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The role of capabilities in the business model transformation: The case of utilities companies

Master of Science Thesis
in the Management and Economics of Innovation Programme

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Göteborg, Sweden, 2012
Report No. E 2012:092

MASTER'S THESIS E 2012:092

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Chalmers Reproservice
Göteborg, Sweden 2012

Abstract

The purpose of this master thesis is to study the role of capabilities in the business model transformation in the wind-power business from the case of utilities companies. More specifically, this thesis is an attempt to explain the changes of business models in relation to the changes of capabilities. The changes of capabilities are visualized through the use of conceptual model which is created from the combination of literature from several authors. The empirical data is mainly based on the annual reports and publications of two utilities companies: Vattenfall and Göteborg Energi. The time range of this study is from 1995 to 2011. Thereafter the analytical description regarding the business model and the capabilities is presented.

The conceptual model visualizes the relationships between each particular type of dynamic capabilities and lower-order resources/capabilities. The conceptual model is finally used to explain the changes of business models of the studied companies from capability perspectives. The application of the model to the cases shows the capabilities that the companies had developed before they were able to change the elements in the business models. This conceptual model is an attempt to explain the co-evolution of business models and capabilities. The thesis is considered as the first step to provide the understanding of the dynamic capabilities regarding their types and importance and to lead the way for future research. The future research should aim for making the concepts of dynamic capabilities more practical for the researchers and applicable widely to the cases in the strategic management area.

Acknowledgements

This master's thesis has been conducted as a part of the master's program Management and Economics of Innovation. The supervision has been provided by Magnus Holmén at the Department of Technology Management and Economics. We would like to give grateful thanks to the supervisor.

Gothenburg, October 2012

Rangsan Ritthiphruk

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1 Introduction

This section introduces the underlying theories and concepts exploited in this thesis and the reasons for choosing these theories and concepts. Next, it is presented the background of the case studies and the rationale for using the selected set of concepts and theories to explain the phenomenon. The purpose of the thesis is explicitly presented in the next section.

1.1 Background

This report originates in the interest of the authors in the challenge that represents for firms to diminish the greenhouse emissions. Specifically, the objective of this report is to gain a better understanding how utilities companies are changing their business models and competences while introducing electricity from wind power in their product portfolio. This interest led to the development of a conceptual model where the dynamic capabilities concepts are applied in order to get some knowledge of the processes between business models and capabilities.

1.2 Problem framing

One of the main objectives of the dynamic capabilities framework proposed by Teece et al. (1997) is to study value creation and value capture by firms competing in rapid technological change environments. Rapid technological changes do not happen only because the interactions occurred in a marketplace but they also emerge from the management and exploitation of resources and capabilities both inside and outside of an organization.

According to Teece et al. (1997), 'dynamic capabilities' is defined as "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments". Recently, there has been a significant amount of literature elaborating on dynamic capabilities in terms of distinctive processes, asset positions and evolution paths and also different ways to develop those micro foundations of dynamic capabilities all of which are necessary in building competitive advantage of an organization (Teece, 2007, Teece et al., 1997, Dierickx and Cool, 1989, Hamel, 1991). There are different components of dynamic capabilities: adaptive (Chakravarthy, 1982, Hooley et al., 1992, Miles et al., 1978), absorptive capabilities (Cohen and Levinthal, 1990, Zahra and George, 2002a), innovative capabilities (Wang and Ahmed, 2004, Tushman and O'Reilly, 1997) and networking capabilities (Walter et al., 2006). Furthermore, (Winter, 2003) classified the capabilities into zero, first, second and third orders. An extensive body of literature has elaborated the theories and concepts over zero-order resources, second-order or core capability and the highest-order or dynamic capability. Dynamic capabilities have been addressed as a response to deal with strategic issues encountered in the organizations, but the authors of this thesis considered that this theory developed by management scholars is quite abstract and impractical for managerial purposes.

On the other hand, the business model concept has been developed and used widely by management. Business model is "a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm" (Osterwalder et al., 2004). In addition, business models analysis is a practical tool for companies in order to visualize the elements that add value to the business. The authors of this report consider that business model analysis by itself does not help to further develop the strategic direction of firms.

As mentioned before, dynamic capabilities and business models theories have been widely developed in the management field. However, there has been still little contribution in the academic field to relate both of the concepts together and explaining a way that they enhance the practicability and the strategic direction of each other. Although, Brink and Holmén (2007) deals with technological capabilities and business models by analyzing three start-up bioscience firms, the business model component of the study only relates to the value proposition. In this thesis, the business model and capabilities are considered as more extensive concepts. Furthermore, it is important to relate capabilities from different levels together in order to see the relationships among them, to point out the importance of each type of capabilities and how they affect the business models. In sum, to study the co-evolution of business models and capabilities with the development of a conceptual model with the aim of understanding the concepts in a new way and merge the existing gaps of literature in the area of dynamic capability.

1.3 Changing toward green energy

At the present time, nations and corporations are continuously developing strategies and policies for diminishing greenhouse gas emissions in response to climate change caused by human activities, partly claimed by politicians, policymakers and researchers. Furthermore, an entirely carbon-free power system must be operating by 2050 in order to meet the European Union (EU) goals on climate change, decarbonizing the energy sector is one of the main challenges faced by EU that implies an industrial revolution (Jacobsson et al., 2009). Dealing with the challenge of diminishing CO2 emissions, renewable energy has been developing as an alternative option to the increasing world energy consumption. In that sense, changing the energy market to a carbon-free power sector in 40 years is not an easy challenge.

From the facts mentioned above, a number of actors in energy sector have been changing from dealing with sole conventional energy businesses towards wind power and other renewable energy sources. A utilities company is one of the actors that are affected by this change. The role of the utilities companies is to operate and distribute energy and services to buyers or end-users. Therefore, it is essential for utilities companies to develop another mindset in terms of

processes, routines, resources, in order to generate the capabilities to compete in this forthcoming scenario that demands significant technological changes.

Compared with other types of renewable energy, the global wind power market has been significantly growing in the past decades due to technologies and governmental support. Global cumulative installed wind capacity increased from 6100MW to 197039 MW in 2010 (GWEC, 2010). Due to the increase of wind power generation in recent years, this report focuses on electricity production based on renewable energy sources generated from wind power.

1.4 Purpose

The purpose of this research is to study the role of capabilities in the business model transformation of two utilities companies. This master's thesis intends to answer the following research questions all of which will help achieve the purpose of this study.

***RQ1*:** What capabilities and resources have been developed in the wind power business during the past two decades?

***RQ2**:* What dynamic capabilities are key for the utility companies in the wind power business for the past two decades?

RQ3: How have the business models of the utility companies changed during a period of time?

***RQ4**:* How can the cases of the utility companies be explained by means of the developed conceptual model?

1.5 Scope and Limitations

The scope of this master thesis includes the analysis of activities performed by two utilities companies regarding the introduction of wind power electricity production. This analysis is completed in terms of business models and capabilities. The companies chosen to be studied for this thesis are Göteborg Energi and Vattenfall. The analysis of activities of these companies is based almost in public information, secondary sources such as annual reports, news, etc . The analysis of the empirical data of Göteborg Energi and Vattenfall empirical data is used to develop a conceptual model of the relationships between resources, capabilities and dynamic capabilities. However, it is important to mention that in order to have a more robust concept model development, it is needed to study the activities related with capabilities performed by other energy companies, companies not engaged in the energy business. Furthermore, detailed information from the inside the company is a key element in determining how capabilities are

managed and developed in detailed. This insider information from the companies is lacking in this master thesis.

1.6 General outline

The outline of the thesis is described as follows: in Section 2 it is presented a literature review of frameworks on resource based view, capabilities and dynamic capabilities. Additionally, it is presented the business model concept. This literature review will help the reader to understand the underlying concepts of this thesis. In the section 3, the methodology of the study is introduced. Later, Section 4 presents the empirical data concerning different activities and resources of Vattenfall and Göteborg Energi. In Section 5 it is presented the analysis of the empirical data in terms of capabilities and business models. Finally, Section 6 presents a conceptual model development that is supported with the analysis. In section 7 and 8 are presented the discussions and conclusions, respectively.

2 Theoretical Framework

In this section is presented the theoretical framework. It will help to understand the concepts involved in the research question. This section covers the literature review with the following concepts: resource-based view, capabilities, dynamic capabilities and business models. In addition, a conceptual model is presented in order to understand dynamic capabilities.

2.1 Literature Review

2.1.1 Resource-based view

In order to understand dynamic capabilities, it is important to highlight the broad range of literature that attempt to explain and define the resource based view. It is often proposed as a response for dealing with strategic management issues. The resource based view literature contains the underlying elements that help us understand how dynamic capabilities are developed. Complementing this, Teece et al. (1997) states it is likely to say that dynamic capabilities framework is an extension of the resource based perspective, specifically, the resource based view is reflected into firms strategy from a static perspective emphasizing in efficiency following the tradition of mainstream economics, on the other hand the dynamic capabilities deals with the dynamic and systemic nature of the firms while refreshing the resource base in order to compete in a dynamic and competitive market.

The resource based view has been studied from different perspectives such as different as distinctive competences as the underlying element of the resource-based, this distinctive competences are concerned with the direction, rate and performance effects of the diversification strategy. Additionally, the resource based view has been analyzed and studied following an organizational economics mindset along with evolutionary economics, transaction cost economics, property rights, property agency theory and positive agency theory (Mahoney and Pandian, 1992). In addition, resource based theory could be seen as a counterpart regarding the knowledge comprised in the Harvard and Chicago industrial organization studies (Teece et al., 1997).

The origin of rents in the resource based view comes from scarce firm-specific resources and not from the positioning of the product point of view. Competitive advantage comes from difficult to imitate resources developed by each and individual firm following the idiosyncratic elements processes created within by the resources of the organizations. These resources cannot be changed overnight, they are have been continuously changing and adapting through time. In that sense, it requires time and monetary assets in order to attempt to change the resources nature of a firm (Wernerfelt, 1995).

Resource-based view has been framed in a dynamic context. As stated by Teece et al. (1997) “competition may be translated into the resource-based framework by considering the firms

new combinations of resources as a means of achieving the goal of sustained competitive advantage following Shumpeter views of the competitive process as dynamic involving uncertainty, struggle and disequilibrium" (Teece et al., 1997).

2.1.2 Core competence, core capabilities, path dependence

According to Long (1995, p.13), "core competencies" is defined as "the special knowledge, skills, and technological know-how that distinguish you from other firms". Long and Vickers-Koch (1995) further argues that although the terms competencies and capabilities have been frequently used interchangeably, there are still distinct aspects differentiating these two terms. Stalk et al. (1992) mentions that core competences refer to the firm's proficiency in technology and production which are only parts of the value chain. In contrast, capabilities cover the firm's abilities across the value chain. As illustrated in the **Figure 1** from Long and Vickers-Koch (1995), core capabilities result from the combination between the core competencies and strategic processes.

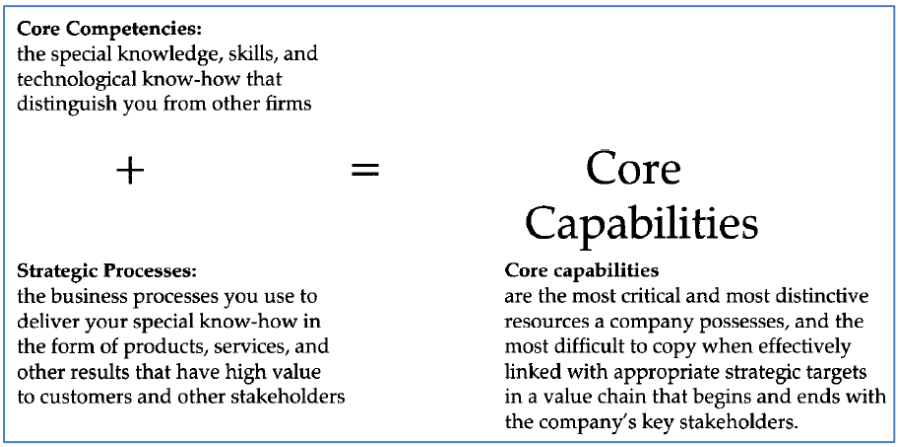

Figure 1 (Long and Vickers-Koch, 1995)

Banerjee (2003) mentions the definition of core competencies as strategic differences that a firm can maintain with others on the basis of resources available inside the organization. Core competences can determine the firm's future path, therefore should be properly developed and utilized (Hafeez et al., 2002). Prahalad and Hamel (1990)defines a core competency as "the collective learning in the organization, especially how to coordinate diverse production skills and integrate multiple streams of technologies". According to Sanchez (1996), competence is "ability to sustain the coordinated deployment of assets in the ways that help a firm achieve its goal". Another definition of core competence defined by Collis (1991) is "the vector of the

irreversible assets along which the firm is uniquely advantaged. Although the vector is multidimensional, reflecting the entire system of tangible and intangible resources that the organization has in place, it is commonly represented on a single plane" (p. 51). The concepts defined by Collis and Banjaree emphasize the aspect of distinction and uniqueness of resources that the firm can use to compete over other competitors. On the other hand, the definitions given by Prahalad and Hamel together with Sanchez et al. concern more in the accumulation and integration of resources and expertise generated by the firm. The concept of core competences has been widely used in several dimensions such as capabilities, knowledge and learning related to each other; thus this has led to some confusion. Three reasons to this confusion are given by Chiesa and Manzini (1997): (1) the interchangeable use of different terminologies for similar concepts; (2) the levels of activities are not clearly identified; (3) a lack of dynamic view of competences that can describe how to create and transform those competences. Moreover, this confusion causes problems when researchers intend to identify the competences (Hamel and Prahalad, 1994). In addition, Hamel and Prahalad (1994) states different perspectives of core competences that should be taken into consideration for the company: (1) core competency identification; (2) creation of core competence acquisition agenda; (3) core competence generation; (4) core competence utilization; (5) core competence leadership maintenance.

