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Aiming at Innovation in the Context of Disruptive Market Change

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AIMING AT INNOVATION IN THE CONTEXT OF DISRUPTIVE MARKET CHANGE: A CASE STUDY FROM THE SWEDISH DEFENCE INDUSTRY

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BIOGRAPHY

Sofia Börjesson is associate professor in technology management at Chalmers University of Technology and is research director for Center for Business Innovation. The academic research field evolves around questions of how organizations change and develop with focus on the management of R&D and innovation work. Current research include eco innovation management, innovative capabilities, innovation as change. The research is conducted on basis of qualitative methods such as interviewing, joint workshops, and participative observations, and is based on the idea to produce actionable knowledge.

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Abstract

Previous research on disruptive change has mainly focused on radical technology shifts, thus have focused on disruptiveness from a technology point of view whereas other disruptive changes and urged organizational responses have been given less attention. This paper is based on an exploratory interview study of a Swedish defence supply organization. The Defence industry in Sweden has recently undergone a disruptive change in market context, changing from a stable develop-to-order logic to a market-driven industry. The paper argues that for being innovative, it is equally important for technology-driven firms to rapidly detect and respond to disruptive changes in the environment, changes that heavily impacts on business models and prerequisites for developing new offers, technology-based or others, and that organizational changes as to how to generate new knowledge are needed. The organization presented in this paper did not question the overall assumptions in their development organization, neither did they revisit the underlying norms and values of their product development organization. The initiatives they launched as a response were ambitious, yet insufficient, since not addressing the critical issue of knowledge generation. The paper aims at contributing to the body of knowledge concerning organizational responses to disruptive changes in their environment that are of non-technological character. Disruptive context changes are difficult to interpret and companies need to consider the role of as well as principles for knowledge generation when aiming at developing their innovating capabilities. This, in turn, requires a clear strategy where the company collectively engage in the development of alternative capabilities, addressing both the structures and processes of the company and also the underlying values driving the decisions taken. Changes in the context pinpoints the strategic change aspect of the development of innovating capabilities; changing the logics for knowledge generation is a managerial, yet not always obvious, strategic action.

Key words: innovation capabilities; disruptive change, defence industry

1. INTRODUCTION

In the extensive literature of innovation the notions of disruptive technology changes and the subsequent need for disruptive innovations are frequently discussed. As discussed in the theory by Christensen (1997), the degree of influence that the technology has on existing products is used to distinguish between *sustaining* technologies that improve the performance of previously available products and *disruptive* technologies that bring a different value proposition to the market (Christensen, 1997; 2006). The consequences of the emergence of disruptive technologies are extensively discussed in literature, mainly on radical product innovations (e.g. Leifer et al.; Mc Dermott and Colarelli O'Connor, 2002) but recently also on business-model innovations (e.g. Christensen, 1997; Markides, 2006). From initially having focused on the disruptiveness in the technology change and its impacts on the organization, the notion of disruptive innovations have come to include all kinds of radically new thinking in products, services and business models (e.g. Christensen and Raynor, 2003; Markides, 2006). As has been pointed out, although there is a fundamental difference between a disruptive technological innovation and a disruptive business model innovation or a disruptive product innovation in that they arise differently, have different competitive effects and require different responses (Markides, 2006). Further, research has highlighted how companies need to adapt their organizations to be innovative (e.g. Sharma, 1999; Christensen and Overdorf, 2000; O'Reilly and Tushman, 2004; Govindarajan and Trimble, 2005) yet mainly focusing on responses to technological changes, and, has also pointed at various sets of inhibitors and enablers for innovation in general and for undertaking such an adoption in particular (e.g. Colarelli O'Connor and Veryzer, 2001; Reid and De Brentani, 2001; Assink, 2006). However, there is little research so far on disruptive changes in the market context that can be just as disruptive as technological changes for a company,

thus a disruptive change that has a substantial effect on firms but is neither a technological change nor a change in business model or product/service offer. In this paper we argue that disruptive changes in the market context require a re-thinking and a re-designing of the overall knowledge generation process. Further it is argued that this required re-thinking is difficult to perceive as urgent in technology-driven firms, when the technology has not changed subsequently.

