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CORPORATE ENTREPRENEURSHIP IN SMEs DURING THE SEARCH FOR DISCONTINUOUS INNOVATIONS

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ABSTRACT

The present paper illustrates, through three Danish/Dutch case studies, how several of the characteristics connected with SMEs entail significant reasons to make use of corporate entrepreneurship as a search strategy for discontinuous innovation. Characteristic dimensions of corporate entrepreneurship are researched, and pro-activity, risk-taking and autonomy are in particular found to be significant elements of the approach applied. The way these dimensions are implemented, counterbalances the resources constraints in terms of human, social and financial capital found in the SME setting. Competitive aggressiveness is found to be only indirectly influential as a way for the case firms to stay ahead of other firms by knowing what developments are made on shared technologies or part components.

Keywords: discontinuous innovation, corporate entrepreneurship, SME

1. INTRODUCTION

A frequently used distinction between two types of innovation is *continuous innovation* vs. *discontinuous innovation* (Bessant, 2005, pp. 35). Continuous innovation is related to “*the use and development of things already known*” (Levinthal and March, 1993). Thus with continuous innovation organizations search, select and implement product improvements, line extensions, and market developments (Tidd et al., 2005, pp. 13). Because this is a reasonably well-known form of innovation there is an established set of ‘rules of the game’ which entails particular pathways followed by the organization to come to a good form of innovation. These pathways can be followed through the whole innovation process (Tidd et al., 2005, pp. 509).

However, when discontinuity comes into the equation, the standard rules do not apply anymore. The ‘good practices’ may then be ineffective or even inappropriate (Bessant, 2005, pp. 37). The journey of especially (but not exclusively) highly innovative projects is often complex and uncertain. Starting conditions for an innovation may be uncertain and events in the development may not settle down to a stable or quasi equilibrium. As a result, attempts to explain and manage innovation with a focus on stability may fail.

This realization has lead some scholars to adopt a different approach that views innovation as a random process (Tushman and Anderson, 1986; Veryzer, 1998; Bessant

et al., 2005), assuming that there are so many unobservable and/or unidentifiable endogenous factors that may affect innovation development that it is impossible to isolate what causes what. This is essentially described as a discontinuous innovation process. The typical feature of a discontinuous innovation process is breaking with the past, thus leading to a radical, revolutionary change. As Miller and Morris (1999) argued, this kind of innovation “*falls outside existing markets or market segments and, when successful, it extends and redefines the market, exposing new possibilities*” (p. 6). McDermott and O’Connor (2002) define discontinuous innovation as “*the creation of a new line of business, both for the firm and for the marketplace*” (p. 425), highlighting the centrality of novelty on more than one measure.

Due to the element of non-linearity in a discontinuous innovation process, it is suggested that management hereof should be based on strategic readiness rather than strategic planning (Lassen, 2007). Focus is increasingly on the importance of social capital and organizational learning as a means for creating a frame for managing discontinuity (O’Connor and McDermott, 2004). For this, existing incumbents are often at a disadvantage relative to new entrants under “fluid” conditions (Tushman and Anderson, 1986; Utterback, 1994), and especially established firms which have a well-developed steady-state (continuous) routines for innovation come across great problems when searching for discontinuous innovation.

To address this problematic aspect, many researchers have tried to reveal the workings of this kind of innovation (Utterback, 1994; Christensen, 1997; Leifer et al., 2000; Bessant, 2003; Gertsen et al., 2007). One way of doing so has been through first identifying that there is a generic renewal process that is similar to all organizations that deal with innovations (Bessant, 2005, pp. 35), and secondly, researching the specifics of the phases of this process when dealing with discontinuous innovation. Four phases forming this process have been identified (Tidd et al., 2005):

1. *Searching*: Looking around to find relevant signals that indicate a possible threat or opportunity for change.
2. *Selecting*: Choose the signals you want to follow up on. This lays the basis of a strategic of how the organization should develop.
3. *Implementing*: translating an idea into reality. This also includes managing the process of adoption and adaptation, for the short- and long-term.
4. *Learning*: This means learning from experiences and building a knowledge base that allows the organization to inhabit future innovations.

