaining and understanding sensing capability and therefore dynamic capabilities, which build the basis for a company's sustainable competitive advantage.

FIGURES

FIGURE 1

Concept of the Study

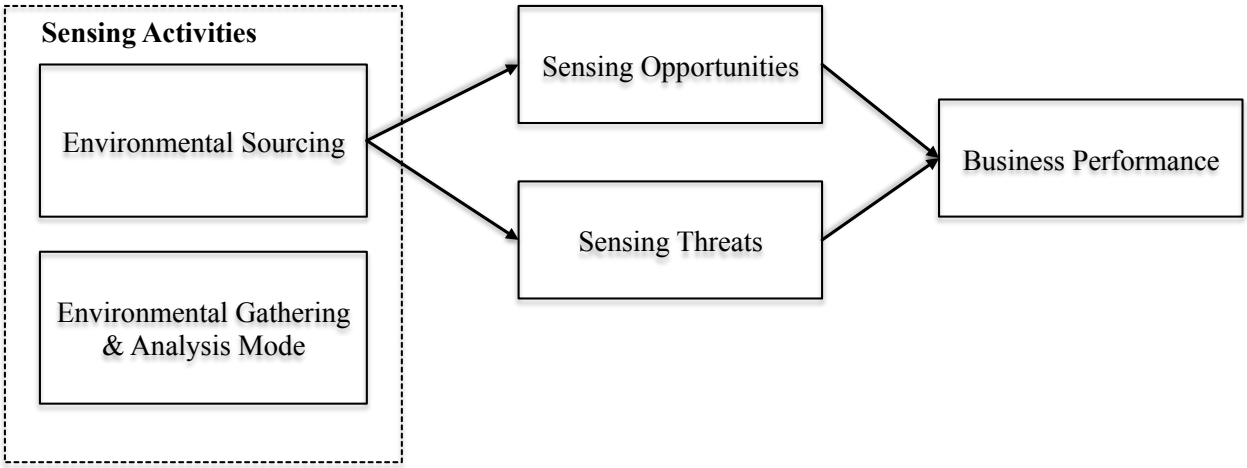
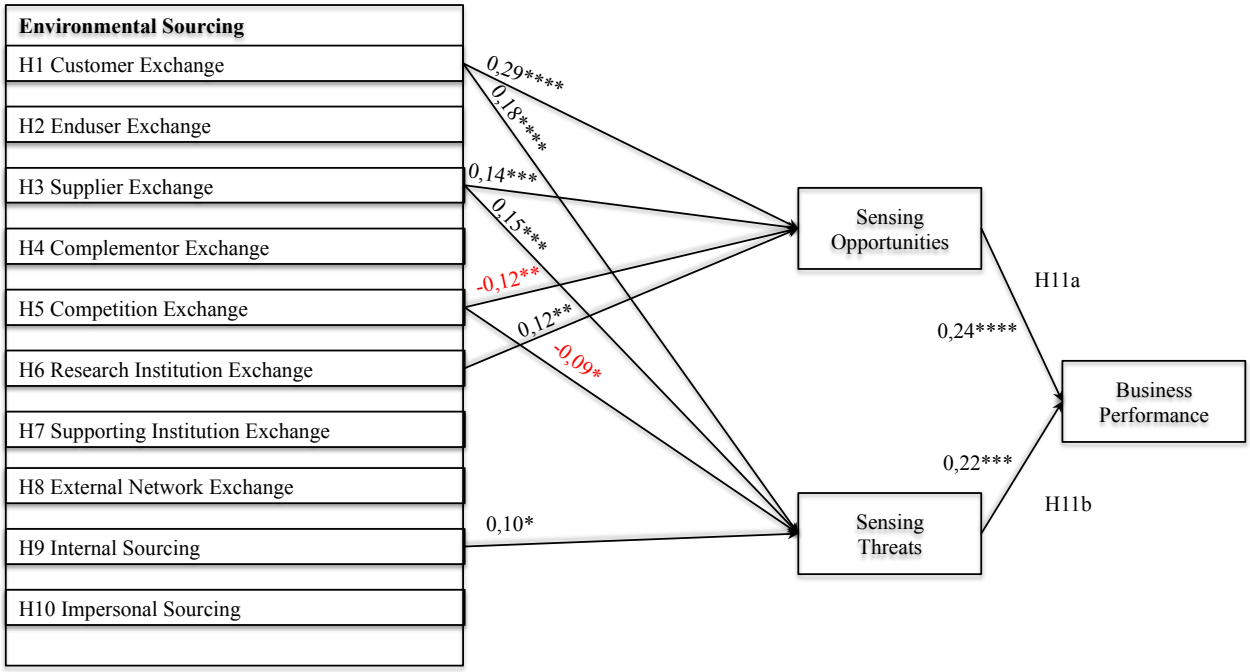


FIGURE 2

Structural Equation Modeling Results for Overall Sample (Model I)



*p<0,10; **p<0,05; *** p< 0,01; **** p< 0,001

(Ersetzen: End-user; Risk-Taking; bei Ziffern: Kommas mit Punkten ersetzen)

TABLES

TABLE 1

Model Statistics

Model	CFI	SRMR	RMSEA	Chi²	d.f.	Normed Chi²
Model I	0.94	0.06	0.07	126	48	2.62

TABLE 2

Environmental Sourcing Effects on Sensing Opportunities and Threats

Environmental Sourcing	Sensing Opportunities	Sensing Threats
Customer Exchange	+	+
Supplier Exchange	+	+
Competitor Exchange	–	–
Research Institution Exchange	+	n.s.
Internal Sourcing	n.s.	+

"+" positive effect; "-" negative effect; "n.s." not significant
All effects are significant at $p \leq 0.10$

