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Towards Understanding Strategic innovation in Small & Entrepreneurial Clean Technology firms

Exploring capacity, arenas and outcomes

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TOWARDS UNDERSTANDING STRATEGIC INNOVATION IN
SMALL & ENTREPRENEURIAL CLEAN TECHNOLOGY FIRMS

EXPLORING CAPACITY, ARENAS AND OUTCOMES

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Abstract

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Title: Towards Understanding Strategic Innovation in Small & Entrepreneurial Clean Technology Firms – Exploring Capacity, Arenas and Outcomes

Background and problem: The realities of our knowledge-based society have dramatically changed the prerequisites for business strategy and competition. Today, Strategic Innovation (SI), i.e. the ability to radically change the rules of the game, is required in order to cope with the new economic landscape. Small and entrepreneurial Clean Technology (CleanTech) firms are of central interest to study in this context, due to their ability to advance our future green economy.

Purpose: The purpose of this paper is to investigate how small and entrepreneurial CleanTech firms manage SI, by answering four research questions: 1) *what model could describe a holistic approach to SI in a CleanTech context*, 2) *what is the capacity for SI among small and entrepreneurial CleanTech firms*, 3) *how has SI been attained by small and entrepreneurial CleanTech firms*, and 4) *what SI outcomes have small and entrepreneurial CleanTech firms achieved to date*.

Method: This exploratory study applies a qualitative research strategy, based on ten semi-structured interviews with small and entrepreneurial CleanTech firms, as well as one unstructured interview with a subject matter expert from the Technical Research Institute of Sweden (SP). The sample includes Gothenburg-based CleanTech firms that were selected from a list published by the Swedish Agency for Economic and Regional Growth (Tillväxtverket).

Research implications: This study presents an adjusted model for SI in a CleanTech context, where the new contributions incorporate an increased attention to learning, additional arenas for SI, access to large-scale development projects and a new type of SI output. In addition, several conclusions are presented regarding the companies' capacity for and outcomes of SI.

Practical implications: First, companies are recommended to establish a questioning attitude and challenge both corporate and industry boundaries. This can be achieved by a shift from the current inside-out approach to an outside-in approach, where external actors are utilized to a greater extent. Second, this paper proposes a more exploratory approach to strategy. Third, companies are encouraged to follow non-customers more closely. Last, companies are recommended to develop 'loaded expressions' in order to communicate the value of their products/services more efficiently.

Key words: Strategic innovation, clean technology, small and entrepreneurial firms

Abbreviations

Business Sweden	Swedish Trade & Invest Council
CleanTech	Clean Technology
SI	Strategic Innovation
SME	Small and Medium Sized Enterprise
SP	Technical Research Institute of Sweden
SWENTEC	Swedish Environmental Technology Council
Tillväxtverket	Swedish Agency for Economic and Regional Growth
VINNOVA	Sweden's Innovation Agency

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1. Introduction

This chapter presents the background to the research and puts the study into a broader context. The study will be positioned in relation to two scholarly fields: i) strategic management, and ii) clean technology (CleanTech). The chapter concludes with the description of the research questions together with a discussion regarding the delimitations of the study.

1.1 Background

The foundations of traditional economic and business thinking is being seriously challenged today because of the realities of our global and knowledge-based society (Davenport, Leibold & Voelpel, 2006; Afuah, 2009; Heracleous, 2003). Rapid technological change and increased globalization has resulted in the breakdown of traditional industry boundaries, enabling knowledge and innovation to move quickly and easily across traditional boundaries and industries (Davenport, Leibold & Voelpel, 2006; Afuah, 2009). The proportion of economic value attributable to intangible capital in business, has increased dramatically, which puts new demands on firms to reinvent and adapt constantly (Davenport, Leibold & Voelpel, 2006). To thrive in the new economic landscape, companies must create, grow and profit from completely new business models (Govindarajan & Trimble, 2005).

Traditional and competition-based strategy approaches were developed for relatively static industry and market conditions and have, thus, become unable to cope with the dynamics of today's economy (Davenport, Leibold & Voelpel, 2006; Kim & Mauborgne, 1999). Such approaches only lead to reactive behavior, incrementally improved products and services and imitative strategies (Kim & Mauborgne, 1999). By and large, the strategy process of today has become fuzzier; it is no longer realistic to divide the strategy process into the traditional sequential steps (Davenport, Leibold & Voelpel, 2006). On the contrary, strategy analysis, formulation and implementation are on-going and intertwined activities, with increased internal and external interaction (Davenport, Leibold & Voelpel, 2006; Kim & Mauborgne, 1999). There is a greater need for more holistic, creative and intuitive thinking rather than analytical and rational ditto (Davenport, Leibold & Voelpel, 2006). In addition, the traditional view of organizational culture has to change from being focused on conformity and protection to center on diversity and sharing (Davenport, Leibold & Voelpel, 2006). It is widely accepted today that open-sourcing and cross-boundary collaborations in ideas and processes enhance innovation (Davenport, Leibold & Voelpel, 2006).

Observations of these tendencies have resulted in the emerging research field of Strategic Innovation (SI), which advocates the ability to radically and continuously change the rules of the game, in order to create quantum leaps in customer value and make competition irrelevant (Govindarajan & Gupta, 2001; Berghman, 2006; Kim & Mauborgne, 1999). Recent research has focused on organizational capacity for SI and argues that deliberate interventions can foster SI (Berghman, Matthyssens, Streukens & Vandenbempt, 2013). Thus, it becomes interesting to examine how firms could stimulate their capacity for SI.

The Swedish government has implemented various measures aimed at strengthening the position of Swedish companies as well as increasing the general level of innovation within the economy (European Commission, 2013). In line with these endeavors, VINNOVA (2013a) state that Swedish companies need to strengthen their ability to accept, apply and develop new knowledge and techniques in new business opportunities. Thus, they are calling for more creative and innovative companies. Moreover, a sector which is particularly important to strengthen is the CleanTech sector (Swedish Agency for Growth Policy Analysis, 2013). It is becoming increasingly difficult to ignore the threats from global climate change and a core challenge of the contemporary society has become to create economic growth while not harming the environment or the climate (Swedish Agency for Growth Policy Analysis, 2013; Ekins, 2010). Numerous countries have launched policies and strategies, with the purpose of fostering globally competitive CleanTech companies (Swedish Agency for Growth Policy Analysis, 2013). In 2010, the Swedish Environmental Technology Council (SWENTEC) recognized that all sectors of the Swedish economy were in need of new solutions in order to meet the requirements of the future green economy. The council further argued that there would exist great opportunities for the Swedish economy to prosper, if clean technology could be stimulated to spread through society (SWENTEC, 2010). In line with this development, the Swedish government launched ‘the Environmental Technologies Strategy’ (a strategy for the development and export of environmental technologies) in 2011. The aim was to promote economic growth driven by CleanTech companies. (Swedish Agency for Growth Policy Analysis, 2013)

Conclusively, in order for our nation to stay competitive in a future green economy, it is important to have strong CleanTech companies that thrive in our increasingly complex economic landscape. Subsequently, it seems critical that these firms learn how to manage SI.

1.2 Problem Discussion

Business strategy is considered to constitute the link between an organization and its competitive environment, which means that the transition from the old industrial economy to the current knowledge-based society, should require seriously reconsidered strategy approaches (Davenport, Laibold & Voelpel, 2006). Organizational strategy is, however, still typically conceptualized and developed based on the assumption that the future is a linear extension of the past and present; an assumption which is being heavily questioned by researchers today (e.g. Carlopio, 2010). It seems more likely that we are facing a future which is *not* a linear extension of the past (Carlopio, 2010). Today's rapidly changing society is driven by advanced technology, knowledge-networks and globalization, which increasingly challenges traditional business strategy (Davenport, Laibold & Voelpel, 2006; Foss, 2005). Despite this, companies around the world continue to rely on variants or extensions of proven strategies from the past, which now result in failed outcomes (Carlopio, 2010).

Although there is a growing body of literature today, proclaiming the importance of new and innovative strategic management approaches (Davenport, Laibold & Voelpel, 2006; Normann, 2001; Foss, 2005; Carlopio, 2010), the scholarly field of strategy does not seem to offer any accepted theory, methods or tools for the creation of SI (Carlopio, 2010). On the contrary, the research field of SI is scattered, with a rich variety of concepts, themes and sub-themes (Sammut-Bonnici & Paroutis, 2013). Although attempts have been made to synthesize the literature within SI (e.g. Schlegelmilch, Diamantopoulos & Kreuz, 2003), the research field is still conceptually underdeveloped according to Simonson (2005). The research to date has mainly been supported by examples and anecdotes rather than having more rigorous underpinnings (Simonson, 2005). New techniques and concepts that promise managerial innovations, generally tend to gain much popularity, albeit for a short period of time (Simonson, 2005). Given this short life cycle, in combination with the time required to publish an article in a major journal, researchers have been unwilling to study such techniques (Simonson, 2005). Markides (in Mang, 2000) claims that additional research on SI is essential for the concept to gain more credibility. Particularly important is to understand the complex interrelationship between the strategy of the firm and its organizational environment (i.e. its culture, incentives, evaluation systems etc.) (Markides in Mang, 2000). Research to date has generally focused on narrowly examining sub-themes of SI, like organizational learning, customer logic or network configurations. Consequently, such studies would never be able to identify possibly important interdependent relationships between various sub-themes. In addition, the literature body is primarily focused on 'renewal journeys'

(Volberda, van den Bosch, Flier & Gedajlovic, 2001) of large corporations (Berghman, 2006). Thus, although Small and Medium Sized Enterprises (SMEs) are regarded as an important source of innovation (VINNOVA, 2013b), the literature on SI seems to have neglected these companies. Conclusively, SI remains to be explored on a more holistic level, with an increased focus on a small firm perspective.

1.3 Purpose and Research Questions

Against the background described above, it seems highly relevant to explore how small and entrepreneurial CleanTech firms manage SI. Formulating strong and competitive strategies is crucial for any company that wishes to conquer the market with its products or services. However, because of the national interest in creating and absorbing green innovation, it becomes particularly important that CleanTech companies become stronger and more competitive through the use of innovative strategies. Moreover, it is of central interest to study small and entrepreneurial[1] CleanTech firms, since it is within these companies that much of the green innovation is born. To a large extent, small and entrepreneurial CleanTech firms are inventing the new technologies that are essential to diffuse into the society, in order to advance our green economy. Thus, the purpose of this thesis will be to investigate how small and entrepreneurial CleanTech firms manage SI, in order to evaluate their ability to compete effectively in our future economy.

Because this research will apply a broad approach to SI, a prerequisite is to define a holistic model. The model should display what preconditions that are necessary for the creation of SI, the elements that are connected to the SI process as well as the outcomes of SI. Hence, this study will take its starting point in the following research questions:

1) *What model could describe a holistic approach to SI in a CleanTech context?*
2) *What is the capacity for SI among small and entrepreneurial CleanTech firms?*
3) *How has SI been attained by small and entrepreneurial CleanTech firms?*
4) *What SI outcomes have small and entrepreneurial CleanTech firms achieved to date?*

1.4 Delimitations

[1] Here, an entrepreneurial firm is defined as a firm that seizes market opportunities by offering innovative products or services.

First, this study is limited in terms of perspective. Rosén (2011) offers an organizing map for the field of strategic management (see *Figure 1*). The map is based on three different contexts and three fundamental inquires. The contexts are described as macro, organizational and micro perspectives. The macro context is primarily concerned with the institutional-level ideas within which strategy is formulated. The organizational context incorporates a firm level perspective, whilst the micro context refers to the activity based view of the firm. The horizontal division is based on the inquiries: what, how and why? The questions are referring to *what* strategy is or should be, *how* strategy forms or should form and *why* strategy is developed or should be developed. (Rosén, 2011)

This study will take its starting point in a firm-based perspective, where CleanTech firms will be asked to describe their approach to strategy as well as their strategy activities and processes. Thus, this study will be placed between the organizational and micro context of Rosén's (2011) framework. Hence, leaving out the institutional-level perspective. Concerning the fundamental inquires, this study will consider the 'what' and 'how' questions. Thus, this study will *not* explore the firm-level and activity-level strategy rationale. *Figure 1* illustrates the location of this study within the framework described above.

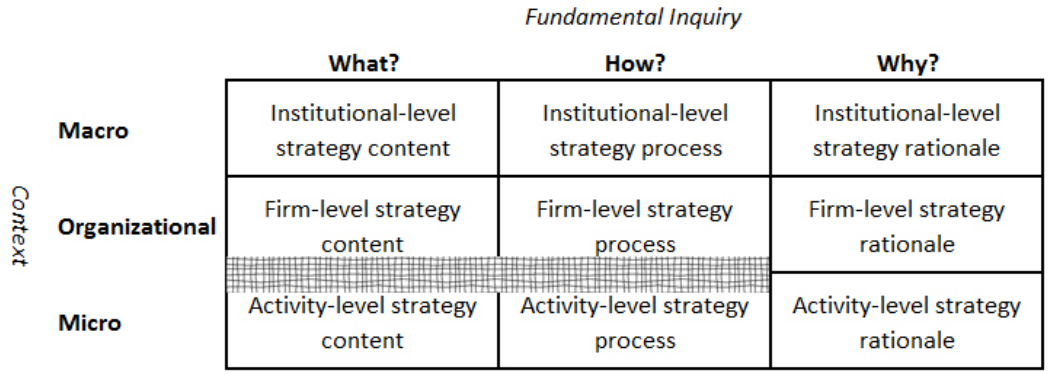

Figure 1: The location of this study within the scholarly field of strategic management (adapted from Rosén, 2011).

Second, this study is geographically limited to the region of Gothenburg, which affects the generalizability of the results. Third, this study will be limited to the view of small firms. In this context, I define small firms as having less than 20 employees. The fourth and last limitation considers the sample of the study. Only ten companies will be explored in this study, which limits the possibility to generalize the findings to other firms. Thus, the sole purpose of this research is to describe the management of SI within these ten firms and to point out potentially interesting patterns and phenomena for further research.

1.5 Thesis Disposition

This paper will proceed by a presentation of the *Theoretical Starting Point*, providing an overview of the scholarly field of strategy and the emergence of the sub-field of SI. A model will be presented, which constitutes the basis for this research. Thereafter, the drivers, arenas and outcomes of SI will be discussed together with some concluding remarks regarding key issues for SI. Subsequently, this study's *Methodology* will be explained and reflected upon. The primary focus will be to describe how the research has been carried out and provide arguments for the methodological choices that have been made. In the next chapter, the *Empirical Findings* will be presented. The focus will be to describe the ten companies that participated in this study, in terms of their capacity for SI, arenas for SI and their SI outcomes. In the successive *Analysis*, the theoretical framework will be compared to the empirical findings. The purpose is to examine to what extent the empirical findings corroborate with the literature and vice versa. Thereafter, *Conclusions* will be drawn from the research, by summarizing the main findings. Lastly, the implications of this study for future research will be discussed.

2. Theoretical Starting Point

The purpose of this chapter is to provide the reader with a well-founded theoretical background to the problem statement of this study. First, the concept of business strategy will be defined briefly. Second, the emergence of SI will be explained and put into context. Last, a model for SI will be presented followed by a more detailed explanation of the model's components.

In order to answer the research questions of this thesis: 1) *what model could describe a holistic approach to SI*, 2) *what is the capacity for SI among small and entrepreneurial CleanTech firms*, 3) *how has SI been attained by small and entrepreneurial CleanTech firms,* and 4) *what SI outcomes have small and entrepreneurial CleanTech firms achieved to date,* it is important to understand what SI really is and what factors that are connected to the phenomenon. To achieve such understanding, a fundamental review of the literature within strategy is required.

2.1 The World of Strategy

> *"If you know your enemy and know yourself, you need not fear the result of a hundred battles. If you know yourself but not the enemy, for every victory gained you will also suffer a defeat. If you know neither the enemy nor yourself, you will succumb in every battle."*
>
> (- Sun Tzu, The Art of War)

The scholarly field of strategy dates back to Sun Tzu's classic, *The Art of War*, from about 500 BC, and the term *strategy* derives from the Greek word for "generalship". Military strategy and business strategy have many similarities and exist much for the same reasons. Nevertheless, there are also differences (e.g. in terms of the degree of which one seeks the complete destruction of competitors) that has led to separate development paths between military strategy and business strategy. (Grant, 2013)

Mintzberg, Ahlstrand and Lampel (2009) illustrate how strategy has been explored from numerous different perspectives, resulting in a complex field of research. The authors describe five different definitions of strategy and ten different schools of strategy, which combined help practitioners and scholars to understand what strategy is. The first definition describes *strategy as a plan*, which incorporates the intended course of action or the guideline for how to deal with certain situations. By this definition, strategies are formulated purposefully and consciously in advance. The second definition describes *strategy as a ploy*, which refers to a specific strategic

maneuver, aimed at out winning a rival. The third definition describes *strategy as a pattern*, either intended or unintended. This definition emphasizes that strategy is sometimes the result of unintended actions rather than careful planning. Generally, there is a distinction between deliberate strategies (where intended plans are realized) and emergent strategies (where patterns develop into strategies). The fourth definition describes *strategy as position*. By this definition, strategy describes the fit between the organization and its environment. Strategy as position is an outward looking definition, which seeks to locate the firm within a broader context. In contrast, the fifth definition – *strategy as perspective* – looks inside the organization. Here, the question is how the strategists, within the organizations, collectively perceive the world. By this definition, strategy describes the personality of the organization, through which it explains the organization's actions. (Mintzberg, 1987; Mintzberg, Ahlstrand & Lampel 2009)

The ten different schools of strategy (presented in *Table 1)*, emerged when Mintzberg, Ahlstrand and Lampel (2009) categorized the different perspectives that could be found within the past literature on strategic management. Although, the authors' emphasize that every strategy process has to combine the perspectives of the ten different schools, the categorization can still provide useful guidance for understanding the complex field of strategy.

Table 1: Ten different schools of strategy (Mintzberg, Ahlstrand & Lampel, 2009).

School of Strategy	**Description**
The Design School	Strategy formation as a process of *conception.* There should be a 'fit' between internal capabilities and external possibilities.
The Planning School	Strategy formation as a *formal* process, which should be managed by highly educated planners.
The Positioning School	Strategy formation as an *analytical* process. Only a few key strategies or positions are desirable in any given industry.
The Entrepreneurial School	Strategy formation as a *visionary* process. Strategy is the construct of the inspiring leader.
The Cognitive School	Strategy formation as a *mental* process. Knowledge structures and thinking processes are developed through direct experience.
The Learning School	Strategy formation as an *emergent* process. The world is complex and strategies need to form in small steps, as the organization adapts or learns.
The Power School	Strategy formation as a process of *negotiation.* Power relations surround and influence organizations.
The Cultural School	Strategy formation as a *collective* process, rooted in the social force of culture.

The Environmental School	Strategy formation as a *reactive* process. The organization must respond to the forces of the environment.
The Configuration School	Strategy formation as a process of *transformation.* Strategy making describes the leap from one state to another.

Moreover, Mintzberg, Ahlstrand and Lampel (2009) analyze how the ten schools are placed in relation to the single process of strategy formation (see *Figure 2*). *Figure 2* illustrates the actual creation of strategy as a black box, since most of the schools treat it that way. The only true exception is the cognitive school, which really tries to dig deep into the thinking processes. All other schools of strategy are placed around the actual creation of strategy; above, below, before and after. The positioning school is placed behind the box, illustrating a perspective where historical data is analyzed and acted upon. On the contrary, the planning school, the design school and the entrepreneurial school, are placed after the box. The planning school looks ahead, but just ahead, while the design school looks farther ahead, to a strategic perspective. The entrepreneurial school looks beyond and beside the current situation, centering on a unique vision of the future. Meanwhile, the learning and power schools look below, concentrating on the details. The cultural school is placed above the box and described as being enshrouded in clouds of beliefs. Well above the cultural school, is the entrepreneurial school, looking *on* the creation of strategy. Last, the configuration school looks all around the creation of strategy. (Mintzberg, Ahlstrand & Lampel 2009)

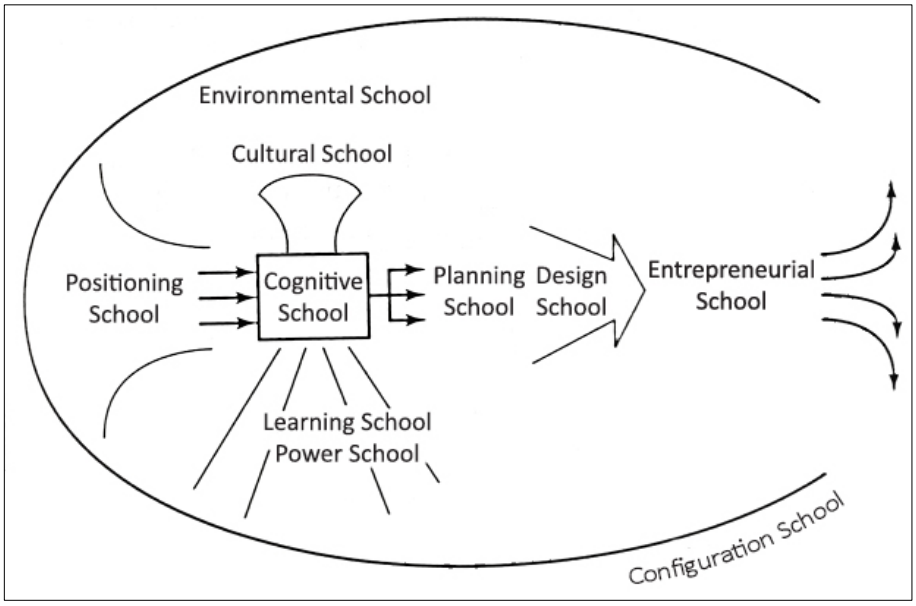

Figure 2: The location of the ten schools of strategy in relation to the process of strategy formation (adapted from Mintzberg, Ahlstrand & Lampel, 2009).

Afuah (2009) describes the historical development of main themes within the field of strategic management. In the 1960's, the dominant theme was corporate planning, largely driven by the Cold War and the reconstruction of Europe and Japan, following World War II. The SWOT (Strength, Weaknesses, Opportunities, and Threats) framework became a popular tool for assessing a firm's potential to achieve its objectives through evaluating internal and external factors (Afuah, 2009).

In the late 1960's and early 1970's, the main theme was corporate strategy, including a focus on diversification and product portfolio planning (ibid.). Some popular analysis tools were Boston Consulting Group's Growth/Share matrix and the McKinsey/GE matrix (ibid.). Consultancy firms started to exercise a substantial influence on the practice of strategy, due to the scholars' insistence that strategy was idiosyncratic to each individual firm, which led to a demand for standardized strategic frameworks (Heracleous, 2003).

In the late 1970's and early 1980's, the primary theme became industry and competitive analysis, which centered on an organization's positioning vis-à-vis competitors (Afuah, 2009). In the late 1980's and early 1990's, key themes were competitive advantage and its sources within a firm (ibid.). Popular concepts were core competence of the firm and the resource-based view (ibid.). From the late 1990's to today, the dominant themes have been the impact of information and communications technologies, globalization and SI (ibid.).

2.2 The Dawn of Strategic Innovation

The importance of new and more entrepreneurial strategies was recognized already in 1985, by Drucker (1985), who promoted the concept 'entrepreneurial judo' as a means to surprise the market by hitting competitors "where they ain't". Schlegelmilch, Diamantapoulos and Kreuz (2003) describe how the concept was further developed by Baden-Fuller (1995), Normann and Ramirez (1993), Kim and Mauborgne (1997) and Markides (1997, 1998, 1999). These authors proclaim the importance of "a fundamental reconceptualization of what the business is all about that, in turn leads to a dramatically different way of playing the game in an existing business" (Markides, 1998, p 32, in Schlegelmilch, Diamantapoulos & Kreuz, 2003).