The focus in the present paper is limited to the searching phase. The step of searching for needs and possibilities by picking up weak signals from unusual directions is critical for the selection and implementation phase of discontinuous innovations (Tidd et al., 2005). In other words, no discontinuous innovation can take place when the search phase is skipped or only partially run through. Large organizations use internal resources to fund the search for innovations. Smaller organizations usually do not have the sufficient resources to do the same as the large ones. Smaller organizations are therefore depending on other ways of developing search activities, like searching through networks and connections (Tidd et al., 2005 pp. 350).

Several so-called search strategies to help organizations find discontinuous innovations that fit their organization are identified in the handbook for the Discontinuous Innovation Project (DIP) (see figure 1).

Search Strategies		
1. Idea Hunters	6. Deliberate diversity	11. Corporate venturing
2. Explore different futures	7. Hypothesis and experiment	12. Intrapreneurship
3. Use the web	8. Mobilize the main stream	13. Data mining
4. Engage active users	9. Establish observatories	14. Opportunities from failure
5. Deep dive	10. Brokers, gatekeepers, bridges	15. What else?

Figure 1: Search strategies for DI (source: DIP Handbook)

One of these strategies is corporate entrepreneurship. The use of corporate entrepreneurship in this context has been positively connected to the development of discontinuous innovation by Lassen (2006). Corporate entrepreneurship refers to the process whereby firms engage in diversification through internal development. Such diversification requires new resource combinations to extend the firm's activities in areas unrelated, or marginally related, to its current domain of competences (Burgelman, 1983). Corporate entrepreneurship can therefore be defined as the presence of innovation plus the presence of the objective of rejuvenating or purposefully redefining organizations, markets or industries in order to create or sustain competitive superiority (Covin and Miles, 1999)

In existing literature there is however a lack of knowledge on how corporate entrepreneuring can be used in small & medium sized enterprises (SMEs) (Carrier, 1997). Corporate entrepreneurship is almost always used to describe a situation occurring in a very large organization (Carrier, 1997), though at a conceptual level it is clarified that the implementation of corporate entrepreneurship is not only important for large corporations, but is just as essential for smaller firms (Covin and Slevin, 1989; Covin and Covin, 1990; Carrier, 1994; Zahra and Pearce, 1994).

It may even be argued that corporate entrepreneurship should be of particular interest in the context of SMEs, as research on the importance of firm growth largely shares the view that growth SMEs has a special importance in the economy (see e.g. Storey, 1994). Despite (or maybe even because of) their disadvantages, most often attributed to resource constraints (Freel, 2000), SMEs often use innovation as a means of competitive strategy to a higher degree than large firms (Fritz, 1989). Furthermore SMEs are generally considered to have behavioural advantages, such as low hierarchy, fluid structures, low formality high flexibility, that may justify their significant share in innovation (Dutta and Evrard, 1999) and indeed indicate that this context is highly appropriate for the development of discontinuous innovation. Thus, there is a particular interest in enriching our understanding of corporate entrepreneurship in an SME context.

In the present paper the central interest will therefore be the clarification of the role played by corporate entrepreneurship when searching for discontinuous innovations in SMEs. The main research question concerning this problem is:

“How does corporate entrepreneurship help the search for discontinuous innovations in SMEs?”

2. METHODOLOGY

The methodology in this paper is twofold, as it integrates a conceptual discussion and empirical research. The paper is structured as follows.

First, we discuss and elaborate on the current knowledge and coherence around the different concepts in the paper, like DI, corporate entrepreneurship, SMEs and the search phase of innovation. From this discussion we build the frame of focus for the empirical research. Second, to empirically investigate the research question, three qualitative case studies from the Netherlands and Denmark are used to illustrate and explain the process and effect of corporate entrepreneurship, while searching for discontinuous innovations in SMEs. Case studies are used as the empirical foundation due to the fact that these are very suitable for exploratory research (Yin, 1989, pp.19). The case studies are originally from two individual data sets, but are considered highly comparable due to similarities in the focus, scope, methods applied and theoretical underpinning. The aim of using case studies from respectively the Netherlands and Denmark is not to make a cross national comparative analysis, but to create qualitative robustness in the conclusions drawn. Finally, the empirical results are discussed in relation to the conceptual frame and answers are provided to the research question.

2.1 DATA SELECTION

The firms where the case studies were undertaken were purposively selected to provide information-rich cases on the use of corporate entrepreneurship in the search of discontinuous innovation in SMEs. The criteria for selection were that:

- The firms were experienced with corporate entrepreneurship
- The firms operated in high-technology markets
- The firms had engaged in technology-based discontinuous innovation.
- The firms were SMEs

2.2 DATA COLLECTION

The data was collected through qualitative semi-structured interviews with top management, middle managers, project leaders and R&D professionals.

