

Innovation Strategy Explored: Innovation Orientation's Strategy Preconditions and Market Performance Outcomes

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This study researches a topic that has rarely been analyzed in innovation management so far: innovation strategy and dynamic capabilities. The study is based on data from 140 firms in the IT industry. Its main finding is that an adequate choice of strategies increases market performance because specific dynamic capabilities are realized. In this context, innovation orientation and flexibility are viewed as two classes of dynamic capabilities. Uncertainty is found to be an important moderating factor on the choice and effect of strategies and dynamic capabilities. With low levels of uncertainty, a deliberate strategy whose positive effect unfolds through flexibility improves market performance. In contrast, under high uncertainty, an emergent strategy enhances market performance through an intra-firm innovation orientation.

Keywords: Strategy, Innovation Management, Dynamic Capabilities, Innovation Orientation, Flexibility

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Abstract

This study researches a topic that has rarely been analyzed in innovation management so far: innovation strategy and dynamic capabilities. The study is based on data from 140 firms in the IT industry. Its main finding is that an adequate choice of either a deliberate or an emergent strategy can increase market performance through the realization of dynamic capabilities. The two classes of dynamic capabilities that we research here are innovation orientation and flexibility. Our research also shows the important role uncertainty enfold on the choice of strategies: The effect of strategies and dynamic capabilities is moderated by uncertainty. With low levels of uncertainty, a deliberate strategy whose positive effect enfold through flexibility improves market performance. In contrast, under high uncertainty, an emergent strategy enhances market performance through an intra-firm innovation orientation.

A. Introduction

Competitive success is dependent upon an organization's management of innovation (Balachandra and Friar, 1997; Griffin, 1997). Prior studies have examined performance drivers of the innovation management process (Wolfe, 1994). Ernst (2002), in a review of the determinants of new product development (NPD) success, reaffirms Cooper and Kleinschmidt's prominent five factors for new product performance: process, strategy, organization, culture, and management commitment and also demonstrates that new product performance depends on choices of top management (Cooper and Kleinschmidt, 1995; Cooper, 1984). One of the key factors of performance is the link between innovation strategy and overall business goals (Pinto and Prescott, 1988), precisely because a number of principal contributions to the literature evaluate innovation as a crucial strategic issue (Henderson and Clark, 1990; Utterback, 1994). Dosi (1988) stresses that the role of strategy formulation is still underplayed in the literature. At the same time, management continually faces major challenges in the strategic design and alignment of companies' innovation activities. This

research subject is important, especially as innovation performance does not come about by coincidence, but instead owes a great deal to the formulation of strategies and firms' ability to tackle challenges.

To reduce this research gap, our research draws on the distinction among deliberate and emergent strategy formulation (Mintzberg and McHugh, 1985) and further develops those ideas to increase understanding about the link between innovation strategies and performance. As innovation is always uncertain, our research also contributes to the innovation literature in clarifying the role of uncertainty on innovation strategy and its performance link. Thus, our research contributes to an important question about strategy not answered before in innovation management.

Beyond this serious omission in previous studies firms find themselves questioning how to continuously achieve innovation. As such, the arrangement of internal capabilities plays an important role for the repetitive encounter of customers' changing preferences. The strategic preconditions and effects of internal capabilities that allow a company to cope with change and that achieve product market success is still a rudimentarily explored field. Thus, we not only investigate the innovation strategy-performance-link we also contribute to innovation management by researching the intermediate effect of internal capabilities, namely innovation orientation and flexibility that can be regarded to as dynamic capabilities.

Insights of this study are derived from testing a conceptual model. Our model explains how strategies can be transformed into dynamic capabilities and into market performance while controlling for uncertainty. In accordance with Mintzberg, we differentiate two modes of strategic orientation: detailed rational planning – the “deliberate strategy” – versus ad-hoc (intuitive) activities – the “emergent strategy” (Mintzberg and McHugh, 1985, p. 161). By addressing the dynamic capabilities we draw on the resource-based view of the firm, which suggests that a sustained competitive advantage is a function of the internal resources and dynamic capabilities of a firm. Our study intends to shed light onto this performance relationship of innovation strategy in an industry that permanently experiences change and faces uncertainties from emerging technologies and shifting customers' preferences: the IT industry. We assume that innovation orientation and flexibility are important classes of dynamic capabilities in an industry characterized by constant change and uncertainty. Specifically, the model investigates two contrasting strategic orientations of a deliberate and

an emergent strategy, their relation to dynamic capabilities of innovation orientation and of flexibility as well as their performance link.

A survey of 140 SME companies within the IT sector serves for hypothesis testing. Structural equation modeling is used to reveal direct as well as indirect effects. While we observe effects both of innovation orientation and flexibility as dynamic capabilities, these facets interfere in various ways and have different performance effects. We disentangle the interrelations of exogenous and intermediate factors by means of moderator analysis.

In summary, this paper lets light into the black box of performance-enhancing innovation strategy and its contingencies. Specifically, we research the relationship between innovation strategy and performance and the intermediary effect through innovation orientation and flexibility. To get an even more detailed picture, we investigate the moderating effect of uncertainty. Thus, our research contributes to the knowledge about innovation strategies, internal dynamic capabilities and their performance effects under high and low uncertainty. Taking a multi-faceted view and using thorough methodology, we can derive suggestions for effective choice of innovation strategy.

B. Theoretic Framework

I. Uncertainty of Innovation

Starting with Schumpeter (1911) researchers have developed various terms to describe innovations such as revolutionary, disruptive, discontinuous, or breakthrough (Garcia and Calantone, 2002). For our research we refer to innovation as a two-tier phenomenon. First, innovation can be derived from its final outcomes often with regard to the results of the innovation project. Second, innovation can harness the intra-firm and organizational orientation towards innovation that enables ongoing productivity in terms of innovativeness. The latter is influenced through structures and motivational devices that increase an organization's propensity to generate, identify, and implement innovations. By its firm-specific, enduring elements it can be regarded as a dynamic capability. The former – the final performance of innovation – is related to the number of new product innovations introduced by the firm, percentage sales of new product, innovations, and the relative frequency of introducing innovations compared with competitors.