APPENDIX A

Variables and Sources

ENVIRONMENTAL SOURCING
Customer Exchange How often, compared to your competitors, does your company meet direct customers to figure out what products or services could be of value to them in the future? (Matsuno et al., 2000)
End User Exchange How often, compared to your competitors, does your company meet end users to figure out what products or services could be of value to them in the future? (Matsuno et al., 2000)
Supplier Exchange In our company, we exchange with suppliers very often about market developments and their plans and activities. (Matsuno et al., 2000)
Complementor Exchange In our company, we exchange with providers of complementary goods very often about market developments and their plans and activities. (Matsuno et al., 2000)
Competition Focus We constantly benchmark ourselves against our competitors. We have extensive information about our competition. (Flores et al., 2012; Matsuno et al., 2000; Teece, 2007)
Competitior Exchange In our company, we exchange with competitors very often about market developments and their plans and activities. (Matsuno et al., 2000; Teece, 2007)
External Networking To what extent do employees of your company actively participate in business networks? How strongly is your company engaged in associations? (Matsuno et al., 2000; Teece, 2007)
Impersonal Sourcing To what extent does your company use media to be able to estimate market developments better?

(Baron, 2006)
Research Institution Exchange In our company, we exchange information with universities or other research institutions very often about market developments and their plans and activities. (Teece, 2007)
Supporting Institution Exchange In our company, we exchange information with supporting institutions very often about market developments and their plans and activities. (Teece, 2007)
Internal Sourcing We operate very intensively in internal market research. (Matsuno et al., 2000)
ENDOGENOUS VARIABLES
Sensing Opportunities In the last three years, as soon as an opportunity for our company arose from market changes, we were always the first to recognize this opportunity. In comparison to our competition, we recognized far fewer opportunities in the last three years (R). (Kohli et al. 1990, Matsuno et al. 2000, Teece 2007)
Sensing Threats In the last three years, as soon as a threat to our company arose from market changes, we were always the first to recognize this threat. (Kohli et al. 1990, Matsuno et al. 2000, Teece 2007)
Business Performance How would you evaluate the development of your company in comparison to your main competitors in terms of sales revenue growth? How would you evaluate the development of your company in comparison to your main competitors in terms of market share? How would you evaluate the development of your company in comparison to your main competitors in terms of profitability? (Anand & Ward, 2004; Richard et al. 2009)
CONTROL VARIABLES
Company Size How many persons are currently employed at your company? (Smith, Collins & Clark, 2005; Weber & Kabst, 2004)
Risk-Taking In our company, we have a disproportionate tendency to take risks. (Jambulingam, Kathuria, & Doucette, 2005)

REFERENCES (noch unvollständig und noch nicht formatiert)

Adner, R., & Helfat, C. E. 2003. Corporate effects and dynamic managerial capabilities. ***Strategic Management Journal***, 24: 1011-1025.

Aguilar, F. J. 1967. ***Scanning the Business Environment***. New York: Macmillan.

Ambrosini, V., & Bowman, C. 2009. What are dynamic capabilities and are they a useful construct in strategic management? ***International Journal of Management Reviews***, 11: 29-49.

Anand, G., & Ward, P. T. 2004. Fit, flexibility and performance in manufacturing: coping with dynamic environments. ***Production and Operations Management***, 13: 369-385.

Anderson, M. H., & Nichols, M. L. 2007. Information gathering and changes in threat and opportunity perceptions. ***Journal of Management Studies***, 44: 367-387.

Arbuckle, J. L., & Wothke, W. 1999. ***Amos 4.0 user's guide***. Chicago: SPSS.

Arbuckle, J. L. 2003. ***Amos 5 user's guide***. Chicago.

Arbuckle, 2011

Armstrong, J. S., & Overton, T. S. 1977. Estimating nonresponse bias in mail surveys. ***Journal of Marketing Research***, 14: 396-402.

Bagozzi, R. P. 1980. ***Causal models in marketing***. New York: Wiley.

Barr, P. S. (1998). 'Adapting to unfamiliar environmental events: a look at the evolution of interpretation and its role in strategic change'. Organization Science, 9, 644-69.

Barr, P. S., Stimpert, J. L. and Huff, A. S. (1992). 'Cognitive change, strategic action, and organizational renewal'. Strategic Management Journal, 13, 15-36.

Barrett, P. 2007. Structural equation modeling: Adjudging model fit. ***Personality and Individual Differences***, 42: 815-824.

Barney, J. 1991. Firm resources and sustained competitive advantage. ***Journal of Management***, 17: 99-120.

Barney, J. 1995. Looking inside for competitive advantage. ***Academy of Management Executive***. 9: 49-61.

Barreto, I. 2010. Dynamic capabilities: A review of past research and an agenda for the future. ***Journal of Management***, 36: 256-280.

Baum, J. R., & Wally, S. 2003. Strategic decision speed and firm performance. ***Strategic Management Journal,*** 24: 1107–1129.

Bensaou, M., & Coyne, M., & Venkatraman, N. 1999. Testing metric equivalence in cross national strategy research: An empirical test across the United States and Japan. ***Strategic Management Journal,*** 20: 671-689.

Bergh, D. D. and Fairbank, J. F. (2002). 'Measuring and testing change in strategic management research'. Strategic Management Journal, 23, 359-66.

Browne, M. W., & Cudeck, R. 1993. Alternative ways of assessing model fit. ***Sociological Methods & Research***, 21: 230-258.

Chandler, A. D. 1990. The enduring logic of industrial success. ***Harvard Business Review***, 68: 130-140.

Chang et al. (2010): Common method variance in international business research. Journal of International Business Studies, Vol. 41, No. 2, pp. 178-184.

Chattopadhyay, P., Glick, W. H., & Huber, G. P. (2001). Organizational actions in response to threats and opportunities. Academy of Management Journal, 44(5), 937-955.