The case study tools applied in the research include *documentation, interviews and direct observations*. Through the interviews, experiences with corporate entrepreneurship and search for discontinuous innovation were examined. Conversations were recorded and subsequently essential parts were transcribed. Relevant documentation was additionally provided by the respondents both prior to and after the interviews. This included; strategic documentation and product development roadmaps. This data has been used to cross reference findings from the interviews and to provide added historical background on the case studies. Observation helped the interviewer to get first hand knowledge of the dynamics and interactions between the individuals in the firms. Thus, by uniting these three tools, an understanding is created which is broad and stable as well as specific and targeted. Furthermore, by applying different tools some of the weaknesses each of the tools possess are counterbalanced. For example, the use of observation counterbalances the possibility of biased responses during the interviews. In addition to the official tools of research, *informal conversations* must also be added to the list of tools. Through these conversations valuable perspectives on the research are provided, and help in fine-tuning the questions asked during the more formal interviews.

Confirmability and credibility in the qualitative data was obtained by the use of interview protocols and the quality control of the data-analysis done by sharing the information and analysis with the interviewee. In addition to this, impressions of the atmosphere during the interview were documented as support for evaluating the dependability of the interview.

3. LOOKING FOR THE UNKNOWN

So how do organizations search for DI according to the new rules? The signals, which have to be transformed into innovations, can come from various directions and are (usually) weak, for example they can come from inside the organization or even from far outside the organization. These signals can be about technology, markets, competitor behavior and shifts in the political or regulatory environment (Tidd et al, 2005, pp. 349). Mostly, organizations develop certain routines to search for innovations in these different areas. The step of searching for needs and possibilities by picking up weak signals from unusual directions is critical for the selection and implementation phase of discontinuous innovations (Tidd et al., 2005).

3.1 SEARCH FOR DISCONTINUOUS INNOVATION

Research on the searching phase of the innovation process is also described in literature as "Fuzzy Front End of Innovation", "Phase 0", "Stage 0" or "Pre-Project-Activities" or "pre-ject". This is where the organization undertakes problem/opportunity structuring and/or identification/ recognition (Leifer *et al.* 2000), formulates a concept of the product to be developed, and towards the later stages of the Front End decides on whether or not to invest resources in the further development of an idea (Boeddrich, 2004).

The need to focus on this phase separately from the rest of the innovation process is found in the fact that there is a range of significant difference between this phase and the following phases of development and implementation (Koen *et al.*, 2001). These differences include for example; the search phase is not structured, but is experimental, explorative and relies on creativity rather than planning (McFadzean, 1998); work in the the search phase is so early that revenue expectations are uncertain and it is often not possible to predict commercialization dates (Lichtentaler and Savioz, 2004); the lack of predictability may also cause funding of the project to be highly variable in this phase; and the aim of this phase is often the development of a concept, not the achievement of a planned milestone, why it might be difficult to integrate with a general linear development process.

There are a number of strategies that can help the search process take place at the fuzzy front-end. These strategies were already listed in the introduction of this research paper (see figure 1). Some of these search strategies may be considered as techniques with a focus on the actual searching (idea generators, exploring multiple futures, using the web) whereas others are wider in their scope when it comes to process steps in an innovation process, time frame and organization, for example the use of corporate entrepreneurship. This strategy is likely to involve more process steps, organizing and a longer time frame than the technique-like strategies.

The main goal of applying these strategies is to create an open mind and facilitate 'pattern breaking' thinking (Gertsen *et al.* 2007, pp. 5). Some of these strategies focus on the internal environment of the organization, while others tend to focus more on the external environment. Utterback (1994) related the internal/external to discontinuous innovation: *'In the case of discontinuous innovation, old elements usually come initially from an individual in the firm who has the idea to combine one or more technologies, which previously were unrelated in an important way. In other words, new-to-the-world products that expand the market tend to be initiated from outside the current industry but through individual and firm-level processes'*. So both the internal and the external environment should be taken into account when looking for discontinuous innovation. This indicates that also a number of strategies can be used at the same time to cover the internal and external environment. The reason for covering both the internal and external environment is because an organization has to be in a place where something new can happen (Bessant *et al.*, 2007, pp. 238).