The paper aims at contributing to an increased understanding of how companies respond to disruptive changes in their environment that are of non-technological character and reports a study of a Swedish firm in the defence industry. Until recently, companies in this industry used to develop new products in close collaboration with the National Defence Ministry that steered and financed development projects. This approach was characterized by low risk for the firms and was based on a long term planning. Today, the industry is changing and product development is becoming market driven, involving a wide range of customers, suppliers and collaboration with competitors. The market also entails a stronger competitive situation and the firms in the defence industry companies need to be even more innovative and responsive to new demands, and rapidly develop more innovative products to remain in business. We argue that disruptive context changes are difficult to interpret and translate into appropriate corrective actions in the firm, especially for technology-driven firms with a technology-plan logic. The case presented here – DefCorp, a firm in the Swedish defence industry, and its developments efforts around the R&D organization - points at that companies need to consider the role of as well as principles for knowledge generation when aiming at developing their innovating capabilities. This, in turn, requires a clear strategy and often a re-organisation of where the company collectively engage in the development of alternative capabilities. The objective with the article is to

explore the challenges of a technology-driven firm in changing change and developing its innovative capabilities, with specific focus of the knowledge generation process, when facing a radically changing context. Based on that exploration, the paper aligns to the innovation literature on enablers and hinders for innovation in large established firms and specifically points at the need to deeply re-think the overall innovation logic despite the technology being the same.

The article is structured as follows: First some central notions pertaining to innovative work and the development of capabilities are presented, followed by a note on the research methodology. Thereafter, the empirical study is depicted and analysed. Finally, some implications on theory and how the findings may be used in practice are provided.

2. FRAME OF REFERENCES

2.1 Knowledge generation perspective of innovation (innovation capabilities)

An organizational capability is described as the ability of a firm to deploy the available resources as their main assets (Prahalad and Hamel, 1990). According to Christensen, an organization's capabilities are defined by its *resources*, (both tangible and intangible), its *processes and structures* (the methods used to transform inputs to output of higher value) and its *values* (the mindset of the people taking the decisions) (Christensen, 1997; 2006; Christensen and Overdorf, 2000). To avoid that core capabilities become core rigidities (Leonard-Barton, 1992), a dynamic perspective on capabilities was introduced by Teece, Pisano and Shuen (1997) where the need to systematically revise and develop organizational capabilities to remain competitive is underlined (Nonaka and Kenney, 1991; Helfat et al., 2007).

This view of capabilities is important in the context of innovation since the application of new knowledge is inherently linked to a certain amount of risk and uncertainty (Burns and Stalker, 1961; Galbraith, 1982; Birchall and Tovstiga, 2005). Innovation is here defined as the application of a new idea to create a new product or process (e.g. Galbraith, 1982; Tidd et al. 2005). The management of innovation is often described as a balancing act between planning and chaos (Quinn 1985), or as Bartezzaghi *et al*. (1997:134) put it "a balance between the urgency for immediate returns and the need to create superior capabilities which are the basis for developing future innovative products". This difficult trade-off between short term returns and long term capability building has been described as exploration/exploitation (March, 1991) and the ambidextrous organization (Tushman and O'Reilly, 1996; 1997).

Viewing typical characteristics of innovative companies, these systematically work with the creation and assimilation of new knowledge (Assink, 2006). The notion of learning is considered essential in such capabilities (Lynn et al., 1998; Elmquist, 2007). An organization's capability to innovate - innovative capabilities - have been defined as "the internal driving energy to generate and explore radical, new ideas and concepts, to experiment with solutions for potential opportunity patterns detected in the market's whitespace and to develop them into marketable and effective innovations" (Assink, 2006:219). Assink (2006) further argues that a way of developing this capability is to enhance the absorptive capacity, i.e. the capacity to recognize and understand external knowledge and assimilate an apply it internally (Coen and Levinthal, 1990; Lane et al., 2006). Other authors have underlined the more generative aspects of innovative capabilities where values are collectively recreated (e.g. Le Masson et al., 2006).