George, E., Chattopadhyay, P., Sitkin, S. B., & Barden, J. (2006). Cognitive underpinnings of institutional persistence and change: A framing perspective. *Academy of Management Review*, *31*(2), 347-365.

Choo, Chun Wei. "Perception and Use of Information Sources by Chief Executives in Environmental Scanning." Library & Information Science Research 16, no. 1 (1994): doi:10.1016/0740-8188(94)90040-X.

Churchill Jr, G. A. 1979. A paradigm for developing better measures of marketing constructs. ***Journal of Marketing Research***, 16: 64-73.

Daft, R. L., & Weick, K. E. 1984. Toward a model of organizations as interpretation systems. ***Academy of Management Review,*** 9: 284-295.

Daft, R. L., & Lenge, R. H. 1986. Organizational information requirements, media richness and structural design. ***Management Science,*** 32: 554-571.

Daft, R. L., & Sormunen, J., & Parks, D. 1988. Chief executive scanning, environmental characteristics, and company performance: An empirical study. ***Strategic Management Journal,*** 9 : 123-139.

Danneels, E. 2008. Organizational antecedents of second-order competences. ***Strategic Management Journal***, 29: 519-543.

Davis, J. P., & Eisenhardt, K. M., & Bingham, C. B. 2009. Optimal structure, market dynamism, and the strategy of simple rules. ***Administrative Science Quarterly***, 54: 413-452.

Day, D. V., & Lord, R. G. 1988. Executive leadership and organizational performance: Suggestions for a new theory and methodology. ***Journal of Management***, 14: 453-464.

Day, G. S. 2011. Closing the marketing capabilities gap. ***Journal of Marketing,*** 75: 183-195.

Day, G. S., & Wensley, R. 1983. Marketing theory with a strategic orientation. ***The Journal of Marketing***, 47: 79-89.

De Jong, M. G., & Steenkamp, J. E. M., & Fox, J. 2007. Relaxing measurement invariance in cross-national consumer research using a hierarchical IRT model. ***Journal of Consumer Research***, 34: 260-278.

Dierickx, I., & Cool, K. 1989. Asset stock accumulation and sustainability of competitive advantage. ***Management Science***, 35: 1504-1511.

Di Stefano, G., & Peteraf, M., & Verona, G. 2014. The organizational drivetrain: A road to integration of dynamic capabilities research. ***The Academy of Management Perspectives***, 28: 307-327.

Di Stefano, G., & Peteraf, M., & Verona, G. 2010. Dynamic capabilities deconstructed: A bibliographic investigation into the origins, development, and future directions of the research domain. ***Industrial and Corporate Change,*** 19: 1187-1204.

Drnevich, P. L., & Kriauciunas, A. P. 2011. Clarifying the conditions and limits of the contributions of ordinary and dynamic capabilities to relative firm performance. ***Strategic Management Journal***, 32: 254-279.

Dutton, J. E., Fahey, L., & Narayanan, U. K. 1983. Toward understanding strategic issue diagnosis. Strategic Management Joumal, 4: 307-323.

Dutton, J. E., & Jackson, S. E. 1987. Categorizing strategic issues: Links to organizational actions. Academy of Management Review, 12: 76-90.

Dutton, J. E., Stumpf, S. A. and Wagner, D. (1990). 'Diagnosing strategic issues and managerial investment of resources'. In Shrivastav, P. and Lamb, R. B. (Eds), Advances in Strategic Management. Greenwich, CT: JAI Press, 6, 143-67.

Eisenhardt, K. M. 1989. Making fast strategic decisions in high-velocity environments. ***Academy of Management Journal***, 32: 543-576.

Eisenhardt, K. M., & Martin, J. A. 2000. Dynamic capabilities: What are they? ***Strategic Management Journal***, 21: 1105-1121.

Ellonen, H. K., & Wikström, P., & Jantunen, A. 2009. Linking dynamic-capability portfolios and innovation outcomes. ***Technovation***, 29: 753-762.

Eriksson, T. 2014. Processes, antecedents and outcomes of dynamic capabilities. ***Scandinavian Journal of Management***, 30: 65-82.

Ettlie, J. E., & Pavlou, P. A. 2006. Technology-based new product development partnerships. ***Decision Sciences***, 37: 117-147.

Fahey, L., & King, W. R. 1977. Environmental scanning for corporate planning. ***Business Horizons***, 20: 61-71.

Farh, J. L., & Hoffman, R. C., & Hegarty, W. H. 1984. Assessing environment scanning at the subunit level: A multitrait multimethod analysis. ***Decision Sciences***, 15: 197-220.

Fey, C. F., & Birkinshaw, J. 2005. External sources of knowledge, governance mode, and R&D performance. ***Journal of Management***, 31: 597-621.

Fey, C. F., & Denison, D. R. 2003. Organizational culture and effectiveness: Can American theory be applied in Russia?. ***Organization Science***, 14: 686-706.

Flores, L. G., & Zheng, W., & Rau, D., & Thomas, C. H. 2012. Organizational learning subprocess identification, construct validation, and an empirical test of cultural antecedents. ***Journal of Management***, 38: 640-667.

Ford, J. K., & MacCallum, R. C., & Tait, M. 1986. The application of exploratory factor analysis in applied psychology: A critical review and analysis. ***Personnel Psychology***, 39: 291-314.

Fornell, C., & Larcker, D. F. 1981. Evaluating structural equation models with unobservable variables and measurement error. ***Journal of Marketing Research***, 18: 39-50.

Foss, N. J., & Lyngsie, J., & Zahra, S. A. 2013. The role of external knowledge sources and organizational design in the process of opportunity exploitation. ***Strategic Management Journal***, 34: 1453-1471.