3.2 CORPORATE ENTREPRENEURSHIP AND SEARCH FOR DISCONTINUOUS INNOVATION

As already touched upon in the introduction, the literature on corporate entrepreneurship is divers and ranges from considerations on the role of the individual (Pinchot, 1985) over corporate venturing and to macroeconomic effects hereof (Zahra, 1991, 1993). Thus, a further clarification of the use of the term in this paper is needed in order to create a workable definition to use in the analysis of how SMEs use corporate entrepreneurship in the search of discontinuous innovation.

Corporate entrepreneurship is in this paper considered *an entrepreneurial orientation, which permeates an organization's outlook and operations leading to a variety of outcome* (Lumpkin and Dess, 1996). This definition is based on Miller and Friesen's (1983) categorization of innovative strategy making. Covin and Slevin (1986, 1991) expanded this concept, called it "entrepreneurial posture", and phrased three now widely-accepted characteristics of firm level entrepreneurship: (1) innovativeness, (2) pro-activeness and (3) risk-taking. Lumpkin and Dess (1996) renamed the concept the "entrepreneurial orientation" and further extended the concept by identifying two additional dimensions: (4) autonomy and (5) competitive aggressiveness (Lassen *et al.*, 2006, pp.361). The 5 dimensions of entrepreneurial orientation are used to form the analytical basis for the empirical research.

The dimension of innovativeness is central in corporate entrepreneurship though referred to in fairly wide terms. E.g. Stopford and Baden-Fuller (1994) observed that *"most authors accept that all types of entrepreneurship are based on innovations."* Innovation is seen as the centre of the conceptual network that encompasses the construct of corporate entrepreneurship, and without innovation there is no corporate entrepreneurship regardless of the presence of other dimensions termed entrepreneurial through literature (Lassen *et al.*, 2006). Innovativeness is hence used as the dependent dimension of the empirical research, and as clarified, we limit our focus to that of discontinuous innovation. The dimension of pro-activeness refers to the fact that corporate entrepreneurs take initiative and act on possible future problems, needs or changes. This is closely linked to risk-taking, which can refer to either the ability to handle a general sense of uncertainty and unfamiliarity that may be cause by to venturing into the unknown, or the willingness to take financial risk which refers to a risk-return trade-off (Miller and Friesen, 1978). Autonomy is also considered to be an essential part of entrepreneurial acts, and refers to the autonomous actions of an

individual or a team in coming up with an idea or vision and carrying it through to completion (Lumpkin and Dess, 1996, pp. 140). Lastly, competitive aggressiveness refers to a firm's predisposition to directly and intensely challenge its competitors to achieve entry into new markets or improve the present position in an existing market.

In the research of Lassen et al. (2006) it was found that the dimensions of pro-activeness, risk-taking and autonomy all have a stimulating effect on discontinuous innovation. Competitive aggressiveness however refers to a strong focus on outperforming existing competitors on present markets, and as such, this dimension is not directly linked to stimulating discontinuous innovation (Lassen et al., 2006, pp.362). This is because in case of discontinuous innovation, competitive aggressiveness does not seek to outperform competitors, but the goal is to engage in the creation of new markets, where there are no competitors yet (Lassen et al., 2006, pp.369). Indirectly, this dimension may however function as a driver for the wish to engage in discontinuous innovation.

3.3 DIMENSION OF CORPORATE ENTREPRENEURSHIP IN THE SME

The third and last part of reviewing the influence of the use of corporate entrepreneurship in smaller organizations that search for discontinuous innovation focuses on the five dimensions of entrepreneurial orientation and the particulars of how these could be expected to appear in an SME context.

This first dimension is innovativeness. As Phillips et al. (2003) said: *'It is well documented that SMEs, particularly entrepreneurial start-ups, are more successful at discontinuous technologies and are more likely to develop disruptive discontinuous technologies.'* (Christensen, 1997; Kassicheh et al, 2000). So the innovativeness of smaller organizations must be there, else they could never develop discontinuous innovations. And what is known is that, to come to discontinuous innovation, an organization must be very innovative, because unlike continuous innovations, discontinuous innovation forces organizations to use new problem solving approaches to develop new technical or commercial skills (Reid et al., 2004, pp.176).