2.2 Disruptive change in context and organizational response

The consequences of the emergence of disruptive technologies (Christensen, 1997) are extensively discussed in literature (Christensen, 1997; Markides, 2006) in terms of how companies need to adapt their products and organizations to these technological changes (e.g. Sharma, 1999; Christensen and Overdorf, 2000; O'Reilly and Tushman, 2004; Govindarajan and Trimble, 2005). However, changes in the competitive context can be just as disruptive as technological changes for a company, albeit in different ways and this seems to be a weak area in research so far.

According to Daft and Weick (1984), a company can be seen as an interpretation system where signals are detected, interpreted and then acted upon. It has been shown that this can be very difficult for established firms (Williander, 2007) since companies are often locked-in in their old practices and knowledge sets (e.g. Leonard- Barton, 1992). In its very form, organizations are also designed to reduce uncertainty and enable planning hence organizations contain structural inertia that inhibits any change (Hannan and Freeman, 1984). Viewed from a learning perspective, Argyris has also shown that most organizational structures are designed to support "single loop learning", i.e. to correct errors in a structure without questioning the underlying values and norms of the structure itself (Argyris, (1993; 1995). Also, managers that have reached their positions through the stairways of the established structures are seldom willing to question them, and are thus not prepared to apply what Argyris (1977) calls "double loop" learning principles through questioning the structures they are part of: "What managers lack is a habit of thinking about their organizations capabilities as carefully as they think about individual people's capabilities (Christensen and Overdorf, 2000:68). Research also distinguishes between two theories of managerial action, the *espoused theory of action*

described as “the theory of action advanced to explain or justify a given pattern or activity” and the *theory in use*, defined as “the theory in action which is implicit in the performance of that pattern of activity” (Argyris and Schön, 1996: 13), that is the difference between what people say they do and what they actually do.

Managers can influence the prerequisites for innovation in the organizations. Some authors even argue that the main impediment to successful innovation is “a lack of experience or judgment at reconciling new ideas in the context of pre-existing interests” (Sharma, 1999:147). Since people are increasingly squeezed by projects deadlines, managers need to create a context that facilitates and supports innovation, as proposed by Nonaka and Kenney (1991) and to stimulate an ongoing debate on innovation and the requirements of innovation. Discussing innovation is also a way of creating a common meaning to the notion which has been argued to be important to develop innovative capabilities (Dougherthy and Hardy, 1996).

3. METHOD

The research behind this article is based on a single case study (e.g. Eisenhart, 1989; Yin, 1994) and is a qualitative study (e.g. Silverman, 1993), employing open interviews with 10 key actors in DefCorp’ s R&D-, market- and product planning organization. Internal documentation on R&D processes and innovation initiatives were also studied. The qualitative abductive approach (Dubois and Gadde, 2002) facilitated the investigation of the complex phenomena that innovative capabilities are. The research team consisted of two senior researchers who did all interviews together. The research team has a background in collaborative research (Adler, Shani and Styhre, 2004), meaning that the knowledge search mode is interactive, dealing with joint knowledge

production by practitioners and researchers, a knowledge search approach applied also in this study despite not being a collaborative setting. In this study, in-depth and contextual knowledge was initially limited why an abductive approach for interpretation was applied, that is, empirical data was viewed against intermediate conceptual models and understanding was continuously developed (Alvesson and Sköldberg, 1994).

In the study of DefCorp, the respondents cover the key areas and disciplines involved in innovative work: the R&D manager, product planning manager, technology researchers, and market managers. The respondents were interviewed and asked to freely describe their experience and perspectives on the actual organization practice referring to innovation projects and R&D activities. A central theme was their perception of the changes in the market context that DefCorp were facing and their subsequent consequences for the organization. The selection of respondents were initially made by the R&D manager, but after each set of interviews the respondents were asked to recommend a new respondent relevant for the issues explored, a process sometimes called “snowballing”. Each interview lasted for approximately 90 minutes. Thorough notes were taken and these were validated by the respondents with respect to facts and perception of processes and activities. The interviews were analyzed and interpreted by the two researchers and the results presented at an interactive work shop, a jam session (Börjesson and Fredberg, 2001), at DefCorp where respondents and other central actors were participating. The work shop simultaneously served as a validation procedure.