Fuchs and Diamontopolous 2009

Gerbing, D. W., & Anderson, J. C. 1988. An updated paradigm for scale development incorporating unidimensionality and its assessment. ***Journal of Marketing Research***, 25: 186-192.

Ginsberg, A., & Venkatraman, N. 1995. Institutional initiatives for technological change: From issue interpretation to strategic choice. ***Organization Studies***, 16: 425-448.

Ginsberg, A. and Venkatraman, N. (1992). 'Investing in new information technology: the role of competitive posture and issue diagnosis'. Strategic Management Journal, 13, 37-53.

Gioia, D. A., Thomas, J. B., Clark, S. M. and Chittipeddi, K. (1994). 'Symbolism and strategic change in academia: the dynamics of sensemaking and influence'. Organization Science, 5, 363-83.

Goll, I., & Rasheed, A. 1997. Rational decision-making and firm performance: The moderating role of environment. ***Strategic Management Journal***, 18: 583-591.

Greenwood, P. E., & Nikolin, M. S. 1996. ***A guide to chi–squared testing***. New York: Wiley.

Hansen, M., & Perry, L., & Reese, C. 2004. A Bayesian operationalization of the resource-based view. ***Strategic Management Journal***, 25: 1279-1295.

Harmancioglu, N., & Grinstein, A., & Goldman, A. 2010. Innovation and performance outcomes of market information collection efforts: The role of top management team involvement. ***International Journal of Research in Marketing***, 27: 33-43.

Harreld, J. B., & O'Reilly III, C. A., & Tushman, M. L. 2007. Driving strategy into action. ***California Management Review***, 49: 21-43.

Helfat, C. E., & Finkelstein, S., & Mitchell, W., & Peteraf, M., & Singh, H., & Teece, D., & Winter, S. G. 2007. ***Dynamic capabilities: Understanding strategic change in organizations.*** Malden, MA: Blackwell.

Helfat, C. E., & Peteraf, M. A. 2003. The dynamic resource-based view: Capability lifecycles. ***Strategic Management Journal***, 24: 997-1010.

Helfat, C., & Peteraf, M. 2009. Understanding dynamic capabilities: Progress along a developmental path. ***Strategic organization***, 7: 91-102.

Helfat, C. E., & Winter, S. G. 2011. Untangling dynamic and operational capabilities: Strategy for the (n)ever-changing world. ***Strategic Management Journal***, 32: 1243-1250.

Hills, G. E., & Shrader, R. C. 1998. Successful entrepreneurs' insights into opportunity recognition. ***Frontiers of Entrepreneurship Research***, 18: 30-41.

Hitt, M. A., & Ireland, & R. D., & Camp, S. M., & Sexton, D. L. 2001. Strategic entrepreneurship: Entrepreneurial strategies for wealth creation. ***Strategic Management Journal***, 22: 479-491.

Holland, W. E., & Stead, B. A., & Leibrock, R. C. 1976. Information channel/source selection as a correlate of technical uncertainty in a research and development organization. ***IEEE Transactions on Engineering Management***, 23: 163-167.

Hu, L. T., & Bentler, P. M. 1999. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. ***Structural Equation Modeling: A Multidisciplinary Journal***, 6: 1-55.

Hurmelinna-Laukkanen, P. 2012. Constituents and outcomes of absorptive capacity–appropriability regime changing the game. ***Management Decision***, 50: 1178-1199.

Hurmelinna-Laukkanen, P. 2011. Enabling collaborative innovation–knowledge protection for knowledge sharing. ***European Journal of Innovation Management***, 14, 303-321.

Iansiti, M., & Clark, K. B. 1994. Integration and dynamic capability: Evidence from product development in automobiles and mainframe computers. ***Industrial and Corporate Change***, 3: 557-605.

Jackson, S. E. and Dutton, J. E. (1988). 'Discerning threats and opportunities'. Administrative Science Quarterly, 33, 370-87.

Jambulingam, T., & Kathuria, R., & Doucette, W. R. 2005. Entrepreneurial orientation as a basis for classification within a service industry: The case of retail pharmacy industry. ***Journal of Operations Management***, 23: 23-42.

Jansen, J. J., & Simsek, Z., & Cao, Q. 2012. Ambidexterity and performance in multiunit contexts: Cross level moderating effects of structural and resource attributes. ***Strategic Management Journal***, 33: 1286-1303.

Jarzabkowski, P., & Balogun, J., & Seidl, D. 2007. Strategizing: The challenges of a practice perspective. ***Human Relations***, 60: 5-27.

Jaworski, B. J., & Kohli, A. K. 1993. Market orientation: Antecedents and consequences. ***The Journal of Marketing,*** 57: 53-70.

Johnson, G. L., & Melin, L., & Whittington, R. 2003. Micro-strategy and strategizing. ***Journal of Management Studies***, 40: 3-22.

Jöreskog, K. G., & Sörbom, D. 1993. Lisrel ***8: Structural equation modeling with the SIMPLIS command language***. Chicago, IL: Scientific Software International Inc.

Judge, W. Q., & Miller, A. 1991. Antecedents and outcomes of decision speed in different environmental contexts. ***Academy of Management Journal***, 34: 449-463.

Jung-Erceg, P., & Pandza, K., & Armbruster, H., & Dreher, C. 2007. Absorptive capacity in European manufacturing: A Delphi study. ***Industrial Management & Data Systems***, 107: 37-51.

Kindström, D., & Kowalkowski, C., & Sandberg, E. 2012. Enabling service innovation: A dynamic capabilities approach. ***Journal of Business Research***, 66: 1063-1073.

Kirzner, I. 1973. ***Competition and Entrepreneurship***. Chicago, IL: University of Chicago Press.