The next dimension of corporate entrepreneurship is pro-activeness. The question remains if there is any difference between larger and smaller organizations. In other words, is the degree of pro-activeness different in smaller organizations compared to large organizations? As Miller (1983) noticed it depends on the degree in which an organization is innovative. Miller stated: *'In general, theorists would not call a firm entrepreneurial if it changed its technology or product-line ('innovated' according to our terminology) simply by directly imitating competitors while refusing to take any risks. Some pro-activeness would be essential as well.'* (Miller, 1983, pp.780). This suggests that pro-activeness grows larger when the innovation is more discontinuous, because more risks are involved.

Often associated with pro-activeness is risk-taking. This third dimension is especially related to small organizations, since the risk-seeking behavior is credited to the smallness of the organization (Hitt et al., 1991). In other words it is argued that, the smaller the organization, the bigger the risk -taking behavior is.

The fourth dimension, which has a positive effect on corporate entrepreneurship, is autonomy. But is this positive effect also visible when corporate entrepreneurship is used in smaller organizations? Worthy (1950) found that the degree of autonomy was higher in smaller firms, which would suggest that the use of corporate entrepreneurship

in smaller organizations is positively influenced and stimulated by higher level of autonomy.

Competitive aggressiveness is the fifth dimension of corporate entrepreneurship. According to Lassen et al. (2006) this was the only dimension which did not have a direct positive effect on radical innovation. Whether it refers to large or small organizations, the fact stays that, when searching for discontinuous innovation, an organization is looking for a new market where there are no competitors yet. So, therefore in smaller organizations, competitive aggressiveness would not be expected to be a part of the corporate entrepreneurship process and would not have a positive effect on it the use of corporate entrepreneurship.

4. EMPIRICAL FINDINGS

In this section three cases will be presented on what the role of corporate entrepreneurship is in the search for discontinuous innovation. The names of the companies have been made anonymous.

4.1 SECURITY INC.

For more than 10 years Security Inc. has worked with electronic surveillance systems from the perspective of *"improving the profits of our retail customers by considering loss prevention as an integrated part of their business process"*. Security Inc. has about one hundred employees and is therefore considered to be a small organization. The size of the organization is not likely to grow in terms of number of employees. When growth happens, a new business unit is created and spun off from its former unit. This way the organization stays small and flexible. Security Inc. claims to search for discontinuous innovation in a rather different way than other competitors. They do not look at what customers need or want, but they focus on the processes that run within the customers' organizations. By doing this, opportunities for innovation in unforeseen areas emerge. The process of searching for such possible changes happens in small steps. Each step may not be discontinuous in itself, but in the end a discontinuous innovation is likely to be the result. For example, Security Inc./Net is discontinuous, but it did not start out that way. The product in itself is nothing new, but the application which they found for it after going through multiple steps was really new and discontinuous.

Innovativeness is thus a key word describing Security Inc. Everything they develop is innovative and the whole organization is build for innovation and changes within it. This is reflected in their product portfolio where the vast majority is highly innovative and some even new to the market.

Pro-activeness is according to Security Inc. very hard to trigger within employees. It is a leaders' task to find the triggers that lead to proactive behavior. However it is said that it is not only the triggers that must do the job, it also depends on the employee. Some are just not proactive by nature and are not capable of acting like a proactive person, but some do have the proactive attitude. These people can be found at Security Inc. because here it is necessary to act proactively in order to fit within the organization.

Risk-taking is seen as an important, because when searching for discontinuous innovation there is a lot of risk involved. Security Inc. does not like taking risks. Of course there are some risks that cannot be excluded, but besides these, the main part of

the risk-taking is minimized by the small steps that are taken in each project. This way every risk is as little as possible, but nevertheless unforeseen events can be integrated in the process.

Autonomy is also reflected through the above-mentioned. Employees who act as entrepreneurs within the organization have a lot of freedom. This autonomy and independence from management is encouraged, because it creates a better environment and leads to great products. However, the autonomy has its boundaries. Besides the responsibilities, entrepreneurial employees have strict limitations in the form of deadlines and goals which have to be met. At each step of the development process the manager has a lot of contact to spot possible problems and act on them before they grow larger or even before they even occur.

When asking if at Security Inc. if they use competitive aggressiveness the answer was: “Yes, of course”. Security Inc. sees competitive aggressiveness as necessary, because when a competitor brings out a product that is better than your own, you have to make an even better one. So by analyzing the products of competitors, new ideas for improvements can be found. Another reason why competitive aggressiveness is present within Security Inc. is because not every step of the development process may be discontinuous. This means that not every part of the actual end-product is entirely new to the world. This implicates that other organizations possibly produce the same parts as Security Inc. Therefore it is necessary to keep an eye out for threats and opportunities from competitors.