4. RESPONDING TO RADICAL CHANGES – THE CASE OF DEFCORP

4.1 The changing context of the Defence industry and DefCorp[1]

After the 2nd world war, the "cold war" was dominating the defence business. The Swedish defence was dimensioned for meeting a super power attack from the east (The Sovjet Union) and despite being neutral, Sweden had to have an independent, high quality defence industry; Sweden is a nation with a relatively small population but a rather large geographical territory. The Swedish defence has always been rather small in relation to the defended territorial area. To compensate for this, the Swedish defence went for variety and quality in its development of defence equipment. For long, the most important mission of the Swedish defence industry has been to satisfy the Swedish armed forces need for defence materiel, it is thus a national market. Through the parliaments defence decisions, the defence agency has the development and acquisition of defence equipment from a long term perspective. The industry has principally had an agreement with the defence agency where the industry promised low hourly rates in return of guarantees for long term occupation. This contract-driven set up the defence agency was the main customer and controlled the requirements through detailed specifications to obtain exactly the desired product – it was actually quite unclear who was in control of new product management.

Today, there has been a radical shift in the market context. During the last ten years, since the end of the cold war, the needs of the Swedish armed forces have successively changed and the focus for the Swedish defence has shifted from territorial defence to international peace-keeping missions. Reduced national military budgets and restrictions around military activities, is rapidly transforming the industry towards a

[1] The description of DefCorp's role in the business is mostly build on Carpenfelt 2007, a master thesis work supervised by one of the authors, the co-operation that also initiated the research.

more open and market-driven system. Future technology and product development are still partly contract driven but the markets forces are increasingly important and companies now need to involve a wide range of customers, suppliers and even collaborate with competitors. Previously, the industry made business on export markets mainly when the product capabilities were similar to the product needs from international customers, now export markets are becoming key to survive.

The market also entails a stronger competitive situation in general and the firms in the defence industry need to be even more innovative and responsive to new demands, and fast develop innovative products to remain in business, thus applying an innovation logic for the knowledge generation rather than a planning logic.

DefCorp is a Swedish defence materiel company that produces weapon systems for the national and international defence market needs. DefCorp has a long history of being a successful actor in the field of defence material. Today, they belong to an international group but have remained fairly independent. Their main activities are within R&D where over 60% of the employees work and the organization is structured around four product divisions, the fourth being “New Products”. Foreign defence agencies acquire DefCorp’s products when fitting their needs. When doing business on a higher system level, the business structure in terms of financing, industrial participation and offerings of support systems becomes increasingly important. The changes in the Swedish defence industry imply that DefCorp will obtain a new and different relation to international customers. The products that are being developed will already from the beginning be developed for meeting the needs and requirements of the international market. There will be no Swedish special solutions. The need for company internal product management is thus changing dramatically.

4.2 Awareness of the need to change

Traditionally, DefCorp has worked in close collaboration with the National Defence Ministry in Sweden that used to be their single most important customer. This customer has been guiding product and technology development and also financed the investments through long term develop-to-order contracts. This approach has been characterized by low risk taking from DefCorp's perspective and also a long time perspective that enabled planning and risk reduction. The industry has been considered both stable and mature. The recent transformation of the market has resulted in important changes in the product development processes at DefCorp. The company is well aware of this contextual change and there is a perceived urgency to change to adapt to the new situation. One manager described the changes*: "We are now moving from customer driven (develop-to order) to market driven product development. Before, the National Defence did the market analysis and planned the products and the technologies. Now we increasingly need business ideas, not just technology concepts"*. He also described how customers have changed their behaviour radically: *"Before, customers bought material to have in store, but now the material that is bought is used all the time. Products are made for a different type of situation [---] We used to work with contract development, now customers want to buy off-the-shelf. Both user behaviour and buyer behaviour have changed"*. Another R&D manager underlined how the customer relation has changed:*"We have worked a lot with trying to understand what the customers want. It has been rather discouraging to try to learn that from the customers: I do not think they know what they want"*. Although this challenge is well known to many companies in market driven industries, this is new to the defence companies.

4.3 Reactions to change

DefCorp perceives an urgency to change and also, does have a willingness to learn and the company also has a long tradition of changing to adapt to new demands from the customers. However, these previous adaptions have mainly been in terms of new technologies. The overall industry is indeed very much technology driven, with a large focus on new product development and technology development. Y

et, the changes in the market context do not only require changes in the market interaction behaviour and the subsequent relations to (new) customers, but also necessitate changes in the overall product development approach.