Although SI is the most commonly used term within the literature for applying innovation on business strategy, there can also be found closely related terms such as strategic change, strategic entrepreneurship and value innovation (Schlegelmilch, Diamantapoulos & Kreuz, 2003). By and large, these terms have developed from two major fields of research: *strategic management* and *innovation management*. According to Sammut-Bonnici and Paroutis (2013), Schlegelmilch, Diamantapoulos

and Kreuz (2003), and Buzzavo (2012) strategy and innovation have developed almost as separate schools of thought, with a lack of a common view. Subsequently, when more attention was finally given to bridge the two fields of research, a wide range of definitions and notions came into play (Buzzavo, 2012). *Figure 3* illustrates where the SI phenomenon is found within the literature.

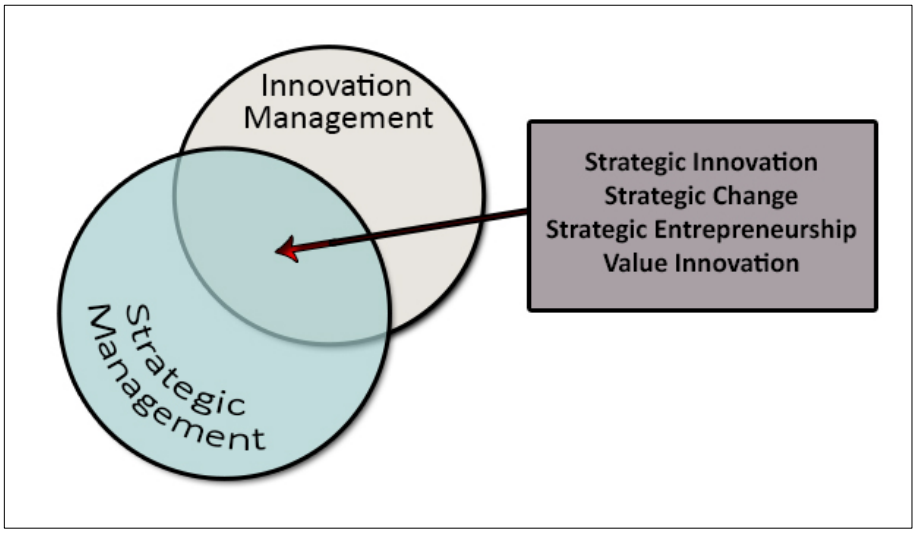

Figure 3: The origin of SI within the literature (illustration by the author).

Nevertheless, Schlegelmilch, Diamantapoulos and Kreuz (2003) argue that despite the variety of terms and definitions, there are key themes within the literature, including the fundamental questioning of mental models and tacit rules (e.g. Geroski, 1998; Gilad, 1994; Hamel, 1996, 1998; Johne, 1992; Kim & Mauborgne, 1999; Lynn, Morone & Paulson, 1996; Markides, 1997, 1998; Martinsons, 1993), the redefinition of industry boundaries and market space (e.g. Hamel, 1996; Johne, 1992; Kim & Mauborgne, 1999) and the creation of dramatically increased customer value and company growth (e.g. Krinsy & Jenkins, 1997; Markides, 1999; Seurat, 1999). *Table 10* in Appendix C summarizes the main contributions within the field of SI.

There are several different definitions of SI within the literature. For instance, Markides (1997) argues that "strategic innovation occurs when a company identifies gaps in the industry positioning map, decides to fill them, and the gaps grow to become the new mass market" (p. 12). Hamel (1998) states that "strategy innovation is the capacity to reconceive the existing industry model in ways that create new value for customers, wrong-foot competitors, and produce new wealth for all stakeholders. Strategy innovation is the only way for newcomers to succeed in the face of enormous resource disadvantages, and the only way for incumbents to renew their lease on success" (p. 8). Pitt and Clarke (1999) describe SI as "the purposeful

orchestration and directed application of organizational skills and knowledge" (p. 301).

After having synthesized previous literature within the research field, Schlegelmilch, Diamantapoulos and Kreuz (2003) offer the following definition of SI:

> *Strategic innovation is the fundamental reconceptualization of the business model and the reshaping of existing markets (by breaking the rules and changing the nature of competition) to achieve dramatic value improvements for customers and high growth for companies.* (p. 118)

SI involves the redesign of at least one of three arenas: value-chain architecture, conceptualization of customer value and identification of customer base (see *Figure 4*) (Govindarajan & Gupta 2001; Gebauer, Worch & Truffer, 2012). There are three important principles for the redesign of the end-to-end value chain (Govindarajan & Gupta 2001). First, the central attributes of the value chain must be redesigned, i.e. the set of activities performed and the interfaces across the activities (ibid.). Second, the new value chain must result in dramatic gains in either cost structure, asset investment or speed of responsiveness to external change (ibid.). Third, the new value chain must ensure rapid growth in market share, fast globalization and product/service expansion, by enabling the firm to scale up its business model (ibid.).

Reinventing customer value can e.g. include the shift from selling discrete products to selling integrated solutions (ibid.). However, this will be successful *only* if the firm is best-in-class in every product category and the integrated solution is remarkably better and cheaper than the alternative where customers buy discrete products and bundles them together by themselves (ibid.).

Redefining the customer base could e.g. incorporate the discovery of a hidden mega-segment, which could change the value potential of the industry, resulting in a dramatically increased size and growth rate of the overall marketplace (ibid.). Furthermore, the solution for the new segment could begin to substitute the existing solution for the original customer segment (ibid.). In addition, technological, financial and organizational capabilities accumulated in the process of finding the new customer segment could be leveraged to out-maneuver incumbent players on the market (ibid.).

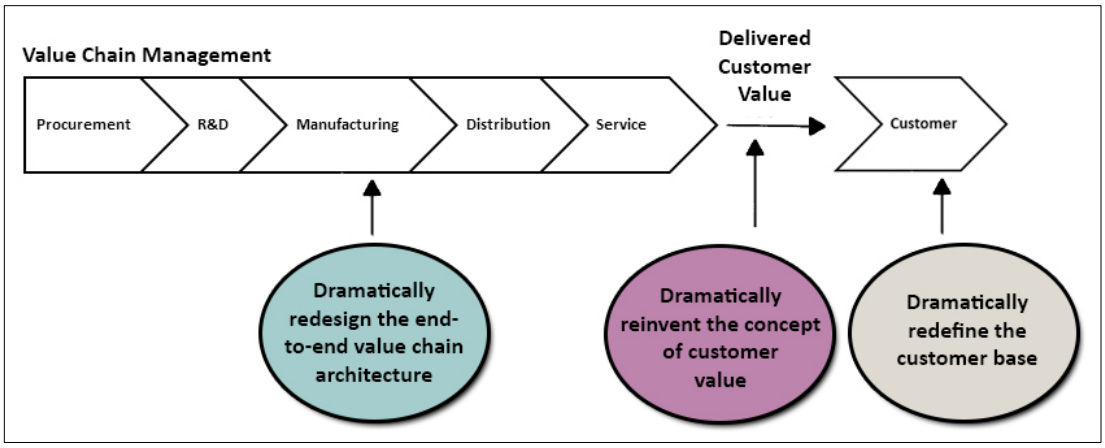

Figure 4: Three arenas for SI (adapted from Govindarajan & Gupta 2001).

Conclusively, SI incorporates the ability to radically change the rules of the game, by reinventing the end-to-end value chain, the customer value or the customer base. It seems like SI is rooted primarily in the configuration and entrepreneurial schools of strategy, even though it contains elements from all of the perspectives proposed by Mintzberg, Ahlstrand and Lampel (2009). First, SI applies a strong focus on change. Companies are encouraged to reinterpret their business realities and reconfigure in new and surprising ways, with the purpose of breaking the current stability or balance on the market. Thus, SI seems to be influenced by the perspective of the configuration school, which emphasizes transformation. Additionally, SI incorporates a strong focus on entrepreneurial visions. SI is mentioned by the literature as being the only way for newly started firms to succeed in the face of huge resource disadvantages. By inspiring companies to look far beyond and beside current industry norms, SI, therefore, seems closely connected to the entrepreneurial school of strategy as well.

2.3 Theoretical Framework

In order to answer the research questions of this thesis a holistic framework for SI is needed, which should incorporate both the capacity for SI as well as the outcomes of SI. Although there are no universally accepted thematic frameworks for SI (Sammut-Bonnici & Paroutis, 2013), a comprehensive attempt to harmonize the research body of SI and create a model for more rigorous empirical testing was made by Schlegelmilch, Diamantopoulos and Kreuz (2003) (see *Figure 5*). Their work include the majority of the most influential SI publications during the 1980's and 1990's and has been frequently cited in later SI research. Their broad approach to SI makes their framework an ideal starting point for this thesis' first research question: w*hat model could describe a holistic approach to SI in a CleanTech context*. Thus, in this research I will test Schlegelmilch, Diamantopoulos and Kreuz's (2003) model in practice, with the purpose of determining its viability in a CleanTech context.

Schlegelmilch, Diamantopoulos and Kreuz (2003) illustrate some common themes regarding outcomes of SI as well as drivers for SI (see *Figure 5*). When discussing outcomes of SI, the literature centers on the creation of radically new *customer value* and the ability to turn currently viable *market positions* upside-down. The literature on drivers for SI mentions business *culture*, the characteristics of the strategy *process*, the *people* participating in the process and the view of *resources* as important factors (Schlegelmilch, Diamantopoulos & Kreuz, 2003).

By capturing both drivers and outcomes of SI, Schlegelmilch, Diamantopoulos and Kreuz's (2003) framework constitutes a solid basis for investigating this thesis' research question 2) w*hat is the capacity for SI among small and entrepreneurial CleanTech firms,* and 4) *what SI outcomes have small and entrepreneurial CleanTech firms achieved to date?* Hence, in this study I will investigate the CleanTech companies' capacity for SI based on how the firms manage the drivers for SI proposed by Schlegelmilch, Diamantopoulos and Kreuz (2003). Similarly, I will use the authors' proposed outcomes of SI as a starting point for analyzing what SI outcomes the CleanTech firms have achieved to date.

Moreover, Schlegelmilch, Diamantopoulos and Kreuz (2003) argue that SI generally is centered on the reinvention of customer value and, therefore, exclude the three arenas for SI proposed by Govindarajan and Gupta (2001) (see *Figure 4*) in their model. Thus, while answering research question 3) *how has SI been attained by small and entrepreneurial CleanTech firms*, I will test if Schlegelmilch, Diamantopoulos and Kreuz's (2003) assumption holds in practice.

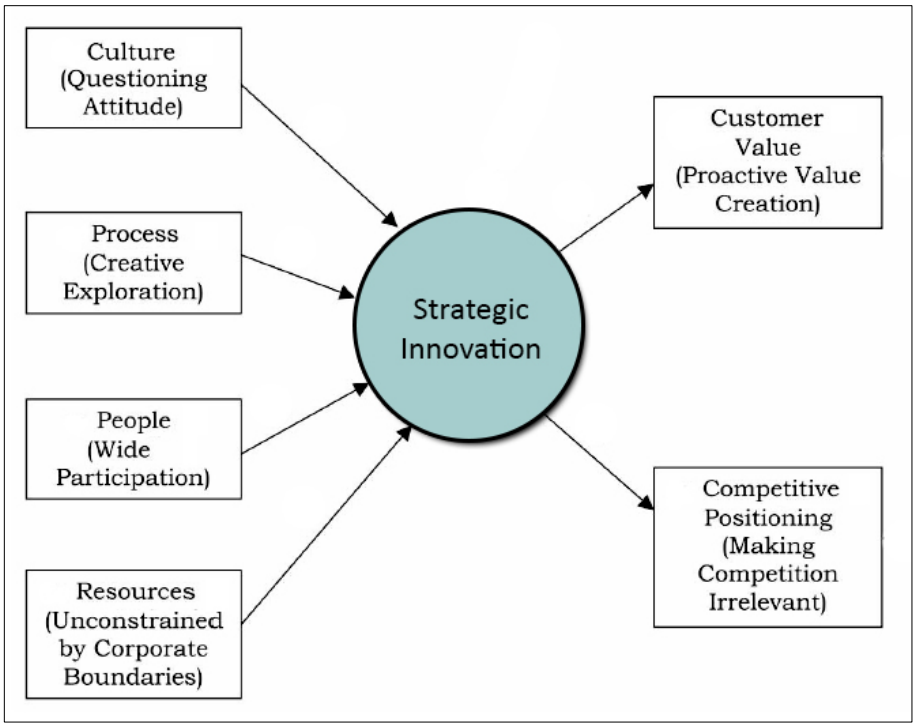

Figure 5: SI model (adapted from Schlegelmilch, Diamantopoulos & Kreuz, 2003)

2.4 Strategic Innovation Outcomes

2.4.1 Proactive Customer Value Creation

Firms have always been encouraged to closely follow their existing customers' needs and wants, in order to satisfy them more effectively than competitors do (e.g. Kotler, 2009; Varadarajan & Jayachandran, 1999). Kotler (2009) emphasizes the importance of retaining existing customers, since the cost of attracting new customers is about five times the cost of keeping the current customers pleased. When it comes to innovation, conventional wisdom claims that in order to develop more innovative products and services, companies should listen more closely to the market by asking their customers to identify new ideas and involve them in the product development process (e.g. Markides, 1997; Von Hippel, 1988; Merlo, Eisingerich & Auh, 2013).

The view of customers has changed dramatically over time; from being regarded as the recipients at the end of the chain to becoming co-creators of value (Senge & Carstedt, 2001; Normann, 2001). Already in 1991, researchers began to proclaim the importance of 'co-production'. Brown (1991) argued that the research department's ultimate innovation partner is the customer. 'Co-production' is radically different from traditional market research, since the latter assumes that a particular product already exists or that the customers already know what they want and need.

Prototyping a need is the first step to create innovation. In 1991, Brown foresaw how the future would incorporate computer-based "envisioning laboratories", where customers could co-produce new products and visualize their benefits (Brown, 1991).

SI literature challenges these arguments to some extent (Schlegelmilch, Diamantopoulos & Kreuz, 2003). Although e.g. Berghman (2006) argues that it is crucial to attentively listening to existing customers and trying to understand their buyer experience stages, other researchers suggest that a too strong focus on existing customers can limit the firm (Schlegelmilch, Diamantopoulos & Kreuz, 2003). Strong and long-term relationships with customers may turn into shackles, limiting the company's flexibility and promoting hesitancy to change (Sull, 1999; Kim & Mauborgne, 1999). On the contrary, these authors argue that firms should strive to create value proactively, i.e. provide their customers with solutions they did not know that they wanted (Kim & Mauborgne, 1999; Markides, 1997). Furthermore, Kim and Mauborgne (1999) and Berghman (2006) claim that by following non-customers closely, a firm might discover trends and changes in the market, that can be matched to the firm's competences. Carlopio (2010) suggests that strategy practitioners should turn to the field of design in order to identify latent customer needs more effectively and interpret people's behavior, needs, emotions, preferences and reactions better. In traditional market research, companies are concerned with understanding the market, the competition and its own organization (ibid.). The purpose is to position the company correctly and to be able to forecast future industry conditions (ibid.). What is significant for the traditional strategy research approach is the search for one true answer – one ideal position according to the prerequisites (ibid.). On the contrary, a stronger focus on design thinking would incorporate the understanding of *different* perspectives and options (ibid.). Designers seek a much deeper understanding of their customers, where one key aspect is the understanding of the emotional meaning products and services have, or could have, for customers (ibid.). Thus, firms could gain from applying a more observation-based and exploratory market research (ibid.).

2.4.2 Competition Becomes Irrelevant

Conventionally, competition has occupied the center of strategic thinking (Kim & Mauborgne, 1999). Managers try to assess what competitors do in order to outperform them by providing the market with better products and services (ibid.). However, such focus on competitors leads to reactive behavior, incrementally improved products and services, and often imitative strategic moves (ibid.). When companies focus strongly on their competitors they tend to overlook changing customer demands and emerging markets, which makes innovation hard to attain (ibid.). In order to achieve sustained profitable growth, companies need to break out of this competitive and imitative trap (ibid.). Rather than striving to play the game

better, firms need to learn how to change the rules of the game (ibid.). When a company is able to offer fundamentally new and superior buyer value, competition becomes irrelevant and there will be significant shifts in market share (ibid.). In order to break out of the competitive trap, Kim and Mauborgne (1999) argue that firms should continue to monitor their competitors, however, without benchmarking. Companies should strive to discover untapped value, by creating deep understanding of the total solution buyers seek when they choose a product or service (Kim and Mauborgne, 1999; Carlopio, 2010). Thereafter, the company should look across complementary product and service offerings that go beyond the conventional industry boundaries in order to identify novel customer value propositions (Kim and Mauborgne, 1999).

2.5 Four Drivers of Strategic Innovation

2.5.1 Business Culture & Learning

The most important cultural factor necessary for SI is the establishment of a questioning attitude within companies (Markides, 2001). Normann (2001) argues that companies are constantly involved in the dynamic process of maintaining consonance between the organization and its environment. However, the process can be executed on three different levels: 1) adaptation and correction, 2) framebreaking reconfiguration, and 3) recurrent purposeful emergence (ibid.). Adaptation and correction occurs when a company simply adapts to the new circumstances within the environment (ibid.). The next level – framebreaking reconfiguration – is achieved when a company reinterprets itself according to the environmental changes (ibid.). The third and deepest level of the consonance process – recurrent purposeful emergence – occurs when a company holds a capacity and preparedness to achieve framebreaking reconfiguration when required (ibid.). Thus, companies should constantly strive to question its own identity and explore what it *could be* rather than trying to find 'the one best way' (ibid.). Markides (1997) argues that one way to kick-start SI is to: 1) redefine the business, 2) redefine who the customers are, 3) redefine what products that the company is offering, 4) redefine how business is done, and 5) start the thinking process at different points. Govindarajan and Trimble (2005) emphasize the importance of learning how to *forget* all assumptions about what made the business successful in the past.

> *"Very few companies decide explicitly what business they are in, let alone think about how to redefine the business."*
> *- Markides (1997)*

Gebauer, Worch and Truffer (2012) conducted a study of organizational absorptive capacity from a learning-process perspective. The authors describe four different learning processes: exploratory (the acquisition of external knowledge), transformative (maintaining and reactivating knowledge over time), exploitative (the ability to apply acquired knowledge) and assimilative (the ability to integrate acquired knowledge into the organizational knowledge base). The findings of their study indicate that transformative learning processes in particular, are crucial for SI. The authors found that the interaction between exploratory, assimilative and exploitative learning processes triggers *traditional innovation*, whilst exploratory, transformative and exploitative learning processes drives *SI*.

In contrast, Berghman, Matthyssens, Streukens and Vandenbempt (2013) proclaim that the mix of recognition (i.e. exploratory), transformative and assimilative learning processes as important factors for SI. Moreover, the authors claim that the three learning processes can be stimulated through deliberate learning mechanisms. First, by actively applying learning mechanisms to the company's exploratory learning, a company might be able to stimulate insights into:

- Future customer needs.
- Industry tendencies.
- Deep customer needs.
- General environmental information (macro-tendencies, regulation, etc.).
- Innovative customers.
- Other industries.
- End customers.
- Non-customers.

Second, when actively stimulating the transformative learning processes, Berghman, Matthyssens, Streukens and Vandenbempt (2013) argue that a company will gain deeper insights into:

- Critical reflections on customers.
- Critical reflections on markets.
- Critical reflections on the marketing approach.
- Keeping alive past critical reflections on customers and markets.
- Sharing critical reflections on customers and markets.
- Filing critical reflections on customers and markets.

Last, applying learning mechanisms to the company's ability to assimilate new information will lead to the stimulation of the following areas:

- Adapt the organizational structure.
- Support new initiatives.
- Adapt procedures.

- Replace skills/competencies.
- Change the way of working.
- Prevent organizational chaos. (Berghman, Matthyssens, Streukens & Vandenbempt, 2013)

Conclusively, researchers seem to agree on the fact that transformative learning processes are critical for SI.

2.5.2 Strategy Processes

Commonly, the strategy process is a calendar driven and analytical ritual, rather than an exploration of a potential revolution (Hamel, 1996). The main assumption is that the future will be more or less like the present and the industry barriers are taken for granted (ibid.). As a consequence, the strategy process becomes constrained by current conditions and fundamental industry beliefs (ibid.). In contrast, Krinsky and Jenkins (1997) (in Schlegelmilch, Diamantopoulos & Kreuz, 2003) argue that SI is developed through creative exploration, i.e. "a growth-visioning and synthetic process" (p. 38) that "adapts a future-pull orientation" (p. 38). However, whether the creative process should *replace* or *complement* the conventional analytic strategy formulation process has not been discussed much in the literature (Schlegelmilch, Diamantopoulos & Kreuz, 2003). Schlegelmilch, Diamantopoulos and Kreuz (2003) claim that Hamel (1998) is the only one considering the issue, by proposing a combined perspective, where the traditional strategy process is expanded by non-traditional strategic options, in order to create a greater amount of strategy opportunities.

Carlopio (2010) argues that companies sometimes try to use creative techniques to develop new strategies, but that the companies' main problem is that they continue to look for 'one perfect idea'. In contrast, Carlopio (2010) proclaims the importance of generating a diverse range of ideas and suggests that companies should use some techniques from the field of design, in order to stimulate SI:

- *Creative Combination and Alteration:* By combining two or more previously unrelated thoughts or concepts, new valuable ideas can emerge.
- *The physical work environment:* Behavior and attitudes can be influenced by a deep understanding of the physical environment and its impact on people.
- *Random stimulation:* Creativity can be stimulated by exposing yourself to out-of-the-ordinary places, people, literature and industries.
- *Identify and violate assumptions:* By questioning our preconceived assumptions, we become more likely to try new things.

- *Expression and emotional release:* By thinking symbolically and expressing ourselves creatively (through e.g. art or music) we can enhance our general ability to 'think outside the box'.
- *Incubation:* Creativity is stimulated when ideas are allowed to incubate, which means that we e.g. take a holiday, talk the problem over with others or temporarily engage in another project. (Carlopio, 2010)

Berghman (2006) emphasizes how relationships with innovative customers or suppliers can be of great value to the process of developing new SI initiatives. By and large, companies are more likely to develop innovative strategies if being highly stimulated by other actors within their network (ibid.).

2.5.3 People & Participation

Schlegelmilch, Diamantopoulos and Kreuz (2003) argue that the literature generally distinguishes between people within the company (i.e. managers and employees) and people outside the company (i.e. customers, partners, suppliers, etc.).

People within the company

Generally, the strategy planning is conducted by the management and thus harness only a small fraction of an organization's creative potential (Hamel, 1996). A common view is that the management should be responsible for strategy planning, since they generally have the most experience (ibid.). However, such experience is valuable only to the extent that the future is similar to the past (ibid.). It is not until the strategy process is freed from relying on experience that there is a chance for industry revolutions (ibid.). Similarly, research shows that in turbulent and fast-moving environments, the CEO should act more as a coach and a coordinator rather than a commander (Heracleous, 2003). The reason is that the conventional leadership encourages a separation between strategy *planning* and *implementation*, and thus *thinking* and *acting*. Hamel (1996) argues that when separating strategy planning and implementation, the former is conventionally considered to be an easy activity, in relation to the latter (ibid.). However, if planning for a revolution rather than a slightly different position on an established market, the process becomes radically more complex and strategy planning should not be underestimated (ibid.). The strategy process should be democratic and characterized by a diversity of perspectives (Hamel, 1996; Markides in Mang, 2000; Afuah, 2009). Thus, the process must cut across all boundaries within the company and be deeply participative (Hamel, 1996; Afuah, 2009). Young and newly employed people can be a great source of creativity, being closest to the future, and should therefore have an obvious role in the strategy planning process (Hamel, 1996). Additionally, experiences from

radically different industries can be highly valuable, in terms of challenging a company's orthodoxies (ibid.).