4.2 ELECTRONICS INC.

Electronics Inc. is a firm, which repeatedly has been able to move in new directions, leapfrogging competitors, and creating rapid growth. The firm was started as an entrepreneurial venture by two brothers based on their personal interest in how to develop new technological advances for guitar pedal-effects. When adding a professional management-team, the firm experienced rapid growth over several years, and became world-leader within digital signal- and effect processing for professional audio environments. The firm now employs around 180 persons. The case evolves around the development of digital signal-processing equipment, which revolutionized possibilities in audio products, and the case pictures how re-thinking a technological platform from hardware to software meant that the firm was able to expand existing markets, move into different markets, and direct the creation of new markets.

Pro-activeness is in Electronics Inc. highly associated with *action*, in recognition of the fact, that more than one activity has to be initiated in order to challenge the future, that more than one vision of the future should be developed, and that more than a handful of selected people have to be aware of this. In Electronics Inc., a respondent describes this pro-activeness in the following way: “Some say that ‘luck follows the crazy’, but I strongly believe that ‘luck follows the ones who seek it’. So we need to ‘seek’ continuously, and this will create possibilities of riding on entirely new waves and gaining a unique market position”.

The type of innovation engaged in was predominantly highly exploratory and thus subjects to risk. The risk management in Electronics Inc. is however not planning and control parameters as the primary tool to reduce this risk. Instead, risks were reduced through deliberate sharing of knowledge across a wide spectrum of people, discussing many different angles of the projects continuously. “I can see how we may appear very

risk willing when looking at us from the outside. But, actually we don't particularly like risking our investments....Instead we have learned how to be a little risk-willing all the time, and then it feels like everyday business instead of risk-taking to us". This brings a unique "rationality" to the management applied in the absence of pre-existing goals and high uncertainty.

A strong influential factor on the efficient search for ideas for discontinuous innovation was the entrepreneurial leadership, which create a frame of innovation and creativity in the firm. The entrepreneurial leadership was expressed through respectively the self-management by the individual, the top-management, and the dynamics of self-organization at group-level. This approach ensured that leadership and strategic management of resources is not merely a concern of the top-management, but is an integrated part of the way the entrepreneurial individuals in the organization perceive and develop opportunities. Furthermore, autonomy was observed in connection with project which embodied a high level of uncertainty. Such project were initially spun off into a separate venture and later integrated again, as the innovation and its possibilities had matured and become more manageable in connection with existing resources.

When it comes to Competitive aggressiveness, Electronics Inc. shows that they have a very good understanding of their competitors and the market in which the innovation is to be implemented, but that their focus is on the market the innovation is *going to create* rather than on how to *compete in the existing market*. One respondent puts it this way: *"we work very 'blue ocean-like', meaning that of course we know our markets and the competitors who operate here. But when it comes to radical innovation, we haven't directly targeted any existing competitors – instead we have focused on creating new markets, where we would automatically be leading. Of course some of the existing competitors have been defeated based on this, but it has not been our primary objective to do so"*. Hence, it is more relevant to stress a pro-active intent of the firm rather than competitive aggressiveness.

4.3 WIRELESS INC.

Wireless Inc. was founded based on the entrepreneurial desires and ideas of three individuals employed in a large mobile technology firm. Their main products are based on the development of front edge silicon IP for wireless terminals, which provides mobile technology services with an entirely new platform for performance. The firm was founded with the venture capital of a large multinational firm within GSM wireless communication technology, and was considered to be a spin-in trial venture of the established firm. This had certain benefits for the establishment of the case-firm, as the entrepreneurs were able to benefit from the logistical system, brand and sales channels of the established firm. Thus, the development of the case-firm was given excellent conditions for fast growth. Major customers were after few years attracted, and financial performance of the technology was significant. Wireless Inc. employed around 35 persons up until it was bought up by a large player in mobile technology.

Pro-activeness was the ground on which the Wireless Inc. was founded and it continued to play a major role for the company in the approach to create support for new projects, attracting new customers and eventually also to deciding that the future of the company would be better served if selling the firm to a competitor.