According to Leonard-Barton (1992), capabilities are considered as core capabilities when they provide a firm with distinct strategic advantages over other competitors. To recall the main difference between core competences and core capabilities mentioned by Long (1995) above in this section, it can be simply viewed that compared with core competences, core capabilities are relatively more critical and distinctive. Moreover, driven by strategic processes relating the interaction with the market and other stakeholders, core capabilities are essential for competitive strategy formation. Winter (2003) defines the term organizational capability as "high-level routine (or collection of routines) that, together with its implementing input flows, confers upon an organization's management a set of decision options for producing significant outputs of a particular type" (p. 991). Leonard-Barton (1992) views core capabilities from a knowledge-based perspective and defines the term as "the knowledge set that distinguishes and provides a competitive advantage" (p. 113). In addition Leonard-Barton further proposes four dimensions of the set of knowledge (**Figure 2**): (1) people knowledge and skills; (2) knowledge embedded in technical systems; (3) knowledge created by managerial systems; (4) values and norms.

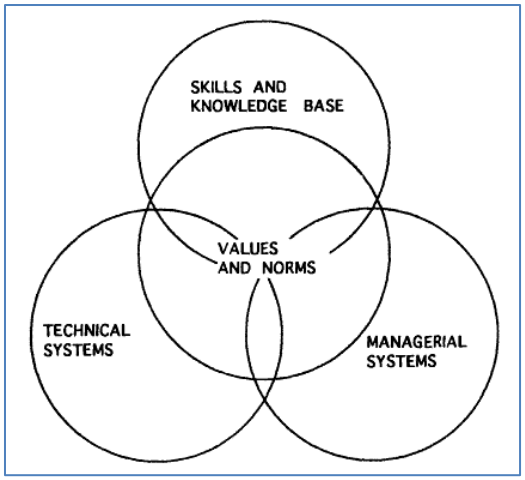

Figure 2: The four dimensions of core capability (Leonard-Barton, 1992)

In order to create competitive advantages from core capabilities, a company has to focus not only on its own inside capabilities, but it also has to look for market opportunities at the same time (Long, 1995). Moreover, Long (1995) mentions some key practical suggestions for a firm to balance the internal capabilities and external opportunities or so called strategic targeting.

Core competences are very linked with the concept of path dependence. In that sense, path dependence is an attempt to explain the phenomena of past decision making could constrain or expand the variety of future possible choices. The idea of path dependence is that "where a firm can go is a function of its current position and the paths ahead. Its current position is often shaped by the path it has traveled (Teece et al., 1997)."

2.1.3 Dynamic capabilities

According to Teece et al. (1997), 'dynamic capabilities' is defined as "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments". Winter (2003) defines dynamic capabilities as abilities to create or improve ordinary capabilities of firms. From those mentioned definitions, it means that not only does a firm have to rely on competitive advantage that is built from better position in terms of resources; it needs processes to deal with the resources. These processes are mentioned in Eisenhardt and Martin (2000) as ones that can integrate, reconfigure, gain and release resources to match and even create market change. In addition, Teece (2007) mentions about micro foundations that shape a firm's dynamic capabilities and those micro foundations include the distinct skills, processes, procedures, organizational structures, decision rules and discipline.

Winter (2003) differentiate resources and capabilities in hierarchical order. Resource is considered as the "zero order" which is then combined together among several types of

resources and forms capabilities regarded as the “first order”. It is also claimed that although a firm has accomplished developing these two components, it is unnecessarily successful and survive in the industry. When core capabilities are formed from core competences and strategic processes, they lead to competitive advantages (Long, 1995). It is the core capabilities that are classified as “second order” in Winter (2003). Finally dynamic capabilities are regarded as the “third order”. In addition, there are several studies describing clear distinctions between ordinary or substantive capabilities and dynamic capabilities. Winter (2003) and Zahra et al. (2006) distinguish the two types of capabilities by defining the former as abilities to produce desired outputs in terms of both tangible and intangible while defining the latter as abilities to change the way outputs are produced. Rindova and Kotha (2001) mentions dynamic capabilities enable the changes in substantive capabilities over time. However, by having dynamic capabilities, it is not certain that a firm will obtain higher performance. Managing these capabilities strategically is required in order to increase the performance (Zahra et al., 2006).

Teece D. J. (1997)proposes three fundamental units of analysis in the paradigm of dynamic capabilities: processes, positions and paths. Managerial and organizational processes are shaped by a firm’s asset position and its evolution path.

According to Teece et al. (1997) managerial and organizational processes refer to organizational routines and they include three types of activities: coordination/integration, learning and reconfiguration. The studies on organizational routines have been divided into two streams: one stream which mentions that the routines lead to organizational inertia and stability (Nelson and Winter, 1982; Freeman 1984) and the other research stream viewing the routines as a dynamic system that can continuously change (Cohen, 1991; Pentland and Feldman, 2005). However, the concept of dynamic capability tends to support the former point of view.

Integration of technology and external activities can put a firm in a better strategic position. Those external activities include strategic alliances, buyer and supplier partnerships and technology collaboration (Teece et al., 1997; Droge et al., 2004). In contrast, internal integration can facilitate informational flows and the coordination of investment plans (Teece 1999). From product development perspectives, internal integration includes practices that help a company bridge the boundary between design engineering and manufacturing. Grant (1996)proposes that integration of knowledge can lead to organizational capability. This knowledge can be in the form of individual organizational members. Therefore, in order to achieve competitive advantage, firms have to utilize as much knowledge buried in their staffs.

Coordination has been considered as an important organizational behavior that will enable the effectiveness. The higher the level of coordination the greater the organizational performance (Cheng and Miller, 1985). Moreover, the studies from Cheng (1984)show that the level of

coordination has a positive relationship with productivity. Coordination is referred as integration of different organizational activities to accomplish organizational tasks or objectives. This has to be done due to the fact that each organizational activity or unit is conducted and operated interdependently (Kim, 1988). This idea is emphasized by Teece et al. (1997) mentioning that productive systems are restricted with a high level of interdependency. The changes that occur in one level will definitely have impacts on other levels. The level of analysis in the studies of coordination can also be found on the industrial level. This coordination is in the other word called inter-organizational relationships (Van de Ven and Walker, 1984). However, the focus of studies related to the concept of coordination for dynamic capabilities mentioned in Teece et al. (1997) is inside a firm.

Reconfiguration is considered as a type of dynamic capabilities and refers to transfer processes for replicating, transferring and recombining resources (Eisenhardt and Martin, 2000). Majumdar (1999) mentions that key strategic advantages of a firm are formed from transformation and utilization of resources both of which occurs only if the effective coordination in the firm is put in place. It is also concluded that large firms might have difficulties to transform themselves due to the problem relating to downsizing. In this case, when the company is downsized, it is dispersed in terms of assets and resources. Danneels (2002) mentions leveraging existing resources by using the resources in new ways as one practice of exercising dynamic capabilities. The case of Smith Corona, a typewriter company was studied by Erwin Danneels. The study shows that the company leverages its brand, distribution channels and customer understanding (Danneels, 2011).

As the resource and capabilities change over time in order to sustain competitive advantages, it is essential to explain the changes in relation to the evolution over time. Helfat and Peteraf (2003) propose the concept of capability lifecycle which consists of three different stages: the founding stage, the development stage and the maturity stage. In the founding stage, capabilities are created from a team of individuals who possess such capitals as knowledge, experience and teamwork (Adner and Helfat, 2003). Combined those capitals with resources including financial support and technology, new types of capabilities can be developed. In the development stage, the types of capabilities that will be developed are the ones perceived by the team as feasible and facilitated by their experiences. Helfat and Peteraf mention further that the team can acquire these capabilities by two ways either resemble from other companies or start the processes from the beginning. The development stage will end at some transition points which are difficult to specify. The decision regarding the level of capability development is determined by the team and its cost-benefit consideration. In the maturity stage, most of the activities concerns capability maintenance. When the time passes, these capabilities can become parts of the organizational routines and exist implicitly in the firm's activities (Helfat and Peteraf, 2003).

Figure 3 illustrates the curve of capability level measured against the amount of activity. As mentioned, the first part of the curve (including the founding and development stages) represents the rise of capability level while the second part or the maturity stage shows the stability as the amount of activity increases.

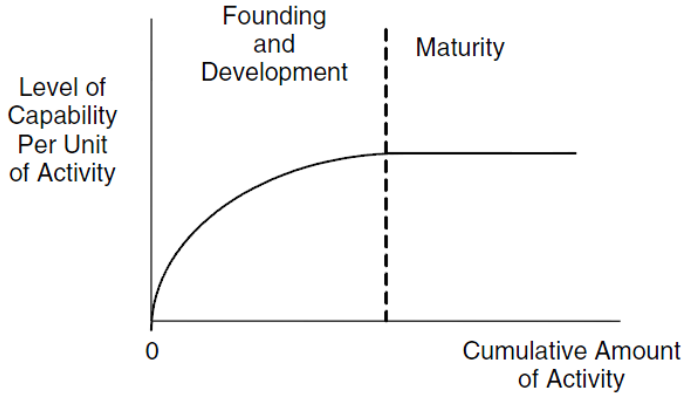

Figure 3 (Helfat and Peteraf, 2003)

2.1.4 Types of dynamic capabilities

By considering definitions of dynamic capabilities mentioned above, the dynamic capabilities can be categorized according to its different actions: To integrate, reconfigure, gain and build resources. Moreover, Danneels (2011) mentions resource alteration as a way of utilizing dynamic capabilities of firms. The resource alteration process that is studied in by Danneels consists of four different resource-management activities: leveraging existing resources, creating new resources, accessing external resources and releasing resources. However, there are also other streams of literature that focuses the study on specific types of dynamic capabilities each of which represents not only ability for a company to manage both of its tangible and intangible resources, but also ability to interact effectively with other stakeholders in the industry. In the following sections, four types of dynamic capabilities will be elaborated: (1) adaptive capability; (2) absorptive capability; (3) innovative capability; (4) networking capability.

2.1.4.1 Adaptive capability

Adaptive capability is defined as the ability to identify and capitalize on emerging market opportunities (Chakravarthy, 1982; Hooley et al., 1992). According to McKee et al. (1989), market adaptiveness can be useful for an organization in order to cope with environmental

dynamism. Examples of activities that can be performed in managing adaptive capability include long-range market scanning, monitoring customers, building customer loyalty through marketing programs, developing extensive distribution network and lobbying governmental actors (McKee et al., 1989). The firm which is the most active in seeking new markets is hypothesized to have the strongest adaptive capability (Miles et al., 1978). However, a significant amount of literature focuses its studies about a trade-off that firms will face when adopting the adaptive capability (Abernathy and Wayne, 1974; Miles, 1982)(Abernathy, 1974, Miles, 1982). The trade-off relates to the inability to deal with both internal and external focus.

An efficient organization is one that has a narrow scope of activities and attention with less variation in standard process. Therefore, the action of involving with changing environment, as seen in a firm with high adaptive capability is considered as making the firm less efficient or a "wandering organization" (McKee et al., 1989; Zammuto, 1982). In contrast, a company with a high level of adaptability and external focus pursue a wider scope in order to achieve greater product-market opportunities. The level of flexibility is considered as important factor of an organization, therefore a small firm has more potential to develop this type of capability (Parida, 2008). In general, the study of adaptive capability is on the market level but the level of analysis can also be conducted on the micro level i.e. relating to individual customers or suppliers (Håkansson and Ford, 2002). Ansoff (1979) mentions that although a strategy chosen by a company determines the way it deals with the changing environment, a strategy is not an effective solution to a specific single problem. It is emphasized that adaptability is not only the ability to deal with changes of external environment, but also changes of processes inside the firm (Scott, 1971). In the early period, the studies regarding adaptation relates to the issue of whether adaptation of an organization occurs. However, recently the direction of the studies has been oriented to the issues of how and when it emerges (Gersick, 1994).

Adaptation can happen through product innovation due to the fact that creating new products has impacts on organizational processes and sometimes force the firms to adapt themselves to the environment (Brown and Eisenhardt, 1995; Eisenhardt and Tabrizi, 1995). Some literature relates the concept of adaptive capability to the open innovation (Chesbrough and Appleyard, 2007). Open innovation is defined as "an innovation paradigm shift from a closed to an open model" (Chesbrough and Appleyard, 2007). Miles et al. (1978) proposes that even if it is difficult and complex for a company to adjust itself to the changing environment in parallel with managing internal interdependent activities, it is still possible to predict the process of organizational adaptation by knowing patterns of organizational behavior.

2.1.4.2 Absorptive capability

The term “absorptive capacity” was coined by Cohen and Levinthal as “an ability to recognize the value of new information, assimilate it, and apply it to commercial ends” (Cohen and Levinthal, 1990). The sources of new information can be found from external side of an organization. New information can be obtained from suppliers, acquisition, collaboration and competitors (Inkpen, 1996; Ragatz et al., 2002; Peterson et al., 2003). When collaborating with suppliers, the level of supplier involvement can be different in some circumstances for instance either when the supplier only provides some useful suggestion for the design process or even is in charge of the whole process (Ragatz et al., 2002).