Innovation is always a risky departure from existing practice (McDermott and O'Connor, 2002). Innovation is challenging and faces uncertainties that are existent in both incremental innovations, such as updated versions or extensions of current products and processes, and radical innovation that base upon the development or application of new ideas and novel technologies (Dewar and Dutton, 1986).

Uncertainty is inherent in the organizational development of an innovation. Both market and technological uncertainties affect the organizational orientation towards innovation and the activities while implementing innovation. While these uncertainties are evident (and well researched) with respect to their effect on the outcome and on the project stage (Pearson and Hauschildt, 1992), they are relevant on an intra-firm and organizational level as well. Uncertainty unleashes its challenging, often limiting effect, especially at the intra-firm stage, because it directly influences the individual's attitude and actions towards the development of novel contributions. Also, more far-reaching uncertainties about relevant and necessary competencies in future business settings can hamper the development, exchange and implementation of novel ideas. In contrast to specific uncertainties in single projects and their outcomes, these meta-uncertainties are likely to prevail over a long period and thus constitute determinants of strategy formulation and its implementation. We thus focus specifically on uncertainties about competencies, as these may impede the targeting of company-specific capabilities and thus obstruct the creation of a basis for long-term market success.

II. Strategy as Precondition of Innovation Capabilities

1. Strategies for Sustainable Innovation Capabilities

We refer to strategy as a pattern in a stream of decisions that include a commitment to actions and resources (Mintzberg, 1978). Thus, we follow Mintzberg who views strategies as both intended and realized. Like other strategies, an innovation strategy can be regarded as a timed string of conditional resource allocation decisions to achieve specific goals (Ramanujam and Mensch, 1985). Commonly, an innovation strategy is understood as a description of a firm's innovation position with regard to its competitive environment in terms of its new product and market development policies (Dyer and Song, 1998). Innovation per se is a core strategic endeavor: High degrees of freedoms coincide with the possibility of radical changes, thus calling for a broad perspective in goal setting. Not only must planned courses of action take into account a variety of environmental factors; they must be conducive to a cross-functional

integration of capabilities within the company. Finally, resources have to be allocated while tasks are less structured and of higher uncertainty than routine work.

However, this importance of an innovation strategy has been undervalued in the past: While strategy formulation is an important issue in planning literature, there are few works which analyze innovation strategy as a linking pin between strategy formulation and long-term market success. For example, entering “innovation strategy” as a keyword term in a search engine brings up only 23 titles of SSCI-listed publications from 1990-2006, while “marketing strategy” produces 111 hits. This is astonishing, as innovation is at the very core of every strategy that is about enabling fundamental changes in targeted markets, applied technologies or entire organizational settings.

In the few examples of strategy issues in innovation management literature, scholars even enquired if and how classical strategic management can contribute (Adams, Bessant and Phelps, 2006). Li and Atuahene-Gima (2001) assume that the evidence for an embedded innovation strategy is subjective. Further, the literature provides two distinct types of strategic orientation measures. One identifies whether the organization has an innovation strategy (Miller and Friesen, 1982; Cooper, 1990). The other assumes that strategy exists and explores its effectiveness, e. g. by further measures of strategic fit (Bessant, Kaplinsky and Lamming, 2003; Tipping, Zeffren and Fusfeld, 1995). It has been found that more innovative firms adopt different operational strategies to accommodate flexibility and quality capabilities (Alegre-Vidal, Lapiedra-Alcami and Chiva-Gomez, 2004), have a range of different financial means to facilitate slack resources (O'Brien, 2003), are more liberal regarding internal conflict in maintaining creativity (Dyer and Song, 1998), and foster organizational structures that are in the intermediate zone between order and disorder (Brown and Eisenhardt, 1997).

While isolated bottom-up project activities may lead to single achievements (individual innovation project successes), a much more strategic approach to innovation is needed to ensure that firms achieve a sustained competitive advantage and is an important prerequisite to an innovation orientation. Innovation strategy must transform the overarching corporate vision into objectives both at the program as well as the project level. Activities, resources and competencies need to be purposefully integrated in order to enable knowledge integration to occur on a day-to-day basis of innovation activities and project work. As such, we propose that a reasonable innovation strategy supports the development of enduring innovation capabilities.

Thus innovation strategy should direct project activities towards the creation of a long-term advantage based on dynamic capabilities. These internal dynamic capabilities mediate the positive effect of strategy on innovation and market success. Bonn and Christodoulou (1996) found that a greater flexibility of the organizational system is related to the changing role of planning. The organizational abilities associated with flexibility and a positive direction of personnel and different levels interplay with dynamic capabilities. We argue that the internal abilities to integrate, build, and reconfigure competencies, and especially the role of an overall inclination towards innovation and flexibility, link strategy to market outcomes. Therefore, we propose that an innovation orientation supports long-term market success and is itself influenced by a reasonable innovation strategy. Figure 1 gives an overview of our conceptual model.

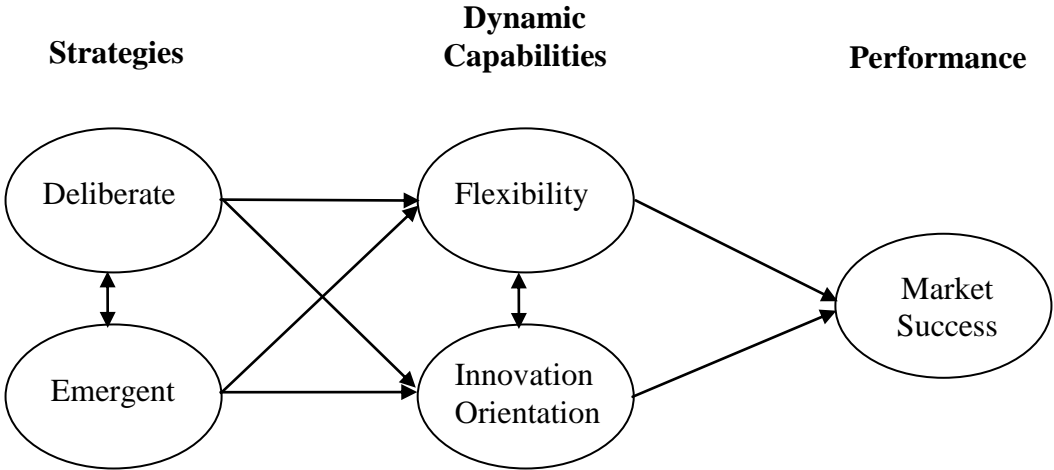


Figure 1: Basic Research Model

2. Strategy Formulation in the Context of Uncertainty

Innovation is regarded as a complex task in an environment of uncertainty and complexity. The assessment of the environment in the first place is considered a cornerstone of the literature on strategy formulation (Dess and Origer, 1987), even though, when pursuing innovation, the increased volatility of the business complicates systematic strategic planning. Thus, a vital question concerns how firms should accomplish strategy formulation to achieve innovation performance (Richard et al., 2003).