When addressing the issue of risk-taking in Wireless Inc. it was found that this indeed was very high and it was perceived to be a given for survival rather than something to

fear. A respondent pointed out that “*you cannot risk, what you don’t fear to loose*” when explaining the background for initiating a technology project with high uncertainty of applicable results.

Autonomy was seen as an essential component if the small Wireless Inc. were to outperform larger competitors. Thus, it was part of the given corporate culture that “*most have a little extra in the desk drawer, as long as it doesn’t interfere with their other assignments*”. Autonomous behaviour is therefore seen as a symbol of the drive and passion of each individual, and hence a sign of their compatibility with the corporate culture.

Competitive aggressiveness was not a direct influence in Wireless Inc. The firm was much more oriented towards creating *preparedness* to handling diverse situations, than they were at reaching answers on how to behave depending on the advances made by specific competitors. They recognized that their small size gave them limited possibilities of competing on traditional competitive parameters, and setting the scene themselves was a better option. Preparedness did include a good insight into the competitive scene and development of different scenarios for possible changes in the market, but not a direct targeting of the same parameters as the competitors.

5. ANALYSIS AND DISCUSSION

Across the cases, Danish as well as Dutch, several patters of the influence of corporate entrepreneurship as a search strategy for discontinuous innovation have been identified. In particular it was illustrated how the use of pro-activeness, risk-taking and autonomy plays a very influential role, and that the three dimensions are often intertwined. Several aspects of how these dimensions are implemented were found to be related to the fact that the case firms are SMEs. The findings are illustrated in figure 2, and are discussed in the following.

<i>Dimension of Corporate Entrepreneurship</i>	<i>Influence on search for DI</i>		
	<i>Security Inc.</i>	<i>Electronics Inc.</i>	<i>Wireless Inc.</i>
<i>Innovativeness</i>	Does not look at what customers need or want, but focus on the processes within the customers’ organizations. By doing this, opportunities for innovation in unforeseen areas emerge. The process of searching for such possible changes happens in small steps.	Re-thinking a technological platform from hardware to software meant that the firm was able to expand existing markets, move into different markets, and direct the creation of new markets.	Based on the idea of the three founders for front edge silicon IP for wireless terminals, which provides mobile technology services with an entirely new platform for performance. The idea had gradually matured in the months leading up to the launch of the company.
<i>Pro-activeness</i>	Considers it hard to trigger pro-activeness if it’s not there – and it	Pro-activeness is highly associated with <i>action</i> - more than one activity	Pro-activeness plays a major role in the approach simultaneously

	has to be there! Pro-activeness is considered a personal characteristic, which is valued in managers and other employees alike.	has to be initiated in order to challenge the future; more than one vision of the future should be developed; and that more than a handful of selected people have to be aware of this.	generating new ideas, creating support for new projects, and attracting new customers. All essential components of identifying realistic ideas for DI.
Risk-taking	Does not like taking risks, but acknowledges that some cannot be avoided. Risk-taking is minimized by taking small steps in each project. This way every risk is as little as possible, but nevertheless unforeseen events can easily be integrated in the process.	<i>"We may appear very risk willing when looking at us from the outside. But, actually we don't particularly like risking our investments. Instead we have learned how to be a little risk-willing all the time".</i> Risk is reduced through sharing of knowledge across a wide spectrum of people, and discussing many different angles of the projects continuously.	Risk is perceived to be a given for survival rather than something to fear; <i>"you cannot risk, what you don't fear to loose"</i> .
Autonomy	Autonomy and independence is encouraged. However, the autonomy has its boundaries in the form of deadlines and goals which have to be met.	Self-management by the individual and the dynamics of self-organization at group-level is a strong influential factor for the efficient search for ideas for discontinuous innovation and a way to avoid path dependency.	Autonomy was seen as an essential component if the small firm is to outperform larger competitors. All employees had to be self-sufficient and contribute to the idea generation.
Competitive aggressiveness	<i>"Yes, of course"</i> Other firms are possibly producing the similar part components, and it is necessary to keep an eye out for threats and opportunities from competitors.	Very good understanding of their competitors and the market in which the innovation is to be implemented. But focus is on the market the innovation is <i>going to create</i> rather than on how to <i>compete in the existing market</i> .	Not a direct influence. The firm is oriented towards creating <i>preparedness</i> , which includes a good insight into the competitive scene and development of different scenarios for possible changes in the market. The small size of the firm gives limited possibilities of competing on traditional competitive parameters, so setting the scene themselves is a better option.