As described before the absorptive capacity concept by Cohen and Levinthal follows a neoclassical approach. In this approach resources were assumed to be equally distributed and available for competing companies, knowledge is available to everyone. In contrast, the definition of absorptive capacity from Cohen and Levinthal is reconceptualized by Lane and Lubatkin. In Lane and Lubatkin (1998), it is argued that “one firm’s ability to learn from another firm is argued to depend on the similarity of both firms’ (1) knowledge bases, (2) organizational structures and compensation policies, and (3) dominant logics”. According to Lane et al. (2006), a firm’s absorptive capability is divided into three types of learning each of which helps form a sequential process of external knowledge utilization. First, exploratory learning provides a firm with ability to recognize and understand valuable knowledge from the outside of the firm. Second, transformative learning is a sub-process that helps absorb the external knowledge into the firm. Third, exploitative learning helps the firm exploit the absorbed knowledge for commercial purpose or new knowledge development.

In recent years, the term absorptive capacity has been studied as a dynamic capability, Zahra and George (2002) proposes a reconceptualization of absorptive capacity as a dynamic capability. This reconceptualization consists of potential and realized absorptive capabilities. The definition given by Zahra and George (2002b) is a “set of organizational routines and processes by which firms acquire, assimilate, transform, and exploit knowledge to produce a dynamic organizational capability. For the purposes of this thesis, absorptive capacity will be used as absorptive capability following the dynamic nature of term developed by Zahra and George (2002a).

Likewise, for the past decade, there have been studies about open innovation paradigm proposed by Chesbrough (2003) and both the concepts of absorptive capacity and open innovation concept relates and reinforce well with each other. In **Table 1** is shown a brief summary of the differences between open and closed innovation.

Closed Innovation Principles	Open Innovation Principles
The smart people in the field work for us.	If we create the most and the best ideas in the industry, we will win.
To profit from R&D, we must discover it, develop it, and ship it ourselves.	External R&D can create significant value: internal R&D is needed to claim some portion of that value.
If we discover it ourselves, we will get it to the market first.	We don't have to originate the research to profit from it.
The company that gets an innovation to the market first will win.	Building a better business model is better than getting to the market first.
If we create the most and the best ideas in the industry, we will win.	If we make the best use of internal and external ideas, we will win.
We should control our IP, so that our competitors don't profit from our ideas.	We should profit from others' use of our IP, and we should buy others' IP whenever it advances our business model.

Table 1: Contrasting Principles of closed and open innovation (Chesbrough, 2003)

2.1.4.3 Innovative capability

The term "innovative capability" is defined by Adler and Shenbar (1990) as (a) ability to develop new products that can satisfy market needs; (b) ability to invent and apply processes for producing the new products; (c) ability to develop and adopt new product and process technologies to satisfy future needs; (d) ability to cope with competitors' technologies and activities and opportunities and risks created from them. Wang and Ahmed (2004) defines organizational innovativeness as "an organization's overall innovative capability of introducing new products to the market, or opening up new market, through combining strategic orientation with innovative behavior and process". There are a lot of alternatives regarding innovations such as product and process innovation or service innovation. There are five areas of innovativeness proposed in Wang and Ahmed (2004): (1) product innovativeness; (2) market innovativeness; (3) process innovativeness; (4) behavioural innovativeness; (5) and strategic innovativeness. Product innovativeness refers to the newness, novelty, uniqueness and meaningfulness of the products (Henard and Szymanski, 2001; Wang and Ahmed, 2004). From the fact that perception towards new products involves both market and producer, this makes market innovativeness closely relates to the product innovativeness. According to Ali et al. (1995), market innovativeness refers to a firm's potential to identify new market opportunities and to enter new markets. In contrast, this can relate to innovation in market research, advertising and promotion (Andrews and Smith, 1996). Process innovativeness refers to the introduction of new management and production processes (Wang and Ahmed, 2004). Wang

and Ahmed mention further about the behavioral innovativeness as relating to organizational cultures and commitment that help enhancing new ideas and innovation development. The behavioral innovativeness can be divided into three levels: individuals, teams and management. Finally, Markides (1998) defines strategic innovation as "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".

2.1.4.4 Networking capability

Walter et al. (2006, p.542) mentions that "Network capability comprises a firm's ability to develop and utilize inter-organizational relationships to gain access to various resources held by other actors". According to Foss (1999), from resource-based perspectives, the network firm can reap competitive advantages from acquiring resource and capabilities from networking with other actors. Walter et al. (2006) identifies four dimensions of networking capabilities: (1) coordination, (2) relational skills, (3) market knowledge and (4) internal communication all of which are related to one another. All of the mentioned dimensions to a great extent overleap with the concept of partnership proposed by Mohr and Spekman (1994). According to Mohr and Spekman (1994), it is mentioned that coordination, commitment, trust and interdependence are four components that help enhance the partnership performance between organizations, which determines the firm's ability to find and maintain its competitive advantages. According to Walter et al. (2006), relational skills refer to ability of an organization to adapt to different social situations and to deal with information and internal/external social stimuli. In the context of partnering and networking, market knowledge refers to partner knowledge which is information about suppliers, customers and competitors. Finally, internal communication is mentioned as an important factor that facilitates learning processes of the firm and also prevents redundant processes.

There is an extensive body of literature presenting supplier integration into new product development (Lakemond et al., 2006). According to Brown and Eisenhardt (1995), proper supplier involvement can sustain the firm's competitive position. Supplier integration can lead to higher innovation performance of firms in most industries (Hagedoorn, 2002). Moreover, customer integration has also received much attention from researchers. Customer integration into innovation process or lead-user approach can help minimize market risks, especially in the case of radical innovation (Enkel et al., 2005). According to Foss (1999), network capabilities are public goods and can be built greater through asset accumulation. Although the processes of building such assets as reputation and mutual understanding in order to establish external organization are costly and take a long period of time, it is worth investing in the case of firms that anticipate benefits from this capability. Pfeffer and Salancik (1978) points out the importance of interdependence in the business context. Interdependence happens whenever

an action or the outcome desired from the action cannot be caused or achieved by one actor or a single causal agent. The concept of network capability closely relates to the concept of business ecosystem introduced by James F. Moore. His definition of business ecosystem is "An economic community supported by a foundation of interacting organizations and individuals—the organisms of the business world. This economic community produces goods and services of value to customers, who are themselves members of the ecosystem. The member organizations also include suppliers, lead producers, competitors, and other stakeholders. Over time, they co-evolve their capabilities and roles, and tend to align themselves with the directions set by one or more central companies. Those companies holding leadership roles may change over time, but the function of ecosystem leader is valued by the community because it enables members to move toward shared visions to align their investments and to find mutually supportive roles" (Moore, 1996). According to Walter et al. (2006), network firms will have more opportunities to obtain useful market information which in turn makes the firms respond quickly to the unmet needs.

2.1.5 Dynamic capabilities and activities

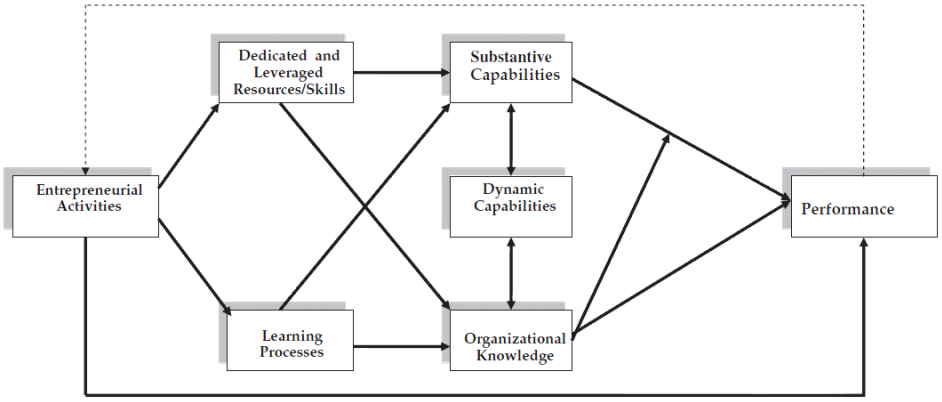

Figure 4 A stylized model of capability formation and performance (Zahra et al 2006)

Zahra et al (2006) presents a model (**Figure 4**) where activities are associated with the creation of dynamic capabilities and consequently on the performance of the company. The initial point of the model is the firm's entrepreneurial activities, this are the activities related with the exploitation of the opportunities. Entrepreneurial activities set the selection of resources and skills, they also creates learning processes to capture external knowledge. New combinations created from the choices made by companies create new substantial capabilities and knowledge base. These two (substantial capabilities and knowledge base) affect each other. These together determine the right dynamic capabilities to adapt to new situations. In addition, the substantive capabilities and firms knowledge base affects directly the performance of organizations. Lastly, new entrepreneurial activities are affected by the performance of the organization.

2.1.6 Business models

The concept business model has gained popularity since the end of the 90's with the emergence of the internet and consequently when the bubble burst, the concept lost some ground with the bankrupt of internet companies in the dot.com bubble (Magretta, 2002). Despite this, in recent years, effective business models are acknowledged by management literature as an important and valuable asset for companies (Chesborough, 2007). Moreover, the traditional relationship between customer and supplier has been changing because of the developments in the global economy such as new communications and computing technology and global trading regimes. Therefore, these development are key for businesses in order to revaluate the existent value propositions to customers (Teece, 2010)

There has been an attempt for defining business model concept in recent years. The concept has been defined from different perspectives, following a narrow view with a technological or financial focus (Stewart and Qin, 2000, Chesborough, 2007). Complementing this idea, sometimes it has been concept related with the architecture of the revenue model(Chesbrough and Rosenbloom, 2002), value creation and appropriation (Shafer et al., 2005)

Some authors follow a more general sense in the matter (Osterwalder et al., 2004, Amit and Zott, 2002). Amit and Zott define the business model as "structural template that describes the organization of a focal firm's transactions with all of its external constituents in factor and product markets. In addition, Amit and Zott (2002) concluded that the phenomenon of business model could not be fully explained by existent frameworks nor by concepts of value chains, Schumpeterian innovation, resource based view of the firm frameworks. Moreover, Zott and Amit (2010) also define business models as "a system of interdependent activities that transcends the focal firm and spans its boundaries". This definition according to Sandström and Osborne (2011) is interesting because "underlines the interconnected nature of business models. This means that business models captures value from actors beyond the boundaries of the firm. The value capture does not happen only in the domain of firms.

Other frameworks have matched business model definition with corporate strategy (Hamel 2000, Timmers 1998). Since there is not an agreement of business models by scholars but in its simplistic view contains the matters of "how a firm creates value, the internal source of the firm's advantage, and how the firm will make money (Morris et al 2005).

According to Teece (2010), it is established that the concept of a business model is lacking from a established theoretical grounding in economics or in business studies, there is no place for business models in economic theory. In a few words, mainstream economics does not discusses or analyzes business models. In this mainstream perspective, it is not relevant the value proposition, the revenue streams and costs. In that sense, customers are driven by the supply-

demand price that resolves everything and therefore there is no need for a business model. In addition, business models do not have a place in organizational and strategic studies. However, Teece (2010) new organizational forms are a part of business models but organizational forms are not business models. Furthermore, the definition of business model is broad and it has many elements. This complexity makes difficult to create theory and business specific managerial.

As stated by Brink (2007) although there is a narrow amount of research in evolution of business models, it is possible to explore business models as a dynamic concept in terms of how managerial staff from companies experiment with ideas with the aim of implementing other viable businesses. These ideas have to go through a process of testing by entrepreneurial action. The business models evolve because the constant variations of feedback from the environment in where companies are active. This feedback is the input needed for companies to know how react in terms of adapting their business models. Therefore, business models are not fully developed after previous experimentation processes to potential customers. They have to change progressively in order to find the right strategy position for the firm given the external environment.

Morris et at (2003) discusses in detail a holistic view of business model developing a framework named: unified perspective of business models". The authors state that among the elemental characteristics business model must contain are the following: comprehensive, measureable, logical, simple, meaningful. The aim of this framework is to provide elements that could bring certain level of generalization and application to firms. Six basic decisions areas are proposed by the authors: Services and products factors related, market factors, internal capability factors, competitive strategy focus, economic factors, growth/exit factors.

2.1.7 Business models components

The approach and definition developed by Osterwald (2004) is the adopted within this master thesis. Osterwalder defines a business model as "A conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and the architecture of the firm and its network of partners for creating, marketing and delivering this value and relationship capital, to generate profitable and sustainable revenue stream"

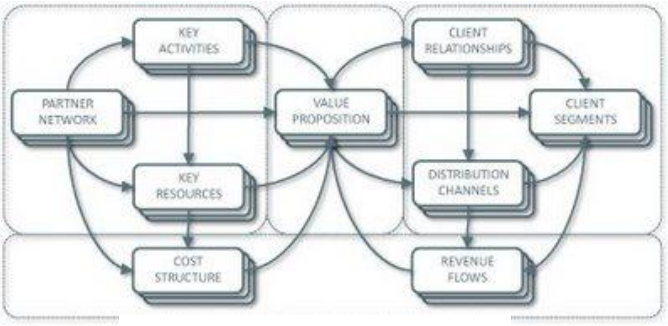

Figure 5 Osterwalder nine building

2.2 Conceptual model development

In the analysis section, four types of dynamic capabilities: adaptive, absorptive, networking and innovative capabilities are matched with data of the company. By doing so, it can provide more understanding how and where each type of dynamic capability is required. By applying further the knowledge from the literature review to the analyzed data, the theoretical framework can be developed. As mention before, the conceptual model was developed with the support of the literature review. In **Table 2,** the most important aspects of the literature review are summarized following the constructs and authors used by the authors of this thesis in order to develop the conceptual model.