Mintzberg and Lampel (1999) identify at least 10 different schools of strategy formation. There is still a heated debate about whether strategies are a result of a formal and deliberate

planning process, or if they emerge as firms accumulate knowledge and experience (Brews and Hunt, 1999). These two schools, the formal, or deliberate, versus the emergent strategy (Mintzberg, 1987; Osborn, 1998), can also inform the research on innovation strategy. Surprisingly, these two prominent approaches to strategy have drawn little attention in the literature on innovation management, even though studies disagreed on the superiority of a formal or an emergent style of innovation project management (Brown and Eisenhardt, 1995).

According to the planning school, strategy is a deliberate, “rational” (Idenburg, 1993, p. 133) process that includes in-depth analyses of markets and implementation alternatives as means and ends (Cohé and Cyert, 1973; Fredrickson and Mitchell, 1984; Guerard, Bean and Stone, 1990). Ansoff (1991) as the proponent of the Planning School states that a-priori formal planning is necessary for achieving performance. In contrast, for emergent strategy formulation, means and ends are specified simultaneously or are intertwined (Fredrickson and Mitchell, 1984; Fredrickson and Iaquinto, 1989). As the emergent strategy does not concentrate on explicit objectives and formal approaches, it is necessary to react in a flexible way, muddling through by trial and error (Idenburg, 1993). Mintzberg (1978, 1990, and 1996) flying the Learning School flag, presumes that emergent processes and incrementalism are beneficial for competitive advantages, especially in unstable environments.

Following the logic of the Planning School, in-depth and formal analyses assist dealing with uncertainties. Proponents state that purposeful planning and analysis of the deliberate strategy improves implementation and, in particular, lessens uncertainty. This is especially important if the cost of a failed trial is very high (Ansoff, 1991). Formal planning is found in the chemical industry to be positively related to sales growth, stock prices, earnings per share, profits, as well R&D expenditures (Herold, 1972), to the financial success of banks (Wood and Laforge, 1979) and to the financial performance of manufacturing firms (Pearce, Robbins and Robinson 1987b). A meta-analysis of 14 empirical papers concluded that strategic planning contributes to firms’ growth and profitability (Miller and Cardinal, 1994). In contrast, others report counterintuitive and non-significant findings on the reimbursements of formal planning on performance (Kudla, 1980; Leontiades and Tezel, 1980). A meta-analysis on 18 empirical studies found inconsistencies in findings and weak results of the formal planning performance relationships (Pearce, Freeman and Robinson, 1987a). Ireland et al. (1987) report contrasting results on the performance link, yet highlight the role of perceived uncertainty on strategy formulation. The studies by Fredrickson (1983; 1984) indicate that

rational planning contributes to performance only in stable environments. Instead, an emergent strategy is favorable in complex and unstable environments, as decisions require speed, primarily, but also, to a lesser degree, integration into an overall strategy (Fredrickson, 1983). Boyd's (1991) meta-analysis on 21 studies showed varying and contrasting findings regarding a formal strategy-performance link. In an international study of 19 different industry categories, Brews and Hunt (1999) found formal planning associated with firm performance regardless of the dynamics the industry enfolds. Still, in very unstable environments, plans have to be both formal and incremental (Brews and Hunt, 1999). Managers then need to be capable of improvisation, co-adaptation, experimentation, and time-pacing to improve performance, especially under unstable conditions (Macintosh and Maclean, 1999).

In particular, with larger risks and environmental uncertainties, it becomes more questionable whether innovation can be the object of detailed rationalized and formal planning or of more intuitive ad-hoc planning (Lewis, 2002). Situations with high uncertainty and ambiguity of technological competencies may especially undermine the positive effects of a deliberate strategy, as there is a continuous and serious need for flexible responses to market and technology change. Uncertainty about business competencies that will be relevant in the future, stemming, for example, from new technologies, economic and political trends, and shifts in consumer preferences, continuously force managers to change their mindset. Scale complexity and diverse perceptions require the generation and application of tacit knowledge from diverse origins (Amit and Schoemaker, 1993). Accordingly, uncertainties associated with rapid competency changes require flexibility and creativity, both of which are rarely associated with formalized planning (Hamel, 1996). As such, uncertainty can moderate the profitability of the strategies (Siguaw, Simpson and Enz, 2006). Trial and experience are the strategies to follow as formal strategic planning does not provide a secure foundation for formulating long term strategy (Brown and Eisenhardt, 1997; Grant, 1991; Grant, 2003). Under high levels of uncertainty about the focus and the technical approach (Pearson, 1990), emergent strategies can be advantageous for achieving innovation. In summary, an emergent strategy is especially beneficial in conditions of high uncertainty about competencies, as it overcomes the negative, especially the too rigid and formal, aspects of a deliberate strategy that is beneficial under low uncertainty.

Hypothesis 1a: A deliberate strategy supports the development of innovation capabilities in case of low competence uncertainties.

Hypothesis 1b: An emergent strategy supports the development of innovation capabilities in case of high competence uncertainties.

III. Performance Effect of Innovation Orientation

Strategy formulation is a “words-only” activity and only the starting point for its implementation and the firm’s final success. Internal processes mediate the potential effects of strategy. In particular, internal abilities of flexibility and an innovation orientation – a positive direction of personnel and different levels of the organization vis-à-vis innovative endeavors – are intermediary outcomes of strategy formulation which will influence the realized success in the market. Thus, we research the mediating role of dynamic capabilities between strategy formulation and long term market output.