People outside the company

Krinsky and Jenkins (1997) (in Schlegelmilch, Diamantopoulos & Kreuz, 2003) proclaim the importance of an outside-in approach, where companies should create a dialogue about strategy that crosses organizational and industry boundaries. By referring to Tushman et al. (1997) and Krinsky and Jenkins (1997), Schlegelmilch, Diamantopoulos and Kreuz (2003) argue that external help to drive strategy could come from consultants, industry thinkers or corporate partners like distributors or suppliers; all of whom could challenge assumptions about the future and fill knowledge gaps. Schlegelmilch, Diamantopoulos and Kreuz (2003) mention the example of Amazon.com, where e.g. liberal-arts majors, rock musicians, magazine editors, and a Wall Street analyst were brought into the company's strategy process (Donelly, 1999; Hof et al., 1998; Rawsthorn & Studemann, 1998, in Schlegelmilch, Diamantopoulos & Kreutz, 2003).

2.5.4 The View of Resources

Kim and Mauborgne (1997) (in Schlegelmilch, Diamantopoulos & Kreuz, 2003) claim that according to conventional logic, a firm should leverage its existing resources (i.e. its assets and capabilities). Kim and Mauborgne (1999) question this inwardly driven focus on capabilities and argue that the company significantly limits its opportunity horizon and strengthens the organizational resistance to change. In order to create radically new and superior value, it is crucial to think beyond and question the company's boundaries (Kim and Mauborgne, 1999; Normann, 2001). By referring to Hamel (1996), Kim and Mauborgne (1997), and Krinsky and Jenkins (1997), Schlegelmilch, Diamantopoulus and Kreuz (2003) state that companies that manage to look beyond current constraints, not only gain more insight into what value customers seek, but are also more likely to act on that information.

Companies that are engaged in SI tend to have a strong network of partners that provide complementary assets, capabilities, products and services (Kim & Mauborgne, 1999). By deploying capabilities and resources from their network, these companies manage to actualize opportunities on the market (ibid.). Hence, companies should learn how to leverage the knowledge embedded in networks, in order to be able to extract the maximum of information and knowledge from the other parties involved (Berghman, 2006). Gebauer, Worch and Truffer (2012) claim that exploratory, exploitative and particularly transformative learning processes benefit from enhanced socialization capabilities, which can be achieved through an increasing gender and role diversity as well as an increased connectedness to different external actors within the knowledge network. Furthermore, the authors claim that companies should take on a participative role in the knowledge network rather than a dominant role, in order to increase the exploratory and transformative learning

processes and thereby enhance the ability to achieve SI. In addition, Triguero, Moreno-Mondéjar and Davia (2013) argue that "collaborative networks with research institutes, agencies and universities are essential to drive all types of eco-innovation" (p. 32). Hence, policy-makers should promote the creation of these networks and entrepreneurs should actively try to engage in them, in order to maximize their strategy (Triguero, Moreno-Mondéjar & Davia, 2013).

2.6 Key Issues for SI

In order to summarize the literature on SI and capture what is essential for the research questions of this thesis, I have created a structured framework that will guide my research (see *Table 2*). My literature review reveals that there are three main perspectives of SI: capacity for SI, arenas for SI, and outcomes of SI. These perspectives are closely aligned with this thesis's research question 2) *what is the capacity for SI among small and entrepreneurial CleanTech firms,* 3) *how has SI been attained by small and entrepreneurial CleanTech firms,* and 4) *what SI outcomes have small and entrepreneurial CleanTech firms achieved to date.* Within each perspective I have formulated central questions that covers the most essential topics discussed in previous research. When it comes to the first perspective, i.e. the capacity for SI, the literature centers on four different drivers of SI, which can be formulated as four central questions: 1) *is the company questioning its identity and competent in transformative learning,* 2) *is the company utilizing creative exploration in its strategy formulation process,* 3) *is there a wide and cross-functional participation in the strategy formulation process,* and 4) *is the company unconstrained by corporate boundaries* (see *Table 2*). Similarly, the second perspective, i.e. the arena for SI, can be summarized into the question: *in what arena does the SI take place* (see *Table 2*). Last, concerning the third perspective – the outcomes of SI – the literature focuses on two important outcomes of SI, which can be translated into two important questions: 1) *is the company proactively creating value for its customers,* and 2) *has competition turned irrelevant* (see *Table 2).*

Conclusively, I argue that by focusing on the above mentioned central questions I will make sure to cover all relevant aspects of my research questions. Thus, I will use these questions as guidance in my continuous research and structure my interview guide, empirical findings and analysis accordingly.

Table 2: Central questions for the key perspectives of SI.

	Central Question(s)
RQ 2: Capacity for SI	• Is the company questioning its identity and competent in transformative learning? • Is the company utilizing creative exploration in its strategy formulation process? • Is there a wide and cross-functional participation in the strategy formulation process? • Is the company unconstrained by corporate boundaries?
RQ 3: Arenas for SI	• In what arena does the SI take place?
RQ 4: Outcomes of SI	• Is the company proactively creating value for its customers? • Has competition turned irrelevant?

2.7 Concluding Remarks

The purpose of this chapter was to develop a deeper understanding of SI and to determine what factors that are important for the phenomenon. First, I have presented a holistic model for SI that summarizes the most important drivers for and outcomes of SI. I will use this model as a starting point in my research and test whether or not it is viable in a CleanTech context. Second, I have presented a summary of the main perspectives of SI together with some central questions that will guide my continuous research. Conclusively, I have provided the reader with a theoretical background to the problem statement of this study together with a theoretical framework, for further testing. The successive chapter will continue to lay the foundation for my research, by presenting the methodological choices I have made.

3. Methodology

This chapter will demonstrate the methodological choices that were made in this study. The research model, selection of firms and respondents as well as the criteria for gathering data will be presented and discussed. The chapter will conclude with a discussion of the quality of the study.

After having identified a theoretical model for SI, the subsequent step is to decide how to validate that model in a CleanTech context. Additionally, in order to answer the central questions that have been identified as important for research question 2) *what is the capacity for SI among small and entrepreneurial CleanTech firms,* 3) *how has SI been attained by small and entrepreneurial CleanTech firms,* and 4) *what SI outcomes have small and entrepreneurial CleanTech firms achieved to date,* some methodological choices have to be made. These choices will incorporate decisions regarding what companies that are suitable to study, what research strategy to use, what respondents that are the most relevant to interview etc. However, the first step is to develop a research model, in order to clearly illustrate what this study will focus on as well as what will be outside the scope of this research.

3.1 Research Design

CleanTech is a complicated concept (Swedish Agency for Growth Policy Analysis, 2013), not restricted to any specific products, technologies or industries (SWENTEC, 2010). For instance, Business Sweden (2014) includes bioenergy, biofuels for transportation, solar and wind power, heating and cooling, waste and recycling, water and wasteland, green buildings and sustainable transportation in their description of the field. In addition, there are different types of companies within those industries, e.g. knowledge intensive technology firms, manufacturers and environmental consultants (Tillväxtverket, 2014a). However, this study will primarily be interested in *small* and *entrepreneurial* CleanTech companies, since they are regarded as an important source of green innovation, following the definition of innovation offered by Baregheh, Rowley and Sambrook (2009): “Innovation is the multi-stage process whereby organizations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace” (p. 1334). Thus, these entrepreneurial firms are assumed to have the greatest potential to contribute to the greening of our society as well as to strengthen the competitiveness of Swedish industries in the future green economy.

The second research field explored in this study is SI, which is also a complex field of research. There exist different definitions of the concept and the phenomenon has been studied from numerous different perspectives (Mintzberg, Ahlstrand & Lampel, 2009). By merging the area of CleanTech and strategy, I have attempted to explore a field of research which is even more complex and hard to grasp. Because the purpose of this thesis is to achieve an in-depth understanding of this complex field of research, it was logical to conduct an exploratory study with a qualitative research strategy (Creswell, 2013, 2014; Bryman & Bell, 2011; Cooper & Schindler, 2011). Hence, I have predominantly applied an inductive approach to the relationship between theory and practice, which means that a large emphasis has been put on individual meaning (Creswell, 2014; Bryman & Bell, 2011). However, qualitative research also incorporates an element of deductive logic, since a qualitative strategy entails multiple stages of data collection; themes are constantly built and compared against the data (Cresswell, 2013, 2014).

After determining what companies to focus on and what research strategy to use, a research model is created in order to clearly illustrate the focus and boundaries of this research. *Figure 6* shows the research model of this study. The outermost circle represents the whole CleanTech sector in Gothenburg, whilst the inner circle represents the *entrepreneurial* CleanTech companies in the region. Thus, companies focusing on the manufacturing of CleanTech or environmental consultancy have been excluded in the inner circle. Amongst the entrepreneurial CleanTech companies, I have conducted interviews with ten *small*[2] firms, in order to increase the understanding for their work with strategy. In addition to the company interviews, I interviewed a subject matter expert from the Technical Research Institute of Sweden (SP) to get a better picture of the practical issues within the field of CleanTech. This respondent is placed on the outermost circle in the research model (see *Figure 6*) to illustrate his connectedness to the CleanTech sector. Moreover, it is illustrated in the research model that the interviewed entrepreneurial firms possess the ability to contribute to the advancement of the green economy, although that development is outside the scope for this research.

[2] In this context, I define *small* firms as firms having less than 20 employees.

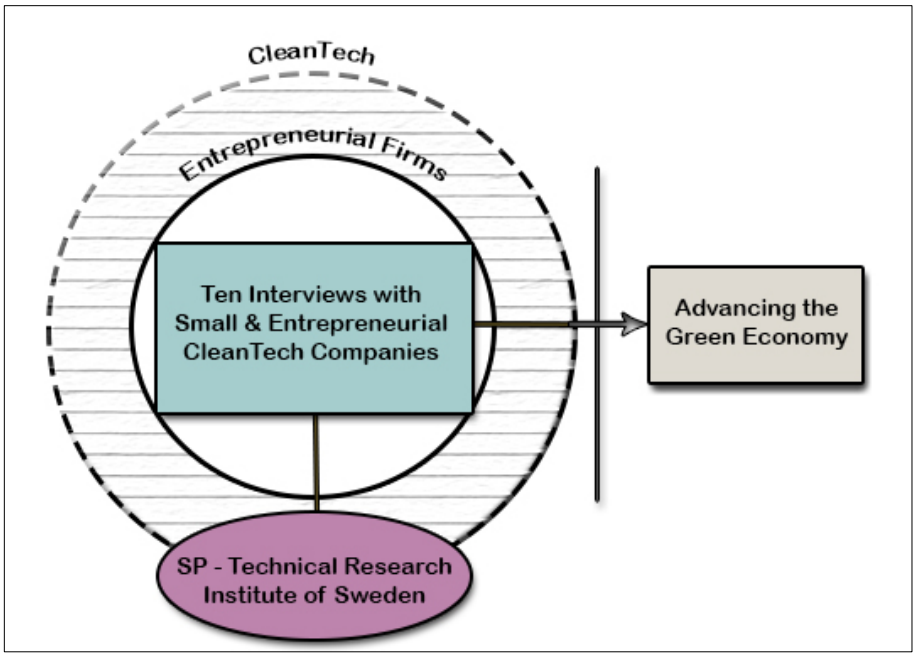

Figure 6: The research model of this study (illustration by the author).

3.2 Selection of Firms and Respondents

In order to find relevant companies to interview, I utilized some selection criteria. First, I was looking for *entrepreneurial* firms, which, in this context, were defined as companies that are offering novel products or services. Thus, environmental consultancy firms, CleanTech retailers, manufacturing firms etc. were excluded from the sample. Second, I focused on small firms, which I defined as firms with less than 20 employees. Third, because I wanted some variance in the results from the interviews, I focused on finding companies that were operating within different sub-areas of CleanTech. Additionally, I deliberately chose some older and some younger companies, in order to be able to detect differences related to the age of the firms. I also included variance in the study, regarding whether or not the firms perceived themselves to have achieved SI. By establishing a control group (consisting of 4 companies that did not perceived themselves to have achieved any SI), I would be able to draw conclusions regarding different factors' correlation to SI output.

The respondents were chosen from a list of CleanTech companies within the region of Västra Götaland, published on Tillväxtverket's webpage (Tillväxtverket, 2014a). Companies can self-register on the list (free of charge), if meeting the following requirements (Tillväxtverket, 2014b):

- The company operates within the CleanTech sector. The definition of CleanTech is goods and services that provide clear environmental advantages over existing or alternative solutions, from a lifecycle perspective.
- The company is based in Sweden and develops, produces and sells goods and services within CleanTech.
- The company has an up-to-date website.

The method of sampling could be considered as a mix of convenience sampling and purposive sampling (Cooper & Schindler, 2011; Creswell, 2013), since the companies were chosen based on both selection criteria *and* geographical proximity. The primary focus was to find companies in the region of Gothenburg.

SP was chosen as an interview object in this study, due to its self-proclaimed competence within the CleanTech area. The company states that they are in the global forefront of energy and environmental technology (Statens Tekniska Forskningsinstitut, 2014).

3.3 Collection of Data

3.3.1 Primary Data

The primary data has been gathered through ten semi-structured interviews (with small and entrepreneurial CleanTech companies) and one unstructured interview (with a subject matter expert from the Technical Research Institute of Sweden) (see *Table 3*). The study was initiated by an interview with the subject matter expert in order to gain some industry insights. Thereafter, the ten company interviews were conducted. Interviews were considered an appropriate data collection option, since historical information regarding the companies' development was important components of the research (Creswell, 2014). In accordance with Cooper and Schindler (2011) all interviews began with a brief description of the purpose and benefit of the research, in order to improve cooperation. Thereafter, the interviewees were asked briefly about their background and how they advanced to the position they have today. The purpose of such broad initial questions is to make the respondents comfortable in the interview situation, by giving them a sense that they have much to contribute (Cooper & Schindler, 2011). Consistent with Larsen (2009) and Trost's (2010) recommended techniques regarding qualitative interviews, I

focused on open and simple questions, in order to receive more comprehensive answers from the respondents. Moreover, the interview guide was sent to the respondents in advance, in order to give them a chance to be prepared and thereby deliver more qualitative and in-depth answers. To retain validity and protect the participants, confidentiality was offered to those respondents who wanted their participant identification and information restricted (Cooper & Schindler, 2011).

Table 3: Overview of the conducted interviews.

Company	Respondent Position	Location	Date	Duration
SP	Expert of explosion protection	Borås	16/03/2014	40 minutes
Alpha AB	Director Engineering & Business Developer	Gothenburg	17/03/2014	60 minutes
Beta AB	Product Manager	Gothenburg	18/03/2014	100 minutes
Gamma AB	CEO	Gothenburg	25/03/2014	60 minutes
Delta AB	CEO	Gothenburg	28/03/2014	60 minutes
Epsilon AB	CEO	Gothenburg	31/03/2014	60 minutes
Zeta AB	Founder & CEO	Gothenburg	01/04/2014	50 minutes
Eta AB	Founder & CEO	Gothenburg	02/04/2014	60 minutes
Theta AB	Founder	Gothenburg	02/04/2014	60 minutes
Iota AB	CEO	Gothenburg	03/04/2014	50 minutes
Kappa AB	S&M Manager & Business Developer	Gothenburg	10/04/2014	50 minutes

3.3.2 Secondary Data

An initial literature search revealed that although SI is the most commonly used term within the literature for applying innovation on business strategy, there are also other closely related terms such as strategic change, strategic entrepreneurship and value innovation (Schlegelmilch, Diamantapoulos & Kreuz, 2003). As mentioned in section 2.2, these different notions have their roots in two separate fields of research: strategic management and innovation management. In this study, I have utilized both traditional literature on strategic management (in order to gain a complete picture of the scholarly field of strategy) as well as more specific literature on the sub field of SI. Additionally, I have complemented the study with some perspectives from the literature on CleanTech.

The secondary data was gathered from books, academic journals, government reports and webpages. I utilized data bases like Business Source Premiere and GUNDA for my literature searches, as well as search engines like Google Scholar. Several references were also found through citations and Web of Science.

3.4 Quality of the Study

In accordance with Creswell (2014), I tried to enhance the reliability in this study by recording and transcribing as many interviews as possible, in order to avoid losing or forgetting important data. Most interviews were conducted in a quiet location, free from distractions, in line with Creswell's (2013) recommendations. However, some interviews were conducted in public settings that were not suitable for recording. Therefore, rather than making the situations uncomfortable, I decided *not* to record those interviews. Nevertheless, during all interviews I took careful notes to hedge against the risk of forgetting information in case of technical issues with the recording. Moreover, I have provided clear documentation of how the research was conducted, e.g. interview guide, information about the interviews and respondents, selection criteria for the companies etc. By and large, I argue that I have applied all available measures in order to make the study repeatable.

In terms of validity, Cooper and Schindler (2011) argue that the very nature of qualitative studies and inductive reasoning is associated with the drawback that the conclusions solely represent *one* of many possible explanations to an observed phenomenon. Bryman and Bell (2011) corroborate their view by referring to LeCompte and Goetz (1982), who argue that external validity often represents a problem for qualitative researchers, due to e.g. small sample sizes. Although I agree with this fact and acknowledge that the generalizability of this study is limited, I have taken measures aimed to increase the validity of my research, by utilizing some of the validation strategies proposed by Creswell (2014). First, I tried to create a *rich and thick description* of the studied phenomenon, which means that I provide many details in the presentation of my empirical findings. Thus, the readers of this paper are able to decide whether or not *they* believe that the findings can be transferred to other settings. Second, I utilized *member checking*, which means that the respondents in this study have been asked to examine my findings and interpretations. Moreover, in line with Creswell (2013) I put effort into identifying what person that could best answer the questions, within each company. During the initial contact with the companies, I explicitly asked to speak with the person who was the most familiar with the company's strategy process. Additionally, I tried to create interview questions without any unsupported or misleading assumptions (Cooper & Schindler, 2011). On the contrary, I focused much on using an easy and commonly shared vocabulary (Cooper & Schindler, 2011).

When conducting semi-structured interviews the results are dependent on the dialogue created between the interviewer and the participant (Cooper & Schindler, 2011). Consequently, there is a risk that the interviewer brings his or her own assumptions to the conversation, which ultimately can lead to answers that are biased (Cooper & Schindler, 2011). To mitigate this effect, I tried to bracket out my own opinions and assumptions, by focusing on the interview guide and on posing objective and open-ended questions.

Because this study examines a phenomenon which is closely related to the core competitiveness of companies, there were some ethical issues to be considered. Some companies explicitly wanted to be anonymous with very limited descriptions of their businesses, while others had no problems being named in the report since they excluded sensitive information during the interviews. Therefore, after each interview, I was very careful to discuss what potential information that possibly could harm the firm if being published. All such information was avoided in the report and the participating companies were given fictitious names. In addition, the respondents got the chance to look through and approve the empirical findings after being compiled. (Creswell, 2014)

4. Empirical Findings

This chapter starts with a brief description of the interviewed CleanTech companies. Thereafter, the material is divided into four main sections: 1) SI capacity, 2) arenas for SI, 3) SI outcomes, and 4) the view of a subject matter expert from SP. The companies' capacity for SI will be discussed in terms of 'organizational identity', 'business culture and learning', 'strategy processes', 'people, participation and organization', and 'the view of resources'. The SI outcomes will be discussed with regards to 'proactive customer value creation' and 'the view of competitors'.

In the previous chapters I have presented a theoretical model for SI together with a guiding framework of central questions. In addition, I have decided upon a suitable methodology to apply to my research. Subsequently, the purpose of this chapter will be to present the data that will be analyzed in the successive chapter, by conveying the stories of ten small and entrepreneurial CleanTech firms and a subject matter expert from SP. Although the main focus will be to answer research question 2) *what is the capacity for SI among small and entrepreneurial CleanTech firms,* 3) *how has SI been attained by small and entrepreneurial CleanTech firms,* and 4) *what SI outcomes have small and entrepreneurial CleanTech firms achieved to date,* this chapter will also provide the foundation for answering research question 1) *what model could describe a holistic approach to SI in a CleanTech context?* As mentioned in the methodology chapter, the interview with the subject matter expert was unstructured, with the purpose of enhancing my general understanding of the industry, while the interviews with the companies were semi-structured and based on the question guide presented in Appendix A. I will begin this chapter by providing a brief presentation of the ten CleanTech firms that participated in my study.

4.1 Presentation of the Ten Firms

Alpha AB

The company generates environmentally friendly electricity using existing fuels. Alpha AB's system is using fossil and renewable fuels to power fuel cells that creates clean energy. The company operates within telecom, automotive, electric power and manufacturing.

Beta AB

Beta AB offers sunlight for indoor environments through an innovative system that captures and directs the rays of the sun. Beta AB enables their customers to enjoy natural sunlight in every room.

Gamma AB

The company offers products and solutions for differentiated collection of waste and waste disposal. Gamma AB's solutions remove the water from food waste and thereby simplify the separation at source.

Delta AB

Delta AB develops, produces and sells small-scale wind turbines. The company's products are specially manufactured for farms and small commercial enterprises.

Epsilon AB

The company develops and sells fluid filtration products primarily to the motor vehicle, pharmaceutical, brewing and beverage, chemical, and iron and steel industries.

Zeta AB

Zeta AB offers revolutionary window fittings that make optimal use of solar control glass. The window fittings drastically reduce heat radiation from the outside during hot periods and, when turned "in and out", solar heat can enter during cold periods.

Eta AB

The company offers technology that enables power boilers to be kept cleaner, produce more and burn more aggressive fuels, such as vegetal residues and construction waste (fuels that will be very important in the future).

Theta AB

Theta AB offers an innovative solution that optimizes the ventilation of interior enclosures such as attic spaces. This minimizes the risk of moisture damage in the property.

Iota AB

Iota AB offers an environmentally friendly and profitable technique to recycle tyres. The original and valuable ingredients of the tyres are being extracted in the process and can be reused for the manufacturing of new tyres or several other products.

Kappa AB

The company is operating in the air cleaning industry and offers an innovative product with radically improved air purifying capabilities.

Table 4 categorizes the companies based on whether they have one innovation or a product portfolio, organizational age, whether or not their product or service is available on the market, number of employees and profitability. Moreover, Appendix B illustrates the organizational charts of the companies.

Table 4: Characteristics of the interviewed CleanTech companies.

Company	One innovation	Product portfolio	Newly founded ≤ 8 years old	> 8 years old	Product available on the market	No product available on the market	≤ 5 employees**	10 -20 employees**	Profitable***	Not profitable***
Alpha AB	X		X		X			X		X
Beta AB	X		X		X		X			X
Gamma AB		X		X	X		X			X
Delta AB	X		X		X		X			X
Epsilon AB		X		X	X			X	X	
Zeta AB	X			X		X	X			X
Eta AB	X		X		X		X		X	
Theta AB	X		X		X		X		X*	
Iota AB	X			X	X		X			X
Kappa AB	X			X	X		X			X

** Another company is licensed to sell Theta AB's products as a part of a larger product portfolio. This company is profitable.*

*** According to last annual report.*

**** According to the last reported annual data on profits/loss for the year.*

4.2 Strategic Innovation Capacity

4.2.1 Organizational Identity

Beta AB shows great ambivalence when discussion organizational identity. On the one hand, the company acknowledges its belonging to the CleanTech industry. The company's board of directors is constantly pushing the company to communicate that belonging more strongly to the market, since it is regarded as a 'hot industry'. On the other hand, the respondent argues that there are very limited energy gains from the company's product, meaning that they do not actually contribute to a more energy efficient society. On the contrary, the respondent proclaims the health effects of their product to be the major value proposition. The respondent draws parallels to

ventilation companies and asks what kind of industry they are in. While concluding that such companies probably argue that they belong to the ventilation industry, the respondent claims that Beta AB should belong to the 'daylight industry'. Kappa AB discusses how the company's identity has changed over time. Kappa AB's technology has been utilized in garbage rooms, conference spaces as well as smoking rooms, before the current industry was identified. Eta AB expresses how the company initially targeted a certain industry, but later realized that another industry also was interested in their technology. Due to financing circumstances, the company then shifted focus to the second industry. Theta AB also explains how they discussed their initial business identity, since it was not an obvious choice. For instance, the company considered to focus on crawling spaces rather than attic spaces, since the problems with crawling spaces often are more apparent to the end customers.