Dynamic Capabilities	Authors	Elements (second-order capabilities)	Authors
Innovative	Adler and Shenbar (1990)	Product and process innovativeness	Wang and Ahmed (2004), Szymanski and Henard (2001)
		Strategic innovativeness	Wang and Ahmed (2004)
Absorptive	Cohen and Levinthal (1990), Lane and Lubatkin (1998), Zahra and George (2002)	Behavioral Innovativeness Open Innovation	Chesbrough (2003)
Networking capabilities	Walter et. al (2006)	CSR	Moore, (1996)
		Partnerships and collaborations	(Mohr and Spekman (1994) Enkel et al., 2005
		Stakeholder management	
Adaptive capabilities	Chakravarthy, (1982), Hooley et. al, 1992)	Entrepreneurial activities	Miles et al., 1978
		Toward Policies and regulations	Mckee et al., 1989
		Customer Discovery	

Table 2. Summary literature review

The **Figure 6** shows the conceptual model that explains the dominant activities inferred by each type of capabilities which are put in the order from the zero to the third order capability. Moreover, the model takes into account the relationships among activities that can somehow influence one another. Nevertheless, the components of capabilities and resources included in the model might fail to cover every type of capabilities presented in the utility companies. These issues regarding the generalization and the flaws of this conceptual model will be further discussed in discussions section.

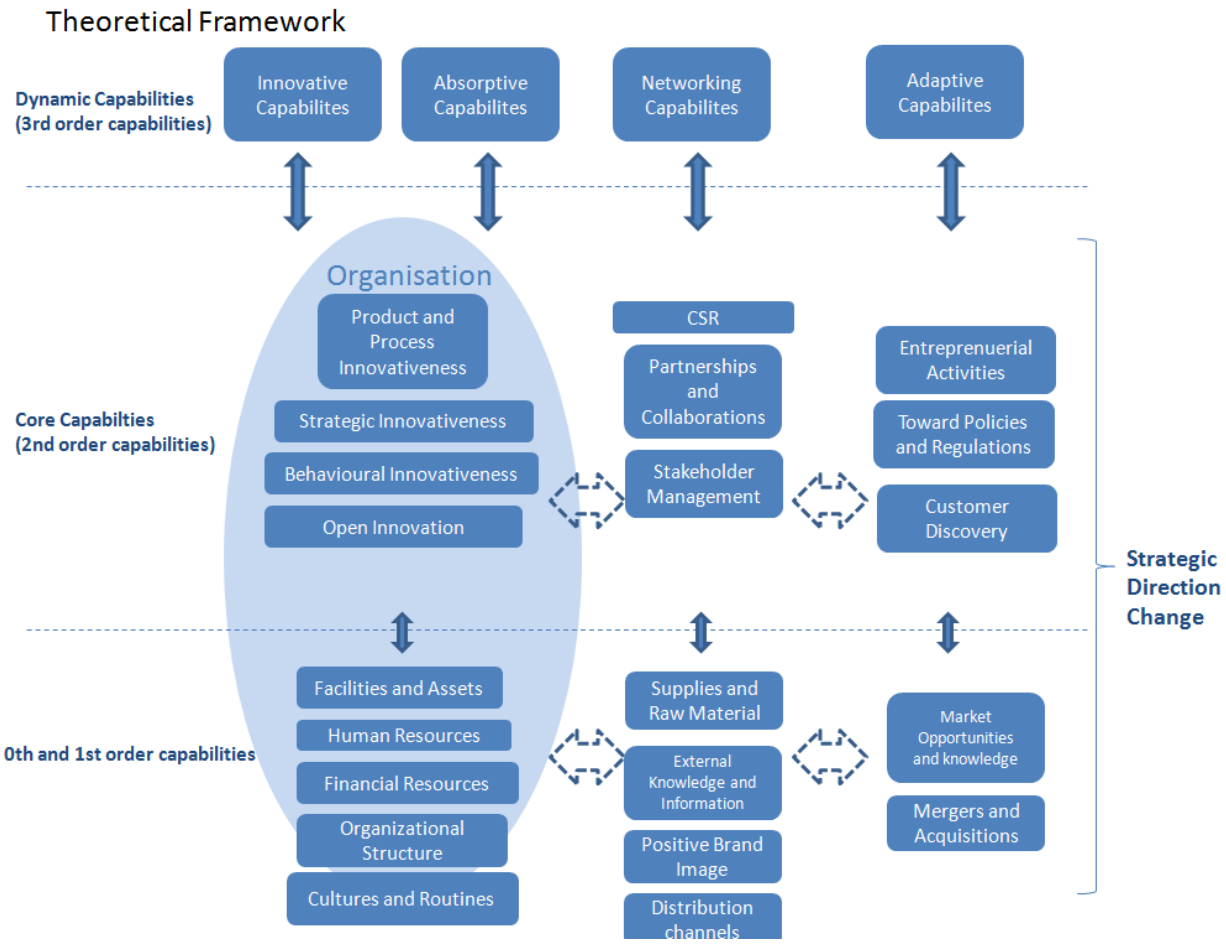

Figure 6 Conceptual model

In the theoretical model, the capabilities are classified into four levels: the zero, first, second and third orders. However, the zero and first orders will be bundled in the same level in the framework. The capabilities of the firm are separated between internal and external activities. As mentioned in the literature, Winter (2003) divides capabilities into different orders. The

zero-order capabilities are basic types of resources such as human resource and financial assets while the first order represents capabilities or different types of resources combined together. When being driven strategically, these capabilities will be then turned to core capabilities. The second order capabilities represent the core capabilities of the company. The capabilities at this level can provide the firm with competitive advantage over other competitors in the industry. According to Zahra et al. (2006), substantive capability is mentioned as being able to change to or to be affected by dynamic capabilities. Thus, in the conceptual model, the substantive capabilities can be considered present in the 2nd order capabilities. Located at the highest level are the dynamic capabilities which are normally explained in a more abstract level in most literature than the previously mentioned resource-based capabilities. In this model, there are two sets of bi-directional arrows presented. The first set of arrows which align in the vertical direction are used to show the reversible causal relationships in which one level of capabilities can cause effects on another level and vice versa. In contrast, the second set of horizontal arrows shows that the resources and capabilities developed internally and externally on the same level can affect each other. However, these relationships will be further explained and exemplified later in the following sections.

It is previously mentioned that dynamic capabilities can distinctly affect capabilities developed inside and outside the company. However, these dynamic capabilities should not be necessarily and precisely confined to be matched with only either the internal or external side of the company. This means that one type of dynamic capabilities can affect activities in both sides.

Adaptive capability and networking capability are more related to the external activities and environment of the firm. Adaptive capability is important in the way that it provides ability to discover and capitalize market opportunities for the company. After conducting literature review and data collection from the case study, activities that can significantly relate to the market opportunity of a company include entrepreneurial activities, compliance with the policies/regulations and customer discovery. By exercising networking capability, a company is given greater potentials to gain essential resources and customer loyalty. The activities that can be conducted by the company regarding networking include corporate social responsibility (CSR), building customer relationships, establishing partnership and collaborations, other stakeholder management activities, mergers and acquisitions. Not only actors in the supply chain does the company need to interact, the ones such as policy makers and regulators cannot be overlooked either. The primary goals of a company conducting these activities are exemplified in the zero and first order-capabilities including supplies and raw material, market knowledge positive brand image and distribution channels. Therefore, networking capability deals with developing and maintaining relationships between the company and the stakeholders in the industry in order to gain valuable resources.

In addition to the external activities, dynamic capabilities are also crucial for activities inside the firm. According to the literature, absorptive and innovative capabilities are more related to the internal activities. In the fast-changing industry, especially one that is in technological field, knowledge and information are important resources that can maintain firms in competitive positions. The external knowledge and information will be necessarily further utilized for the commercial purpose. As mentioned in the literature, the concept of open innovation is closely related to the absorptive capability and both concepts reinforce each other. Thus, open innovation lies in the main agenda for companies which rely heavily on creating value from external knowledge and information.

Derived from the literature, the theoretical model also categorizes activities representing innovative capability into different types depending on the different aspects of innovation. The types of innovations that are dealt internally include product/process innovation, strategic innovation and behavioral innovation. These aspects are considered as second-order capabilities that firms need to perform mainly inside the organizations in order to compete with others. Located in the zero and first order are the internal resources resulted from the higher-level capabilities. These internal resources specified in the model are the basis for an organization to operate in its business and generally include facilities (e.g. offices and operational sites), human resources, financial resource as well as organizational structure and cultures and routines which are determined by the strategies and goals of the company.

As mentioned about the bi-directional arrows (vertical), it means that besides the causal relationship entailing dynamic capabilities being exploded on the higher level and affecting other lower-level capabilities, there is the other opposite relationship. This opposite relationship concerns the change induced from lower-level capabilities which if are developed through deliberate and evolutionary processes will become dynamic capabilities. One example of this situation could be viewed from the activities inside the company. Initiated from the lower level of capabilities, the combination of resources including human capital, cultures/routines and external knowledge can enhance the innovativeness in product/process, strategies and behaviors of the company. Consequently, this enables the company to integrate, build and reconfigure competences to deal with changing environments.

The other set of bi-directional arrows (horizontal) intends to explain that capabilities and resources on the same level can affect each other, regardless whether they belong to internal or external organization. For example, in the second-order capabilities, open innovation processes of a company can lead to new product insights by exploiting external information obtained from collaboration with other companies and customers' feedbacks. After the new product has been developed, the company might need to find greater demand in the market through a customer discovery process.

Finally, on the right side of the model, the issue of change in strategic direction is raised. This is due to the fact that there is extensive body of strategic management literature proposing the concept that capabilities and resources of the company determine the strategies of a company. Furthermore, this concept has been supported by what have been found from the case study. Therefore, in this theoretical model, it intends to explain that after resources and capabilities of the company have been continually developed and changed for a long time, it reaches the point that new set of strategies which is more articulated has to be synthesized and implemented.

3 Methodology

This section explains the methodology in order to create a conceptual model that helps to understand the relationships between business model and dynamic capabilities

3.1 Research strategy

According to Bryman and Bell (2007), research strategy is a general approach in conducting business research. The research strategy can be categorized into two main types: qualitative and quantitative. The latter approach is more employed for explorative purpose in order to draw inductive theory emerged from dominant and frequent themes by methods of observation and description (Thomas, 2006). On the other hand, the former or deductive approach is used for statistic validation and hypothesis falsification. Neither of the approaches is better than the other since each of them has its own advantages differing by situations.

Although the theories concerning dynamic capabilities have been established and proved by a wide range of research, the purpose of this research is to investigate deeper to find relationships between resource-based capabilities, dynamic capabilities and business models. Therefore, the inductive approach is called for this study in order to draw exploratory inferences from the research process. The qualitative research strategy will provide orientation for the research design, the data collection and analysis all of which will be described in the following sections.

3.2 Research questions

The purpose of this research is to investigate the relationships and their importance between particular types of dynamic capabilities and resources/capabilities development of utility companies in wind power industry. This Master's thesis intends to answer the following research questions all of which will help achieve the purpose of this study.

***RQ1*:** What capabilities and resources have been developed in the wind power business during the past two decades?

***RQ2**:* What dynamic capabilities are key for the utility companies in the wind power industry for the past two decades?

RQ3: How have the business models of the utility companies changed during a period of time?

***RQ4**:* How can the cases of the utility companies be explained by means of the developed conceptual model?

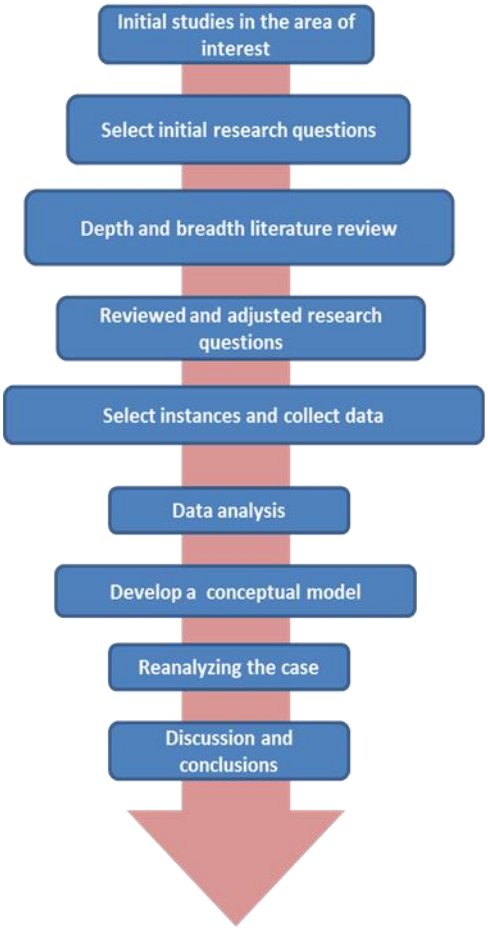

Figure 7 Research scheme of the thesis

The research process (**Figure 7**) began with the initial studies in the area of resource-based capability and dynamic capability. Moreover, the industry of interest was selected to be a wind power industry due to its fast-changing behaviors during the past few decades. By investigating this type of industry, the researchers were able to see changes in a company's capabilities more clearly. Then the researchers tried to develop initial research questions to see the overall picture and to gain main ideas for the research. However, these initial research questions are normally changed later along the stages of the research process. The literature review was then conducted in detail from several sources including publications, licentiate theses and books. After the in depth literature review, the researchers were able to narrow down the research scope and the research questions. In selecting instances, two companies in the wind power industry were chosen in order to study their activities, resources and capabilities. The relevant data were then collected from the companies' annual reports, websites, interviews and publications. The analysis was done by matching the empirical data with the concepts and theories from the conducted literature review. With the insights and new ideas discovered from

the analysis, a conceptual model was then developed and used as a theoretical framework for reanalyzing the case. Finally the discussions and conclusions were produced.