Kohli, A. K., & Jaworski, B. J., & Kumar, A. 1993. MARKOR: A measure of market orientation. ***Journal of Marketing Research***, 30: 467-477.

Kohli, A. K., & Jaworski, B. J. 1990. Market orientation: The construct, research propositions, and managerial implications. ***The Journal of Marketing***, 54: 1-18.

Kor, Y. Y., & Leblebici, H. 2005. How do interdependencies among human-capital deployment, development, and diversification strategies affect firms' financial performance? ***Strategic Management Journal***. 26: 967-985.

Kraatz, M. S., & Zajac, E. J. 2001. How organizational resources affect strategic change and performance in turbulent environments; theory and evidence. ***Organization Science***, 12: 632-657.

Krueger Jr, N. F. (2007). The Cognitive Infrastructure of Opportunity Emergence*. In *Entrepreneurship* (pp. 185-206). Springer Berlin Heidelberg.

Kuvaas, B. (2002). 'An exploration of two competing perspectives on informational contexts in top management strategic issue interpretation'. Journal of Management Studies, 39, 979-1003.

Lang, James R., Roger J. Calantone, and Donald Gudmundson. "Small firm information seeking as a response to environmental threats and opportunities." Journal of Small Business Management 35.1 (1997): 11.

Lavie, D. 2006. Capability reconfiguration: An analysis of incumbent responses to technological change. ***Academy of Management Review***, 31 : 153-174.

Li, D. Y., & Liu, J. 2014. Dynamic capabilities, environmental dynamism, and competitive advantage: Evidence from China. ***Journal of Business Research***, 67: 2793-2799.

Lorenzoni, G., & Lipparini, A. 1999. The leveraging of interfirm relationships as a distinctive organizational capability: A longitudinal study. ***Strategic Management Journal***, 20: 317-338.

Maier, J. L., & Rainer Jr, R. K., & Snyder, C. A. 1997. Environmental scanning for information technology: An empirical investigation. ***Journal of Management Information Systems***, 14: 177-200.

Mittal, V., & Ross, W. T. (1998). The impact of positive and negative affect and issue framing on issue interpretation and risk taking. Organizational Behavior and Human Decision Processes, 76(3), 298-324.

Matsuno, K., & Mentzer, J. T., & Rentz, J. O. 2000. A refinement and validation of the MARKOR scale. ***Journal of the Academy of Marketing Science***, 28: 527-539.

May, R. C., & Stewart, W. H., & Sweo, R. 2000. Environmental scanning behavior in a transitional economy: Evidence from Russia. ***Academy of Management Journal***, 43: 403-427.

McNamara, G., & Valler, P. M., & Devers, C. 2003. Same as it ever was: The search for evidence of increasing hypercompetition. ***Strategic Management Journal***, 24: 261-278.

Miller, D., & Friesen, P. H. 1983. Strategy making and environment: The third link. ***Strategic Management Journal***, 4: 221-235.

Möller, K., & Rajala, A. (2007). Rise of strategic nets—New modes of value creation. ***Industrial Marketing Management***, 36: 895-908.

Nadler, D.A. 1998. ***Champions of Change***. San Francisco, CA: Jossey-Bass.

Narver, J. C., & Slater, S. F., & MacLachlan, D. L. 2004. Responsive and proactive market orientation and new product success. ***Journal of Product Innovation Management***, 21: 334-347.

Narver, J. C., & Slater, S. F. 1990. The effect of a market orientation on business profitability. ***The Journal of Marketing***, 45: 20-35.

Netemeyer, R. G., & Bearden, W. O., & Sharma, S. (Eds.). 2003. ***Scaling procedures: Issues and applications***. Palo Alto, CA: Sage Publications.

Nunnally, J. C., & Bernstein, I. H. 1994. ***Psychometric Theory***. New York: McGraw-Hill.

Pablo, A. L., & Reay, T., & Dewald, J. R., & Casebeer, A. L. 2007. Identifying, enabling and managing dynamic capabilities in the public sector. ***Journal of Management Studies***, 44, 687-708.

Pavlou, P. A., & El Sawy, O. A. 2006. From IT leveraging competence to competitive advantage in turbulent environments: The case of new product development. ***Information Systems Research***, 17: 198-227.

Pavlou, P. A., & El Sawy, O. A. 2011. Understanding the elusive black box of dynamic capabilities. ***Decision Sciences***, 42: 239-273.

Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in organizational research: Problems and prospects. Journal of Management, 12, 69 –82.

Podsakoff, P. M.; MacKenzie, S. B.; Lee, J. Y.; Podsakoff, N. P. (2003): Common method biases in behavioral research: A critical review of the literature and recommended remedies. Journal of Applied Psychology, Vol. 88, p. 900.

Porter, M. E. 1980. ***Competitive Strategy***. New York: Free Press

Protogerou, A., & Caloghirou, Y., & Lioukas, S. 2012. Dynamic capabilities and their indirect impact on firm performance. ***Industrial and Corporate Change***, 21: 615-647.

Richard, P. J., & Devinney, T. M., & Yip, G. S., & Johnson, G. 2009. Measuring organizational performance: Towards methodological best practice. ***Journal of Management***, 35: 718 – 804.

Rosenkopf, L., & Nerkar, A. 2001. Beyond local search: Boundary spanning, exploration, and impact in the optical disk industry. ***Strategic Management Journal***, 22: 287-306.

Rossiter 2002 International Journal of Research in Marketing

Schreyögg, G., & Kliesch-Eberl, M. 2007. How dynamic can organizational capabilities be? Towards a dual-process model of capability dynamization. ***Strategic Management Journal***, 28: 913-933.

Sharma, S., & Mukherjee, S., & Kumar, A., & Dillon, W. R. 2005. A simulation study to investigate the use of cutoff values for assessing model fit in covariance structure models. ***Journal of Business Research***, 58: 935-943.