In contrast, Gamma AB, Zeta AB, Delta AB and Iota AB early identified what business the companies would be in. Epsilon AB argues that the view of their identity is based on a natural extension of its former parent company's business. However, the company has gradually broadened its product portfolio, since then. Iota AB claims that others sometimes wrongly consider the company to operate in the waste industry. The respondent turns himself against that assumption by arguing that the company creates great and valuable raw material in the process. The company perceive themselves to be a manufacturing plant, whilst also contributing with great environmental benefits.

Alpha AB describes how their customers have changed over time. Initially, the company targeted the automotive (truck) market with electric generators. However, since the time to market proved to be longer than expected, the company decided to target the telecom industry instead; an industry with greater price acceptance. Alpha AB explains how they were dependent on Volvo Trucks AB as a customer in the beginning, because the company was the majority owner of the shares in Alpha AB. When the situation changed and Alpha AB was able to offer its product to other customers as well, a new problem emerged as the company started to serve too many different customers. As a consequence, the company currently experiences an uncertainty regarding its value proposition and business identity.

The respondent from Beta AB is hesitant when describing the company's customers. The end customers are the people living in the houses, but often it is the property owners or the construction companies that decide whether or not Beta AB's product should be installed in the building. Moreover, in order for the property owners to be aware of the product, light consultants or architects need to propose the use of the technology and include it in the blueprint of the buildings. Hence, the respondent

claims that it is not obvious who to describe as the customer. The respondent argues that the customers perhaps could be regarded as the ones who are paying for the product, i.e. the property owners, whilst architects, daylight experts, light consultants and energy experts could be regarded as 'gate keepers'. Furthermore, Beta AB explains how the suppliers have changed over time. Initially, Beta AB ordered standardized components for their product. Today, however, the company has become a more sophisticated purchaser, which means that the company is involved in the development process to a larger extent and therefore perceives the new sub-contractor as a partner, rather than a supplier.

Gamma AB's customers and competitors have been quite obvious from the beginning, but the company seems flexible in terms of changing suppliers, if necessary. Similarly, Kappa AB argues that there are well-established competitors in the traditional industries where air purifying technology has been utilized. The respondent explains that the normal preceding is that a company within the industry finds its niche and serves a couple of customers on a long-term basis. However, Kappa AB has now found a unique profiling within the industry, where there currently are no competitors. Moreover, Kappa AB explains how the company replaced all its suppliers, since the old ones did not have the capacity to scale up future manufacturing.

Delta AB also identified its competitors early. The respondent argues that the main competitors are indirect competitors, offering substitute technology like solar panels. Moreover, the company experienced a change in focus regarding its customers. First, the company targeted a broader customer group, realizing later that it would be more profitable to target a niche market. Eta AB quickly identified their competitors and they have not changed much since then. Theta AB quickly identified its customers, but experienced a surprise in terms of competition. The respondent explains how he under unfortunate circumstances signed a confidentiality agreement, when helping another person to develop a similar technology for crawling spaces. This person then created a business based on the technology and sued the respondent from Theta AB personally, for 9 Million SEK, for having violated the confidentiality agreement, despite the fact that Theta AB was already founded at the time he received the help with the technology. Suddenly, Theta AB had a quite aggressive competitor and the company was forced to change their priorities somewhat to cope with the legal situation. Iota AB found both customers and competitors quickly and they have not changed much since then.

Epsilon AB's view of customers, competitors and suppliers has varied greatly over time, due to the many different product groups that the company is offering. The

respondent argues that the company has different strategies for every product group and that there are different competitors connected to each product group.

Alpha AB identifies their competitors as companies who are offering other electricity generating products and positions themselves by promoting a more environmentally friendly and convenient product, albeit more expensive. For instance, one major advantage with the product from Alpha AB is that it is powered by diesel, which is a fuel with high availability in today's society. Many other products are based on less available fuels, which requires an extensive expansion of filling stations in order to be perceived as an attractive option by the customers.

Beta AB has positioned the company as being an affordable and easy system, as compared to one of their main competitors, who are offering a very expensive and technologically advanced solution. Delta AB is also offering an easy and more affordable system. The respondent argues that such systems require less maintenance, although still basically offering the same value to the customers.

Epsilon AB has positioned the company as being able to offer an exceptionally broad product portfolio. The respondent argues that it is extremely costly for customers to have many sub-contractors and that they make great savings when switching to Epsilon AB as their sole supplier.

Theta AB has positioned themselves as focusing on business-to-business sales, whilst their competitors are targeting private consumers. In a similar way, Kappa AB focuses on a business-to-business approach, where they are hoping to pass under the radar of established actors. The respondent explains that there is a solid and conservative structure within the new industry the company targets. Established actors make a lot of money on spare parts and will hopefully not notice the entrance of a substitute technology until Kappa AB has established themselves as a trustworthy actor and gained a grip over the important 'gate keepers' of the industry. Moreover, Kappa AB plans to market themselves as a complementary product initially, in order not to threaten other companies' profits. Gamma AB is not really reflecting upon any positioning. The respondent argues that they do what they do because of passion and engagement. Similarly, the respondents from Zeta AB and Iota AB argue that it is irrelevant to discuss positioning, since the companies have no apparent competitors. On the contrary, the Zeta AB claims that they want to become partner with all window manufacturers out there. The aim is to develop a new standard, which all actors within the industry have to comply with. Nevertheless, the respondent argues that the company would position themselves as providing the easiest technology (patented), if any competition would arise. Eta AB has actively positioned themselves in relation to their competitors, although the respondent argues that the competitors only offer substitutes. The company communicates that they are more knowledgeable and 'at a higher level' in terms of understanding their

customers' manufacturing equipment, whilst the competitors *only* are mechanics manufacturers. This far, the respondent from Eta AB argues that they have been successful with their marketing and that some competitors have come to hate them.

4.2.2 Business Culture & Learning

When discussing the business culture, the respondents emphasize characteristics like having an open organization, a high degree of freedom and responsibility, a boldness to take on different and novel tasks as well as having close relationships, as important (see *Table 5*).

Table 5: Description of the organizational cultures in the companies.

Company	How would you describe the culture in your company?
Alpha AB	An inventor's workshop. We are not limited by processes or routines. It is up to the team to find a solution.
Beta AB	Like a family, where the product is the baby. Everyone feels a great responsibility, helps each other and puts in much effort.
Gamma AB	Result oriented, but with a high degree of freedom. It should be fun to work here and everyone should feel respected.
Delta AB	Flexible and entrepreneurial. The company has to be extremely attentive to lessons from new experiences on the market.
Epsilon AB	Kind. Simple. A jeans culture.
Zeta AB	We are small and intimate.
Eta AB	Ready to do anything. You have to be self-driven, bold and constantly challenge your comfort zone.
Theta AB	An open culture with great expectations. You have to be self-driven and take on a big responsibility.
Iota AB	We want an open culture, where we can talk about anything.
Kappa AB	Opportunistic, with many on-going projects.

When it comes to new ideas, Alpha AB, Gamma AB, Delta AB, Theta AB, Eta AB and Kappa AB explicitly mention that they save ideas for the future, if the ideas are good but does not fit into their current situation.

In Alpha AB, Delta AB, Theta AB and Kappa AB, new ideas come from everywhere. In contrast, the respondent of Gamma AB argues that he is the inventor, who comes up with new ideas. However, some of these ideas are later on transferred to the employees so that they can continue working on them. Delta AB explains how they have a system for new ideas, where they are ranked according to different parameters. Ideas regarding safety have the highest priority, whilst other ideas might be put on their long-term list for general improvements. The respondent emphasizes that they

have a folder where they save potentially good ideas for the future, together with other relevant information that could be of importance later on. Theta AB emphasizes the importance of brainstorming and a continuous discussion and evaluation of experiences on the market as well as future possibilities. Eta AB separates ideas regarding the technology and the business and argues that ideas regarding the business could come from anywhere, whilst ideas regarding technology have to come from someone who is knowledgeable about the product. The respondent gives an example of an old idea, which was patented but never utilized due to resource constraints, and which is now being considered for further development and introduction on the market. Kappa AB emphasizes the importance of prioritizing among all available ideas. The company evaluates new ideas according to two parameters: 1) business potential and 2) technology potential. The respondent argues that trying to pursue all new ideas would be both time consuming and costly.

> *"The hard part is to avoid pursuing every opportunity. That would be very time consuming and costly."*
>
> *- Kappa AB*

Beta AB, Epsilon AB, Zeta AB and Iota AB on the other hand do not account for any idea saving systems, although Epsilon AB admits that such system would be good to have. Beta AB argues that new ideas regarding the technical aspect of the product mostly come from the customers, while ideas regarding e.g. the business model and marketing often come from students who are writing their theses for the company.

Epsilon AB emphasizes the value of structure. The company is structured according to an ISO certification system, which means that they have scheduled meetings continuously. The respondent argues that many new ideas emerge during these meetings, when everyone is exchanging information about what is happening. Often one person has half an idea and someone else can fill in the missing piece of it. The respondent also emphasizes the importance of not only explaining *what* can be improved, but also provide a solution for *how* the problem can be solved. Such approach encourages a sense of responsibility among the employees, states the respondent. Zeta AB describes a situation where the founder is the inventor who comes up with new ideas frequently – perhaps too frequently. The respondent argues that it is important to put the foot down and focus on getting the product out on the market, rather than continuing to improve and improve and improve. Iota AB explains how ideas comes from everywhere, but that they do not save any ideas for the future. Someone who has a

> *"The idea box is the first thing a company should throw out. It's totally useless."*
>
> *- Iota AB*

good idea for the future, has to come back later, argues the respondent. In addition, the respondent claims that the classic idea box is the first thing that a company should throw out. The respondent describes how ideas, generally, gather in the box and are reviewed only once per quarter, by some company representative, the union and the employees. If an idea is regarded as valuable, someone becomes responsible for examining its financial viability. At least one year later it is concluded that it was a *great* idea and the company, therefore, sends a sweat suit to the idea provider. However, since the idea now has become old and outdated, nobody actually goes through with it anyway.

4.2.3 Strategy Processes

The interviewees describe their view of strategy in somewhat different ways, but still with similarities (see *Table 6*). Alpha AB, Beta AB, Epsilon AB, Eta AB, Theta AB, Iota AB, Zeta AB and Kappa AB describe strategy as a plan for the future, while Gamma AB and Delta AB emphasize the organization's role within its environment. Zeta AB highlights the importance of not only deciding what customers to focus on, but also deciding what customers to discard. Last, Iota AB emphasizes that strategy does not solely mean to create a plan and a vision, but also to create boundaries, 'a fence', for the future work.

Table 6: The respondents' definitions of strategy.

Company	What does the concept of strategy mean to you?
Alpha AB	Strategy is a plan for the direction that the company wishes to pursue.
Beta AB	Decisions now that have implications for the future.
Gamma AB	Who are we and what does our environment look like?
Delta AB	Analysis of the current situation and the environment.
Epsilon AB	Strategy is long-term. Where do we want to be in a few years' time?
Zeta AB	E.g. marketing, how to stimulate the market and choose customers.
Eta AB	Our six months plan, basically. There are so many influencing factors.
Theta AB	To figure out a pathway and an approach for how to move forward.
Iota AB	Plan. Vision. Creating a plan and a fence, and package it.
Kappa AB	Two to three year target.

Most companies have an outspoken strategy, although Iota AB mentions that everyone within the organization might not be aware of the exact formulation. Iota AB should make money on the facility in Dalsland, while simultaneously expanding to the rest of the world. Epsilon AB also wants to expand abroad to more lucrative and mature markets. Eta AB's strategy is to make an exit as well as do business within the two areas of power boilers and recovery boilers. Similarly, Zeta AB

explains that their strategy is mainly their description of the market. The main focus is to build a prototype and initiate marketing efforts.

Gamma AB and Epsilon AB emphasize how they have different strategies for different customer or product groups. For instance, Gamma AB targets property owners with their refuse chute solution, while targeting municipalities with their paper bags. Beta AB describes such decisions and trade-offs, as the core of their strategy. Similarly, Theta AB describes how their strategy was focused on how to handle the company's three different customer segments. In addition, Theta AB's strategy incorporated time management; e.g. what to do when, and in what order. The primary focus was to validate the technology, followed by creating a small initial market. Thereafter, the company would pursue with extensive sales, by hiring agents. However, the respondent emphasizes that the strategy had to be adaptive to sudden changes and financing opportunities.

Delta AB explains how they analyze the current situation through e.g. the SWOT framework, in order to develop long-term and short-term targets, with an action plan. Gamma AB explains how they apply for patents, registers their designs and binds up sub-contractors whenever possible, in order to protect their products. The respondent regards their products to be the core of the company and their mission is to create value for the society and its citizens. The company tries to be visible at events and various annual meetings. In addition, Gamma AB strives to get media attention, partly through different PR events. The respondent describes how the company once got the opportunity to build a house which dried food waste. There was a great opening ceremony with live music and the company managed to attract the public, media and influential politicians from the Gothenburg municipality. Moreover, the respondent claims that Gamma AB should focus on its core competence: research and development as well as utilizing contacts and networks. The company should not engage in sales themselves, but hiring sales agents instead.

Epsilon AB has been working with five year plans for a long time. The company generally decided on some long-term goals and five years later they sat down and evaluated the outcome (albeit under some laughter). The company emphasizes that it is extremely hard to know what is going to happen in advance. The respondent mentions the example of opportunities for acquisitions that suddenly might appear and change the prerequisites. As a consequence, the company argues that it is important to be flexible. Otherwise there is a risk that the company gets rigid and limited by its strategy, since it might turn down opportunities with the argument that it does not 'fit with our strategy'. Another strategy-influencing situation could be that a supplier gets acquired. The respondent from Epsilon AB has many examples of

other companies that suddenly found themselves without supplier. It is a devastating surprise which appears from one day to another. Epsilon AB centers on creating their own brand in order to minimize the problems they would encounter if losing their suppliers.
Despite difficulties to foresee the future, the company still plans long-term. For instance, Epsilon AB has recently entered the market of Belarus, even though there is no market for them there today. However, they expect that a market will open up in perhaps ten years' time and argues that it is impossible to become an established player if entering the market first then.

Kappa AB emphasizes the importance of packaging the company itself. For instance, the company rents space in a mechanical workshop in order to be perceived as bigger when visited by potential customers. The respondent claims that it is important to 'look decent' and be able to present decent conference rooms and office spaces. In addition, the company has chosen to place itself close to sub-contractors, so that it is easy to let visiting customers see the manufacturing.

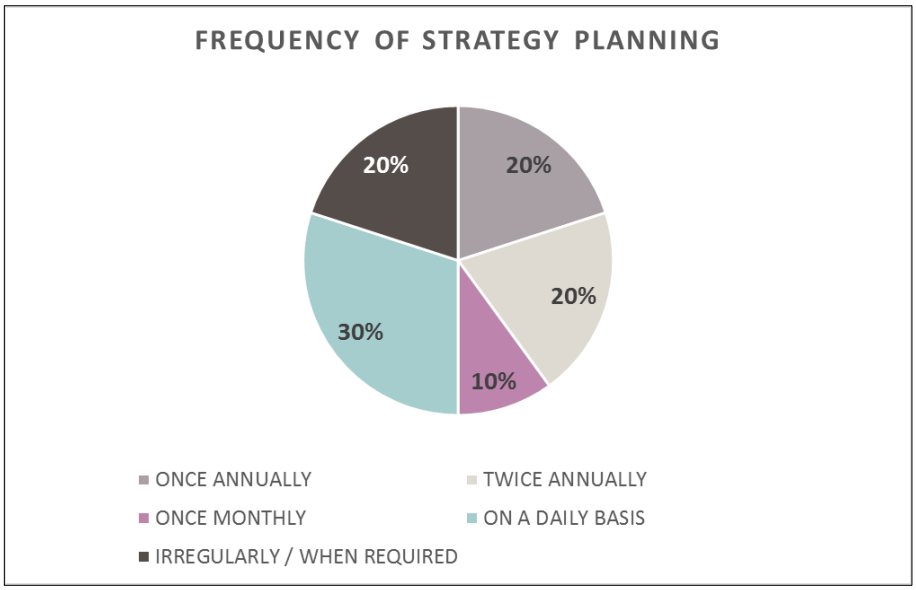

Figure 7: Frequency of strategy planning meetings.

The frequency of formal strategy planning meetings varies between the ten companies (see *Figure 7*). Alpha AB and Delta AB develop their strategy on a yearly basis, although Delta AB mentions that they sometimes have to review their strategy after six months. Epsilon AB and Eta AB engage in strategy meetings twice per year (Eta AB aims to develop one year strategy plans, but frequently fails to meet those plans due to a rapidly changing environment). Epsilon AB mentions that they *do not* develop any sales budgets anymore because such planning solely constitute ill-

founded guessing. Instead, the company focuses on analyzing the profitability on a product level and per customer segment, twice annually. Theta AB has been involved in strategy discussions once monthly, while both Gamma AB and Zeta AB claim to have strategy discussions on a daily basis. Gamma AB argues that such discussions develop as a natural consequence of their business culture, where everyone should be familiar with what is going on. Zeta AB also emphasizes a close contact with the board of directors as a factor which contributes to a daily dialogue about strategy. Kappa AB highlights that their strategy process incorporates a continuous dialogue. Beta AB, Iota AB and Kappa AB *do not* engage in strategy development meetings at all on a continuous basis. Beta AB explains that strategic discussions emerge when the company does not sell sufficiently or when the company receives earmarked funding. Iota AB argues that the company has not yet experienced the need for any strategy meetings.

Most information that Alpha AB utilizes in order to plan ahead is compiled by the managers. They do extensive analyses of the market as well as their technical solutions. The company also listens to their customers, calculates on probabilities and risks and discusses frequently within the company. The respondent highlights that more subjective assessments have to be done when entering new markets with new products. Iota AB argues that information is hard to find when pioneering a market. Today, the respondent focuses on being available everywhere in order to exchange knowledge and information. The only factor Iota AB can identify that would force the company to change direction would be of a regulatory nature. Zeta AB also focuses on being available everywhere, by visiting e.g. international fairs and events. In addition, the respondent mentions that they have developed new relationships with actors within the industry thanks to various EU projects which they have been a part of. The company also reads industry magazines in order to identify new technology and trends. The respondent argues that he already has in-depth knowledge about the industry, having been employed in the window industry for several years. Similarly, Kappa AB emphasizes their own knowledge as an important factor. The company consists of three individuals with a strategic mix of complementary knowledge and experience. The respondent argues that these individuals utilize already established contacts and networks in order to establish themselves on the market. Delta AB also gains information from contacts on the market as well as utilizes market reports from industry associations. The respondent also highlights the Internet as a great source of information. Beta AB discusses with and sends questionnaires to those distributors that the company has a good relationship with and trust. In addition, the respondent claims that they have a dialogue with construction firms.

Epsilon AB's primary source of information is the customers. The company emphasizes that although they sometimes surprise their customers with new technology, the company is still very dependent on its customers and, therefore, has to listen carefully to their demands. Gamma AB also emphasizes the importance of being both perceptive to the environment and humble towards the own organizational identity. New solutions emerge from the overlap between those two realities. Moreover, Gamma AB highlights the importance of human relations and argues that such relationships are the most important thing. The respondent argues that he possesses information that nobody else in the industry knows about, simply because he has been visiting people and utilized contacts frequently. Theta AB also mentions customer contacts as their main source of input. The CEO had much contact with the initial customer segment: insulation contractors. In addition, the company had an advisory board with competent people within important industries, e.g. the construction industry. The respondent also mentions that the company received much help from Chalmers Innovation in terms of various work-shops where strategic frameworks and analytical tools were introduced. Eta AB focuses much on customer feedback too, however also being largely influenced by financing opportunities. The company achieves input from their customers through sales and service meetings. The respondent describes the relationships as very informal and friendly.

4.2.4 People, Participation & Organization

The companies' organizational structures are illustrated in Appendix B.

Alpha AB argues that the managers together with the board of directors are the ones involved in the company's strategy process. The respondents from Alpha AB, Zeta AB and Eta AB emphasize that an understanding of the customers, the customers' needs as well as the market are crucial characteristics of a good strategist. In addition, the companies argue that the one who is responsible for developing a strategy should be well familiar with the company's own technology and its potential. Eta AB highlights the importance of being 'street smart' and that this ability requires a deep understanding of the specific company and its business. Moreover, Alpha AB and Delta AB emphasize an analytical ability to be important for a strategist as well as having a mental toolbox of theoretical frameworks for how to conduct analyses and compile strategy documents. Nevertheless, the respondent from Delta AB also argues that knowledge regarding the industry can be just as valuable as formal education.

In contrast, Beta AB argues that everyone in the company is involved in the strategy process and that the employees have much freedom and responsibility, although the CEO needs to be informed about decisions and sign charges. Gamma AB, Eta AB, Theta AB, Iota AB and Kappa AB also engage everyone within the strategy

development process. The respondent from Gamma AB emphasizes the importance of constantly briefing each other about what is happening. When everyone is onboard and realistically familiar with the development, the respondent argues that the company will become stronger and react faster to changes and new information. The respondent claims to send e-mails to the employees on a continuous basis, solely to keep them updated regarding any kind of information he stumbles over. The respondent from Theta AB highlights the importance of having different background experiences, when it comes to developing strategies. In contrast, Iota AB argues that everyone is involved in the strategy process due to the company's small size. Ideally, the respondent claims that employees should be involved only in those parts of the strategy that concerns them.

Delta AB's ambition is to let everyone be involved in the strategy process. However, the CEO, parent company and board of directors are the ones developing the long-term targets, while the more short-term goals are discussed with the employees, who can contribute with improvements.

The respondent of Epsilon AB describes the company as a sales organization and argues that the sales people are at the core of the business. Therefore, the sales people play an influential role in setting the company's strategy, at least when it comes to tactics regarding how to approach the market. However, when it comes to long term strategies (like decisions regarding whether or not the company should expand to foreign markets), the CEO and board of directors are more influential.

Alpha AB does not generally utilize any external actors in the strategy process. The company used consultancy firms a couple of times, for some specific markets, where Alpha AB lacked sufficient knowledge. However, by and large the company argues that there are no other actors that know Alpha AB's industry well enough. Similarly, Delta AB argues that the company is fairly uninterested in utilizing any external actors in their strategy development process. This far, Delta AB has only received help from their parent company and the board of directors. Zeta AB also proclaims the role of the board of directors as well as personal contacts as important external input for developing the company's strategy.

Beta AB hired a communication bureau to look through the business plan. It was an order from the board of directors and the respondent argues that they probably could have done it by themselves. The company further explains how they appreciate that external and objective people sometimes gather feedback about Beta AB. Customers might be more open with criticisms and the external people might make different interpretations of the information than someone from Beta AB would have made.

Additionally, the respondent claims that they receive much help from their advisory board, which they meet once a quarter.

Last, the respondent mentions that he has been in contact with an MBA program in the United States, which was looking for CleanTech companies to do working cases on. The respondent argues that it would be great if a team of really bright students could turn Beta AB's business plan upside down – be totally crazy – and come up with radical improvements.

Epsilon AB has also been utilizing external expertise when it comes to marketing. The company relies on external actors to create e.g. the company's webpage. However, the respondent argues that they have not yet considered collaborating with external parties when it comes to developing their strategy; partly because other actors lack sufficient insights into the business.