3.3 Research design

According to Bryman and Bell (2007), research design is a framework used by researchers to collect and analyze data. The research design will determine how the research process undergoes and what dimensions are prioritized for instance the requirements to generalize findings, the level of specification of the selected settings. There are five types of research design mentioned in Bryman and Bell (2007, pp. 71): experimental, cross-sectional, longitudinal, case study and comparative.

The purpose of this research is to find out how firms resources and capabilities are affected by the particular types of dynamic capabilities and how business models could affect the capabilities of an organization. In that sense, capabilities, resources, business models and activities of the firms of interest (Gothenburg Energy Company and Vattenfall) need to be investigated to find significant relationships between the resource-based capabilities and specified types of dynamic capabilities. Finally, the outcomes discovered from the analysis conducted from both companies are used to develop a conceptual model.

The initial aim for this study was to conduct a case study, obtaining in-depth information collected through the interviews, however the lack of information found in the process led the authors to develop a conceptual model based on the literature review. The conceptual model was later used to do illustrate two cases: wind power business in Göteborg Energi and Vattenfall.

The illustration of these two companies takes place by applying the literature available in the development of a conceptual model in the matter of capabilities and business models. It is important to corroborate the reality of facts in order to have robustness in the illustration. It is important to highlight that the authors adopted an approach of interpretation in order to explain certain phenomena because of the lack of information collected in this thesis. Therefore, some aspects of the interpretation of the authors could be wrong or in need to be further discussed.

3.4 Research process and methods

In this section, **Table 3** is presented with the most relevant information regarding research process and methods

Stage	1. Literature Study	2. Data Collection	3. Analysis	4. Conceptual model formulation	5. Discussion and Conclusions
Objectives	i) Provide an overview and understanding for resources and capabilities that in general exist inside a firm	i) Obtain information about resources, competences and capabilities needed for the firms to operate in the industry	i) Find out what and how resources and core capabilities are managed in the firms	i) Create the model of relationships among different types of capabilities	i) To discuss about the need of business model concept in model development
	ii) Provide an understanding for dynamic capabilities essential for a firm	ii) Understand what activities of the firms can be used to signal the exercise of dynamic capabilities	ii) Find out how the specific types of dynamic capabilitites are important for the firms in the case studies	ii) Reanalyze one of the cases by using the formulated conceptual model	ii) To discuss about applicability and generalization of the developed models
		iii) Understand business models of the company.	iii) Mapping of the firms' business models		iii) To discuss about interdependence and dynamic capabilities
					iv) To discuss about the differences in capabilities between Vattenfall and Göteborg Energi vi) To make a conclusion
Research Methods	Literature review	Semi-structured interviews, open interviews	Applying a framework and models to empirical findings	Combine findings from the analysis with literature and illustrate them in the model	Raise up issues that are left out and might be useful for readers

Outcome	A set of theories and concepts for making analysis	Data regarding the firm's resources, competences and capabilities	i) Key resources and capabilities management in the firms	i) Models illustrating relationships of different-level capabilities of the firm(derived from applying theories into data) and business models	i) Academic contributions regarding the concepts of dynamic capability and business models
			ii) Importance of dynamic capabilities for the firms	ii) Analysis from the formulated model	ii)Implications for researchers
					iii) Conclusion

Table 3 Research process and methods

4 Empirical study

In this section is presented the electricity industry background and key aspects of the two utilities companies for this thesis, Vattenfall and Göteborg Energi.

4.1 Industry background

During the late 90's, the initiative of the European Union, the legislation and regulation in the electricity markets were clearly issued. Due to the wave of deregulation in many countries, a number of major utility companies entered the markets. Those companies extended their own business and shortened the supply chain by means of a consolidation and therefore reduce the number of traditional power companies. High level of competition decreased the marginal profits of the companies; thus economies of scales were required by those companies. Moreover, resource allocation processes were effectively exploded by the companies to be able to target prioritized markets. According to Bergek and Jacobsson (2003), the policy issued by the Swedish federal government in 1997 was a significant factor to the rapid increasing development of wind power industry during 1990s since it provides huge development on the supply sides i.e. turbine manufacturers in Sweden and their R&D programs.

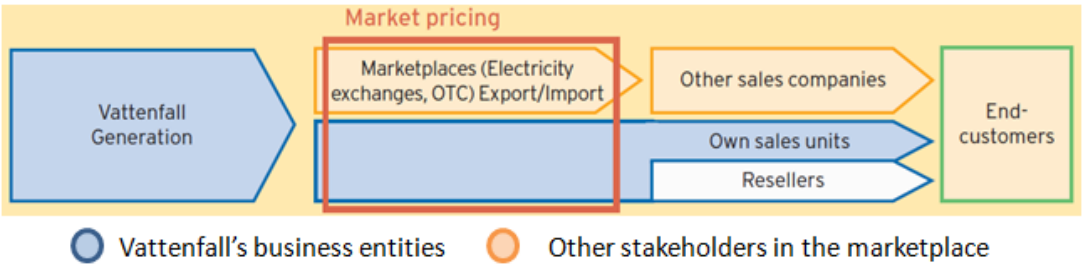

Figure 8: the value chain of an electricity production industry

According to the value chain presented in the **Figure 8**, the industry starts with the electricity generation from utility companies like Vattenfall, Göteborg Energi and others. Then the prices of the generated electricity are determined in the market through the deals done by electricity suppliers or sales companies before the electricity is sold to their end-customers.

Electricity suppliers are significant players linking between electricity exchange and end-customers. The electricity suppliers are responsible for purchasing electricity on exchanges and then sell it to the end-customers. It is too risky for customers to trade on the electricity exchange. In return, the electricity suppliers charge the customers for the service.

NordPool is the Nordic electricity exchange, a place where the price of electricity in the Nordic countries is set. In Sweden, NordPool is owned by the national grid operator Svenska Kraftnät. On the other hand, Statnett which is also a national grid operator owns the part of NordPool in Norway. NordPool consists of two types of markets. The first is the spot market in which the price of electricity of the coming day is auctioned differently in different hours. In contrast, in the second type of market, the electricity is traded according to the contracts that can define the price of electricity up to three years ahead.

4.1.1 Electricity networks

The Swedish power system is divided into three levels: local networks, regional networks and the national transmission grid. As shown in the **Figure 9**, the distribution of electricity starts from the national grid and then delivered to a regional network and finally a local network. The local network is then connected to end-users. In Sweden, there are around 170 local distribution system operators (DSOs). The smallest local network has a line length of around 3 km, and the largest over 115,000 km. The local networks are normally divided into low voltage (400/230V) and high voltage networks (typically 10-20 kV). The total line length of Sweden's low voltage networks is over 302,500 km, of which 76,500 km consist of overhead lines and 226,000 km of underground cable. The local high voltage networks, also frequently referred to as medium voltage networks, are made up of 97,000 km of overhead lines and 93,500 km of underground cable. Some 5.2 million electricity users are connected to the low voltage networks and 6,500 to the high voltage networks. The regional grids are mainly owned by three DSOs and have a combined line length of around 33,000 km. The Swedish national grid is owned and operated by the public utility Svenska Kraftnät, and is made up primarily of 400 kV and 220 kV lines with a total length of around 15,000 km. In total, the Swedish electricity grid contains 541,000 km of power lines, including 319,500 km of underground cable (Svensk Energi, 2010).

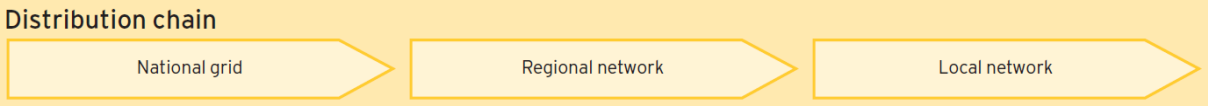

Figure 9: the distribution chain of an electricity production industry (Vattenfall, 2004)

National grids in Eastern Germany and the Hamburg region are also owned by Vattenfall. Regional and local electricity networks are then used for electricity transmission. In the market of distribution, Vattenfall and other companies own the market shares with regional and local network companies.

4.1.2 Institutions

In December 1997, an international agreement on reducing emissions of greenhouse gases called Kyoto Protocol was put into action. The Kyoto Protocol commits the EU Member States to reducing their aggregate emissions of greenhouse gases (GHG) by 8 per cent by 2012 compared to 1990. However, in the beginning, it was difficult to enforce the regulations to actors in the industry since this might lead to negative effect on the existing energy policy and power generation in the Nordic countries. In 2000, restrictions and charges were implemented for the purpose of supporting the reduction of carbon dioxide emissions in Sweden. When conducting the businesses during that period of time, Vattenfall and Göteborg Energi believed that the company had to rely strongly on the political agenda which would provide the company with strategic advantage for a long time in the future. Governmental support regarding renewable energy is an important factor for the development of market and adoption in this sector. However, the support scheme differs across the countries. For example, in Germany and Denmark, “feed-in” tariffs have been used as a guarantee for a fixed rate for energy producers. On the other hand, Sweden uses an electricity certificate system. In this system, renewable electricity producers are given certificates determining the amount of generated electricity that can be sold fairly in the market.

In 1996, a system for environmental labeling electricity was introduced by the Swedish Society for Nature Conservation (SSNC). The electricity sold by electricity suppliers to the customers and the wind power plants operated by the producers had to be certified by SSNC that they are environmentally friendly. During that time, the electricity market was competitive and the green electricity market was well-participated by the electricity suppliers and consumers. “Green certificate” is a system which was introduced in Sweden on May 1st 2003. The purpose of these certificates is to stimulate generation of electricity from renewable energy sources. Before the system was introduced, the government was the only actor who provided support for generation of electricity from renewable sources. By means of the green certificates, the market and end-customers are instead responsible for this support. The amount of money that the operator receives from selling green certificates will be spent for supporting production

later. In Sweden, annual quotas for electricity suppliers 2003-2030 decided by Parliament are 7.4 % for 2003, 17.9% for 2010 and 4.2% for 2030. The goal is to increase total generation from renewable energy sources in Sweden to 10 TWh by 2010. Each electricity supplier is obligated to purchase a certain quantity of certificates connected to electricity consumption. Certificates are purchased for the customers' account by the electricity suppliers, which pass on the cost to their customers (Vattenfall, 2003). In **Figure** 9 is shown the increase in electricity prices in Sweden.

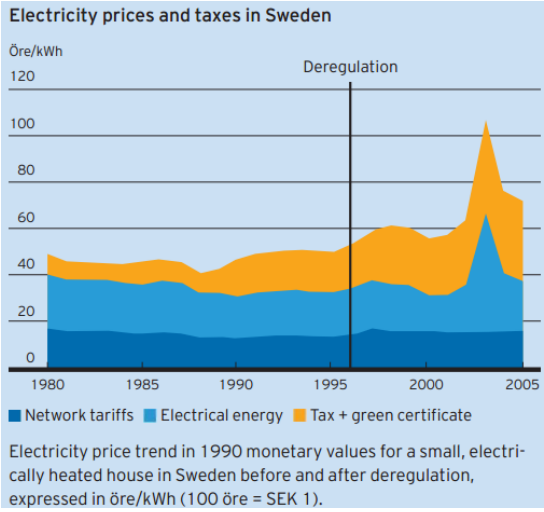

Figure 10 Electricity prices and taxes in Sweden 1980-2005 (Vattenfall, 2004)

4.1 Vattenfall

Vattenfall is one of Europe's largest generators of electricity and the largest producer of heat. The main products of the company include electricity, heat and gas. For the electricity sector, the company' business units cover the entire value chain consisting of electricity generation, distribution and sales. The parent company or Vattenfall AB is totally owned by the Swedish state. The main markets exist in Sweden, Germany and the Netherlands. In addition, Belgium, Denmark, Finland, Poland and the UK were also countries in which the company operated in 2010. Regarding renewable sources, Vattenfall has played a leading role in working with different types of renewable energy for electricity production. The sources of renewable energy that are produced by Vattenfall mainly include hydro power, biofuel-fired plants and wind power (Vattenfall, 2011).

The electricity generation of the company comes from different sources including hydro power, nuclear power, fossil fuels and a smaller proportion of wind power, biofuel and waste. The produced electricity is then sold in the marketplaces. The major clients of the company are sales company or other resellers. However, Vattenfall also has its own sales units which are

responsible for selling electricity to the end-customers. Prices of electricity are set by the agreements between sales companies and end-users (Vattenfall, 2010).

The amount of installed capacity and generation capacity of wind power of Vattenfall has increased continuously since 1997. In 1997, the amount of wind electricity generation was 0.014 TWh and it has been increased to 3.4 TWh in 2011.