Sharma, S. (2000). 'Managerial interpretations and organizational context as predictors of corporate choice of environmental strategy'. Academy of Management Journal, 43, 681-97.

Shook et al., 2004; An assessment of the use of structural equation modeling in strategic management reseearch, Strategi Management Journal, 25 (4), 397-404.

Smith, K. G., & Collins, C. J., & Clark, K. D. 2005. Existing knowledge, knowledge creation capability, and the rate of new product introduction in high-technology firms. ***Academy of Management Journal***, 48: 346-357.

Talke, K., & Colarelli O'Connor, G. 2011. Conveying effective message content when launching new industrial products. ***Journal of Product Innovation Management***, 28: 943-956.

Teece, D., & Pisano, G. 1994. The dynamic capabilities of firms: An introduction. ***Industrial and Corporate Change***, 3: 537-556.

Teece, D. J., & Pisano, G., & Shuen, A. 1997. Dynamic capabilities and strategic management. ***Strategic Management Journal***, 18: 509-533.

Teece, D. J. 2007. Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. ***Strategic Management Journal***, 28: 1319-1350.

Thomas, J. B., & Clark, S. M., & Gioia, D. A. 1993. Strategic sensemaking and organizational performance: Linkages among scanning, interpretation, action, and outcomes. ***Academy of Management Journal***, 36: 239-270.

Thomas, J. B. and McDaniel, R. R. Jr (1990). 'Interpreting strategic issues: effects of strategy and the information-processing structure of top management teams'. Academy of Management Journal, 33, 286-306.

Thomas, J. B., Gioia, D. A. and Ketchen, D. J. (1997). 'Strategic sense-making: learning through scanning, interpretation, action, and performance'. In Shrivastava, P., Huff, A. S. and Dutton, J. E. (Eds), Advances in Strategic Management. Greenwich, CT: JAI Press, 14, 299-329.

Tseng, S. M., & Lee, P. S. 2014. The effect of knowledge management capability and dynamic capability on organizational performance. ***Journal of Enterprise Information Management***, 27: 158-179.

Von Krogh, G., & Roos, J. 1996. ***Managing knowledge: Perspectives on cooperation and competition***. London: Sage Publications.

Wang, Y. L., & Ellinger, A. D., & Wu, Y. C. J. 2013. Entrepreneurial opportunity recognition: An empirical study of R&D personnel. ***Management Decision***, 51: 248-266.

Weston and Gore Jr., 2006 A brief guide to structural equation modeling, The Counseling Psychologist

Wiggins, R. R., & Ruefli, T. W. 2005. Schumpeter's ghost: Is hypercompetition making the best of times shorter? ***Strategic Management Journal***, 26: 887-911.

Winter, S. G. 2003. Understanding dynamic capabilities. ***Strategic Management Journal***, 24: 991-995.

Yang, C., & Liu, H. M. 2012. Boosting firm performance via enterprise agility and network structure. ***Management Decision***, 50: 1022-1044.

Yin, R. K. 2014. ***Case study research: Design and methods***. Thousand Oaks, CA: Sage Publications.

Appendix

Appendix A – Questionnaire for the Online Survey

1. Questions about the market dynamics

We would like to get an idea of the prevailing dynamics in your main market.

	strongly disagree					*strongly agree*
Our company often has to change its products or services to be able to keep up with the competition.	☐	☐	☐	☐	☐	☐
Products or services are rapidly becoming obsolete in our market.	☐	☐	☐	☐	☐	☐
In our market, the technology is changing faster than in other markets.	☐	☐	☐	☐	☐	☐
The customer needs in our market differ greatly between the different customer segments.	☐	☐	☐	☐	☐	☐

2. General questions about the adaptability of businesses (Part 1/2)

For companies in a very dynamic market environment, it is often difficult to react quickly to market changes. In the following section, we are interested in the adaptability of your company.

	strongly disagree					*strongly agree*
When **an opportunity** opened up due to market changes in the last three years, we were always the first on the market to recognize this opportunity.	☐	☐	☐	☐	☐	☐
When **a threat** arose due to market changes in the last three years, we were always the first on the market to recognize this threat.	☐	☐	☐	☐	☐	☐
Compared to our competitors, we have identified much less opportunities in the last three years.	☐	☐	☐	☐	☐	☐

Compared to our competitors, in the last three years we have used **opportunities** that have resulted from market changes mostly:	*strongly disagree*					*strongly agree*
- much more effectively	☐	☐	☐	☐	☐	☐
- much faster	☐	☐	☐	☐	☐	☐
- much rarer	☐	☐	☐	☐	☐	☐

Compared to our competitors, in the last three years we have fought **threats** that have resulted from market changes mostly:	*strongly disagree*					*strongly agree*

- much faster	☐ ☐ ☐ ☐ ☐ ☐
- much more effectively	☐ ☐ ☐ ☐ ☐ ☐

In the last three years, we were far more flexible than our competitiors in terms of:	*strongly disagree*					*strongly agree*
- the change in the corporate structure (incl. incentive systems)	☐	☐	☐	☐	☐	☐
- the adjustment of our goals and strategies	☐	☐	☐	☐	☐	☐
- the change in our processes and procedures	☐	☐	☐	☐	☐	☐
- the adaption of our human resources (layoffs, recruitments, internal reshuffles)	☐	☐	☐	☐	☐	☐

2. General questions about the adaptability of businesses (Part 2/2)

Please rate the following skills of your company compared to your competitors:

	signifi-cantly worse					*signifi-cantly better*
The ability to develop new products.	☐	☐	☐	☐	☐	☐
The ability to develop new services.	☐	☐	☐	☐	☐	☐
The ability to market new products and services successfully.	☐	☐	☐	☐	☐	☐
The ability to utilize the R & D (research and development) results in new products and services.	☐	☐	☐	☐	☐	☐
The ability to acquire staff for after-sales services in international markets.	☐	☐	☐	☐	☐	☐