Figure 2: Influence of Corporate Entrepreneurship on Search for Discontinuous Innovations in SMEs

One of the particulars of SMEs which was identified in the conceptual discussion is the element of resource constraints often experienced by firms of this size. Such constraints can be related to human capital, social capital or financial capital.

The financial and human resource constraints experienced by the case SMEs are circumvented creatively through their approach to pro-activeness, risk-taking and autonomy. Pro-activity is seen through the fact that the firms by sending a variety of low-cost probes into the future continuously in order to stay oriented towards creating entirely new technologies and/or products. By doing so, a multitude of images of different possible directions to take in the future was created. Keeping the probes low-cost provides several advantages for the SMEs; (1) the firms did not have to choose between being allocating personal (human capital) to either exploitative or exploratory activities; (2) the pressure to implement results directly is also kept low as the probes serve as inspirational projects rather than projects seeking specific answers (financial capital); (3) the firms could explore the potential of an idea without risking large scale failure or damage to the reputation of the firm (social capital), which could destroy an SME.

An aspect which also comes across in all the cases is the focus on *continuity in the search* for ideas for discontinuous innovation through pro-activeness and risk-taking. Keeping a constant focus on the future allows for strategies to develop emergently and more easily adapt to changes in the future market. This approach was characteristic in all the cases for their view on risk-taking. Risk is taken as a given in order for an SME to be able to identify ideas for discontinuous innovation and compete efficiently, but through a steady approach to risk which involves small steps and continuous re-evaluation, this risk is minimized. Low, but continuous, intensity in the search for discontinuous innovation is emphasized, as it signals that the future alone is not of interest, but rather the implications that future possibilities may have on the present. One respondent phrased this in the following way: *“one of the benefits we see in radical innovation is also the mere fact that we change...I mean, stagnation equals decline for us...and I think the best thing is to continuously challenge both the organization and the individuals...it’s also a matter of personal growth and should take place continuously”*

Autonomous behaviour is in the SMEs often taken as a given. Employees are expected to take ownership of ideas and be actively part of the decision processes in the fuzzy front end. This is most likely also a particular effect of the human capital constraints in SMEs, where no one focuses exclusively on searching for ideas for discontinuous innovation and likewise, no one focuses exclusively on exploiting such ideas. Everyone is expected to be able to relate to both. The frames for doing so differ between the cases, where some case firms were more restrictive than others; but all cases emphasized the importance of employee involvement and self-management in groups.

From the theoretical background we initially found that the dimension of competitive aggressiveness was debatable in relation to the development of discontinuous innovation in general. This was further underlined through the cases. The cases all illustrated how SMEs do not have the resources to spend on extensive market intelligence, but still focus on maintaining a solid understanding of their markets and the directions competitors are taking. This is however not done in order to directly target competitors and outperform them on existing competitive parameters, but to find inspiration on the developments which could influence the future products/markets they are trying to create through discontinuous innovation. Hence, it is more relevant to stress a pro-active intent of the firm rather than competitive aggressiveness.

6. CONCLUSION

By way of introduction it is described how corporate entrepreneurship is increasingly recognized as a meaningful answer to the challenges of creating discontinuous innovation. In this connection, it is found that there is a lack in knowledge on how this is actively used in SMEs when searching for new ideas. Hence, the aim of this research study has been to address the question: “*How does corporate entrepreneurship help the search for discontinuous innovations in SMEs?*”

Through the case studies it was illustrated how several of the characteristics connected with SMEs entail significant reasons to make use of corporate entrepreneurship as a search strategy for discontinuous innovation. Pro-activity, risk-taking and autonomy were in particular significant elements of the approach applied by the case firms to continue to be able to search for discontinuous innovation. Competitive aggressiveness was interpreted as competitive preparedness and was influential in the sense that in order for the case firms to stay ahead of other firms, they needed to know where these other firms were heading and what developments were made on shared technologies or part components. To end this conclusion on the influences on SMEs it can therefore be said that the use of corporate entrepreneurship in SMEs when searching for DI is likely to have a highly positive effect on the organization.

The research presented in this paper points to several topics in both depth and breadth which could be of interest for further research. As the research reveals how particulars of SMEs influence the approach applied to search for discontinuous innovation, it could be of interest to further deepen the understanding of other search strategies in this particular context. Furthermore, it would be of interest to also widen the research focus to include the phases of selection, implementation and learning to this research agenda.

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