Our understanding of dynamic capabilities as the firms’ ability to integrate, build and reconfigure competencies to suit dynamic environments is adopted by Teece et al. (1997). The dynamic capability approach is embedded in the resource-based view of the firm (RBV). The focus of the RBV is on unique resources and capabilities. It regards to competitiveness as a function of the strength, identification, exploitation, and leveraging of a firm’s internal capabilities and resources (Barney, 1991a; Conner, 1991; Wernerfelt, 1984). The RBV searches in particular for grounds of sustained competitive advantages, which is also the main interest of our study. According to Reed and DeFillipi (1990), ambiguity is a key driver of enduring advantages, as it reduces the imitation of valuable resources by other firms. Social and causal ambiguity emerges from the complexity of skills and/or resource interactions within and between competencies. Dynamic capabilities fall into the category of transformational resources of the RBV that also distinguishes among managerial resources, input resources, and output resources (Lado, Boyd and Wright, 1992). The RBV requires a conscious analysis of internal resources, capabilities, and core-competencies and their utilization of potential markets. Also the RBV acknowledges the often slow and evolutionary path by which capabilities emerge (Lovas and Ghoshal, 2000; Nelson and Winter, 1982). Therefore, dynamic capabilities can apply to both types of strategy formulation.

We distinguish between two origins of dynamic capabilities within firms that are shown to be particularly and synergistically important for implementing innovations: internal innovation

orientation (Siguaw, Simpson and Enz, 2006, p. 559) and flexibility in operations (Worren, Moore and Cardona, 2002, p. 1133). Both flexibility and innovation orientation are embedded in socially complex, firm-level processes and procedures that will generate social and causal ambiguity. These can develop barriers for imitation. Given that both types of capabilities are developed on the basis of an effective innovation strategy, they should contribute to performance as complementary combination of innovation orientation and flexibility increases a flexible stretch of resources and demands of customers, while using internal resource combinations and engaging in continuous innovation. This holds especially as innovations develop from transverse connections and combinations that include multi-party ideas from different levels and flexible adjustments. Thus, a firm that systematically builds on a high level of flexibility and high-level innovation orientation should increase its performance.

For successful achievement and implementation of innovations, diverse functions within a firm continuously need to resonate with each other and with the markets. This can be supported through an underlying internal innovation orientation, which is strategically established in order to increase total innovation programs (Manu, 1992). Here, we go beyond the technical superiority in inventing and refining products (Berthon, Hulbert and Pitt, 1999) and pure market direction (Manu and Sriram, 1996) and highlight a firm's internal capacity to innovate (Atuathene-Gima and Ko, 2001). Thus innovation orientation is based upon the transfer and upstream and downstream use of information, shaping and refining the innovation. Innovation orientation also implies a willingness to move beyond old habits and to try new ideas at different levels of the organization. An innovation orientation can assist a firm's predisposition, openness, and inclination to generate novel ideas on processes and products. The innovation orientation includes the motivation of various individuals on numerous levels.

Astonishingly, the construct of innovation orientation has been neglected in the scientific discourse so far. A review of the SSCI-listed literature from 1990 to 2006 reveals only 3 articles with "innovation orientation" being mentioned in the title. This stays in sharp contrast to the extensive discourse on market orientation (147 SSCI-listed title mentions within the same time period). This parallel literature, however, documents the high relevance of orientation measures both for strategy implementation (Ruekert, 1992) and for enduring market success (meta-analysis in Kirca, Jayachandran and Bearden, 2005). Market orientation

seems to interfere with strategy and performance (Homburg and Pflesser, 2000), as it accounts for market-sensing and customer-linking capabilities that subsequently lead to superior organizational performance (Day, 1994; Hult and Ketchen, 2001).

However, the construct of market orientation serves a different focus and does not put exclusive emphasis on innovation: Market orientation concentrates on day-to-day business instead of long term, far reaching activities (Matsuno et al., 2002). Furthermore, the emphasis on the market inherently leads to a more exogenous perspective on market influences, somehow undervaluing internal forces which are competence-driven. Accordingly, a recent meta-analysis of 56 empirical studies shows that market orientation exerts stronger effects in large, mature markets (Ellis, 2006). Thus, we identify a need to investigate a distinct phenomenon of innovation orientation in the context of innovation strategy and environments of uncertainty.

O'Sullivan (2003) considers earlier studies and conceives product innovation as a continuous and cross-functional process that requires the integration of different internal competencies. Thus, successful innovation output requires an innovation orientation toward all aspects of the organization, crucially including people and process as well as technology-related issues. The transformational strength of an innovation orientation is strongly embedded in the social structure and the integration of diverse levels of the firm. Its idiosyncratic properties require time to develop and need to be cultivated within a firm rather than being acquired externally. An innovation orientation is thus a firm-specific, valuable, and socially complex resource that is not easily transferable or imitable across firms and therefore fulfills the basic criteria of the RBV grounded on the work of Barney (1991b). Simpson et al. (2006) propose that innovation orientation impacts a firm's number, rate, and type of innovations. Furthermore, Baker et al. (2003) postulate that firms can develop routines and structures for innovation that can contribute to an innovation orientation. Following this, we view innovation orientation as a dynamic capability which can be proactively designed by strategic endeavors and which provides the basis for long-term innovation success. Thus, we view innovation orientation as an intermediary variable between strategy and performance outcomes. This stays in contrast to the conceptual model of Sigauw et al. (2006) who incorporate strategy within their measure of innovation orientation. This definition seems inadequate for our research as it would not allow for the examination of the effects of alternative strategies on the development of this dynamic capability. Innovation orientation goes above and beyond a pure market orientation

(Kirca, Jayachandran and Bearden, 2005) and encompasses aspects of technology orientation as well. Both deliberate and emergent strategy can serve as a basis for shaping innovation orientation, as visionary and planning may provide complementary guidance.