Wind farm	Country	Type	Number of turbines	Installed capacity, MW	Owner
Thanet	UK	Offshore	100	300	Vattenfall
Horns Rev	Denmark	Offshore	80	160	Vattenfall (60%), Dong (40%)
Ormonde	UK	Offshore	30	150	Vattenfall
Lillgrund	Sweden	Offshore	48	110	Vattenfall
Egmond aan Zee	Netherlands	Offshore	36	108	Vattenfall (50%), Shell (50%)
Kentish Flats	UK	Offshore	30	90	Vattenfall
Stor–Rotliden	Sweden	Land-based	40	78	Vattenfall
alpha ventus	Germany	Offshore	12	60	EWE (47.5%), E.ON (26.5%), Vattenfall (26.5%)
Edinbane	UK	Land-based	18	41.4	Vattenfall
Nørrekær Enge	Denmark	Land-based	13	29.9	Vattenfall
Under construction					
DanTysk	Germany	Offshore	80	288	Vattenfall (51%), Stadtwerke München (49%)
Zuidlob	Netherlands	Land-based	36	122	Vattenfall
Swinford	UK	Land-based	11	22	Vattenfall

Figure 11 Vattenfall's largest wind farms (Vattenfall, 2011)

4.1.1 Key resources

In 1997, Vattenfall bought NORDIC 1000 which was capable of generating higher amount of electricity at that time from its manufacturer and installed five large units in Malmö harbor (Vattenfall, 1997). The resources regarding wind power of Vattenfall continuously increased and in 1998, Vattenfall owned 38 power wind power plants which in total provided 20 MW capacity for Sweden. The amount of electricity generated by wind power increased from 1997 around 50% and the amount was accounted for 12% of wind power production in Sweden. The situation of wind power at that period of time significantly depended on the perception of end-consumers and governmental decision to permit extensive development of wind power plants. After being evaluated, the project called Näsudden II, which is a 3 MW unit supplied by Kværner, was given a permission in 1998 (Vattenfall, 1998). The wind power plant has had a high capability and holds the world record in energy output for one year (7.7 GWh) (Vattenfall, 2000). In 2000, the first commercial high voltage Powerformer was operated and provided higher efficiency and lower maintenance cost for the turbine. In 2000, the company ordered a new wind powerplant which was called Näsudden III. The powerplant was a result of development from the previous project and was planned to be constructed at Näsudden, Gotland at the end of 2001. The year 2000 can be considered as the beginning of off-shore wind

power operation for Vattenfall. During 2000, Vattenfall launched a project for off-shore wind power in the southern part of the Kalmar Sound. This project was considered as the beginning of the company to expand its business in the off-shore wind power sector. In 2005, Vattenfall started a construction of a wind power park at Lillgrund and the facilities began the operation in 2007 with a maximum capacity of 110 MW. During 2005, Vattenfall was permitted to build one of the world's largest wind power farms (1.6 TWh/year) in Kriegers Flak, an area in the southern part of Baltic Sea. In 2005, the total tangible non-current assets of the company were accounted for 379.9 SEK millions (Vattenfall, 2005). The year 2008 was considered as the year of wind power of Vattenfall. In that year, Vattenfall acquired the companies AMEC Wind Ltd and Eclipse Energy UK Plc, as well as the Thanet Offshore Wind Ltd wind farm. In October 2011, Vattenfall acquired full ownership of the Zuidlob land-based wind farm in the Netherlands. It is expected that in 2013, 36 wind turbines will provide power for some 88,000 households. The wind farm will have installed capacity of 122 MW. In November 2011, the company purchased the licenses to build the Sandvank offshore wind farm off the German of Sylt. The wind farm will start the construction in 2014 and is expected to have 96 wind turbines with the total capacity of 575 MW. In sum, Vattenfall invested 2,972 SEK million in wind electricity generation in 2008 (Vattenfall, 2008).

4.1.2 R&D competence

During the year 1998, the company constructed a 600 kW wind power plant in Suorva, Lappland. The aim is to test wind power under arctic conditions. The turbine was equipped with a heating system which prevents ice formation on the blades. The project was finished in 1999 and became the Sweden's first Arctic wind power. Further, it was recorded as the most efficient wind power plant in Sweden after one year of operation. During 1999, the company developed a technology that enhance the material reduction and cost effectiveness for off-shore wind power plants. During the same year in November, Vattenfall founded the Innovation Center. This center was lunched in order to test products for retail customers and to reduce the product development time. Recently, Smart grids technology was developed and implemented in order to help in electricity generation and distribution from wind power (Vattenfall, 1999). Vattenfall has put a lot of effort in R&D projects for the smart grid technology that will provide the system with secure and reliable network services. Calculated in proportion to the Group's sales, Group-wide R&D expenditure was approximately 0.6% in 2011, which is in parity with Vattenfall's competitors. This share is reasonable considering that Vattenfall is a technology using, rather than product-developing company. At the present time, for the wind R&D program, Vattenfall has organized the five technology platforms. The five wind R&D programs consist of (1) Wind resource and micro-siting (2) Turbine and foundation technology (3) System integration and grid connection (4) Operation and maintenance and (5) Acceptance and Environment. Moreover, it is stated by the company that the external R&D programs which are

conducted by the collaborations with several actors in the industry are also greatly supported for instance Vindforsk and the national Swedish research program. The external stakeholders that involve in the company's R&D programs include several universities, research institutes and other wind energy stakeholders (Vattenfall, 2011).

4.1.3 Partner network and stakeholder management

In wind power businesses, Vattenfall has collaborated with many other actors in the industries in order to get access to valuable resources and competences such as knowledge, human, technologies and facilities. In 1998, Vattenfall cooperate with Gotlands Energiverk, ABB and the Swedish National Energy Administration in order to construct a pilot facility for intermediate voltage (80 kV), using a new type of inverter station and a new type of direct current cable. In 2000, the project was accomplished and the developed technology was able to solve the problem of voltage variations, therefore improves the quality of electricity. This finally enabled the further expansion of wind power on Gotland. Vattenfall also focused on the acquisition of and partnerships with well-known energy companies such as Oslo Energi and HEW in Hamburg. Moreover, new subsidiaries and associates such as "Plusenergi" (with Göteborg Energi) "abonnera.com" and "Sensel" could importantly help the company to adapt with the competitive environment at that time (Vattenfall, 1998). At the end of 1999, Vattenfall had partnership agreements with 11 major energy companies in Sweden, representing a customer base of 272,000 customers in total. In 2000, the wind power plant that was called Näsudden III was supplied with material and equipment for the power plant construction produced by cooperation between Scanwind and ABB. During the past decade, it has been more difficult for companies in this industry to grow organically, thus the major growth of the companies have been built through the mergers and acquisitions. In 2006, there was an asset swap between Vattenfall and the Danish energy company DONG. In the agreement, 24% of the combined production capacity of the Danish companies Elsam A/S and Energi E2 A/S was transferred to Vattenfall in exchange for Vattenfall's 35.3% shareholding in Elsam A/S and participation in I/S Avedore 2. The assets in this case include wind power plants and combined heat and power plants. However, the possibilities to make major acquisitions have decreased since 2006 due to the decreasing number of takeover candidates in Europe. From this phenomenon, the energy prices have risen. Therefore, Vattenfall decided to push the growth of the company by organic growth in parallel (Vattenfall, 2006). In 2008, in addition to that Vattenfall acquired the companies AMEC Wind Ltd and Eclipse Energy UK Plc, as well as the Thanet Offshore Wind Ltd wind farm, they also made partnership with ScottishPower Renewables and participate in the tendering process for the continued expansion of offshore power in Britain. During 2008, Vattenfall collaborate with Swedish forest company Sveaskog in order to search for locations to build land-based wind power farms in which more than 500 wind turbines were installed. In addition, in the same year, Vattenfall participated in the Alpha

Ventus development and demonstration project, Germany's first offshore wind farm. During the year, Vattenfall signed framework agreements with the suppliers Vestas and Siemens for deliveries of wind power turbines (Vattenfall, 2008). In 2010, Vattenfall started a project by cooperating with Stadwerke Munchen (SWM). In this project, there was a construction of wind farm with the total installed capacity of 288 MW. The total completion and operation were expected to be done by the beginning of 2014 (Vattenfall, 2010).

Characteristics of stakeholder relations

Main group	Stakeholders	Attributes and description
Society	Neighbours	Neighbours are people living close to Vattenfall plants and operations who are directly affected by the company's activities. It is very important for Vattenfall to keep an open dialogue with neighbours, since they influence public opinion. Vattenfall meets its neighbours in face-to-face meetings with the purpose of providing information and taking neighbours' needs into account in decision-making processes.
	Citizens	Vattenfall has an impact on citizens in all countries in which it operates, mainly as a provider of electricity and heat, but also as an employer and taxpayer. Vattenfall is owned by the Swedish state, which makes Swedish citizens stakeholders in the sense that they can be regarded as indirect owners of the company. Vattenfall paid a dividend of SEK 4.4 billion to the Swedish state in 2011.
	Potential employees	Vattenfall's long-term business planning involves analyses of the company's future competence needs. Mostly, the company needs people with a technical background and good commercial knowledge to work in the core business. But there is also need for people with knowledge and skills in such areas as the environment, IT, project management and general management. Vattenfall's company philosophy and core values are the foundation for the corporate culture. It is important that potential and current employees share this mindset.
	Media	Energy is high up on the media's agenda. As one of the largest players in the European energy industry, Vattenfall is in focus. The national media in all markets – including tabloids, daily newspapers, business newspapers, radio and TV – monitor Vattenfall's development very closely. Local media has a particular interest in Vattenfall, especially in areas in which the company conducts its operations. Recently, Vattenfall has also attracted growing interest from international business media. Media coverage is important for Vattenfall, since independent media have a substantial influence on public opinion. Vattenfall maintains an open and constant dialogue with key media to update them on developments within the company while also being available as a knowledgeable partner in energy-related issues.
	Politicians	Vattenfall interacts with politicians at the local, national and European levels. The purpose of these contacts is to increase general knowledge about Vattenfall and the energy industry and thereby enhance the quality of decision-making. Relationships are based on respect, trust and openness.
	Authorities	Vattenfall maintains an ongoing open dialogue with authorities involved in regulating the energy sector. Vattenfall has a need to understand how authorities want the energy sector to develop, and it is in the company's interest to increase the authorities' knowledge about Vattenfall and the rationale behind company actions. The dialogue is based openness and respect for the authorities' oversight of the electricity market.
	Non-governmental organisations (NGOs)	It is important for Vattenfall to build relationships with NGOs based on mutual understanding and respect. Vattenfall conducts dialogues at European, national and local levels, for example regarding our Carbon Capture and Storage (CCS) activities, and has partnered with international NGOs on climate change initiatives.
	Customers	Vattenfall has more than 10 million customers across all its markets. Vattenfall's ambition is to continue developing competitive price policies. Margins on electricity trading are extremely narrow, which means that the only way to increase profitability is to exploit benefits of scale by increasing market share.
	Retail customers	Vattenfall offers a variety of electricity and heat services to households in Belgium, Finland, Germany, the Netherlands, Poland and Sweden. A wide range of fixed, variable and tailored pricing options enables customers to choose the most suitable solution. In many markets, electricity with declaration of origin is also available. Vattenfall has made a number of improvements in recent years, such as the introduction of a Customer Ombudsman function and installing remote meters and issuing disruption guarantees. In the Netherlands, our policies for avoiding termination of energy supply exceed the legislated requirements, and we have taken additional initiatives to avoid termination of supply to customers with special needs.
	Business and industrial customers	Vattenfall provides the public and private industry sectors with electricity and heat, and also offers a variety of energy related services. Vattenfall caters to the specific needs of each industrial operation. Electricity purchases can be combined with energy solutions and operation and maintenance services to increase efficiency and lower costs. Vattenfall is a long-term partner in large-scale energy projects.
Internal	Employees	Vattenfall has 37,400 employees in total.
	Employee representatives	Vattenfall has employee representatives in representative bodies such as the European Works Council (EWC–Vattenfall), local co-determination bodies, supervisory boards and commissions. Vattenfall's Board of Directors includes three employee representatives.
Financial	Owner (the Swedish state)	For information about the owner, see the Corporate Governance section on www.vattenfall.com.
	Investors	These include bond investors, such as insurance companies, pension funds, hedge funds and asset managers, and other lenders, such as banks and credit institutions. Vattenfall's total net debt in 2011 was SEK 141 billion.

Figure 12 Vattenfall's stakeholder relations (Vattenfall, 2011)

4.1.4 Organizational structure

In 1997, the company introduced the new group structure to be implemented in 1998 and also put its direction toward a goal to be a European player. This provided Vattenfall with net sales that are several times greater and come from several sources – Germany, Poland, Finland and Sweden. The purpose was to increase its competitiveness and sustain its strategic development (Vattenfall, 1997). In 1999, Vattenfall operated its business by focusing on an international strategy. The main goal of the strategy was to build brand image of Vattenfall in other markets. Later in the mid-1999, the company implemented the matrix organization, in which business areas are in charge of making profit for the company. Business is conducted through geographical market areas. The organization is based on the value chain since Generation, Networks and Market are each ruled by their own business logic (Vattenfall, 1999). As of January 1, 2000, there are four business areas: Electricity Generation, Energy Market, Services and Electricity Networks. Not too long after the company changed its organizational structure in 2000, due to the effect of the acquisitions in the group of the northern Europe, new organization was introduced in Vattenfall. The focus of the new structure was on the long-term financing and development issues (Vattenfall, 2000). In 2011, Vattenfall restructured its organization from three sales business units to one in order to facilitate new strategic direction of the company (Vattenfall, 2011).

4.2 Göteborg Energi

4.2.1 Background

Göteborg Energi is an energy company with a strong presence in western Sweden. The corporate offices and most of its operations are located in Göteborg. The portfolio of services is comprised with different areas such as district heating, ready heat, energy services, gas, cooling, data and telecommunications. *Göteborg Energi* is owned by *Göteborg Kommunala Förvaltnings* AB. The latter is owned by the Municipality of Göteborg. As described before, *Göteborg Energi* is involved in different businesses. It is important to highlight that the strongest products or core business areas are district heating and the electricity supply network as stated by CFO Margareta Fischer (Göteborg-Energi, 2010).