Please indicate to what extent the following statements apply to your company:

Over the past three years, we have...	*strongly disagree*					*strongly agree*
...often tailored products to specific requirements of various international markets.	☐	☐	☐	☐	☐	☐
...often adapted our after-sales sevices to the conditions of international markets.	☐	☐	☐	☐	☐	☐
...often made adjustments to our “marketing process” in response to the specifics of international markets.	☐	☐	☐	☐	☐	☐

	strongly disagree					*strongly agree*
The product adjustments that we have made for international market requirements were always substantial.	☐	☐	☐	☐	☐	☐

	not at all					*con-sider-able amount*
To what extent do you have unused production capacity in your company?	☐	☐	☐	☐	☐	☐

3. Questions about the company´s development

How would you rate your company´s development in the last three years with regard to the following criteria compared to that of your main competitors?

	signifi-cantly worse					*signifi-cantly better*
Revenue(Value) growth	☐	☐	☐	☐	☐	☐
Market shares	☐	☐	☐	☐	☐	☐
Profitability (operating income/earnings before tax/operating profit before tax)	☐	☐	☐	☐	☐	☐
Innovativeness (innovator image on the market)	☐	☐	☐	☐	☐	☐

What was your company´s revenue last year (2013)? (in Mio. €)	☐ Mio. €
What percentage of the total revenue comes from your strongest business segment?	☐ %
On average, what percentage of the revenue was invested in R & D in the last three years?	☐ %

4. Questions about the collection and analysis of market information (1/3)

Now we are interested in the collection and analysis of market information. Please indicate to what extent the following points apply to your company.

	not at all					*very strongly*
We undertake very intensive internal market research (e.g., through employee surveys or in the form of working groups).	☐	☐	☐	☐	☐	☐

	not intensively at all					*very intensively*
How intensively are diverse media (reports, studies, journals, newsletter, etc.) used in your company to better assess the developments in the market?	☐	☐	☐	☐	☐	☐

	not active at all					*very active*
To what extent are employees of your company active in business networks (e.g., Rotary Club, Marketing Clubs, Business Circles)?	☐	☐	☐	☐	☐	☐

	not at all					*very strongly*
To what extent is your company involved in associations?	☐	☐	☐	☐	☐	☐
To what extent are cross-industry research and development partnerships used in your company (e.g., networks, clusters, consortia, initiatives)?	☐	☐	☐	☐	☐	☐

	barely					*very often*

How often do employees of your company take part in trade shows or confereces?	☐ ☐ ☐ ☐ ☐ ☐

4. Questions about the collection and analysis of market information (2/3)

In our company, we **often** exchange ideas with the following operators about the **market developments** and their **plans and activities**:	*not correct at all*					*applies complet-ely*
- with universities or other research institutes	☐	☐	☐	☐	☐	☐
- with our partners, who are in direct contact with our end customers (e.g., trade, distributors)	☐	☐	☐	☐	☐	☐
- with suppliers of supplementary products (NB:hardware is a supplementary product to software)	☐	☐	☐	☐	☐	☐
- with our suppliers	☐	☐	☐	☐	☐	☐
- with our competitors	☐	☐	☐	☐	☐	☐
- with “development banks” (e.g., support institutions, foundations)	☐	☐	☐	☐	☐	☐

	strongly disagree					*strongly agree*
We constantly compare ourselves with our competitors.	☐	☐	☐	☐	☐	☐
We have comprehensive information about our competitiors (e.g., competitive products or services, competitive prices, competitive campaigns).	☐	☐	☐	☐	☐	☐

	strongly disagree					*strongly agree*

In our company, we often communicate with our **direct customers** in order to deduce opportunities to satisfy their wishes.	☐ ☐ ☐ ☐ ☐ ☐
We interview the **end-user** at least once a year in order to gain information about the quality of our products and services.	☐ ☐ ☐ ☐ ☐ ☐
We measure our customer´s satisfaction systematically and regularly.	☐ ☐ ☐ ☐ ☐ ☐
We are not particularly quick in identifying changes in customer requirements.	☐ ☐ ☐ ☐ ☐ ☐

How often, compared to your competitors, do you meet with the following operators in your company in order to find out what products or services may be of worth to them in the future?	*much rarer*	*much more often*
Direct customer	☐ ☐ ☐ ☐ ☐ ☐	
End user	☐ ☐ ☐ ☐ ☐ ☐	

In our company, we have regular meetings to discuss the following developments and their impact on our company:	*not correct at all*	*applies complet-ely*
- legal framework	☐ ☐ ☐ ☐ ☐ ☐	
- general macroeconomic developments (e.g., interest rate, exchange rates, GDP, inflation rate, growth rates of industries)	☐ ☐ ☐ ☐ ☐ ☐	
- technological developments	☐ ☐ ☐ ☐ ☐ ☐	
- socio-cultural developments (e.g., stronger environmental awareness, new lifestyles)	☐ ☐ ☐ ☐ ☐ ☐	
- demographic developments (e.g., aging of the population)	☐ ☐ ☐ ☐ ☐ ☐	
- political developments (e.g., government initiatives, budget plans)	☐ ☐ ☐ ☐ ☐ ☐	