Hypothesis 2a: Innovation orientation builds the basis for a strategic alignment of companies' overall innovation program and thus supports the long-term market success of innovations.

A holistic mental and organizational frame may emerge which guides innovative actions. This integral perspective allows for the comparison of the concept with an overarching “entrepreneurial orientation” (Zhou et al. , 2005, p. 54), which has been shown to support innovation success across a broad range of innovativeness and uncertainties. This stays in contrast to a one-sided technology orientation, which only supports technology-based innovations, and goes beyond a pure market orientation, which fails for innovations that target emerging market segments (Zhou et al. 2005). Thus, an effective innovation orientation is expected to contribute to innovation outcomes in both less and highly uncertain environments (Tushman and O' Reilly, 1996).

Hypothesis 2b: The positive impact of innovation orientation on market success is independent of encountered uncertainties within the development of the innovation.

IV. Performance Effect of Flexibility

Flexibility in operations captures the ability to cope with changes of the environment (Nadkarni and Narayanan, 2007). A literature review reveals that this construct has mainly been discussed from the perspective of operations or production systems (or, in the, for this study, even less relevant financial discourse on option valuation): articles on flexibility refer to operations/productions in their title three times more often than they refer to strategy. Still, flexibility can be regarded as a more multifaceted phenomenon. Its possible impact might thus be more far reaching.

Flexibility covers resource deployment, competitive actions, and has been used to explain why firms find and exploit new niches more quickly (Eisenhardt and Martin, 2000). Nadkarni and Narayanan (2007) find that complexity drives forth strategic flexibility, which they regard as a critical success factor in dynamic industries. Johnson et al. (2003) underline the capability character of flexibility. The concept of flexibility involves the capability to deal

with short-term changes such as instant fluctuations of demand, equipment changes, the implementation of new processes and technologies in the manufacturing process (Matusik and Hill, 1998; Johnson et al., 2003). Flexibility includes the capability to cope with changes in the product design, the inputs of customers, adjustments in plant and equipment use, and the firm's ability to apply resources effectively to the changing environment (Sanchez, 1995).

The importance of flexibility for innovation success has been stressed by advocates of an improvisational approach of innovation project management. Improvisation that defines a convergence of design and execution of novel actions in innovation can however not only be related to tactical adjustments but also to generic orientations towards innovation (Moorman and Miner, 1998). Ettlie et al. (1984) find that more aggressive strategies, informal approaches, and unique structural arrangements are more beneficial than traditional structural arrangements; formal approaches and market oriented strategies for achieving novel solutions.

Flexibility as a firm's ability to adjust processes and structures to changes will increase innovation performance and the market success of products as customers will find appropriate and novel solutions according to their preferences and input. Flexibility can also allow for a stretch of solutions and a reconfiguration of existing solutions to customers. With an ongoing innovation orientation, a firm can develop from its internal resource combinations that also develop novel solutions to internal and external markets. Consequently, flexibility can establish barriers of imitation and continuously improve a firm's position as well.

Hypothesis 3a: Flexibility in operations (complementary to innovation orientation) supports operational issues in innovation projects and thus the long-term market success of innovations.

Flexibility in operations, however, can hardly be a valuable capability if uncertainty rises above and beyond a threshold value. In this case, both its effects as well as its manageability may become blurred. High uncertainty at the meta-level of competencies impedes any strategic planning and deteriorates possible effects on the long-term market success. The latter holds, as two countervailing effects can be presumed: In situations of high uncertainty about competencies, a high flexibility in operations may (a) lead to fast, positive market reactions and, correspondingly, short-term successes, but (b) impede the substantial build-up of long-term competencies (due to erratic behavior). Thus, flexibility in highly uncertain environments cannot be regarded as a capability shaped by strategy.

Hypothesis 3b: Flexibility in operations does not function as an intermediary effect between strategy and market success in case of high uncertainty.

V. Research Model

To give an overview of our model, figure 2 shows our concepts, and the hypotheses to be tested. Hypotheses 1a, 2b; 2b, 3b refer to uncertainty as a moderator. Hypotheses H1a and H1b postulated different significant relationships of the two strategies on innovation capabilities in case of low and/or high competence uncertainty. Hypothesis H2b predicts that innovation orientation has a positive influence on market success in case of low and high uncertainty. Furthermore, hypothesis H3b postulates that there is no significant effect of flexibility on market success in case of high uncertainty. As such, figure 2 integrates relationships in a baseline model without differentiating across ground and in two different groups: firms operating under either high or low uncertainty. Therefore, the different shapes of arrows in figure 2 to refer to these contingencies.

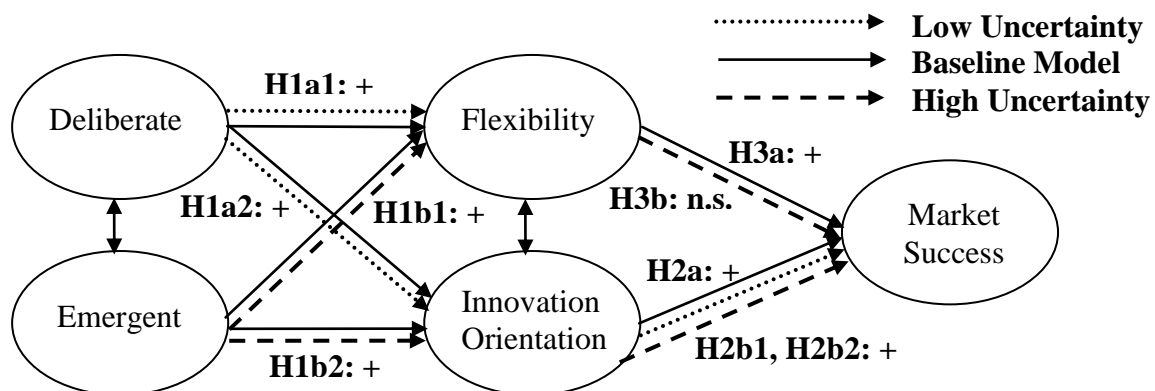


Figure 2: Research Model and Moderator Effect of Competence Uncertainties

C. Empirical Study

I. Sample & Scale

Our sample was composed of a number of international firms operating in the German IT industry. We contacted 423 firms to get information about executives who knew about their firm's strategies and performance. Afterwards, we contacted 356 executives personally by phone, asking them to fill out our questionnaire. After two rounds of mailing, 141 surveys

were returned. 140 of these could be analyzed. Consequently, the response rate was 33.1%. The average firm size was 125 employees. The firms operated in various subsets of the IT industry. To check the key information quality of our data collection, two researchers made a series of phone calls to verify the position of the key informants in the companies. The scales used to measure our constructs were taken from previous studies. Most items were measures with 5-point Likert-type scales (1=I strongly disagree, 5=I strongly agree).