Moreover, Göteborg Energi states the importance of an efficient energy supply as key element for a well-functioning society. *Göteborg Energi* states continuously in the annual reports that they are dedicated to the creation of long-term sustainable energy and one of the main goals for *Göteborg Energi* is to reduce the environmental impact (Göteborg-Energi, 2005, Göteborg-Energi, 2006, Göteborg-Energi, 2007, Göteborg-Energi, 2008, Göteborg-Energi, 2009, Rönnborg, 2006). In 2001, Göteborg Energi certified their environmental management system according to ISO 14001 norms (Göteborg-Energi, 2004).

According to the 2003 financial statements from Göteborg Energi, districting heating represented 65 % and electricity production only 6% of the turnover"(Rönnborg, 2006). The condition of generating that small amount of electricity was a worrying issue for the City of Gothenburg and for Göteborg Energi. Because of this situation, Göteborg Energi evaluated various risk scenarios by not having enough electricity production. Among the main risks, there was a mayor risk of disruptions of public functions if a power failure occurs. As stated by a manager inside the organization: "*Göteborg Energi is a very small electricity producer, implying that the city is exposed to a risk that inhabitants are probably not aware of. We scarcely produce 5 percent of all the electricity we consume within Gothenburg and that is not even enough to start up the indispensable societal functions, if we have a large power failure, Therefore, our strategy was to expand electricity production*" (Rönnborg, 2006, pp.58).

In that sense, for Göteborg Energi became a priority to solve this lack of electricity production. The generation of electricity became a strategic objective for Göteborg Energi, they pursued to become a larger actor on the local electricity production market. Since Göteborg Energi objectives were to reduce the environmental impact of their activities, this electricity production had to be generated with a renewables source of energy. They had two projects for reaching that objective: The Rya Combined heat and power plant and the offshore wind turbines at Fladen. Regarding to renewables sources of energy, Göteborg Energi focuses its

efforts in wind power and a combined heat and power plant (CHP). However, from the annual reports from 2008 there is an indication that solar and wave power is included in renewable plan of action (Göteborg-Energi, 2008). As stated in recent annual reports, renewables such as biogas and even will become increasingly competitive and solar energy may also become a viable commercial alternative" (Göteborg-Energi, 2010).

In order to accomplish its objectives regarding electricity production, Göteborg Energi built a new production facility –the Rya Combined heat and power-. When this CHP plant started to operate, Göteborg Energi became also a player in the production of electricity not only in the distribution. The aim of the CHP project was for Göteborg Energi to become a major electricity producer in a sustainable way. Göteborg Energi was a small producer of electricity before the construction of Rya combined heat and power plant that is in operation from November 2006. Until the construction of Rya combined, it is possible to say that they only distributed electricity, its electricity production was marginal with 6%. The envisioned plans for Rya plant were to cover 30 percent of Göteborg electricity needs (Göteborg-Energi, 2010).

The previous Göteborg Energi experience about wind power production starts with the ownership of a couple of wind turbines located in the harbor area of Gothenburg. They were somehow involved in the construction of the turbines. But before that there is a need to recall some background, introducing wind power in Sweden in the 1980 was a failure for some wind power ventures. The problem was there was no demand for large-scale turbines and it was very expensive at the time, stakeholders stated. In that sense Göteborg Energy tried to develop some wind turbines at a smaller scale in order to be cost efficient using ABB's generators and gearboxes by KMV. However, it was a first attempt to start the production of wind turbines in the city. These desired wind turbine production never happened and they decided to buy them (Rönnborg, 2006)

Göteborg Energi decided to buy a wind turbine from Howden, a Scottish manufacturer, that was a failure because the turbine had some defects, and since energy producers did not have the knowledge on producing electricity from wind power, the real problem was that they did not know what to buy in terms of specifications. As stated by someone working in the project: "The turbine they delivered was an almost finished construction, equipped with wooden blades with a hydraulic devise, with turned the top of the blade and many other strange technical solutions. Nevertheless, we arranged a site out there at Risholmen and erected the turbine. We turned the key and expressed a delighted: yes it is running and the next second it broke down…. The blades were always filthy from hydraulic-oil or something… at the end we got really fed up with it and simply decided to dismantle it." (Rönnborg, 2006, pp. 67).

Regardless of the failure of the Howden turbine, they bought turbines from Danish manufacturers. In 1993 was built a turbine from Bonus manufacturer, they formed the

cooperative Göteborgsvind, the cooperative owns four wind turbines, operated by Göteborg Energy. Furthermore, Göteborg Energy started to developed eleven sites at Risholmen, Torsholmen and Hjartholmen. These initial efforts boosted the research of other sites for wind power in Swedish west coast.. The activities related to finding right places for wind power lead to the Fladen project at Göteborg Energi (Rönnborg, 2006).

Göteborg Energi was one of the very first electricity producers involved in a large-scale offshore wind power project. In 2001, The Board of Directors decided to go further with a project of 60 wind turbines with a 300 MW wind power production. The scope of the project was to erect these turbines at Fladen in the Kattegatt Sea. The estimated figures about the annual electricity produces were about 1 TWh. This amount of electricity represented about 20% of the annual consumption in Göteborg. Furthermore, they keep the project further and went to a four years application process, however at the end the Fladen project was denied by the Regional Environmental Court and the Swedish government (Rönnborg, 2006).

Although the failure of the Fladen project, in 2004, Göteborg Energy embraced a wind power policy; a budget of MSEK 70 for the next three years was provided with the aim of wind power expansion. Moreover, Göteborg Energi was granted permission to locate wind power station at Gårdsten (Göteborg-Energi, 2004). Furthermore, statements from annual reports shows positive attitude towards wind power, statements as the following are recurrent: “We view wind power as a natural part of an electricity production system that is sustainable in the long term. We will therefore be investing heavily in an expansion of wind power over the next three years. Quite simply, wind power must be given more scope if we are to achieve the environmental goals that the Swedish Parliament has laid down” (Göteborg-Energi, 2004, pp. 46).

4.2.2 Key resources

The goal for Göteborg Energi was for several years to have 100 wind turbines by 2015. The purpose of these 100 turbines is to generate 10% of the electricity of Gothenburg with an annual production of 500 GWh. However, this 2015 target was moved to 2017 in 2010, the main reason is because obtaining the permits is a long and difficult process (Göteborg-Energi, 2010)

In 2005, Göteborg Energi had electricity production of 8 GWh a year in the existing wind power stations. The objective for Göteborg Energi in that year was to increase that number in the following years. In the years 2006-2008 there were not activities related with wind power, Göteborg Energi was developing alternatives for a new wind project. Moreover, in 2008 the financial crisis and lower prices of electricity and electricity certificate in 2008 prevented investments in wind power for some companies (Göteborg-Energi, 2009).

In the year 2009 was erected a wind power turbine in Gardsten, these tower has a rotor diameter about 82 meters. It has a capacity of 2 MW and with 5000 MWH productions per year. Previous this turbine Göteborg Energi have built twelve wind turbines in the harbor of Gothenburg. At that time, Goterborg Energi is the owner of six and half, the others belongs to Göteborgsvind cooperative association and Shell. Before the conclusion of 2009, Göteborg Energi got an agreement of ten wind turbines which were already developing on Toftedalsfjallet in Dals-Ed (Göteborg-Energi, 2009).

During 2010, Wind power had an increase in efforts compared to previous years, this increase was not reflected in terms of electricity production from wind power, all this efforts with the propose of reaching the objective of the 100 wind turbines. By 2010, Göteborg Energi owned 10 wind turbines in Gothenburg, Falköping and Askersund and was building 10 in Töftedalsjallet. In this year, Göteborg Energi invested SEK 142 million in wind power. Furthermore, several permisions were submitted for eight wind turbines in Rävbacka and twelve wind turbines in Sätila. A permit for continuing operations at Arendal was obtained from the authorities (Göteborg-Energi, 2010).

In 2011, Göteborg Energi and Rabbalshede Kraft built the largest wind farm at Vastra Gotaland, this is located in Toftedalsfjallet, Dals-Ed. This wind farm increases Göteborg Energi wind power production capacity by 60GW/year as shown in **Figure 13**. In 2012 with the installation of the largest GE wind turbine in Sweden at Rishomen, Göteborg Energi is generating about 100 GWh of electricity production from wind. It represents 1/5 of the target of 500 GWh in 2017 (Göteborg-Energi, 2011).

Key figures

Key figures, Group	2011	2010	2009	2008
Electricity production wind/hydro (GWh)	67	16	11	11

Figure 13 Göteborg Energi (2011)

4.2.3 R&D competence

Göteborg Energi is involved in research and development through the Foundation for Research and Development for outside projects. Göteborg Energi conducts their development projects with the participation of the industry. During 2011 was built a state of the art wind power center called Göteborg WindLab. It is located at Arendal at the entrance to the Port of Gothenburg. The companies involved in this research center for wind power are SKF, Chalmers and General Electric. In this research wind power lab, it is included the largest wind turbine (GE)

built in Sweden (4.1MW) located at Risholmen, all these facilities will become a knowledge platform for wind power (Göteborg-Energi, 2011).

4.2.4 Partner network

4.2.4.1 Joint Venture Project Göteborg Energi and AB Volvo

In 2005, there was a project with Göteborg Energi and Volvo AB to make the Tuve factory a carbon-dioxide free. In this project is included an energy system with electricity from five wind power stations. The project also includes other sources of energy as biofuels. Three of these wind power stations are located in Risholmen and the other two in the Arendal area (Göteborg-Energi, 2005).

4.2.4.2 Joint project Göteborg Energi, Gårdstenbostader, Forvaltnings AN, Framtiden and SKF

This project involved a pilot testing a new supplier from Germany, the company was Kenersys GmbH. In 2008 was obtained the building permit in Gårdsten and by 2009 the wind turbine was finished. In this project, it was necessary to obtain three leasehold with landowners for the construction of wind turbines. This project involved several stakeholders such as Göteborg Energi, Gårdstenbostader, Forvaltnings AB, Framtiden and SKF. The main aim of this project was to provide electricity to approximately 2000 apartments. Moreover, since this turbine was very close to a residential area, it was important to know what the people perception about this project. The results find by Göteborg Energy were that most of people living near the turbine were ok with the turbine operating close to their homes (Göteborg-Energi, 2009).

4.2.4.3 Joint project with SKF

The partnership of SKF and Göteborg Energi was formed with the aim of reducing carbon dioxide emissions. In a few words, Göteborg will be in charge of delivering green energy in terms of heating, biogas, cooling and wind generated electricity to SFK. This cooperation includes a research effort for wind power technology such as energy efficiency improvement. This type of research involves Chalmers University of Technology and the aim is to optimize the maintenance of wind turbines and wind farms. This is an important issue because the high costs for electricity production in wind power come from the maintenance (Göteborg-Energi, 2010).

4.2.4.4 Cooperative with VästanVind

Göteborg Energi was involved in the launch of a cooperative named VästanVind where is possible to obtain wind power ownership. Göteborg Energi ownership of VastanVind is 49%(Göteborg-Energi, 2010).

4.2.4.5 *Other*

Göteborg Energi has been involved actively in stakeholder management activities. They are involved in promoting wind power in a number of trade organizations like the Word Energy Council (WEC), Swedenergy, the Swedish wind energy association and the Swedish association of environmental (Göteborg-Energi, 2006).

4.2.5 Organizational structure

Göteborg Energi is the owner of the local distribution grid. In the year 1999, having this privileged condition of having complete possession of the electricity distribution network, Göteborg Energi was the infrastructure provider of a company called *Plusenergi*, this company was jointly owned with *Vattenfall*. In a few words, *Vattenfall* was the producer of the electricity and *Göteborg Energy* the distributor using its own network to supply electricity for end users, for instance households and companies. Nevertheless, Vattenfall and Göteborg Energi agree to cancel this trading partnership (Plusenergi) in 2008. Consequently, they divided the customers between the two companies by region(Göteborg-Energi, 2009).

For the customers that stayed with Göteborg Energi created a new company called DinEL on April 1, 2009, with the same employees from Plusenergi. This new company is an electricity trader, belongs 100% to Gothenburg Energi. Din El does not produce electricity, they buy electricity on the Nordic Pool Exchange (Nordpool) or directly from electricity producers (Annual Report, 2008). By 2011, around 70 % of the electricity sold through Din El is produced with renewable energy. Additionally, customers through Din El can own holdings in wind power. Moreover, Göteborg Energi donates 20% of the revenues from local wind power to DinEl environment fund in order to finance environmental projects (Göteborg-Energi, 2010).

5 Analysis

In this section is presented the analysis of each company: Göteborg Energi and Vatenfall. Both companies are analysed in terms of business models and capabilities.

5.1 How do we find dynamic capability?

According to the literature review, dynamic capability is considered as a third-order capability which is not based on the amount or a type of resources owned by a company, but is based on how the company can develop its resources to deal with the changing environment. Therefore, it is difficult and vague to measure whether a firm effectively exercises its dynamic capability or not. In order to identify the dynamic capability in this thesis, besides resource-based theory, indicators must be defined in order to measure the capability of the company. The energy

market is one of the dynamic markets due to the changing in technology and perception from consumers' perspectives, especially in wind power industry. The analysis is conducted based on the assumption that the changes in resources and organizational routines imply the ability to cope with the dynamic environment. In this case, the indicators will determine the performance of the company according to the model in **Figure 14** and **Figure 15** proposed by Zahra et al. (2006).