The respondent of Gamma AB explains how he had a mentor who helped him much with e.g. project management. The mentor never charged the company and the respondent from Gamma AB believes that the mentor helped the company simply because he liked them. Gamma AB also emphasizes the help they received from Almi, regarding business development.

Eta AB heavily rejects the thought of utilizing external actors in their strategy development process. The respondent argues that strategies developed by external parties are totally useless, since they are extremely disconnected from the customers' needs and the business reality. External parties have no knowledge about Eta AB's customers. Eta AB claims that it is quite common that financial partners engage external actors in the creation of new and amazing strategies, but because such consultants often have more experience from large corporations rather than small start-ups, the strategies often become totally dysfunctional. Iota AB and Kappa AB also claim that they do not utilize any external actors when developing their strategies. Kappa AB argues that they can manage the strategy process without any external help.

> *"It is not unusual that financiers bring in external people for the creation of new and amazing strategies… but they're totally useless! Totally useless! Such strategies are not related to the business reality at all. They are just imaginary products."*
>
> *- Eta AB*

Theta AB was considering to bring in some expertise regarding the consumer market, since the company perceived themselves to lack such knowledge. However, since they later on decided to focus on a business-to-business perspective instead, they never realized those plans. Instead, the company mentions their advisory board as a valuable source of input for the strategy process.

4.2.5 The View of Resources

Alpha AB, Delta AB and Epsilon AB describe their employees as their main resources. The respondent from Alpha AB argues that among the company's 22 employees, only 5 lack a higher education. In addition, 6 of the employees have a PhD degree. Similarly, Beta AB proclaims their employees as their main resource together with their product and brand. Zeta AB describes their main resources to be their employees and their patents. Gamma AB and Kappa AB mention their employees and networks as their main resources. Eta AB regards their employees and customers to be their main resources. The respondent from Eta AB argues that the company develops its product in close collaboration with existing customers and that Eta AB closely follows up their customers' experiences. Theta AB describes their business idea and technology together with their access to financing channels as their main resources. The company has strong connections to Chalmers School of Technology as well as Chalmers Innovation, who have great experience and knowledge regarding how to finance start-ups, together with a large network. Iota AB argues that the main resource depends on what part of the business you have in mind. For instance, the manufacturing plant in Dalsland is the main resource if considering the execution of production.

Alpha AB argues that it is hard to find the right competences. Since the employees, to some extent, had to be self-taught, it took a long time to develop the right expertise within the company. The respondent emphasizes that the company is very vulnerable, because of the strong dependency on the employees' competences. If the employees decide to leave, the company will run into trouble.

Alpha AB explains how the company initially relied on personal contacts. Later, when the company established its brand in the industry, there was a shift from outreaching efforts to more responsive activities. Today, the company has relationships with distributors, customers and suppliers, who are all considered to be partners. Similarly, Delta AB describes that they sometimes would like to be able to offer their customers substitute products. Under some circumstances, wind power is not the optimal solution and Delta AB would in such cases like to offer an installation of e.g. solar power instead.

Beta AB describes how they feel limited in terms of being able to evaluate potential distributors. The respondent argues that people contact the company frequently and want to become distributors, but that it is extremely hard to evaluate those persons. Previously, the company used the Swedish Trade and Invest Council and the Swedish American Chamber of Commerce, but it did not work at all. The respondent argues that they are no better than a random student with access to Google. Thus, Beta AB concludes that it is more effective to utilize references. Additionally, the company mentions a problematic use of strategy. The respondent argues that the company is lousy at following up sales and results. Generally, they continue to follow a direction until they realize that it is unfeasible. At that point, the company changes its strategy and tries another direction. Therefore, the respondent argues that the company constantly sells in new ways, to new customers, with new arguments, and that this is far from optimal. Last, the respondent emphasizes that the company lacks resources for simulating their technology. Hence, they have to hire external people to create simulations, when it is considered absolutely necessary.

> *"The Swedish Trade and Invest Council and the Swedish American Chamber of Commerce are no better than a student with access to Google."*
>
> *- Beta AB*

> *"We don't know what works. We continuously sell in new ways, to new customers with new arguments..."*
>
> *- Beta AB*

Gamma AB describes how limitations and resistance is a part of life and that the important thing is to learn from it. Problems should be regarded as a guidance regarding what direction the company should pursue, states the respondent. If you find out that one door is closed, you have to figure out what doors that are open. Iota AB also describes limitations as a part of life. The respondent claims to be constrained in terms of 'time, money… everything'. Similarly, Kappa AB emphasizes time and money as their main constraints.

Epsilon AB, Zeta AB and Theta AB claim that their main resource constraints are monetary in nature. Additionally, the respondent from Epsilon AB explains that when the company previously wanted to expand, the market was not ready. Theta AB also highlights that the market was not

> *"Perhaps we could've increased the financing and driven more campaigns, but because the market wasn't ready it wasn't worth it anyway."*
>
> *- Theta AB*

ready at the beginning. Some processes are very slow and it is impossible to force the customers to evolve faster. Zeta AB describes that they want to expand their organization faster, but that it is impossible due to their financial situation. Similarly, Eta AB argues that they ideally would have more employees.

Beta AB argues that they have no influence at all within their network. The respondent claims that the company has to be reactive to the development within the industry and that the company is dependent on large and conservative certification systems and regulations. Thus, the respondent argues that the network primarily is used for gaining input regarding trends and developments within the industry. Alpha AB claims to have very little influence over their network.

Alpha AB claims that it is of great importance to be named on the lists that e.g. the department of transport or the region of Gothenburg considers when initiating new projects. There is a lot of government money spent on various development projects regarding alternative ways of powering vehicles. Thus, it becomes important to be a part of that sphere. Today, the company tries to find forums where they can have influence, primarily within the European region. The respondent argues that it sometimes helped to have a strong relationship with Volvo, in the beginning, but that Volvo currently only follows Alpha AB with interest rather than engages actively in promoting the company. Beta AB argues that while being a small and dependent actor on the market it becomes important to act carefully, in order not to disturb or provoke other actors. Nevertheless, the respondent emphasizes that most people want to help, and feel good about themselves when being asked for advice. Kappa AB also perceives themselves to be dependent on other actors within their industry. The companies need to be supported by well-renowned firms in order to sell. Thus, it becomes extremely important to find the right partners.

Gamma AB describes a reality where the company is an important part of a large network. The respondent argues that Gamma AB has great influence and often both initiates and gets invited to new development projects within their network. Gamma AB collaborates with municipalities, the region of Västra Götaland, SP and the private sector. The only problem the company perceives is that the private sector sometimes is difficult to collaborate with, due to their strict commercial approach, where every dollar and penny counts. Delta AB, Epsilon AB, Eta AB and Theta AB also perceive that they have influence within their networks. The respondent from Delta AB emphasizes how the company actively drives the adoption of certification systems within the industry. However, the company argues that the market is sluggish, with few actors and a low demand, due to the low price on electricity. The respondent argues that politicians need to create a support system for wind power,

just as they did for solar power, in order to set the industry in motion. Epsilon AB expresses a similar experience where the company was an active part of developing new regulations within the industry, which led to the creation of a new customer group. Moreover, the respondent highlights that they had some contact with Business Region Gothenburg and Swedish Cleantech, but that their CleanTech promoting activities were quite weak and lacked a clear goal. Furthermore, the respondent emphasizes that all networks are not good networks and mentions various business network sites online, where far too much information is available. Strategically, it is not very clever to reveal your suppliers and business contacts, claims the respondent. Eta AB describes how they have been an active part in their network and how the network has created shared messages and statements to the market. However, the company also describes how the large industry network SPCI (Svenska Pappers- och Cellulosaingeniörsföreningen) has to become more knowledgeable regarding financing. The respondent argues that it is extremely difficult to get financing for a start-up within the industry. Theta AB has influence in their network because the founder has been working as a researcher within the same field (at Chalmers School of Technology) for five years. Thus, he has a large personal network and influence within the industry. For instance, the company NCC requested the help from the founder of Theta AB, in his role as a researcher, which finally resulted in NCC adopting a policy to implement Theta AB's product. The respondent claims that the construction industry sometimes can be quite conservative. The companies within the industry has to defend their strategic decisions and by implementing Theta AB's product, the companies basically admits that they have used an inadequate construction method before; a statement which few companies are willing to make.

Zeta AB perceives that they have influence within their network. In addition, the company has great political contacts within China, who they expect to be very beneficial when entering that market. The only limitation the company mentions in terms of their network, is a somewhat lower understanding of the American market, where the company does not have the same solid relationships with established actors.

Iota AB reveals a somewhat different view of their network. The respondent argues that one should not try to manipulate or influence a network, since the other actors would lose confidence in you. Iota AB clearly separates formal and informal networks and highlights informal networks as being the most important. The respondent mentions 'bastuklubben' where people help each other with contacts and expertise.

4.3 Arenas for Strategic Innovation

The SI conducted by the ten companies is primarily centered on the creation of a radically new customer value (see *Figure 8*). Alpha AB, for instance, argues that their uniqueness lies in their green solution, rather in new ways of doing business. Similarly, Beta AB highlights that sunlight has been around forever, but that the company makes it available *everywhere*. In addition, Eta AB argues that there is nothing new about sootblowing, but that the company offers a revolutionizing and novel technology. Similarly, Theta AB claims that there is no other safe solution on the market for increasing the quality of attic spaces. However, the respondent explains how this insight has emerged gradually and that the company was far from confident in the beginning. Zeta AB and Kappa AB also explain how they contribute with revolutionizing technology and novel product categories. However, Kappa AB highlights a problem within the industry; all customers claim to value a healthy working environment, but nobody is willing to pay for it. Therefore, the company needs to find a balance between the air purifying quality and the price the customers are willing to pay. In addition, the company has focused on the customer group that experiences the most apparent health issues.

> *"The big problem within the industry is that a healthy working environment is regarded as great, but nobody wants to pay for it."*
> *- Kappa AB*

Gamma AB explains how they constantly engage in a dialogue with their customers, in order to find new solutions. The aim is always to understand 'how it *could* be'. The respondent argues that their competitors are imitating Gamma AB's products, but that they always fall one step behind. Gamma AB strives to be in the forefront of the industry by interviewing all kinds of people who are in contact with their products. The respondent describes employees at the municipalities' complaints departments as 'goldmines' for information. In addition, the company utilizes the input received when distributing their paper bags to households. Gamma AB argues that most people are happy to help and love to talk when being asked about something.

On the opposite end of the continuum Delta AB does not perceive themselves to deliver any new and unique value to the customers. In addition, Iota AB offers the same raw materials as all other suppliers. However, the company has a patent for *the process of extracting* the raw materials and thereby provides the world with a new and more environmentally friendly way of recycling tyres.

While discussing new and unique business models, the respondent from Gamma AB argues that he does not know *any* other company that does business in a similar way. The company is extremely focused on research and development, often at the expense

of sales. The respondent argues that he is a genuine inventor, who tends to relax and start new projects whenever the company makes some money. Perhaps – he argues – the company might benefit from another CEO.

Although, Beta AB does not apply a radically new business model today, they have plans to revolutionize their current model in order to appear more novel, cool and creative. The company plans to charge their customers for 'daylight hours' rather than for the product itself. However, this would require a substantial initial investment, since Beta AB would have to finance all production costs as well as all costs for initial installations, with a payback time of several years. Hence, Beta AB regard the change to be more of a future scenario.

Delta AB argues that they do not apply a new and unique business model, although highlighting the importance of being part of a large energy group in West Sweden, which contributes with complementary expertise and product improvements. Similarly, Epsilon AB discusses their support from a consortium, which they created together with two other companies, in order to being able to offer a broader product portfolio. The company argues that the normal proceeding would be for a company to broaden their portfolio through acquisitions of other companies, but that a consortium creates a more beneficial situation for all actors involved. For instance, if the consortium wants to sell a product to customer X, who already has a relationship to one of the individual companies in the consortium, that company will be able to 'face customer X' more advantageous, on the consortium's behalf.

Eta AB, Iota AB, Theta AB, Zeta AB and Kappa AB do not apply a new and unique business model, according to the respondents.

When discussing the customer base, Beta AB describes how they found a new customer base. The company argues that they ideally want to sell their product to those who genuinely appreciate sunlight. However, a much more lucrative customer group has opened up for the company, i.e. construction companies that want green building certificates, in order to increase the value of their buildings. To some extent, Beta AB perceives the customer group to be boring, due to their obvious lack of interest for both the technology and the associated

> *"Ideally, we want to sell to people who appreciate sunlight – who thinks it's beautiful and beneficial for health. But God, who are we to judge? Love all – serve all, we say."*
>
> *- Beta AB*

health effects being provided. These companies are happy as long as they get a certificate to put in their entrance. The positive side is that such companies are far from price-sensitive.

Similarly, Epsilon AB explains how they created a new customer group. The company was actively part of developing a new regulatory framework (which took effect in 2014), where boats' anti-fouling paint became classified as hazardous waste, and thereby, became required to deposit. The new regulations gave rise to a customer group that needed professional and environmentally friendly hull cleaning, which provided a great opportunity for Epsilon AB, who offers filtration for such solutions. However, the company emphasize that they generally avoid catering to new customer groups, since it is regarded as being more expensive than offering their existing customers a broader product portfolio. Theta AB also created a new customer group, while pioneering the market. The construction industry did not have any specific technology for attic spaces before. Gamma AB has found a new customer group for *one* of their products (the paper bag), i.e. private consumers, who the municipality previously had a tight grip of.

Alpha AB, Delta AB, Eta AB, Zeta AB, Iota AB and Kappa AB do not cater to a new customer base, i.e. they are selling their products or services to customers who are familiar with the problem that is being addressed and who have tried to solve the issue through other products or services previously. However, Alpha AB and Eta AB highlight how some customer groups can become more important and influential than others due to their access to capital. The respondent from Alpha AB claims that the large corporations 'the Dragons' have greater possibilities to involve themselves in risky development projects and contribute with financing, than smaller firms. Therefore, Alpha AB is more dependent on these large companies and thereby more eager to prioritize their needs. For instance, Alpha AB explains a trend among large corporations. In greater and greater extent, 'the Dragons' expect a complete solution, rather than individual components; a trend which is in sharp contrast to what entrepreneurs within the industry want. Thus, there are conflicting demands between the two customer groups and the company needs to either package their product in different ways or choose to cater to one specific customer group. Similarly, Eta AB explains how the Swedish Energy Agency financed the company initially, and how the company was influenced to put a stronger focus on power boilers, at the expense of recovery boilers.

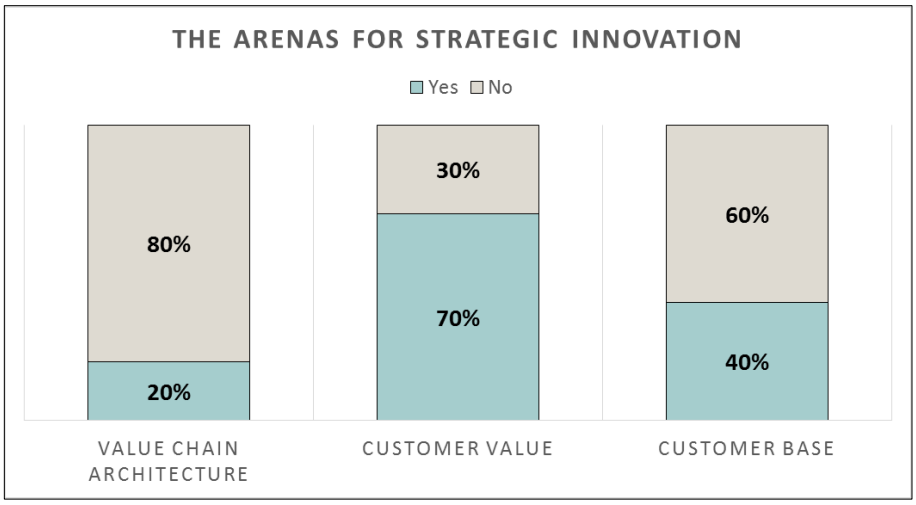

Figure 8: Distribution between the different SI arenas.

4.4 Strategic Innovation Outcomes

4.4.1 Proactive Customer Value Creation

Epsilon AB, Eta AB and Gamma AB experience that they are surprising their customers frequently with new products. Epsilon AB argues that one reason for this is that their customers are quite uninterested in the process where Epsilon AB contributes. For instance, Epsilon AB is a supplier to breweries. These customers' aim is to produce a crystal clear beer, but they are fairly indifferent to *how* that goal is achieved. Therefore, Epsilon AB often has the opportunity to present new and surprising technologies to their customers. Eta AB argues that a company positioned in the forefront of technology always surprises their customers with new products. The respondent further suggests that customers might not even know that the *company* Eta AB exists. Gamma AB emphasizes that they listen very closely to customer complaints in order to surprise their customers with new and innovative solutions to their problems. Kappa AB has previously sold quite well-known products but argues that they are surprising their customers with their *latest* product. A subject matter expert has even described their product as revolutionizing for the industry that the company targets. Similarly, Zeta AB expects to revolutionize the window industry with their product. This far, everyone has been extremely impressed by Zeta AB's product and the respondent has not experienced any negative reactions at all.

In contrast, Delta AB and Iota AB claim that their customers know exactly what they are looking for. Iota AB does not surprise their customers since their innovation lies in their unique way of creating the products. The outcome of tyre-recycling, however, is conventional raw material, which is being sold to the industry.

Alpha AB and Beta AB claim that their customers know what they are looking for, at least to some extent. Beta AB argues that their customers know that they want *daylight*. However, the customers imagine a totally different solution, where someone will create strategic holes in the walls of the building. Hence, the customers get amazed when finding Beta AB's products. Beta AB claims that the technology is old, but that it 'sneaks under the radar'.

Alpha AB claims that their customers know and understand their fuel cell technology. However, the automotive industry is extremely conservative and reluctant to assimilate new ideas. According to Alpha AB, one reason could be the intense focus on risk management. Moreover, Alpha AB explains that when automobile companies embrace the new fuel cell technology they have to make extensive rearrangements in their manufacturing plants. Consequently, they jeopardize their core competence and initial investments. Thus, Alpha AB argues that when big money is at stake, companies tend to choose 'the safest road', i.e. continuing the manufacturing in a conservative manner. However, Alpha AB emphasizes the importance of governmental initiatives. The company claims that regions and countries are able to push CleanTech out on the market through public policy. Alpha AB mentions the 'valley of death', a phenomenon which arises when a company is unable to sell its product at a mass market price (i.e. the price that the customers expect) simply because it is producing too few units. This is a situation where government investments can have major influence. Alpha AB has been part of different demonstrations projects, together with e.g. VINNOVA, the Swedish Energy Agency and the Region of Västra Götaland. In one such demonstration project Alpha AB got the opportunity to develop a fuel cell solution for the Göteborg Opera.

Theta AB describes an interesting situation where the customers either do not understand or do not want to recognize the need for the company's product. The end customers, i.e. the house owners, generally do not recognize the impending risk for moisture damage in their property, and hence, do not address the problem proactively. On the contrary, these customers only react to obvious property damages and health issues. When targeting the construction industry, Theta AB experiences that property developers do not want to recognize the need for the company's product, because that would indirect mean that they have built inadequate buildings to date; a statement which they do not feel comfortable to make.

4.4.2 The View of Competitors

The intensity of monitoring competitors varies among the ten companies. Eta AB does not at all follow their competitors, partly because they are not competing for the

same projects currently. However, Eta AB argues that *if* they would lose a solicitation process to the benefit of a competitor, they might rethink the way they monitor competitors. Similarly, Zeta AB actively avoids focusing on potential competitors. Although pursuing a low profile, the company has come far with its product development and does not want to be distracted by the moves of other companies until they are ready to launch their product on the market. Alpha AB and Epsilon AB compare themselves to their competitors 'now and then'. Epsilon AB claims that they do not actively follow their competitors' moves, but that they 'keep their eyes open'. In contrast, Delta AB, Iota AB, Kappa AB and Theta AB have been engaged in more intense and continuous competition watching activities.

Iota AB is forced to follow the price development of their competitors, since selling raw material to the industry is very competition-based. The industry appreciates green processes, but they are not prepared to pay a premium for raw material which has been produced environmentally friendly. Delta AB and Kappa AB engage in extensive monitoring of competitors. Delta AB claims that they examine the competitors' webpages, visit exhibitions and events to get input, talk to distributors within the industry and listen closely to customers. The purpose is to find e.g. information regarding pricing, technology, what problems the competitors are experiencing and the reasons to why customers buy from competitors. Kappa AB acts in a similar way. The company has not yet launched their latest product fully on the market, which means that they are extremely cautious about the development of the industry and the competitors that might start to feel threatened.

> *"We have to be cheaper and better, otherwise we don't sell. It's not enough with a 'green stamp', because the industry does not have feelings."*
>
> *- Iota AB*

Alpha AB, Beta AB and Kappa AB attend various exhibitions and events related to their industry, partly in order to gather material from their competitors. Beta AB and Kappa AB emphasize the importance of understanding the competitors' sales arguments. For instance, there might be novel studies conducted, regarding the health effects of daylight, which Beta AB is currently unaware of. Thus, Beta AB regards its competitors as an important channel for new information which could be used to strengthen the company's own marketing. Since Beta AB is confident that their technology is superior, they do not focus on the technological perspective when benchmarking against competitors.

Beta AB and Theta AB emphasize the importance of benchmarking against companies that are offering substitutes and complementary products. For example, in order to know how much daylight that is reasonable to expose a room to, it is important to follow the development of lamp manufacturers. In addition, Beta AB wants to offer a product which is easy to install and integrate with other systems, architecture and cabling installations. Thus, it becomes vital to follow the development in those industries as well. Similarly, Theta AB describes how the company previously was very focused on comparing their technology for attic spaces to the technology that competitors' offered for crawl spaces. Theta AB also followed the development of small house manufacturers.

> *"It shouldn't be complicated to install our product."*
> *- Beta AB*

Delta AB and Alpha AB explicitly pronounce that they engage in benchmarking in order to be able to position themselves better on the market. In addition, both companies actively analyze their competitors' strengths and weaknesses. Alpha AB also mentions how they put their competitors' strengths and weaknesses into strategy frameworks like the SWOT.

Gamma AB follows their industry quite carefully by e.g. reading industry magazines and advertisements. The respondent emphasizes the importance of 'keeping the eyes open' to anything and broadening the horizon. Some information might be indirectly important. For instance, the respondent found a company, by accident, which produced large garbage bins. This company was not regarded as a competitor, but after calling the company, the interviewee realized that the company could help promoting Gamma AB's paper trash bags when selling their garbage bins.

Epsilon AB highlights the importance of listening to the *customers* rather than the *competitors*. Not only can the customers provide the company with valuable personal opinions, but they might also provide access to new contacts and networks within the industry (depending on what type of customer it is).

4.5 The View of a Subject Matter Expert

The respondent was employed by the Technical Research Institute of Sweden in May 2008. Since then, he has been working as an expert within explosion protection, explosion risk assessment and investigation of gas and dust explosions. Additionally, the respondent provides general automotive technical support within the areas of electrical vehicles, hybrid vehicles and hydraulic energy saving, since he has a background in the automotive industry, where he was involved in e.g. emission control technology, transmission technology and engine design.

The interviewee describes how his fist contact with the CleanTech sector was a large-scale development project financed by VINNOVA. The respondent's role was to evaluate what safety routines that should accompany the adoption of new and alternative fuels, in automotive manufacturing plants. There was a great focus on electrical vehicles and, thus, electrical safety. The respondent further describes how two major automotive companies as well as two universities were involved in the development project. Moreover, the respondent has been involved in an EU financed project, where the focus was on exploring the regulations regarding the implementation of hydrogen and fuel cell vehicles.