II. Measures

Strategic Orientation

For the formal planning we used questions raised in previous studies (Leontiades and Tezel, 1980; Robinson and Pearce, 1983; Pearce, Robbins and Robinson, 1987b). We refer to deliberate and emergent strategies as to points of a continuum. According to the acquisition of information the deliberate approach is associated with in-depth research of market chances and risks: a) research of market opportunities, b) analysis of rationales of market growth, c) development of different options, and d) evaluation of actions taken. In contrast, the emergent approach in its extreme a) does not plan single actions in advance. Instead, the emergent strategy builds b) upon intuition and c) upon trial and error.

Innovation Orientation

Our construct of innovation orientation is guided by the idea of the organizations' inclination towards the horizontal and vertical exchange of novel ideas. We follow Sigauw et al. (2006) in not defining it in terms of innovation output. Still, we take an action-oriented view instead of structural view (in contrast to Sigauw et al. (2006) as we emphasize the transformation from strategy into specific action). The basic idea of our concept is that innovation is a bottom-up, creative process which requires interdisciplinary exchange and integration within the company for success. We take a participative view on innovation that aims at overcoming functional barriers and consider how strongly everyone is engaged in innovation behavior instead only of single functions in charge of an innovation project.

Analogous to market orientation, which examines the companies' disposition to act in accordance with the marketing concept (Kohli and Jaworski, 1990), we measure innovation orientation by the potential it provides for companies' innovation activities. Accordingly, we consider both behavioral as well as cultural aspects (Homburg and Pflesser, 2000). We focus

on the internal front-end of the innovation process, as we want to differentiate the construct from market orientation. Therefore we used the following items: the firms' engagement towards a) the encouragement of organizational and individual creativity, b) the constant search of novel product concepts, c) the constant refinement and development of products, d) the enforcement of creativity in intra-firm incubators, e) the fast and cross-functional implementation of innovation, f) the horizontal and vertical participation of all personnel in developing novel ideas.

Overall, we refer to the pioneer work on market orientation in which this capability is described as a propensity to gather market intelligence, distribute it throughout the organization, develop and implement adequate responses (Kohli and Jaworski, 1990; Jaworski and Kohli, 1993). Specifically, our selected items (in brackets) constitute specific equivalents of the original and well-established scale of market orientation, transferring it to the context of innovation orientation: to gather innovation intelligence (permanent search for ideas), distribute innovation impulses throughout the organization (novel product concepts by all personnel), develop adequate response of organization (promotion of creativity and innovation in intra-firm incubators), implement adequate response for innovation impulses (fast and cross-functional implementation of innovation, continuous development).

Flexibility

The concept of flexibility broadly denotes a firm's abilities to respond to rapidly changing markets (Worren, Moore and Cardona, 2002). Our measure of flexibility captures issues pertaining to the arrangements and speed of response to the customer, reinvestment, and degree of interruption of existing systems. Our measure is largely adapted from Alegre-Vidal et al. (2004). We correspondingly use a) the ability to make rapid volume changes, b) the ability to customized products to customer needs, c) the ability to make rapid product (mix) changes, and also the added item d) the ability to allow an active integration of customers.

Market Success

For the market success, and referring to the basic idea of a sustained competitive advantage attained by means of dynamic capability, we are interested in the market performance of products instead of technical or short-term measures of success. Subjective measures of performance have been widely used and most studies find high convergent validity with objective measures such as publicly available accounting data for selected studies (Worren,

Moore and Cardona, 2002). We used the quality of the customer-relationship as proxy for enduring market success. This also related to innovation as the process of market penetration moves beyond the technical invention or a market launch. We measured our construct of market success based on five indicators. Two of them measure the overall customer satisfaction: if customers are satisfied with the products and if their expectations are met (Lam et al., 2004). Three other indicators specifically measure the long term market performance: loyalty of customers, revisiting customers, recommendations of our customers leading to additional turnover (Zeithaml, Berry and Parasuraman, 1996). Furthermore, one item measures the degree of acquired reputation (LeBlanc and Nguyen, 1995).

Uncertainty

Uncertainty, used as a moderating factor, was also measured on nine items. We adapted our measure from Lewis et al. (2002) differentiating uncertainty about technological, market and employee capabilities. Four of these items measure the uncertainty about technological uncertainty: technological feasibility, functionality of products, technological qualification of the area, employees' familiarity with the technology. Employee capabilities are measured by the three items competencies of employees, collaboration of employees and collaboration of executives. Market capabilities are measured by the fulfillment of customers' preferences and the understanding of the company's top customers.

III. Measurement Validity

We estimated the model postulated in Figure 1 using AMOS 6. Altogether, the overall fit measures indicate a good model fit. The normed Chi-square value of 1.52 is much lower than the threshold value of 3.0. Bentler's comparative fit index (CFI) that compares the hypothesized model against an independence model as a baseline model (Arbuckle and Wothke, 1999) is 0.88 which almost reaches the required value of 0.90 (Byrne, 2001). The RMSEA of 0.061 (90%-Intervall of 0.04 to 0.07) is lower than the threshold value of 0.08 which indicates a moderate fit (Browne and Cudeck, 1993).

For the local fit, we find standardized factor loadings above 0.4; all respective t-values are above 2.0 indicating that none of the items are to be excluded from the model. Some of the indicators do not reach the necessary indicator reliability value of 0.4. Only the indicators of the two constructs "deliberate strategy" and "competence uncertainty" always have an

indicator reliability value higher than the threshold value. All items were used in our model. (Please refer to the appendix for scales and fit indices.)