The interviews reveal a consensus in terms of the importance of the change in context, but also describe the difficulties to actually change the way of working in the organization: *"Mostly, one follows the same route. Again, this is a rather conservative ship. Implementing a strategy is a management responsibility. If you are strong it is possible to come through with a new strategy but it is not easy.* To address the challenges of these changing prerequisites, DefCorp have launched a new organization and new working routines for cross-functional learning and knowledge exchange in the product development organization as well as initiated a modularization to be better prepared to meet diverse customer needs (Carpenfeldt, 2007). The aim is to be more responsive to the need to develop products for the changing kind of user but also to be able to involve the customer in the R&D process in new ways. But this has not been easy. One of the managers describes the internal struggling: *"We have big problems with involving the customer in R&D and to getting people to see how important this is. To solve this we also need to understand how to work in new ways, we need people that can handle that. As I see it, we are in a shift of generations; the employees that has been*

here for long do not understand what the new people are doing. Right now people just blame each other."

The context of the conservative defence industry does not facilitate change either; the image of defence companies always developing a certain type of products in a certain way remains strong. One manager argues that big change is not possible:*" This is the problem in traditional defence industry [high costs]. It is difficult to change, there has to be a technological complexity. We can not enter a consumer market or even civil B2B markets. We aim at customers in safety, rescue services, protection of vital facilities etc… There could be some kind of innovation of course. But we have many examples where it [to approach other markets] just did not work".*

Also, the shift from low-risk product development towards taking on a larger share of the risk is difficult. In each decision, risk reduction remain the main driver, or as described by one of the interviewees: *"Change processes require investments. We have not shown so good results, acceptable, but hardly more. There is no budget for investments in R&D. [---] In one division there is some financial strength right now, but the ones deciding upon new larger investments weigh the costs in the traditional segments against the costs in potentially new segments, and the known ones always imply less risk…".* Despite the need for developing more innovative products, risk reduction still seem to be dominant.

4.4 Innovative capabilities and innovation strategy

In the development of the new organization, an ambitious idea management process was launched to stimulate innovation. The objective was to facilitate the flow of ideas and

make it easier for employees to put ideas forward. The process was mainly designed to accommodate product concepts and the aim was to identify the viable ideas in an effective way through a structured process with decision gates. In the first step the concept is to be developed by a dedicated team, analysing its potential and making sure to understand the proposal and then putting it forward to the team taking the decision whether to take it further or not in the product development process. One of the managers responsible for the process described the logic:*" For an idea to become classified as a product concept in the company the following criteria need to be fulfilled: a product plan must be developed and verified to pre-defined requirements. Only then can it be approved for marketing activities."* The idea handling process has been a success and people have learnt that this is the way to put ideas forward. However, there have also been some problems: *"We ran into this problem with product X, it is not possible to be profitable in the beginning, but only in a longer term perspective. I do not think this product is the most rewarding deal for us when it comes to generating revenues. It is about the customer having their focus on the soldier [---] and if we can develop something that creates much value to him, we can develop system value and impede our competitors. This is an alternative argumentation to generate value.*

Despite the espoused focus on how to change the product development focus, daily business mainly focuses on improving existing business. For instance, one interviewee described the focus area as: *"We are mainly looking for reasonable changes that are easy to implement. It is mostly modifications of existing products. And we are looking for things that make it easier to sell to the customer"* . Also, there is little time for more long term discussions: *"The management team is very much focusing on the large orders and do not have time for the long term technology strategies"*.