The respondent explains that SP is not only involved in the safety aspects of projects. Rather, SP's mission can vary, depending on what the project aims to achieve. For instance, in a project that aims to develop more environmentally friendly buildings, the company can provide more applied research concerning e.g. alternative construction materials. The respondent concludes that while universities offer contributions on a very theoretical level, SP provides more business-related and applied research.

However, the interviewee describes the application for EU projects as a very lengthy and bureaucratic process. It can take years to get an application approved, which has several implications. First, the project needs to be centered on an important and viable idea, which will be important also in 1-2 years' time, when the project finally will be approved and allowed to start. Second, it is important to choose credible participants for the project, to avoid the risk of losing them in case of potential bankruptcies. The respondent mentions that Saab[3] was one of the participants in the VINNOVA project, described above, and that that had major consequences for the proceeding of the project. Thus, the actors in large-scale projects need to be reliable and credible. Last, the interviewee argues that other companies might be afraid to engage in these kinds of projects, due to the complicated and lengthy processes. However, the respondent explains that national projects generally are associated with

[3] In late 2011, Saab filed for bankruptcy.

shorter and less complicated application processes, which probably makes them more attractive for these companies. Additionally, the respondent emphasizes that VINNOVA probably is quite focused on providing smaller firms access to these projects, which means that national projects might be more available for small and entrepreneurial CleanTech firms.

The respondent highlights the benefits of the large-scale development projects that he has been part of, by arguing that these projects effectively encourage the industry to adopt new technology, which they otherwise might not have had the financial opportunities to implement. However, he can also see difficulties, sometimes, concerning how the results of a project are implemented in the society. Some projects have the explicit purpose of convincing decision makers at municipal, regional or national level to implement certain technologies. The respondent claims that these situations often incorporate great inertia, since nobody wants to be accused of wrong priorities, particularly not in the media.

"Journalists have such great power in Sweden that a municipal politician, who is being accountable for having invested some millions in new automotive technology at the expense of public health care, will be in deep trouble."

- The Subject Matter Expert

When discussing the major issues concerning small entrepreneurial CleanTech firms and their access to large-scale development projects, the respondent claims that the main problem would be to build credibility. Not only in terms of being reliable enough to be around in the upcoming years, but also in terms of being able to provide superior technology.

4.6 Summary

The purpose of this chapter was to present my empirical findings, by conveying the stories of ten small and entrepreneurial CleanTech firms and a subject matter expert from SP. *Table 7* summarizes my main findings concerning the companies' capacity for SI, arenas for SI, and outcomes of SI.

Table 7: Summary of the main empirical findings.

	Central Question(s)
Capacity for SI	**Are the companies questioning their identity and competent in transformative learning?** • Five out of ten companies display a crystal clear view of their identity, industry and competitors. Two companies initially targeted a certain industry, but changed direction later on. One company discussed their identity very carefully, before their market entry. The last two companies show a great uncertainty regarding their identity. • None of the companies express an ambition to maintain a questioning attitude. • Six out of ten companies reveal a solid system for saving ideas for the future.
	Are the companies utilizing creative exploration in their strategy formulation process? • Eight out of ten companies display a plan-driven approach to strategy, while two companies refer to strategy as position. • Five out of ten companies have strategy meetings regularly (once annually, twice annually or once monthly). The other five companies have strategy meetings irregularly or when required. • Six out of ten companies have close relationships with existing customers, suppliers and distributors.
	Is there a wide and cross-functional participation in the strategy formulation process? • Seven out of ten companies let everyone within the organization participate in the strategy development process, while three companies argue that such work is more suited for people with experience and 'the right mental toolbox'. • The majority of the companies show an inside-out approach, arguing that they have sufficient competence in-house to develop their strategies. Five companies explicitly mention an unwillingness to collaborate with external parties, when it comes to the strategy process. Only three companies seem willing to let external people participate in their strategy process.

	Are the companies unconstrained by corporate boundaries? • Generally, the employees are regarded as the companies' main resource. In addition, the companies value their brand, patents and technology. Only four out of ten companies include external elements in their description of primary resources. • The most common constraints are time and money. Some companies also describe the access to the right competences, the ability to evaluate distributors and the ability to offer substitute products, as being constrained. A 'slow market' is also mentioned as a problem. • While most companies describe collaborative networks with research institutes, agencies and universities as important, only three out of ten companies have access to such networks. • Some of the companies in this study display a low confidence in past governmental and regional CleanTech promoting activities. • The majority of the companies are part of a knowledge-network. Three out of ten companies perceive themselves to have *very little* or *no* influence within their networks, while seven companies argue that they *have* influence within their networks.
Arenas for SI	**In what arena does the SI take place?** • The most common arena for SI is the reinvention of customer value. Six out of ten companies provide their customers with a revolutionary technology that enables the customers to achieve cost savings. Four companies provide a technology that centers on environment or health benefits. • Additionally, four out of ten companies argue that they cater to a radically new customer base, while two companies argue that they have redesigned the end-to-end value chain architecture.
Outcomes of SI	**Are the companies proactively creating value for their customers?** • Six out of ten companies perceive themselves to create value proactively for their customers, while four companies argue that their customers already know what they are looking for. • Five out of ten companies listen to their customers carefully, as an input to future strategies. In contrast, the other five companies do not use customer feedback as a part of their product/service development. • Two out of ten companies describe how they monitor non-customers.
	Has competition turned irrelevant? • The companies monitor their competitors to a very different extent. Two companies monitor their competitors closely, with the explicit purpose of positioning their companies accordingly. In contrast, two other companies do not follow their competitors at all. The other companies place themselves in the middle of the continuum.

5. Analysis

The purpose of this chapter is to compare and analyze the empirical findings against the theoretical framework. First, the companies' capacity for SI will be discussed. Subsequently, the arenas for SI will be presented, followed by a discussion regarding the outcomes of SI. The chapter will end with a summary of the main findings.

After having presented the main findings of my field work, this chapter will summarize and analyze the answers to research question 2) *what is the capacity for SI among small and entrepreneurial CleanTech firms,* 3) *how has SI been attained by small and entrepreneurial CleanTech firms,* and 4) *what SI outcomes have small and entrepreneurial CleanTech firms achieved to date,* by answering the central questions presented in section 2.6. Thus, this chapter will constitute the foundation for what conclusions that can be drawn from the study.

5.1 Strategic Innovation Capacity

5.1.1 Are the Companies Questioning their Identity and Competent in Transformative Learning?

Markides (2001), Govindarajan and Trimble (2005), and Normann (2001) proclaim the importance of establishing a questioning attitude regarding the identity of the organization. In this study, five out of ten companies argue that their identity is obvious. These companies have a clear picture of what business they are in and what competitors they have. Two out of ten companies explain how they initially targeted a certain industry, but changed direction later on. One company discussed their identity carefully, before entering the market. What is common between these eight companies is their search for a 'the one best way', which Normann (2001) rejects. In addition, these eight companies illustrate the behavior of adaptation and correction described by Normann (2001). The last two companies, however, show great uncertainty regarding their identity, where one of them constantly search for radically new industries to enter, thus, displaying characteristics of Normann's (2001) second level adaptation – framebreaking reconfiguration. However, none of the companies are expressing an ambition to maintain a flexible identity and continuously questioning their identity, which corroborate with Markides (1997), who argues that very few companies, unfortunately, explicitly thinks about how to redefine their businesses. When comparing the SI outcomes of companies that question their identity with companies that do not question their identity, there are very small differences (favoring the questioning attitude). Noteworthy, however, is that a vast majority (4 of 5) of the companies that express a clear and obvious identity are

among the older companies in the study. Put differently, 80% of the older companies (i.e. more than 8 years old) have a clear picture of their identity. Thus, the older the companies become, the more rigid they tend to be, in terms of business identity. This fact insinuates that Schlegelmilch, Diamantopoulos and Kreuz's (2003) model for SI does not capture the dimension of age, although this factor is obviously important. Therefore, rather than rejecting existing theory about the importance of a questioning attitude, I argue that it is insufficient to explore the prevalence of a questioning attitude in one given moment. On the contrary, a questioning attitude might be a process or a cyclical phenomenon, connected to certain phases of development. It is likely that the companies initially struggle to find their identity and that they temporarily stop searching once they have a 'winning concept'. Later on, however, when profits decrease or the market changes, companies might be more or less likely to question their identity again. When analyzing the results from this study, one must bear in mind that the companies that are categorized as 'old', generally still show no profits. On the contrary, many of them have just recently launched (or are about to launch) their product or service on the market. Thus, it seems irrelevant to question their current absence of a questioning attitude.

While considering a learning-process perspective, Gebauer, Worch and Truffer (2012) proclaim transformative learning processes as particularly important for SI. In this study, a majority (6 of 10) companies reveal a system for saving ideas for the future, hence indicating an ability to maintaining and reactivating knowledge over time. According to Berghman (2012), these companies should be better equipped to critically reflect on customers, markets and marketing approaches as well as keeping past critical reflections alive, sharing critical reflections and filing critical reflections.

5.1.2 Are the Companies Utilizing Creative Exploration in their Strategy Formulation Process?

Eight out of ten companies illustrate what Mintzberg, Ahlstrand and Lampel (2009) describe as a plan-driven approach to strategy. Thus, these companies are formulating their strategy purposefully and consciously in advance (Mintzberg, Ahlstrand & Lampel, 2009). In addition, the companies emphasize the importance of making important decisions for the future. Two out of ten companies refer to Mintberg, Ahlstrand and Lampel's (2009) notion of strategy as position, i.e. the fit between the organization and its environment.

Moreover, Hamel (1996) argues that companies most often apply a calendar driven approach to strategy. In this study, five out of ten companies explain how they regularly have strategy meetings (once annually, twice annually or once monthly). Additionally, this group of respondents incorporates the companies that display the

most analytical view of strategy (Alpha AB and Delta AB). Hamel (1996) argues that such view often incorporates an assumption that the future will be more or less like the past, which hampers SI. The other five companies argue that they either discuss strategy on a daily basis or engage in strategy meetings irregularly or when required. Thus, these companies should be more likely to engage in an explorative strategy process, according to Hamel (1996).

Six out of ten companies in this study have close relationships with existing customers, suppliers and distributors, from whom they gain valuable information. According to Berghman (2006), these companies are more likely to develop innovative strategies. In contrast, Sull (1999) and Kim and Mauborgne (1999) argue that these relationships might be dangerous for companies, since they limit the companies' flexibility and opportunity horizon. However, this study indicates that SI output, i.e. either creating customer value proactively or making competition irrelevant, is more prevalent among the companies that engage in such relationships. Moreover, discussing problems with external people is mentioned by Carlopio (2010) as an important tool for generating a wider range of ideas (through 'incubation'), which ultimately increases the chances for SI.

Interestingly, the majority (4 of 6) of the companies that have close relationships with customers, suppliers and distributors are the companies that tend to apply a calendar driven and analytical strategy process. This indicates that the companies participating in this study use different methods to become more explorative; one group of companies choose to leave the conventional calendar driven and analytical process, while the other group of companies choose to utilize external help more creatively and to a larger extent. Noteworthy is that two out of ten companies (Beta AB and Gamma AB) utilize both methods. Thus, these two companies should have the highest likelihood of creating SI. This is supported by the fact that both companies display elements of both proactive value creation *and* irrelevant competition.

5.1.3 Is There a Wide and Cross-functional Participation in the Strategy Formulation Process?

People within the company

Seven out of ten companies let everyone participate in the strategy development process, while three out of ten companies proclaim that such work is more suited for people with either 'the right mental toolbox' for conducting analyses or with experience and knowledge about the industry. Among the seven companies that involve everyone, five companies seem to do so mostly because of the size of the organization. The respondents from those companies argue, in varied forms, that it is important to have in-depth knowledge about the product and the industry in order to

be able to contribute in the strategy formulation process. Hamel (1996) discusses this attitude and warns companies to harness a too small fraction of an organization's total creative potential. Thus, if the attitude is maintained while the companies grow, the result might be *incrementally* changed strategies rather than *radically* changed strategies. Only two out of ten companies (Gamma AB and Theta AB) explicitly mention the importance of letting everyone participate, with the argument that different backgrounds and perspectives together with increased information sharing actually strengthens the companies. This is in line with Hamel (1996), Markides in Mang (2000) and Afuah (2009), arguing that strategy planning and implementation should not be separated and that the process should be deeply participative and democratic. Indeed, this study shows increased SI output among the companies that let everyone participate in the strategy formulation process.

People outside the company

The companies in this study primarily show an inside-out approach, rather than the outside-in approach suggested by Krinsky and Jenkins (1997). Generally, the companies perceive themselves (together with their board of directors) to have sufficient competence in-house to develop their own strategies. In addition, five out of ten companies explicitly mention an *unwillingness* to collaborate with external parties, when it comes to the strategy formulation process. The main argument is that external parties lack the necessary insights about the company and the industry, in order to be able to contribute fruitfully. Two out of ten companies are utilizing the help from others, but primarily for minor assignments like managing the business webpage, or assisting with marketing. Only three out of ten companies (Beta AB, Gamma AB and Zeta AB) seem willing to let people outside the company participate in their strategy processes. First, Beta AB proclaims the importance of achieving input from students. Second, Gamma AB highlights Almi and the founder's mentor as important sources for help with their business development. Last, Zeta AB emphasizes how they utilize the expertise from various contacts gained from EU projects as well as personal contacts in order to develop their strategy. Interestingly, however, is that several of the companies that claim to reject outside help with the strategy process, still engage their customers to a large extent in their development process. Thus, this kind of help seems to go under the radar when discussing external contributions to the strategy formation. When comparing the SI outcomes of the companies that allow their own assumptions to be challenged, either by customers or other external actors, to those companies that generally reject the help from *all* external actors, there is a significant overrepresentation of SI outcomes (more than twice as frequent) among the companies that are open to external help. This finding confirm Schlegelmilch, Diamantopoulos and Kreuz (2003), who argue that firms benefit from external help in their strategy formulation process.

5.1.4 Are the Companies Unconstrained by Corporate Boundaries?

Kim and Mauborgne (1999) and Normann (2006) argue that it is crucial to think beyond and question the company's boundaries, in order to create radically new and superior value. When the companies in this study are asked to describe their main resources, the vast majority refer to the competence of their employees. Additionally, resources like the brand, patents, and technology are mentioned. Only four out of ten companies (Gamma AB, Kappa AB, Eta AB and Theta AB) include external elements in their description of primary resources. In those cases, the respondents mention their networks, customers and financing channels among their main resources.

By and large, this study indicates that most companies seem to have a limited view of what resources that might be available to them. Kim and Mauborgne (1999) argue that a too inwardly driven focus might limit the opportunity horizon and strengthen the organizational resistance to change. This study indicates a small percentually increased SI output among the firms that consider external resources as highly important for their organizations. Thus, it seems relevant for the companies to learn how to utilize and trust external expertise and resources.

Similarly, Hamel (1996), Kim and Mauborgne (1997) and Krinsky and Jenkins (1997) (in Schlegelmilch, Diamantopoulus & Kreuz, 2003) suggest that companies that manage to look beyond current constraints gain more insights regarding customer value and are more likely to act on that information. When discussing current constraints, most companies emphasize time and money as heavily limiting factors. In addition, some companies describe the access to the right competences, the ability to evaluate distributors and the ability to offer substitute products, as being constrained. Moreover, two companies (Epsilon AB and Theta AB) describe how they feel (or have been feeling) constrained by 'a slow market', when they wanted to expand. Only one company in this study (Gamma AB) shows a positive approach to limitations, by arguing that every constraint or obstacle is regarded as guidance towards new opportunities. The respondent explains that finding the 'closed doors', entails a faster finding of the 'open doors'.

Triuero, Moreno-Mondéjar and Davia (2013) explain the importance of collaborative networks with research institutes, agencies and universities for CleanTech innovation. In this study, only three out of ten companies (Gamma AB, Eta AB and Theta AB) seem to have strong relationships with such institutions. However, such networks seem to be highly valuable in terms of e.g. access to financing and external expertise. The subject matter expert from SP corroborate this view, by proclaiming that such

collaboration projects are very beneficial for encouraging the industry to adopt new technology, which they otherwise might not have had the financial opportunity to implement. Alpha AB highlights how it can be difficult, albeit important, to gain access to large-scale development projects. The subject matter expert from SP argues that the main issue for small entrepreneurial firms is to build credibility and to show other actors that the company indeed is able to contribute with superior technology. Moreover, Triguero, Moreno-Mondéjar and Davia (2013) encourage policy-makers to promote the creation of such networks. Such initiatives have been carried out in Sweden by e.g. CleanTech Sweden and Business Region Gothenburg. However, this research reveals that some CleanTech firms have a very low confidence in these initiatives, due to what is perceived as 'vague descriptions of goals' and 'weak actions'. Additionally, another company (Beta AB) brings up a very low confidence in the Swedish Trade and Invest Council as well as in the Swedish American Chamber of Commerce.

Kim and Mauborgne (1999) suggest that companies engaged in SI tend to have strong networks and the ability to deploy capabilities and resources from them. When the companies are asked about their networks and their own roles in them, three out of ten companies (Beta AB, Alpha AB and Kappa AB) state that they perceive themselves to have very little or no influence within their networks. Although the companies still seem able to gain knowledge and input regarding industry trends from their networks, the companies agree on that it is a problem to constantly be dependent on other actors.

In contrast, seven out of ten companies (Gamma AB, Delta AB, Epsilon AB, Eta AB, Theta AB, Zeta AB and Iota AB) perceive themselves to have influence within their networks. Epsilon AB, Gamma AB, Delta AB, Zeta AB and Theta AB seem to take on a more dominant role in their network (by actively pursuing certain issues), whilst Eta AB and Iota AB seem to take on a more participative role. According to Truffer (2012), companies can increase their exploratory and transformative learning processes by taking on a participative role in the network rather than a dominant one. However, in this study, the vast majority of companies that have entered a dominant role in their networks have managed to create new customer groups or other fruitful business opportunities for themselves, which makes it hard to question their actions. When comparing the output of SI, it seems like a dominant role within a network is equally beneficial as a more dependent role. Thus, it seems more important to be able to extract information from the network rather than being able to influence it.

Conclusively, most CleanTech firms in this study are part of a knowledge-network, from which they primarily deploy information, capabilities and financing. However,

Kim and Mauborgne (1999) also argue that networks should be a source of complementary assets, products and services. Among the two companies that explicitly have mentioned that they lack complementary or substitute products, only one of them (Epsilon AB) seem to utilize its network to achieve access to the preferred products (by creating a consortium with two other companies). In contrast, Delta AB does not seem to put any efforts into gaining access to the preferred substitute products through their network. Rather, the company accepts the limitation, by arguing that they have to prioritize.

5.2 In What Arena does the Strategic Innovation Take Place?

Theory claims that SI involves the redesign of at least one of three arenas: value-chain architecture, customer value and customer base (Govindarajan & Trimble, 2004; Govindarajan & Gupta 2001; Gebauer, Worch & Truffer, 2012). This study indicates that the most common redesign in entrepreneurial CleanTech firms takes place in the arena of customer value. Six out of ten companies in this study provide their customers with a revolutionary technology that enables the customers to achieve cost savings by various means. The fact that the technology is environmentally friendly is regarded more as a bonus. In contrast, four out of ten companies provide a technology which primary purpose centers on the environment or health benefits. A common view among these companies is that the market perceives their solutions as great, although nobody wants to pay for them. The companies have managed this problem somewhat differently. One company strives to be able to offer their products cheaper than their competitors, while at the same offering environmental benefits. Two companies have found niche markets where the customers gain financial benefits from the technology and hence, are willing to pay a premium. The last company has decided to target a customer group where the health benefits are the most apparent and hardest to neglect. Moreover, four out of ten companies argue that they cater to a radically new customer base, while two out of ten companies claim to have redesigned the value chain architecture.

5.3 Strategic Innovation Outcomes

5.3.1 Are the Companies Proactively Creating Value for their Customers?

In this study six out of ten companies perceive themselves to create value proactively for their customers, while four companies argue that their customers already know what they want.

SI theory is ambivalent in terms of customer participation in the companies' development processes. Conventional wisdom regarding the creation of innovation claims that companies should let their customers identify new ideas and become involved in the development process (e.g. Markides, 1997). This study shows that five out of ten companies closely listens to their customers as part of the input for future strategies. One of these companies also engages its customers in co-production, which is in line with Normann (2001) and Berghman's (2006) recommendations. On the contrary, the other five companies are not using customer feedback as part of their product or service development. Schlegelmilch, Diamantopoulos and Kreuz (2003) among others state that excluding the customers might be beneficial for the creation of SI, since the company risks becoming rigid and limited by long-term customer relationships. However, as mentioned in chapter 5.1.3, this study indicates a causality between external participation and the degree of SI outcome, which strengthens the view that customers should be included in the strategy process in order to be able to proactively create value for the customers.

Solely two out of ten CleanTech companies (Gamma AB and Kappa AB) mention potential non-customers and describe how these are being monitored. In accordance with Kim and Mauborgne (1999) Kappa AB actively scouts around the market in the pursuit of radically new markets. Similarly, Gamma AB actively gathers information that indirect might be of importance for the future, explicitly arguing that such behavior might lead to new partnerships or customers. Additionally, the findings from this study show that SI outcomes are proportionally more prevalent among the companies that monitor non-customers.

Although some of the companies in this study show elements of the design thinking proposed by Carlopio (2010), by e.g visiting the end-customers and engaging in other exploratory market research, the majority of the firms in this research do not display a concern for understanding the deep emotional meaning of their products or services, as proposed by Carlopio (2010). Thus, the majority of CleanTech companies in this study might benefit from more exploratory field research.

5.3.2 Has Competition Turned Irrelevant?

In order to avoid reactive behavior and imitative strategic moves Kim and Mauborgne (1999) emphasize the importance of breaking out of the competitive trap. The companies participating in this study monitor their competitors to very different extent. At one end of the continuum, two companies (Eta AB and Zeta AB) do not at all follow their competitors. At the other end of the continuum, two companies (Delta AB and Alpha AB) closely monitor their competitors with the explicit purpose of positioning their companies accordingly. Although, the other companies place themselves in the middle of the continuum, the locus seems to be closer to the beneficial monitoring described by Kim and Mauborgne (1999) rather than conventional benchmarking. By and large, the companies seem good at following e.g. competitors' sales arguments and the general development within the competitive landscape, in order to gain a deeper understanding of what solutions their customers want. Such behavior corroborate with Kim and Mauborgne (1999) and Carlopio (2010), who argue that understanding untapped value is key to identify novel customer value propositions.

5.4 Summary

In order to answer research question 2) *what is the capacity for SI among small and entrepreneurial CleanTech firms*, I have analyzed the central questions for the capacity for SI. In terms of business culture, it has been argued in the literature that a questioning attitude is of great importance for SI. However, this study indicates that SI outcomes are equally prevalent among companies that are questioning their identity as among companies that do not question their identity at all. Although this finding is in sharp contrast to the literature, I argue that it might be a cyclical phenomenon that needs to be examined over time, since my analysis shows that age is an important factor for the presence of a questioning attitude. When it comes to transformative learning processes, most companies in this study seem to have good preconditions for such learning. Regarding strategy processes, this study supports the theory, which proclaims that companies should abandon the traditional calendar driven and analytical approach to strategy as well as increase the customers' participation in the strategy formulation process. When it comes to participation in the strategy formulation process, this study shows that it is equally critical to engage people within the company, as people outside the company in the strategy development process. Noteworthy is however that several companies claim to reject all external help with strategy, despite the fact that they actually involve their customers to a large extent in their development process. All companies in this study seem heavily engaged in knowledge-networks, from which they manage to deploy information, capabilities and financing. However, whether the companies apply a

dominant or a participative role in the network seem to be of minor importance. One aspect that has been especially highlighted by several respondents in this study is the importance of having access to large-scale development projects, which is in line with the literature, claiming that collaboration with research institutes, agencies and universities are highly important for CleanTech innovation.