Nearly all constructs fulfill the necessary condition for convergence validity. Cronbach's alpha and composite reliability almost always reach the necessary condition of 0.7 (Nunnally and Bernstein, 1994) and 0.6 (Bagozzi and Yi). Only the dependent latent variables "emergent strategies" and "flexibility" have lower Cronbach's alpha values of 0.62 and 0.66. But all of the constructs reach the necessary level of composite reliability. Thus, the measures demonstrate adequate convergent validity and reliability.

Testing for discriminant validity on the basis of average variance extracted, we found a bad fit at certain points: market success only has an AVE value of 0.14. Only the construct "deliberate strategy" reaches the threshold value of 0.5. In contrast, we found good discriminant validity by using the χ^2 -difference test. Here, we test whether two constructs are distinct, i.e. whether the constructs correlate perfectly or not. The lowest χ^2 -difference value of all correlated constructs was 39.0 exceeding the required threshold value of 3.841 indicating the difference of two constructs.

Overall, we found good convergent validity and reliability as well as moderate discriminant validity in the model. Consequently, our model should not be rejected.

IV. Results

To examine the possible influence of competence uncertainty we conducted a multi-group estimation. Therefore, we did a median split of the whole sample in a low and high uncertainty group.

Hypothesis H1a stating a positive effect through deliberate strategy on the two innovation capabilities "flexibility" and "innovation orientation" in case of low uncertainty can be confirmed. The standardized path coefficients are 0.50 (with a t-value of 1.91) and 0.66 (with a t-value of 2.80). However, the influence of deliberate strategy on flexibility is only significant at the 10%-level. Furthermore, hypothesis H1b can only be partly accepted. In case of high uncertainty, we found a significant relationship of emergent strategy on innovation orientation (0.34, t-value = 1.66), but we did not find a significant influence of emergent strategy on flexibility (-0.07, t-value = -0.27).

Path	Hypothesis	Standardized Estimate	t-value	Confirmation (✓) / Rejection (x)
<i>Low Uncertainty:</i> Deliberate → Flexibility	1a1	0.50*	1.91	✓
<i>Low Uncertainty:</i> Deliberate → Innovation Orientation	1a2	0.66**	2.80	✓
<i>High Uncertainty:</i> Emergent → Flexibility	1b1	-0.07	-0.27	X
<i>High Uncertainty:</i> Emergent → Innovation Orientation	1b2	0.34*	1.66	✓
<i>Baseline Model:</i> Innovation Orientation → Market Success	2a	0.41**	3.10	✓
<i>Low Uncertainty:</i> Innovation Orientation → Market Success	2b1	0.32	1.47	X
<i>High Uncertainty:</i> Innovation Orientation → Market Success	2b2	0.70**	3.09	✓
<i>Baseline Model:</i> Flexibility → Market Success	3a	0.30**	2.14	✓
<i>High Uncertainty:</i> Flexibility → Market Success	3b	-0.06	-0.27	✓
standardized path coefficient significant at **p<0.05 respectively *p<0.1				

Table 1: Structural Parameters and Hypotheses

Hypotheses H2a and H3a predict positive relationships between innovation capabilities and market success. The path coefficient between flexibility and market success as well as the path coefficient between innovation orientation and market success were found to be significant and positive (see table 1). In contrast, the moderating effect of competence uncertainty shows a different picture. The relationship of innovation orientation and market success is only significantly positive in case of high uncertainty (0.70, t-value = 3.09). In case of low uncertainty, we could not find a significant relationship (t-value = 1.47). Similarly, we found no significant effect of flexibility on market success in case of high uncertainty, as postulated in hypothesis H3b.

Recapitulating, we find two different routes of action: in case of low competence uncertainty, deliberate strategy has a positive influence on market success via flexibility as mediating variable. In case of high competence uncertainty, the emergent strategy has a positive influence on market success via innovation orientation.

Discussion

The aim of this paper was to shed light on the complex areas of innovation strategy, internal capabilities and performance. Our results contribute to clarify the strategy-performance link of innovation while considering the effects of dynamic capabilities. The model investigated is not restricted to researching innovation strategy, even though the latter is a still insufficiently explored topic, it also contributes towards understanding the preconditions and effects of an internal innovation orientation. Our idea of internal innovation orientation was inspired by the distinction of innovation versus innovativeness and the missing results on this firm level inclination and as such long term proclivity towards innovation (Menguc and Auh, 2006). Entrenched by the RBV and its explanation of a sustained competitive advantage we regard innovation orientation and flexibility as dynamic capabilities. As such, we take up the quest for increased consideration of the internal capability-performance link (Teece, Pisano and Shuen, 1997).

An important theoretical contribution of this study is the finding that an internal dynamic capability is enhanced by a good strategy. Thus, we improve the research on the RBV, which often is accused of lacking concrete suggestions about strategy formulation. Our results on strategies and performance effects bring life into the theoretic discussion about a sustained competitive advantage. More than that, we can derive different adequacy of strategies according to the contingency factor of uncertainty. We researched long term market success through internal capabilities and extend the work of scholars who have focused on the market orientation-firm performance relationship (Baker and Sinkula, 1999). Alike these studies, we investigated contingency conditions – the uncertainty about competencies.

We find that under low levels of uncertainty a deliberate strategy is the only right choice. Only then will firms accomplish an innovation orientation and are in particular enabled utilizing operational flexibility to improve long term market success. Therefore, firms being confronted with low levels of uncertainty should follow a deliberate strategy and foster their operational flexibility in order to achieve market success. Differently, an emergent strategy is

the appropriate choice under high uncertainty. It enfold positive effects on an innovation orientation, which under this contingency also contributes to long term market success.

These results do not only show different effects of strategies depending on the level of uncertainty on dynamic capabilities they also indicate dissimilar leverage of dynamic capabilities on market success in relation to uncertainty. High-level information exchange and the individuals' efforts to generate and implement novel ideas, in conjunction with an innovation orientation will only have a positive effect on long-term market success under the condition of high uncertainty. Even though the positive effect of a deliberate strategy on the innovation orientation enfold in conditions of high uncertainty, it will not affect the market performance outcome. In contrast, in conditions of high uncertainty, the emergent strategy is positively associated with innovation orientation which also has a positive effect on market success. Thus, firms can achieve market success through an innovation orientation associated with an emergent strategy.