4. Questions about the collection and analysis of market information (3/3)

	barely					*on a large scale*
To what extent are changes in the market environment specifically searched for in your company?	☐	☐	☐	☐	☐	☐

	strongly disagree					*strongly agree*
In our company, market information is collected and analyzed using a clearly structured scheme.	☐	☐	☐	☐	☐	☐
The collection and analysis of market information is carried out continuously.	☐	☐	☐	☐	☐	☐

	strongly disagree					*strongly agree*
New relevant information always results in a rethinking of the decisions in our company.	☐	☐	☐	☐	☐	☐
If something is not clear, we analyze it twice.	☐	☐	☐	☐	☐	☐
We take a lot of time for the collection and analysis of market information.	☐	☐	☐	☐	☐	☐
Extremely extensive research and analysis has to be undertaken before a decision due to a market change is made in our company..	☐	☐	☐	☐	☐	☐
I would consider our analytical methods for the	☐	☐	☐	☐	☐	☐

interpretation of market information as being extremely pragmatic.

	not at all					*very intensively*
Please indicate on the following scale the intensity with which you analyze market information in your company.	☐	☐	☐	☐	☐	☐

	strongly disagree					*strongly agree*
Findings from the analysis of all market information are quickly spread throughout the company.	☐	☐	☐	☐	☐	☐
Findings from the analysis of all market information are always distributed to all functional areas within the company.	☐	☐	☐	☐	☐	☐

5. Questions about the position of the salespeople in the company

We are now interested in your salespeople. In many companies, they serve as a central interface to direct information from the market.

	strongly disagree					*strongly agree*
Our salespeople are a very good source for market information.	☐	☐	☐	☐	☐	☐
Our salespeople are heavily involved in the process of generating market information.	☐	☐	☐	☐	☐	☐
The task of collecting market information is documented in the job description of our salespeople.	☐	☐	☐	☐	☐	☐
The task of information collection gives our salespeople the opportunity to earn additional incentive payments.	☐	☐	☐	☐	☐	☐
Our salespeople receive feedback on the use of their collected market information.	☐	☐	☐	☐	☐	☐

6. Questions about the basic conditions in the company

An essential aspect of the adaptability of companies is the basic conditions in the company. Please indicate to what extent the following statements apply to your company.

	strongly disagree					*strongly agree*
The management can rarely be dissuaded from their intentions.	☐	☐	☐	☐	☐	☐
The employees in our company only have to consult their supervisors about extremely critical decisions.	☐	☐	☐	☐	☐	☐
Each employee must strictly adhere to the processes and procedures.	☐	☐	☐	☐	☐	☐
We accept above-average risks in our company.	☐	☐	☐	☐	☐	☐
In our company, the employees try harder to satisfy the supervisors rather than the customers.	☐	☐	☐	☐	☐	☐

	strongly disagree					*strongly agree*
Our management is convinced that the rules of the market can be redefined by the activities of the market participants (competition, suppliers, customers, etc.) at any time.	☐	☐	☐	☐	☐	☐
Our management is convinced that the expectations of the customers in terms of the product and service promise are difficult to change.	☐	☐	☐	☐	☐	☐
During the analysis of market information, our mangement always considers the possibilities that could result from a cooperation with partners.	☐	☐	☐	☐	☐	☐
Our management always considers that incidents could occur in the market environment at any given time and harm our company.	☐	☐	☐	☐	☐	☐

	strongly disagree					*strongly agree*
Our management is up to providing corporate resources for the collection and analysis of market information.	☐	☐	☐	☐	☐	☐
A specially-appointed corporate function takes care of the collection and analysis of market information.	☐	☐	☐	☐	☐	☐
Our management is keen to make sure all business areas (e.g., marketing/sales, production, controlling etc.) have a common understanding of the existing market information.	☐	☐	☐	☐	☐	☐

	not at all					*very strong*
To what extent is the management involved in the **daily business**?	☐	☐	☐	☐	☐	☐
To what extent is the management involved in the **collection and analysis of market information**?	☐	☐	☐	☐	☐	☐

	barely	*on a big scale*
To what extent has the management of your company made working time available for "entrepreneurial mind games" (à la Google Management)?	☐ ☐ ☐ ☐ ☐ ☐	

	strongly disagree	*strongly agree*
The company is known for our employees not working overtime.	☐ ☐ ☐ ☐ ☐ ☐	

7. General questions about the company

To gain a better picture of your company, we finally would like to ask you about the general situation of your company.

In which industry is your company operating with the strongest sales business segment?		
When was your company founded?		date
How many employees work at your company? (2013)		number of employees

	not very large	*very large*
Please provide an estimate of how large, on average, the particular **industry experience** of the management in your company is.	☐ ☐ ☐ ☐ ☐ ☐	

	not very long	*very long*
Please provide an estimate of how long, on average, the members in your management have had **experience in the management position**.	☐ ☐ ☐ ☐ ☐ ☐	

	0%	1-20%	21-40%	41-60%	61-80%	81-100%
On average, what percentage of the turnover was generated abroad in the last three years?	☐	☐	☐	☐	☐	☐

	yes	*no*
Is your company a subsidiary?	☐	☐
Is your company´s head office located in Germany?	☐	☐

	B2C	*B2B*	*both*
Are your operations mainly focused on private customers (B2C) or corporate customers (B2B)?	☐	☐	☐

	yes	*no*
Our services are always tailored to a specific customer.	☐	☐
Personal selling through our salespeople is very important for our products.	☐	☐

Finally, we ask you to provide some personal information so we can gain a better picture of you as a manager.

How long have you been working for the company?		date
Your current position:		
Since when have you held this position?		date

8. Thank you very much for your assistance!

If you would like to tell us anything else about the adaptability of companies (e.g., personal experiences, success factors) or about the questionnaire (e.g., additional aspects), please usethe following box to do so:

9. E-Mail address

☐ If you would like a **summary of the research findings**, please leave your e-mail address after clicking on the box. Once the evaluation process has been completed, we will be happy to send you the results of the study.

The strictly confidential use of the data will of course be guaranteed at all times.