When it comes to research question 3) *how has SI been attained by small and entrepreneurial CleanTech firms,* I have explored the central question: *in what arena does the SI take place*. In this study, SI is primarily taking place in the arena of reinventing customer value. The second most common SI arena is the redesign of the customer base. The arena where the least SI take place is the redesign of the value chain architecture. Nevertheless, SI is present in all three arenas that are proposed by the literature.

In order to answer research question 4) *what SI outcomes have small and entrepreneurial CleanTech firms achieved to date,* I have answered the central questions: *are the companies proactively creating value for their customers,* and *has competition turned irrelevant.* Six out of ten companies perceive themselves to create value proactively for their customers. Furthermore, it seems to be equally common for companies to engage in close relationships with their customers as to *not* engage in such relationships. However, as previously concluded, this study shows that SI output is more prevalent among companies that do engage in close customer relationships and utilize them as a source of valuable information. A vast minority of firms seem engaged in monitoring non-customers, which is in contrast to the literature's recommendations. Last, it seems like most of the companies in this study have turned competition irrelevant since they are focusing on customer needs and untapped value rather than on conventional benchmarking.

6. Conclusions

This chapter will answer the research questions of this study by summarizing the conclusions drawn from my research. The chapter is divided into two main sections: 1) theoretical contributions, and 2) practical implications. The practical implications will incorporate managerial implications as well as implications for public policy. Subsequently, some concluding remarks will be presented. Last, the implications of this study for future research will be explored.

The prerequisites for business strategy has changed dramatically due to the realities of our knowledge-based society. Today, companies are required to achieve SI (i.e. radically change the rules of the game) continuously in order to stay competitive. At the same time, a core challenge of the contemporary society is to create economic growth while not harming the environment or the climate, which leads to an increased focus on the CleanTech sector. Because small and entrepreneurial CleanTech companies will be an essential part of our future green economy, it becomes particularly important that these companies learn how to manage SI. Thus, this paper explores the capacity for SI, arenas for SI and outcomes of SI among small and entrepreneurial CleanTech firms, by answering the following research questions:

1) *What model could describe a holistic approach to SI in a CleanTech context?*
2) *What is the capacity for SI among small and entrepreneurial CleanTech firms?*
3) *How has SI been attained by small and entrepreneurial CleanTech firms?*
4) *What SI outcomes have small and entrepreneurial CleanTech firms achieved to date?*

6.1 Theoretical Contributions

6.1.1 Main Theoretical Insights

I made some important insights while studying the second research question, *what is the capacity for SI among small and entrepreneurial CleanTech firms*. First, little effort is dedicated to establishing a questioning attitude into the business culture of the firms, which is in sharp contrast to the recommendations by the literature. On the contrary, the vast majority of companies in this study strive to find one true identity. This fact is particularly evident when comparing the older companies with the younger, where the older companies are much more rigid and certain about their identity. Second, the firms in this study describe how they apply an inside-out approach, rather than the outside-in approach suggested by the literature. However,

when carefully studying the respondents' answers, it becomes clear that the majority of the companies receive help either from their customers or from other external parties, when it comes to important decisions about business development. Third, this paper shows that most companies seem engaged in knowledge-networks, from which they deploy information, capabilities and financing. However, it seems to be of minor importance whether the companies apply a dominant or a participative role within the network. Fourth, there is a clear absence of the collaborative networks between research institutes, agencies and universities, which are emphasized by both interviewees and the literature as being critical to CleanTech innovation. A clear minority of the firms that participated in this study are engaged in such collaboration projects. Fifth, while the literature on SI warns companies to engage in too extensive benchmarking, this study reveals that such traditional benchmarking has already been abandoned by most CleanTech firms. In line with theory, the companies have realized that they have more to gain from focusing on understanding customer needs, rather than engaging in financial or technological benchmarking. Last, this study shows that it is as common to apply a calendar driven approach to the strategy process as a non-calendar driven approach.

When taking on a learning-process perspective, researchers disagree about what mix of learning processes are important for SI. Nevertheless, there is a consensus that transformative learning processes are important. This study has investigated the prevalence of transformative learning and concluded that, generally, the preconditions for such learning are good among the CleanTech firms that participated in the study. Thus, further studies could use this fact as a starting point.

The study of the third research question, *how has SI been attained by small and entrepreneurial CleanTech firms,* has also generated some theoretical contributions. Although the findings of this study corroborate with existing literature, arguing that the locus of SI efforts is concentrated in the arena of creating radically new customer value, this study shows that entrepreneurial CleanTech firms create SI in all three arenas proposed by Govindarajan and Gupta (2001). Thus, further studies should not neglect SI in these arenas.

Concerning the fourth and last research question, *what SI outcomes have small and entrepreneurial CleanTech firms achieved to date,* it seems like most companies manage to create value for their customers proactively, partly due to close collaboration with customers. There has been some disagreement within the scholarly field of SI concerning whether SI capacity is stimulated by close relationships with customers or not.

On one side it is argued that such relationships limit a companies' opportunity horizon, while the other side proclaims the importance of being stimulated to innovate through external forces. This research strengthens the latter view by showing that SI output is more prevalent among the companies that engage in close relationships with customers, suppliers and distributors.

6.1.2 A Framework for SI in a CleanTech Context

In my literature review I discovered a holistic SI model, developed by Schlegelmilch, Diamantopoulos and Kreuz (2003). The model was tested in this study, in order to answer the first research question, *what model could describe a holistic approach to SI*? I found that the model constitutes a reasonable starting point, but that some adjustments need to be made. For instance, my research indicate that the model needs to be more dynamic in the view of business culture. This study shows a relationship between organizational age and the establishment of a questioning attitude, suggesting that business culture needs to be explored as a process rather than a static phenomenon. Thus, I would recommend shifting the focus from examining the current business culture to applying a learning-based perspective.

Furthermore, my research reveals a strong dependency on the access to large-scale development projects. Collaboration with research institutes, agencies and universities has been shown to be of the utmost importance in a CleanTech context. I argue that this element is far too significant to be placed as a sub-theme to the element of *resources* in the model, particularly in a small firm context, since these firms actively have to build credibility and convince others that their technology is superior, in order to gain access to such projects.

Moreover, Schlegelmilch, Diamantopoulos and Kreuz (2003) argue that SI generally is centered on the creation of radically superior customer value. By answering my third research question, *how has SI been attained by small and entrepreneurial CleanTech firms,* I found that dramatically reinvented customer value is indeed the most common case. Nevertheless, I have also found evidence for the presence of SI in other arenas. Thus, I would like to complement the model with the three arenas proposed by Govindarajan and Gupta (2001).

Last, while answering this thesis fourth research question, *what SI outcomes have small and entrepreneurial CleanTech firms achieved to date,* my research reveals an interesting case of SI output, which does not fit into the model. One company (Iota AB) is creating radically new environmental value to the world, albeit without any increased customer value. Similarly, some other companies (Beta AB, Theta AB and Kappa AB) are struggling to make their customers appreciate the health effects

provided by their products. Although few seem willing to pay a premium for such CleanTech innovations, it will still be important for a future green economy and should not be neglected in the model. Therefore, I would like to add the SI output *radically improved environment or health*, in the model. Conclusively, *Figure 9* illustrates the answer to my first research question, *what model could describe a holistic approach to SI in a CleanTech context?*

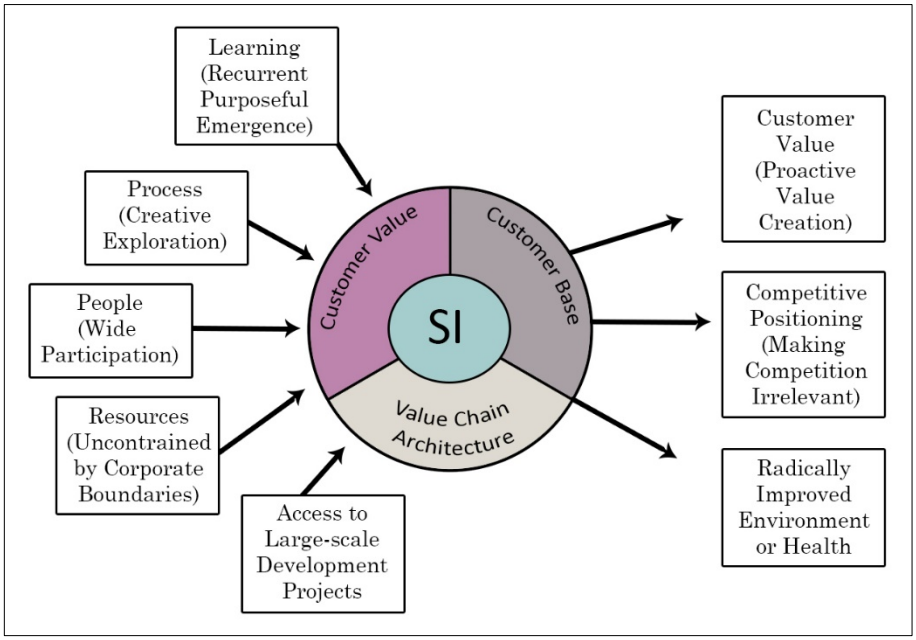

Figure 9: A model for SI in a CleanTech context.

6.2 Practical Implications

6.2.1 Managerial Implications

This study shows that certain actions can be taken by the companies in order to increase their capacity for SI. The companies in this study seem constrained, not only by their own perceived identity, but also by corporate boundaries. The companies need to establish a questioning attitude, where the identity of the firm, as well as the generally accepted industry assumptions, are continuously challenged. To some extent this might be achieved by a shift from the current inside-out approach to an outside-in approach, where external actors are allowed deeper into the strategy formulation process. Some companies in this study express a desire to offer substitute products, while simultaneously arguing that they have to prioritize. However, by following the advice from the literature, these companies could gain from a more extensive collaboration within their knowledge-network.

Regarding the strategy process, the companies in this study could benefit from a more exploratory approach. Although many of the companies explain how they have abandoned the calendar driven and analytical strategy process, the vast majority of the firms still express a plan-based view of strategy, which assumes that the future is a linear extension of the past. By applying methods from the field of design, firms might be able to increase their range of viable ideas regarding strategic options, and hence increase the likelihood of achieving SI. Additionally, there is evidence that the companies could harness an increased portion of the total organizational creativity by letting everyone inside the company participate in the strategy formulation process. Moreover, only two companies in this study seem engaged in following non-customers, meaning that the firms generally can become better at monitoring the need of potential future customers.

An interesting phenomenon discovered in this study is that the market generally tend to appreciate environmentally friendly or health promoting technology, while at the same time being highly unwilling to pay for it. The problem has been managed differently by the firms in this study, but the most viable option undeniably seem to be the creation of 'loaded expressions' like the 'HEPA', which effectively conveys the meaning of increased health and the accompanying extra value to the customers.

6.2.2 Implications for Public Policy

Several companies in this study perceive the market to be slow and unwilling to embrace new and more environmentally friendly technology. Thus, the advancement of Swedish CleanTech is highly dependent on targeted government subsidies. Furthermore, this study indicates a low confidence in institutions like the Swedish American Chamber of Commerce and the Swedish Trade and Invest Council – institutions that are supposed to promote the expansion of Swedish businesses. Additionally, specific CleanTech promoting activities initiated by e.g. Business Region Gothenburg and Swedish CleanTech, seem to be perceived as vague and toothless. There is a need for clearer mission statements as well as increased visibility and collaboration, when creating future CleanTech initiatives. Finally, this study shows that the vast majority of CleanTech firms still perceive their major limitation to be monetary in nature. Although the European Commission emphasizes that Sweden does particularly well when it comes to supporting the country's companies with access to financing, the companies in this study still display a great need for increased financing opportunities.

6.3 Summary and Concluding Remarks

The purpose of this paper was to investigate how small and entrepreneurial CleanTech firms manage SI, by answering four research questions: 1) *what model could describe a holistic approach to SI in a CleanTech context*, 2) *what is the capacity for SI among small and entrepreneurial CleanTech firms,* 3) *how has SI been attained by small and entrepreneurial CleanTech firms*, and 4) *what SI outcomes have small and entrepreneurial CleanTech firms achieved to date?*

As an answer to the first research question, *what model could describe a holistic approach to SI in a CleanTech context*, I have proposed an adjusted model for the peculiarities of SI in a CleanTech context, which helps explaining the most important drivers for and outcomes of SI. Regarding the second research question, *what is the capacity for SI among small and entrepreneurial CleanTech firms*, I have based my analysis on four central questions regarding the drivers for SI. *Table 8* summarizes my main findings in relation to those questions.

Table 8: Main findings concerning the second research question.

Central Question	**Answer**
Are the companies questioning their identity and competent in transformative learning?	Generally, the companies could become better at establishing a questioning attitude within their business culture. However, when it comes to transformative learning processes, most companies perform well.
Are the companies utilizing creative exploration in their strategy formulation process?	Although all companies this study show elements of creative exploration (albeit in different ways), most companies still display a plan-based view of strategy and could, therefore, benefit from more explorative methods in their strategy processes.
Is there a wide and cross-functional participation in the strategy formulation process?	Generally, the companies could become better at increasing the participation among their employees in their strategy process. In addition, most companies in this study could benefit from a shift from the current inside-out approach to an outside-in approach.
Are the companies unconstrained by corporate boundaries?	Most of the companies seem to be constrained by corporate boundaries, in terms of their view of available resources. Nevertheless, the companies seem good at participating in and deploying information from knowledge-networks.

The third research question, *how has SI been attained by small and entrepreneurial CleanTech firms,* was analyzed according to the central question: *In what arena does the SI take place?* I found that the locus of SI efforts is concentrated to the arena of dramatically reinvented customer value, although all arenas proposed by the literature are utilized for SI.

Concerning the last research question, *what SI outcomes have small and entrepreneurial CleanTech firms achieved to date,* I have based my analysis on two central questions. *Table 9* summarizes my main findings in relation to those questions. Additionally, I found that CleanTech companies sometimes achieve a new type of SI outcome (radically increased environment or health benefits) beside the two SI outcomes proposed by the literature.

Table 9: Main findings concerning the fourth research question.

Central Question	**Answer**
Are the companies proactively creating value for their customers?	The majority of the companies perceive themselves to create value proactively for their customers. However, while the companies often engage in close collaboration with customers, they could become better at following non-customers in order to increase their SI outcomes.
Has competition turned irrelevant?	Although the companies monitor their competitors to a very different extent, most companies seem to have abandoned the conventional benchmarking, in favor for an increased focus on finding untapped value.

Conclusively, by shedding light on how ten small and entrepreneurial CleanTech companies manage SI today, I argue that my research contributes with an increased understanding for the peculiarities of the CleanTech sector together with insights concerning how CleanTech companies could increase their competitiveness in our future green economy.

6.4 Suggestions for Further Research

I argue that further research is required before a more robust quantitative study can be conducted within this field of research. First, this paper has shown that age is an important factor when it comes to the questioning of business identity. My findings suggest either that companies stop questioning themselves when they grow older, or that the questioning attitude is more of a cyclical phenomenon, connected to a certain phase or phases. Thus, future studies could take on a learning perspective and determine what actually happens with the questioning attitude within companies, over time.

Second, this study has shown that small and entrepreneurial CleanTech companies have the ability to create innovations that are great for our environment and health, and that customers, unfortunately, are unwilling to pay a premium for these innovations. The person who buys the product or service might not even be the one who benefits from the environmental or health effects. I suggest some case studies be made on companies that manage to tackle the problem in a profitable way. It was mentioned in this paper that 'loaded expressions' like the 'HEPA' can be used in order to convey the value of a product more efficiently. Hence, future studies (preferably within marketing) could target the peculiarities of developing such common notions for quality assurance.

Next, this study has shown the importance of utilizing creative exploration in the strategy formulation process. Therefore, I argue that further studies could investigate more in-depth, how companies e.g. could implement design-thinking or other explorative techniques in their strategy process.

Moreover, this paper has highlighted the importance of collaboration with research institutes, agencies and universities, for the creation of CleanTech innovation. Future studies could therefore focus on how small and entrepreneurial firms could build enough credibility to gain access to such networks and the accompanying large-scale development projects.

Furthermore, this study shows that the most common arena for SI, among the companies in this study, is to dramatically reinterpret the concept of customer value. Therefore, it might be interesting to investigate how SI in the other two arenas might be stimulated. A case study of a company that has achieved SI output by dramatically redesigning its value chain architecture, might be the starting point for such research.

Last, I recommend that future studies explore potential differences in the importance and function of formal versus informal networks, since this paper suggest that they sometimes are utilized very differently.

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Appendix A - Interview Guide

Business Culture

- In your opinion, what business/industry are you in? Has this changed over time? (If yes: please explain how and why)
- Has the view of who your customers, competitors or suppliers are changed over time? (If yes: please explain how and why)
- How would you describe your positioning versus your competitors? Has this changed over time?
- How would you describe the culture in your company?
- What do you expect when you leave for work in the morning?
- Where do new ideas come from within your company and what happens to them? (Please give some examples)

Processes

- What does the concept of strategy mean to you?
- Does your company have a strategy? (If yes: how did it form and what does it say?)
- Who or what decides what your next actions will be?
- How does your company prepare for future survival?
- What kind of material or information does your company utilize in order to plan ahead?
- When do you engage in strategy development processes?

People

- What is your company's organizational structure? Please, draw a quick organizational chart.
- What people are/were/would be involved in your strategy creation process?
- What individual experience or knowledge do you regard as important for setting a strategy?
- Would you consider collaborating with any external actors when creating your company's strategy? (If yes: who and why?)

Resources

- In your opinion, what is your company's main resources?
- How do you use those resources in pursuing market opportunities that you identify?
- What kind of limitations do you perceive, in terms of available resources, and how do you manage those limitations?
- Please describe your company's network. What kind of actors do you have a relationship with and why?
- Do you perceive that your company is able to influence and enforce actions within the network it is part of? (Please give an example)
- Do you perceive any limitations or problems within your network?
  (If yes: please give examples)

Strategic Innovation

- To what extent and in what way does your company apply a new and unique business model?
- To what extent and in what way does your company create new and unique value to the customers?
- To what extent and in what way does your company cater to a new and unique customer base?

Outcomes

- To what extent does your company sell products/services that your customers do not yet know that they want? (Please give some examples)
- In what way does your company benchmark against competitors within your industry? (Please give some examples)

Appendix B – Organizational Charts

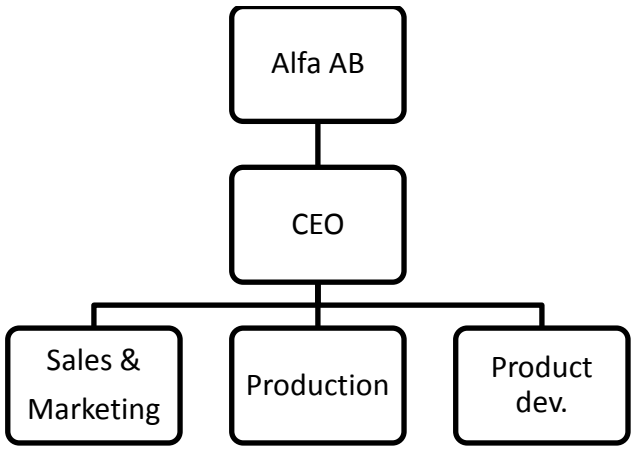

Figure 10: Alfa AB's organizational chart.

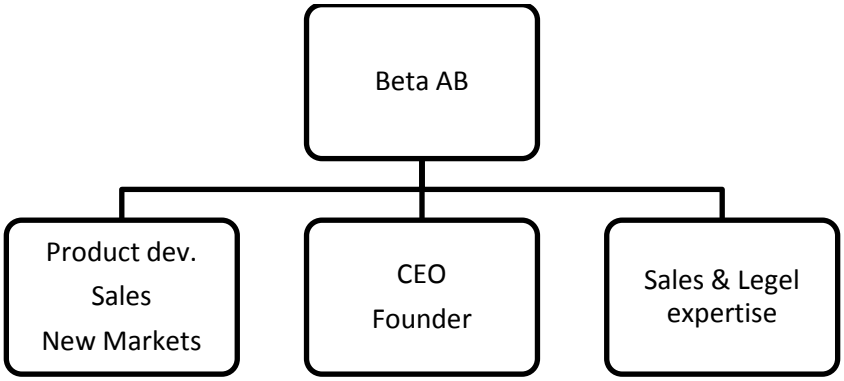

Figure 11: Beta AB's organizational chart.

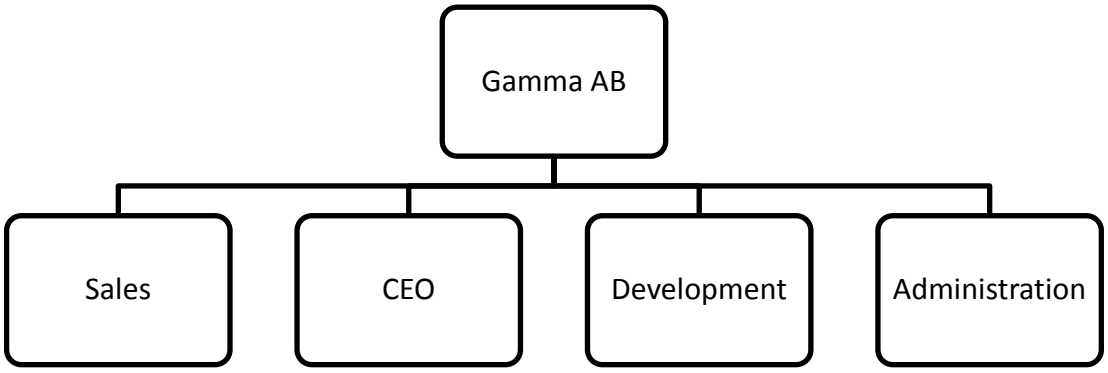

Figure 12: Gamma AB's organizational chart.

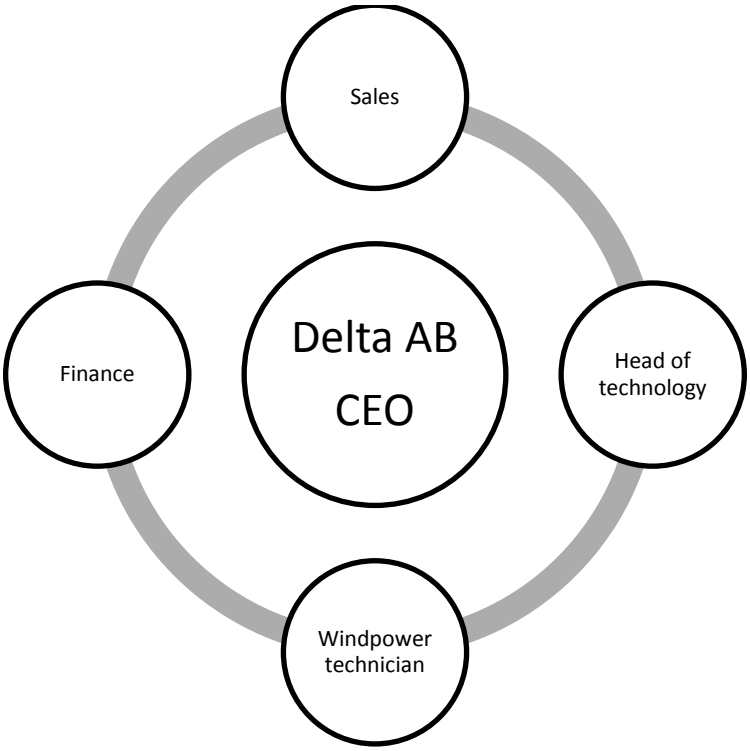

Figure 13: Delta AB's organizational chart.