In summary, our research goes beyond results hitherto gained, but is consistent with the results on general strategy and project management styles. In conditions of low uncertainty, results are in line with proponents of a rational planning and/or a formal innovation project management style (Schenhar and Dvir, 1996). In conditions of high uncertainty, the view of intuitive ad-hoc activities, often postulated by proponents of flexible and informal innovation project management style (Kamoche and Cinha, 2001) or proponents of an emergent general strategy formulation (Mintzberg, 1978) is needed to succeed. However, our study can show the mediating effects through which the benefits of the strategy develop: innovation orientation and flexibility.

Our results can provide some advice for the management in firms. The findings in conditions of low uncertainty of a deliberate strategy indicate that managers should pay more attention to the activities of ex-ante rational planning, such as road mapping tools, strategic market assessment and thus the classic tools of strategic planning itself. In contrast, the results in conditions of high uncertainty stress the importance of improvisation as well as fast and multi-level information exchange within organizations. The advanced freedom of individuals, self-reliance, and the improved information exchange will enable the firm to stretch their ideas and competencies. This is somehow related to the opinion that supporting innovation is difficult, as cultures and pressures often limit the extent to which current capabilities can be expanded (McDermott and O'Connor, 2002). An emergent strategy associated with an

innovation orientation can encourage individuals to overcome barriers related to innovation in turbulent conditions.

The results of our study (average of 125 employees) might especially apply to SMEs. Scholars often indicate that SME are naïve about strategy and tend to intuitively derive strategies (O'Regan, Ghobadian and Sims, 2006). Here, we find that the firms investigated can achieve positive performance effects when following an emergent strategy. Therefore, “naïve” may not be the appropriate word. Still, we find that this strategy is beneficial only under high uncertainty and is associated with innovation orientation. Especially as we consider the emergent planning and the soft factors of an innovation orientation, we go beyond a techno-centric view that predominates in innovation strategy literature and risks of overlooking those innovative initiatives that are internally focused.

Despite contributing to the innovation strategy literature, the results of this study should be interpreted in the light of some limitations inherent in every empirical work. First, results of our study are based upon a single industry survey. The results could be limited to generalization for industries beyond IT, such as services, non-profits or others that are less dynamic. Second, one might have a concern with our data that the conclusions drawn are based on subjective success measures and a potential common method bias in our performance measure. Thus, there is a need of more objective data which we did not have access to. This could be an avenue for further studies. Third, innovation orientation's effect on innovation outcome might differ according to incremental or radical innovations.

Considering conceptual arguments of the RBV and the view on dynamic capabilities, we have argued that innovation orientation and flexibility are dynamic capabilities. Other capabilities are likely to act as intermediary effects on market success. Our research then does not recommend the organizational structures or the control mechanisms. Future studies can benefit from defining diverse facets of internal structures. A picture of more internal structures can enhance or contribute to the two dynamic capabilities and the most appropriate controls. Other concepts to be explored in further studies and in line with the resource based view could be other managerial resources (Penrose, 1959), such as leadership. Especially the distinction between transactional and transformational leadership, which was found to influence the innovation outcome can provide a basis for further studies. Especially its interaction effect with flexibility, innovation orientation and strategy might be interesting for the search of market and innovation performance.

APPENDIX

Construct	Item	Standard. factor loadings ^a	Indicator reliability	α	Composite reliability	AVE
<i>Deliberate</i>	Research of market opportunities	0.77	0.59	0.82	0.81	0.51
	Analysis of rationales of market growth	0.71	0.50			
	Development of different options	0.66	0.43			
	Evaluation of actions taken	0.73	0.54			
<i>Emergent</i>	Actions and market opportunities are not planned in advance	0.74	0.55	0.62	0.64	0.38
	Intuition	0.51	0.26			
	Trail and error	0.56	0.32			
<i>Innovation Orientation</i>	Encouragement of organizational and individual creativity	0.78	0.61	0.82	0.81	0.37
	Constant search for novel product concepts	0.56	0.31			
	Constant refinement and development of products	0.67	0.45			
	Enforcement of creativity in nuclei	0.73	0.53			
	Fast and cross-functional implementation of innovation	0.58	0.34			
	Horizontal and vertical participation of all personnel in developing novel ideas	0.67	0.45			

^a: All factor loadings are significant ($t > 2.0$ respectively $p < 0.05$), and therefore, they are not listed

TABLE 2a: Assessment of Fit of Internal Structure of the Hypothesized Model (1)

Construct	Item	Standard. factor loadings^a	Indicator reliability	α	Composite reliability	AVE
<i>Flexibility</i>	Ability to make rapid product changes	0.60	0.36	0.66	0.61	0.29
	Ability to customized products to customers needs	0.75	0.56			
	Ability to allow an active integration of customers	0.46	0.21			
	Ability to make rapid volume changes	0.45	0.20			
<i>Market Success</i>	Customers expectations are met.	0.57	0.30	0.79	0.68	0.14
	Loyalty of customers	0.61	0.37			
	Enjoying a good reputation	0.70	0.50			
	Customers express their satisfaction with the company.	0.62	0.39			
	Recommendations from our customers	0.61	0.37			
	Revisiting of customers	0.63	0.40			
<i>Uncertainty</i>	Employees' familiarity with the technology	0.67	0.44	0.91	0.90	0.33
	Technological feasibility	0.72	0.52			
	Functionality of products	0.76	0.57			
	Technological qualification	0.66	0.44			
	Competencies of employees	0.83	0.69			
	Collaboration of employees	0.69	0.47			
	Collaboration of Executives	0.75	0.56			
	Fulfillment of customers' preferences	0.69	0.48			
	Understanding with top customers	0.63	0.40			

^a: All factor loadings are significant ($t > 2.0$ respectively $p < 0.05$), and therefore, they are not listed

TABLE 2b: Assessment of Fit of Internal Structure of the Hypothesized Model (2)

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