5. DISCUSSION

5.1 Radical innovation aspirations, quite conservative practices at DefCorp

The development of the new organization is a clear example of the radical aspirations of the company. But despite the espoused focus on becoming more innovative, the organization remains focused on technology development and on new products, thus quite conservative practices. The new organization even contains a new business unit named “New Products”, further enhancing this perspective. There seems to be an unexploited potential for closer collaboration with customers and other partners in order to identify new concepts and possible offers since DefCorp today hardly co-operate with external partner at all in terms of innovation efforts. Also, a lot of faith is put into the idea management system that was developed to accommodate ideas from the organization. The design of the system aimed at not dismissing any ideas before really understanding what they were about and how they might contribute to the organization, thus entailing a broad and open scope. However, the primary function of the idea management system was that of handling the ideas per se, thus not – since that is not the mission of such a system – questioning the evaluation criteria used to identify viable ideas. Since these were not questioned or revised, the accepted ideas were in line with existing product ideas, or in other words, did neither promote innovative ideas outside the scope of current product ideas, nor did they address business or value-based innovative concepts. This phenomenon is well know in literature and described as the illegitimacy of innovation (Dougherty and Hardy, 1994) or a dominant logic (Prahalad and Bettis, 1986). The system was also designed so that it accommodated technology-based concepts, but did not easily recognize concepts that were based on market or

customer based knowledge, another phenomena previously described as different types of concept having different prerequisites to survive in product development structures (Backman et al., 2007). That seemingly rational selection (or division) process that the idea handling system entails could also be argued to be a contradiction in terms with innovation since it pre-assumes that ideas are recognizable and possible to categorize. Most often, ideas are not recognized as potential innovations before they have been conceptualized further and to be so, they need to be recognized. An innovation is not an innovation until it is a successful product or service on the market, indicating that only having a patent does not create a change, projects must be created and rolled-out. One of the problems with any idea handling system is the risk that there are a lot of ideas coming in, thus being collected, but few new projects that are radically different actually pass the selection grids meaning that the ideas, as well as the projects, that may be the result of the ideas all fall within the scope of "more of the same". At DefCorp, it seems as if the ideas coming in are based on technology ideas or concepts, thus within the dominant design, but few ideas that aim at widening the business offer to respond to the changing context can e identified. So, the system is quite well functioning in terms of handling ideas for incremental product innovation, but does not really support innovation.

Further, top management has an ambitious strategic vision of DefCorp becoming a more innovative company but when investigating how strategy is actually used in the organization, it seems to bean underutilized tool. Strategy is mainly considered as being documents and processes, but the links between business strategy and the innovation strategies and practices of the company are unclear for people in the organization. The new innovation strategy at DefCorp needs to be linked to strategic change – but it is not translated into action nor is there a plan for how to address new knowledge areas or how

to connect to external partners. Strategy is nothing if not implemented, i.e., if guidelines, working instructions, rules, selection criteria, specifications etc are not designed to support the strategy. In the case of DefCorp, it seems to be hard to shift from the technology- and product based planning logic towards the much needed market driven logic. In terms of implementation, the processes and structures of DefCorp's actual practices are not reflecting top managements ambitions of innovative activities aside those of technology. Since the strategy hardly exists outside of yearly documents, it becomes of course impossible to implement its subsequent 'strategic rules'. The fact that decision making, tools and working system do not support top management's innovation ambition makes it difficult for DefCorp to identify and develop those kinds of non-incremental initiatives.

So, one could argue that DefCorp is well aware of the required organizational changes that are needed and has started several initiatives but has not approached the core, namely the logic for how new knowledge is generated, instead focus still lies on how new products are generated.

5.2 The difficulties to respond to market change in a technology driven context

Being innovative is an undisputable competitive means to increase the company's potential profit. A company can increase its innovativeness by following – a bit simplistic – three paths: (1) being innovative within the existing business offer; (2) widen the existing business offer; and/or (3) launch innovative initiatives that aim at completely new business offers (e.g. Markides, 2006).

Being innovative within existing business and offers in much means to generating incremental innovations and modifications on existing products. This implies aiming at increasing customer value but without changing the overall product offer. However, such an approach simultaneously embeds the risk of getting nearsighted and disabled to clearly see potential innovation opportunities that are on a certain distance from the current core business. In general, redirecting the business towards adjacent markets and widening the offer, which is the urged action when a technology based firm faces a radical shift in the market context, gives the company an opportunity to widen the business offer in terms of adding customer value through e.g. new functions or new services. Establishing innovative activities in order to widen the business offer or to spread business offer to new markets (not just geographical expansion), requires a radical shift in the knowledge generation process, it does not suffice to implement structures that collect ideas from within an existing approach, in the case of DefCorp, a product development approach.. In order to find ideas and initiatives that correspond to these types of innovative activities, it is required that the company is well aware of its core competences/techniques as well as of its core markets and that it is able to combine these knowledge domains, thus developing its absorptive capacity (Cohen and Levinthal, 1990; Lane et al., 2006).