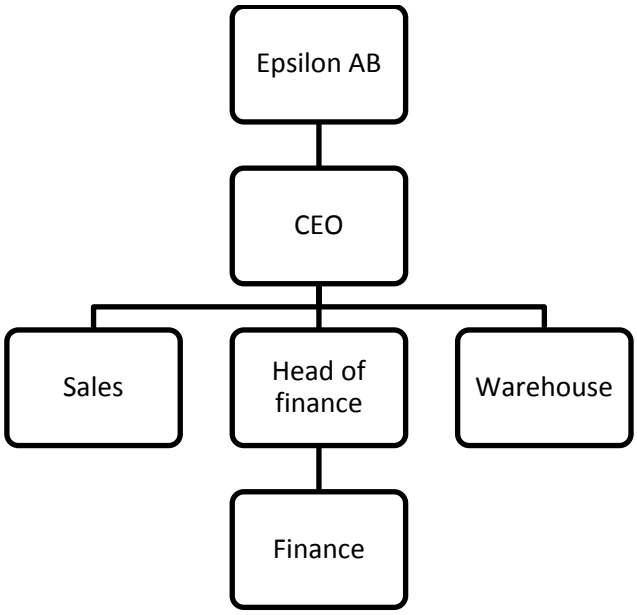

Figure 14: Epsilon AB's organizational chart.

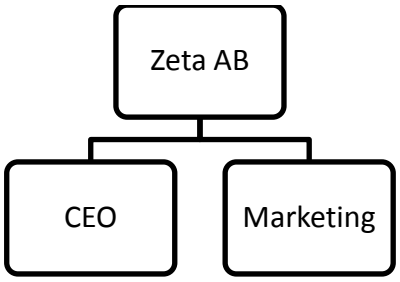

Figure 15: Zeta AB's organizational chart.

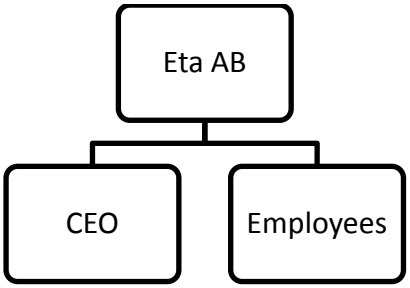

Figure 16: Eta AB's organizational chart.

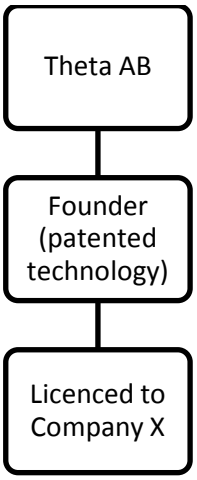

Figure 17: Theta AB's organizational chart.

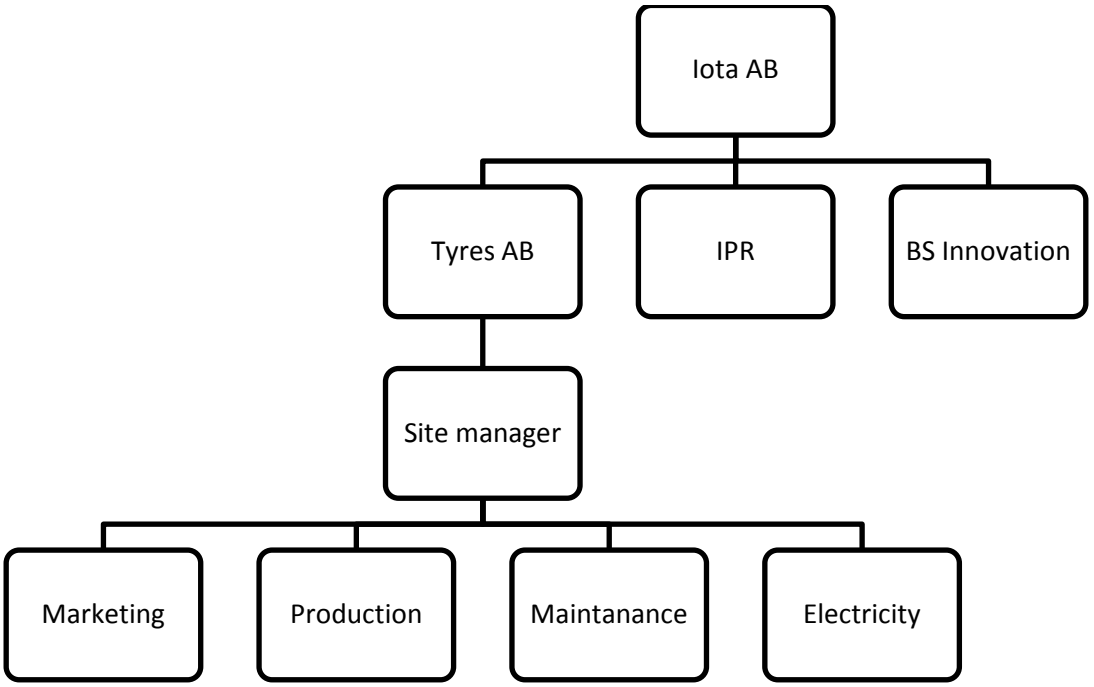

Figure 18: Iota AB's organizational chart.

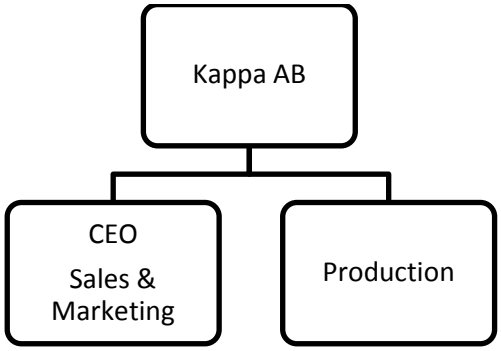

Figure 19: Kappa AB's organizational chart.

Appendix C – Strategic Innovation Contributions

Table 10: SI contributions (influenced by and adapted from Berghman, 2006).

Publication	Term (publication)	Definition(s)	Key element(s)
Normann & Ramirez, 1993	Value reinvention/ Value Constellation (From value chain to value constellation: designing interactive strategy)	"Their [successful firms'] focus on strategic analysis is not the company or even the industry but the *value-creating system* itself, within which different economic actors […] work together to *co-produce* value. Their key strategic task is the *reconfiguration* of roles and relationships among this constellation of actors in order to mobilize the creation of value in new forms and by new players […]. (: 66) "The result is an integrated business system that invents value by matching the various capabilities of participants more efficiently and effectively than was ever the case in the past." (: 67)	• Value reinvention surpasses firm boundaries towards the entire value-creating system of different economic actors → reconfiguration of roles and relationships • Distinction between products and services is breaking down • Value has become more dense: more opportunities for value creation packed into one offering • Conceive entire value-creating system: design, mobilize and train players
Baden-Fuller, 1995	Strategic innovation/ Strategy innovation (Strategic innovation, corporate entrepreneurship and matching outside-in to inside-out approaches to strategy research)	"Strategy innovation is a new configuration of the organization involving new routines, new skills, and new competencies, which either has altered, or has the potential for altering, the rules of competition in an industry" (: S7) Classification of strategic innovations: "those that alter the balance of power within an industry or market sector, which I call the *rules of the game;* and those that alter the geographical, product or service boundaries which I call the *boundaries of the sector"* (: S7) "Some innovations introduce a new set of rules and a new set of boundaries simultaneously" (: S8)	• Staircase of organizational innovative capacity, by the differential effects of the innovations on the firm and its environment (industry rules): 1) renewal (no external effect, large internal effect) → 2) rejuvenation (large external effect, large internal effect) → 3) leadership innovation (large external effect, small internal effect) • A firm's corporate entrepreneurship (proactiveness, teamwork, learning), relative to its competitors' entrepreneurship, determines a firm's strategic innovation capacity

Markides, 1997	Strategic innovation (Strategic innovation)	"Strategic innovation occurs when a company identifies gaps in the industry positioning map, decides to fill them, and the gaps grow to become the new mass market" (: 12) "Strategic innovation takes place when a company tries to satisfy customer needs based on new strategic assets that are unfamiliar to existing competitors" (: 20)	• Break rules of the game: change game, not play better • Not always appropriate strategy (depends on nature of industry, positioning, etc.), is just one possibility; focus of article is not on 'when?', but on 'how?' • Gaps: 1) new/neglected customer needs, 2) new/neglected customer segments, 3) new ways of producing/delivering/distributing existing/new products/services to existing/new customer segments • Gaps can be identified by luck, experimenting, unrelated actions, or proactive thinking approach • Proactive thinking approach: redefine the business 'who-what-how' + start thinking process in different sequence → later on institutionalize innovation • May start out as niche, but is no niche strategy
Kim & Mauborgne, 1997	Value innovation (Value innovation: the strategic logic of high growth)	(no formal definition)	• Findings based on large cross-industry, international research: high-growth • companies (revenues & profits) differ from low-growth companies in their strategic logic (no difference in start-up or not, private-public, young-old mgrs) • Value innovation logic = 1) industry assumptions: shape industry conditions, 2) strategic focus: competition is not benchmark but quantum leap in value (reshape industry's value curve), make the competition irrelevant, 3) customers: no segmentation, target mass by stressing what all customers value, let some existing customers go, 4) assets & capabilities: leverage but if needed, build new, 5) product & service offering: total solution offering, beyond industry's traditional boundaries • LT: Fundamentally different value curve →

			geographical expansion & operational efficiency → econ. of scale → beat competition (imitation) *or* new value innovation on different value platform (product, service, or delivery)
Markides, 1998	Strategic innovation (Strategic innovation in established companies)	"A fundamental reconceptualization of what the business is all about that, in turn leads to a dramatically different way of playing the game in an existing business" (: 32) "When a company identifies gaps in the industry positioning, goes after them, and the gaps grow to become the new mass market" (: 33)	• Most Sis come from new entrants but possibly also from established industry players • Identify and exploit new who-what-how positions • 4 major obstacles established companies need to overcome: 1) inertia of success, 2) know what to change into, 3) know when the idea is a 'winning idea', 4) how to implement
Hamel, 1998	Strategy innovation (Opinion: strategy innovation and the quest for value)	"Strategy innovation is the capacity to reconceive the existing industry model in ways that create new value for customers, wrong-foot competitors, and produce new wealth for all stakeholders. Strategy innovation is the only way for newcomers to succeed in the face of enormous resource disadvantages, and the only way for incumbents to renew their lease on success" (: 8)	• In a discontinuous world strategy innovation is the key to wealth creation, i.e. non-linear strategies to invent new industries or dramatically reinvent existing ones • The goal is not to have earnings exceed the cost of capital but to earn a disproportionate share of the industry wealth creation (= share of total market capitalization of all firms in a • particular competitive domain) • Goal is game of strategy innovation (revenue growth), not cost cutting • Strategy creation is emergent → create organizational conditions to stimulate emergence: 1) new voices, 2) new conversations, 3) new passions, 4) new perspectives, 5) new experiments
Markides, 1999	Strategic innovation (A dynamic view of strategy)	"New strategic position" (new "who", new "what", or new "how") (: 58) "Proactively breaking the rules in an industry" (: 59) "Proactively establishing distinctive strategic positions that were critical to shifting market share or creating new markets" (: 59-60)	• Successful companies continuously question the basis of their business and the assumptions behind their successful formulas • Two options for established companies: 1) become the innovator (need for ambidexterity), 2) exploit someone else's innovation (monitoring system to recognize early SIs, prevent structural and cultural inertia, processes to experiment, build right

			competences, manage transition to new strategic position)
Markides, 1999	Break-through strategy (Six principles of breakthrough strategy)	(no formal definition) Play the game differently, break the rules of the game by identifying new who-what-how combinations.	• Often SI comes from small niche players or new entrants (because established companies focus too much on 'how', i.e. becoming better instead of different), but established players cannot afford not to strategically innovate • 6 fundamental principles for every breakthrough strategy: 1) choose a unique strategic position, 2) generate as much options as possible, 3) make clear choices among options, 4) combine choices into 'reinforcing mosaic', 5) mosaic should fit with firm's environment without sacrificing flexibility, 6) appropriate organizational support for mosaic
Pitt & Clarke, 1999	Strategic innovation (Competing on competence: a knowledge perspective on the management of strategic innovation)	"The purposeful orchestration and directed application of organizational skills and knowledge" (: 301)	• Management of strategic innovation = management of knowledge deployment. - Manage two counter-acting learning cycles (formal + interactive cycle) - Balance conflicting resource constraints and innovation priorities within and between three innovation domains: entrepreneurial domain, engineering domain, direction of innovation domain.
Kim & Mauborgne, 1999	Value innovation (Strategy, value innovation, and the knowledge economy)	"Value innovation is quite different from building layers of competitive advantages and is not about striving to outperform the competition. Nor is value innovation about segmenting the market and accommodating customers' individual needs and differences. Value innovation makes the competition irrelevant by offering fundamentally new and superior buyer value in existing markets and by enabling a quantum leap in buyer value to create new markets" (: 42-43)	• Value innovation is innovation outside the conventional context; innovation not • as technology but as value → buyer, not competition, at the center stage of strategic thinking • Value innovation anchors innovation with buyer value (no mere technological • innovation, no mere value creation) • Innovations are endogenous (not determined by market conditions) → importance of knowledge and ideas → ease of spillovers, imitation → strategic pricing for demand creation + target costing for profit creation → rapid economies of scale → imitators at cost

			disadvantage
Markides, 2000	Strategic Innovation (Strategy as balance: from "either-or" to "and")	"Redefining the business" (: 6) "when a company is able to switch from its dominant way of thinking to an alternative way" (: 6)	• Active thinking: start thinking process from different angles (e.g. external versus internal analysis) • Combination of emerging and planned strategy: creative and intuitive but supported by logical and rational analyses
Govindarajan & Gupta, 2001	Strategic innovation (Strategic innovation: a conceptual road map)	(no formal definition) Radically change the rules of the game (: 3)	• 3 domains where rules of the games can be changed: • Who: redefinition of customer base by uncovering a hidden but large customer segment • What: reinvention of customer value by discrete products to total systems and solutions • How: redesign end-to-end value chain architecture to increase value and/or slash costs
Larsen, Markides & Gary, 2002	Strategic innovation (Imitation and the sustainability of competitive advantage)	(no formal definition)	• Results demonstrate that interorganizational imitation in an industry decreases average firm profits. Continuous SI is capable of sustaining excess profits on a company level. It may also increase average industry profitability, hence rejuvenating the industry.
Markides & Charitou, 2002	Strategic innovation (Competing with dual strategies)	"different and conflicting business model" (: 3) New business models "emphasize different product or service attributes to those emphasized by the traditional business models of the established competitors" (: 4)	• Cfr. Markides & Charitou (2004)
Markides & Geroski 2003	Strategic innovation (Teaching elephants how to dance and other silly ideas)	(no formal definition)	• Innovation = discovery of idea & initial market testing (pioneering) + mass market consolidation (scaling up). Pioneers seldom dominate markets afterwards. Established companies are better fit for the latter activity. They should focus on 'scaling up' markets discovered by pioneers. • Scaling up can be done by standardizing

			products, cutting prices, scaling up production, creating distribution networks, building alliances, etc.
Markides & Geroski 2003	(No specific, but radical innovation is understood) (From creating to conquering markets: how mature firms innovate)	(no formal definition)	• Pioneers often do not have real first-mover advantages: established firms do • 6 scale-up strategies: 1) focus on average customer (price!), 2) drive down costs (market share → econ. of scale), 3) no technological gimmicks but reduce customer risk by branding and direct communication, 4) build distribution network, 5) alliances with key suppliers and producers of complementary products, 6) protect market by exploiting first-mover advantages • Underlying competences required for these strategies are exactly where established firms excel
Charitou & Markides 2003	Disruptive strategic innovation (Responses to disruptive strategic innovation)	"Strategic innovation means an innovation in one's business model that leads to a new way of playing the game. Disruptive strategic innovation is a specific type of strategic innovation – namely, a way of playing the game that is both different from and *in conflict with* the traditional way" (: 56)	• "Different from" = in scope, differentiation, manufacturing systems, etc…; "in conflict with" = different KSFs, requires new combination of activities (e.g. distribution), new supporting cultures & processes, new customers, etc… • Characteristics of disruptive SI: 1) emphasis on different product or service attributes, 2) usually starts out as small, low-margin business, 3) grows to capture a large share of established market • 5 ways for established firms to respond: 1) focus on and invest in traditional business, 2) ignore the innovation, 3) attack back by disrupting the SI, 4) adopt the innovation by playing both games, 5) embrace the SI completely and scale it up • Choice of appropriate response dependent on ability to respond & motivation to respond
Markides & Charitou, 2004	Strategic innovation (Competing with dual	"Using radically different business models" (: 22)	• 4 strategies to manage dual business models dependent on nature of conflicts between new & old business model and strategic

	business models)		relatedness between new & old business model: 1) separation, 2) phased separation, 3) phased integration, 4) integration • Success factors for separation: operational & financial autonomy, own culture & budgetary systems, own (internal) CEO • Success factors for integration: consider SI as opportunity instead of threat, leverage existing, approach in pro-active and strategic manner, do not suffocate SI by existing policies
Markides, 2004	Radical innovation (Rethinking innovation)	"An innovation is considered radical if it introduces major new value propositions that disrupt existing consumer habits, and it undermines the competences and complementary assets on which existing competitors have built their success. This is the kind of innovation that creates entirely new markets" (: 36)	• Pioneer often lose from established firms in dominating markets + established companies can become more innovative, but can not simply take over the organizational characteristics of pioneers in radical innovation → established firms should attack when the market is just created, steal away innovation from pioneers, and should focus on scaling up (and dominating) the new market (6 strategies, cfl. Markides & Geroski, 2003)
Markides & Geroski, 2004	4 types of innovation/ radical innovation (Racing to be 2nd: conquering the industries of the future)	"Innovation are considered radical if they meet two conditions: first, they introduce major new value propositions that disrupt existing consumer habits and behaviors […] and second, the markets they create undermine the competences and complementary assets on which existing competitors have built their success" (: 27)	• 4 types of innovation, depending on their effect on a) consumer behavior and b) competitors' competences: 1) incremental innovation, 2) major innovation, 3) strategic innovation, 4) radical innovation • Radical innovation: create brand new markets, disrupt both consumers and competitors, based on different set of scientific principles, result from a haphazard supply-push process: first-mover advantages for the ones that scale up the market (cfr. Markides, 2004)
Govindarajan & Trimble, 2004	Strategic innovation (Strategic innovation and the science of learning)	"A strategic innovation is a creative and significant departure form historical practice in at least one of three areas. Those areas are design of the end-to-end value chain […]; conceptualization of	• Conventional planning & control systems can create barriers in strategic experiments (as initial predictions may not match eventual outcomes) → Planning practices in strategic experiments must emphasize learning, not

		delivered customer value […]; and identification of potential customers […]" (: 69)	accountability • Apply 'theory-focused planning': 1) no detailed figures, but focus on small number of critical of critical unknowns, 2) focus on assumptions underlying the predictions, 3) use trend graphs, 4) review outcomes frequently, 5) look at trends over time, 6) no financials but leading indicators
Schlegelmilch, Diamantopoulos & Kreuz, 2003	Strategic innovation (Strategic innovation: the construct, its drivers and its strategic outcomes)	"Strategic innovation is the fundamental reconceptualization of the business model and the reshaping of existing markets (by breaking the rules and changing the nature of competition) to achieve dramatic value improvements for customers and high growth for companies." (: 118)	• There are 3 key elements of strategic innovation: 1) fundamental reconceptualization of business model, 2) reshaping of existing markets, 3) dramatic value improvements for customers • Drivers of SI: culture, process, people, resources • Outcomes of SI: new competitive positioning, customer value
Styles & Goddard, 2004	Strategic innovation (Spinning the wheel of strategic innovation)	(no formal definition) Invention of new business models or strategies (: 63)	• Successful firms in mature industries do exist: → they invented a new game and are genuinely different from industry rivals: they broke out of industry's strategic convergence: challenged and overturned some accepted industry *assumptions* (different theory on how to compete), did something genuinely different that *customers* like and reward, constructed different *business model* • 'Strategy wheel' = tool for strategic innovation creation: a) performance measurement, b) analyze current business model, c) competitor analysis, d) challenge industry assumptions, e) understand the future (macro-environment), f) understand the future (industry), g) develop strategic ambition, h) new business design
Govindarajan & Trimble, 2005	Strategic innovation/ strategic experiments (Organizational DNA for strategic	"Through [the] this process of strategic innovation, organizations explore fundamental questions of business definition, by altering at least one of the following: the identification of potential	• Strategic experiment must deviate from traditional business ('forgetting') but must simultaneously exploit the latter's existing assets and capabilities ('borrowing') • 'Dual-purpose organization' has ideal DNA

	innovation)	customers […]; the conceptualization of delivered customer value […]; the design of the end-to-end value-chain architecture […]. Strategic innovation proceeds with strategic experiments" (: 48) Strategic experiments: 1) depart form the firm's proven business definition (and its underlying assumptions about success formulas), 2) leverage existing assets & capabilities, 3) are not simply product-line extensions, geographic expansions or technological improvements, 4) target emerging and poorly defined industries, 5) are launched before any competitor, no clear success formula, 6) have high potential for revenue growth, 7) require development of some new knowledge & capabilities, 8) are confronted with multiple uncertainties (customers, value chain,..), 9) remain unprofitable for some time, 10) produce feedback that is delayed and ambiguous (: 48)	for strategic experiments • Isolate strategic experiment in separate subunit, but select and establish small number of operational links with mother company • Enumeration and explanation of specific aspects of the 'forgetting challenge' and of the 'borrowing challenge' are provided in article
Berghman, 2006	Strategic innovation (Strategic innovation capacity)	"Strategic innovation entails the creation of new and substantially superior customer value by a new and fundamentally different way of playing the game in an existing industry. It implies the deviance from traditional industry assumptions and conventions and, as such, has the potential of altering the rules of the game in an industry. Strategic innovation can be achieved by redefining the business model and the roles and (power) relationships in the industry." (: 31)	• Deliberate interventions can foster strategic innovation capacity • There are 3 key mechanisms that stimulate strategic innovation: 1) recognize new external customer/market information, 2) assimilate this information, 3) act on the information
Davenport, Laibold & Voelpel, 2006	Poised strategy / the new strategic management	"Poised strategy to manage multiple business models for sustaining and disruptive value innovation in	• Purposeful energetic rejuvenation, $E_b=MI^2$ ($Energy_{business}$ = Management (Innovation * Speed))

	approach for the innovation economy (Strategic management in the innovation economy)	collaborative business networks." (: 168)	• Poised scorecard, PSC
Afuah, 2009	Strategic innovation / New game strategies (Strategic innovation: New game strategies for Competitive advantage)	"A strategic innovation is a game-changing innovation in products/services, business models, business processes and/or positioning vis-à-vis coopetitors to improve performance." (: 4)	• The AVAC (Activities, Value, Appropriability & Change) framework can be used to explore the profitability potential of a strategy.
Berghman, Matthyssens, Streukens & Vandenbempt, 2012	Strategic innovation (Deliberate learning mechanisms for stimulating strategic innovation capacity)	"A deviation of the industry rules of the game in order to offer new and substantially superior customer value." (: 41)	• Deliberate learning mechanisms for recognition, assimilation & exploitation can foster SI capacity • There is a value of investing in absorptive capacity; organizations can influence absorptive capacity even in domains where they lack prior experience
Sammut-Bonnici & Paroutis, 2013	Strategic innovation	Proposes a new dominant logic and thematic framework of SI, by merging the fields of strategic management and innovation management.	• New thematic framework consist of 7 high level themes: 1) types of strategic innovation, 2) environmental analysis and strategic innovation, 3) strategic innovation planning, 4) enabling strategic innovation, 5) collaborative networks, 6) managing knowledge, and 7) strategic outcomes and performance