The third path is to direct innovative activities aiming at finding completely new offers, i.e., innovative efforts can be used to find completely new business offers through new technologies combined with completely new markets, outside of core technologies or core markets. To enable this, the innovation process needs to be opened up so that co-operation with external actors embedding new knowledge is facilitated, and thereby initiating a generative approach on the development of the new capabilities (le Masson et al, 2006). In line with Elmquist (2007) that argue that the generative capacity is a

crucial innovative capability, we argue that in order to shift from a technology-driven product based innovative logic to a dynamic and externally oriented innovation logic, an ability to continuously generate new knowledge – not new products - is central to allow the shift.

5.3 Responses in technology based companies – path dependencies

Disruptive or radical innovation development is not a one-time effort but requires continuously developing absorptive capacity to improve the overall innovative capability. Research shows that large, established firms face several different inhibitors on their way to developing and commercializing disruptive or adjacent innovations (e.g. Rice et al., 1998; Leifer et al., 2000) and point at two main clusters of inhibitors (Assink, 2006). They risk to be locked in and victims of 'path dependency', i.e., the power of habitual existing practices in the organization that effectively lock it into current practices. As at DefCorp, for technology based firms there seems to be a need to both develop and redirect innovative activities and make them come true through the overall new product development process, not remaining a new technology or new product focus but developing a new knowledge development focus.

All innovation is about change and from a business perspective, the innovation challenges lie both in understanding and translating the challenges as well as being able to successfully redirect innovation efforts in order be proactive and exploit these new prerequisites. When discussing innovation inhibitors in the context of disruptive innovations in established firms, old practices tend to inhibit the adoption of new ideas. To a large extent, many firms limit themselves to incremental innovation efforts, such as improvements of existing technologies, designs and business offers, within the so-

called dominant design (Le Masson et al, 2006). Existing successful products will limit their will to take risky initiatives and companies thus risk falling in to the familiarity trap.

At DefCorp, most innovative activities involve incremental innovations of existing products on current markets, thus not aiming at unknown areas or aiming at co-operation with outside partners top explore new areas. Implementing new systems to structure processes and create a seemingly rational control over idea handling is another trap. We argue that since the disruptiveness is unknown – in the market context and not a disruptive technology – technology based firms have difficulties in changing their innovation systems in a way that enables them to respond to the changes. It is not enough to change the systems (structures) must also reconsider how knowledge is actually generated (values). Developing innovative capabilities is about developing both processes/activities and the values/mindset when taking decisions (Christensen, 1997). The focus on the tangible and immediately doable actions such as establishing an idea handling systems and promoting idea generation correspond to the natural strive to reduce uncertainty but do not solve the problem. A radical shift in the market context may be easily recognized but not equally easily interpreted in terms of what actions are needed in the knowledge generation process. Such actions risk to be double-crossing since they provide the false sense of being in control of the innovation process but actually result in only more of the same.

6. CONCLUSION

This study was based on a case study of a defence company and pointed at the difficulties they had in interpreting and translating a disruptive change in market

context. The company did not question the overall assumptions in their development organization, neither did they revisit the underlying norms and values of their product development organization. The initiatives launched were ambitious, yet insufficient, since not addressing the critical issue of knowledge generation. We argue that disruptive changes in market context radically change the prerequisites for the knowledge generation process, the core of the innovative capability (Assink, 2006), and that those structures often are neglected

.

This paper has aimed at contributing to the body of knowledge concerning organizational responses to disruptive changes in their environment that are of non-technological character. Disruptive context changes are difficult to interpret and companies need to consider the role of as well as principles for knowledge generation when aiming at developing their innovating capabilities. This, in turn, requires a clear strategy where the company collectively engage in the development of alternative capabilities, addressing both the structures and processes of the company and also the underlying values driving the decisions taken. Changes in the context pinpoints the strategic change aspect of the development of innovating capabilities; changing the logics for knowledge generation is a managerial, yet not always obvious, strategic action.

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