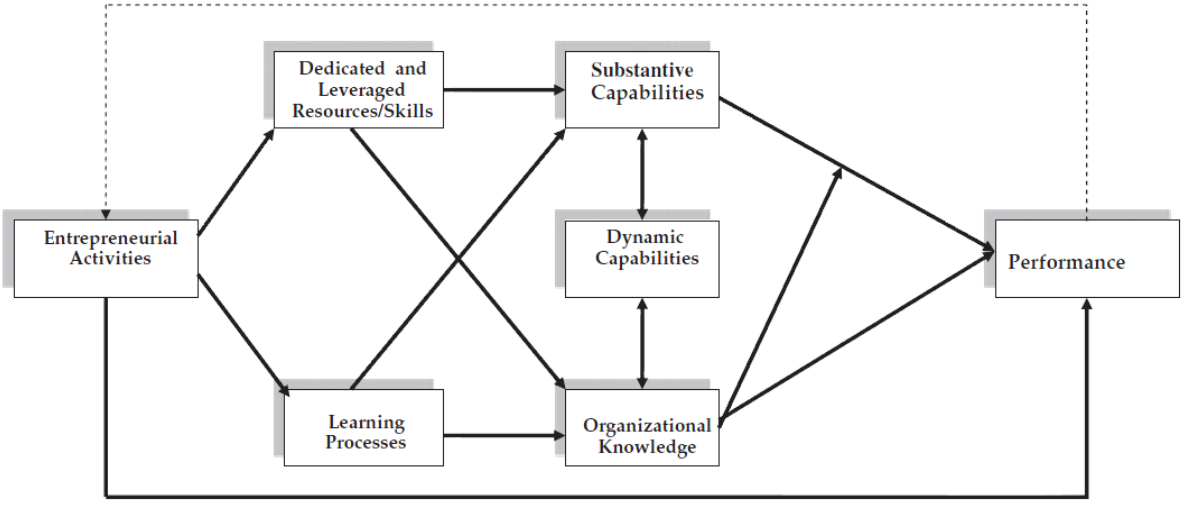

Figure 14: A model of capability formation and performance adopted from Zahra et al. (2006)

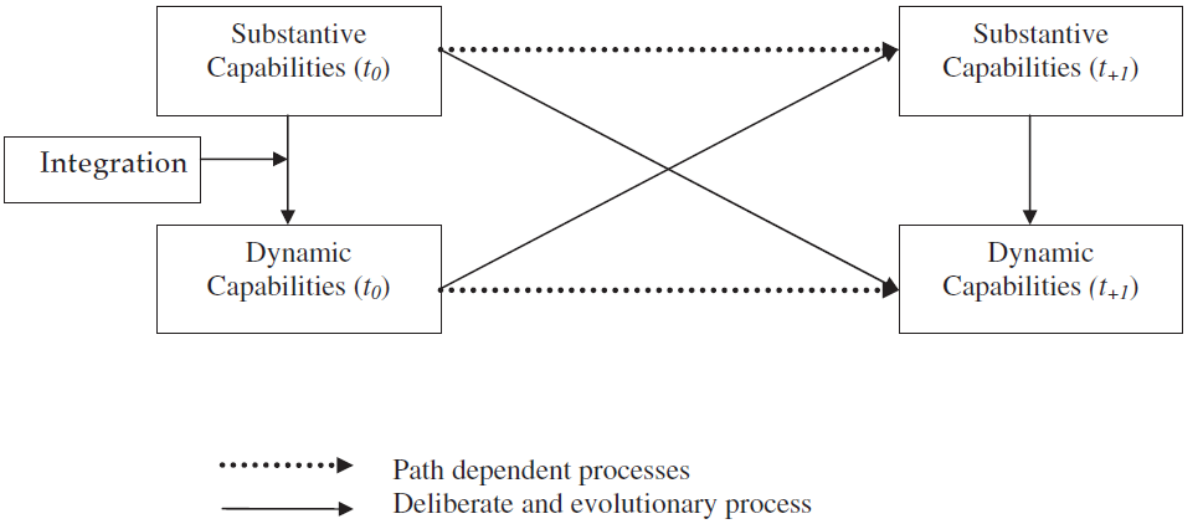

Figure 15 Evolutionary and Path Dependent Processes in Dynamic Capability Development Zahra et al. (2006)

According to the theoretical model proposed by Zahra et al. (2006), dynamic capabilities can affect the performance of the company by improving the substantive capabilities and

organizational knowledge of the firm. At the same time, the substantive capabilities and organizational knowledge determine what types of dynamic capabilities are necessary for the firm.

In order to analyze the data from Vattenfall and Göteborg Energi, performance indicators will be of focus. The indicators that will be used to determine the performance of the company mainly include the installed capacity of wind power, the number of partners and customers and market shares in wind power business. In addition to quantitative indicators, qualitative indicators such as behaviors and business activities will be taken into account. Then different types of dynamic capabilities mentioned in the literature will be analyzed to see which one is a factor of change in performance. However, according to the model adopted from Zahra et al. (2006), the dynamic capabilities indirectly affect the performance of the company via substantive capabilities and organizational, knowledge. Moreover, the substantive capabilities and organizational knowledge are the results from other processes and factors including leveraged resources and skills, learning processes and entrepreneurial activities. Therefore, it is of importance to analyze these preceding processes of the company to holistically understand how dynamic capabilities are developed when the company enhances its performance. For this master thesis, learning processes are very linked with entrepreneurial activities. In that sense, the authors considered learning processes to be as part of entrepreneurial activities.

5.2 Vattenfall

5.2.1 Entrepreneurial activities of Vattenfall

Entrepreneurial activities are activities that help the company identify and explore opportunities on which the company can invest and develop its business. These activities then determine types of resources, competences and learning processes that the company has to develop. In the case of Vattenfall, not until the beginning of the 90's that the company started a small project in wind power. According to the collected data, in the late 90's, there were issues regarding environmental impacts from energy production. These issues were raised from both sides of governmental actors and non-government organizations (NGOs). The decision to invest in wind power of Vattenfall was made way before the environmental restriction from the government and NGOs became effective and influential. This opportunity gave Vattenfall advantages of being the very first actor in the industry or so called first mover advantages, particularly in Sweden. However, it is inevitable to accept that this benefit is simply explained as a result from acting as a natural monopoly in the energy sector from the beginning when the company only dealt with the conventional sources of energy. By being a 100% state-owned company, Vattenfall had enough power in decision making to deal with many projects. In 2000, restrictions and charges were finally implemented for the purpose of supporting the reduction of carbon dioxide emissions in Sweden. When conducting the businesses during that period of

time, Vattenfall believed that the company had to rely strongly on the political agenda which would provide the company with strategic advantage for a long time in the future. The adoption of Kyoto Protocol by the European Union has driven firms in the industry to be more concerned about their production that lead to different types of greenhouse gases (GHGs). The Kyoto Protocol commits the EU Member States to reducing their aggregate emissions of greenhouse gases (GHG) by 8 per cent by 2012 compared to 1990. Vattenfall has continually keep its focus on the environmental activities for the past decade, especially in 2008 when the clear strategic direction to make electricity clean and become a climate-neutral company by 2050. This has made the company reap benefits from collective expertise and experiences in the business as well as economies of scale.

In addition to the opportunities regarding regulation which Vattenfall has been trying to follow, opportunities regarding consumer perception are not of less importance. It is clearly stated in the annual report of the company that in the beginning one of the obstacles for the wind power business concerns the consumer perception. Moreover, the wind power projects at the early phase were not of interest for potential industrial partners due to the resistance similar to the case of nuclear trauma (Bergek and Jacobsson, 2003, pp. 219). However, there have been some groups of consumers who prefer the clean sources of energy and the number of these consumers has been increasing in recent years. Vattenfall has been attempting to persuade consumers to consider the advantages of using renewable energy in several ways. For example, they present themselves as a green energy producer in many events e.g. publications, annual reports and exhibitions. The good thing about doing so is that the direction of the company to produce clean energy corresponds with the present situation in which more arguments and movements from the side of NGOs and end-users are being raised. This can be considered as a first-mover strategy for Vattenfall who tries to take the opportunity and dominate the expanding number of green energy users. Furthermore, the entrepreneurial activities of Vattenfall in wind power sector can be found frequently and apparently from its investment in a number of wind projects ranging from a small demonstration project to a largest one containing hundreds of wind turbines, not only in Sweden but also in other European countries.

5.2.2 Dedicated and leveraged resources/skills

Vattenfall has developed different types of resources to operate in the wind power business. In this section, types of resources that will be focused are tangible resources including wind power plants and relevant technologies and intangible resources including relationship or network partnership with other actors in the industry. However, it is implicit that in order to develop both of the tangible and intangible resources, the company has to be equipped and supported with other significant resources such as human resources, financial assets. Since the 90's, the number of wind power plants of Vattenfall has been increasing significantly. In 1998, Vattenfall

owned 38 power wind power plants which in total provided 20 MW capacity for Sweden. In 2000, the company had 20 wind power plants generating 33 GWh in Sweden. In 2005, the total tangible non-current assets of the company were accounted for 379.9 SEK millions. As it can be clearly seen, Vattenfall has put a lot of effort in its wind power business for a long period of time, although this is still much less, compared with amount of investment in other types of energy. Recently in 2011, Vattenfall operated its wind power farms in many countries and the total assets regarding wind power were considerably larger than in the last decade. Technology is also considered as important factor that has led Vattenfall to this point. The technology in the wind power production and distribution enabled the company to lower the production and maintenance costs and ensure the integration between the wind power plants and the grids. As mentioned in the model of Zahra et al. (2006), these resources and skills will affect the substantive capabilities of the company. This analogy can also be seen in the case of Vattenfall in which the resources (e.g. wind power plants) and skills (e.g. human resources and technologies) will be essentially used to develop and deliver the final products i.e. wind energy sold in the markets.

5.2.3 Substantive capabilities

According to the literature, different types of resources will form into a firm's capability. Similarly, different types of resources owned by Vattenfall have formed substantive capabilities in order to produce wind power. The term substantive capability used in Zahra et al. (2006) is not widely found in academic paper of other authors. However, the term substantive capability is defined close to the terms "capabilities" and "competences". As mentioned in the previous chapter, although the resources of the company can provide it with ability to run its businesses, those resources do not guarantee the competitive position of the firm in the industry until they are transformed into core competences and core capabilities when driven by strategic processes. However, it is stated by Hamel and Prahalad (2004) that it is difficult to identify the core competences of a firm. In this thesis, the authors refer substantive capability as general capabilities or core capabilities that a company possesses and can be developed into dynamic capabilities.

5.2.4 Changes in the business model of Vattenfall (1995-2001 VS 2005-2011)

In order to provide a more precise understanding of how Vattenfall operates its wind business, the concept of business model is employed. In the mapping of business models (**Figure 16, Figure 17)**, it has been found that the changes in the elements of the business model of Vattenfall tend not to happen suddenly but they were more of a gradual process.

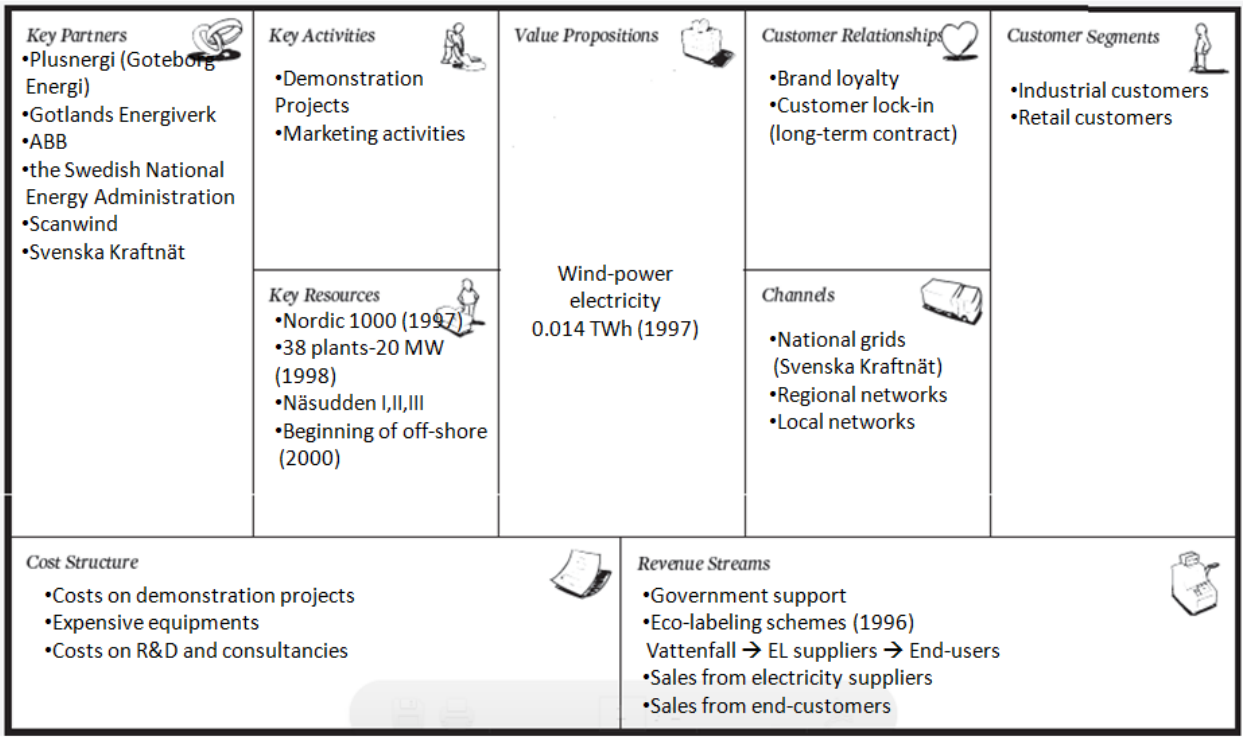

Figure 16 Business model of Vattenfall during 1995-2001

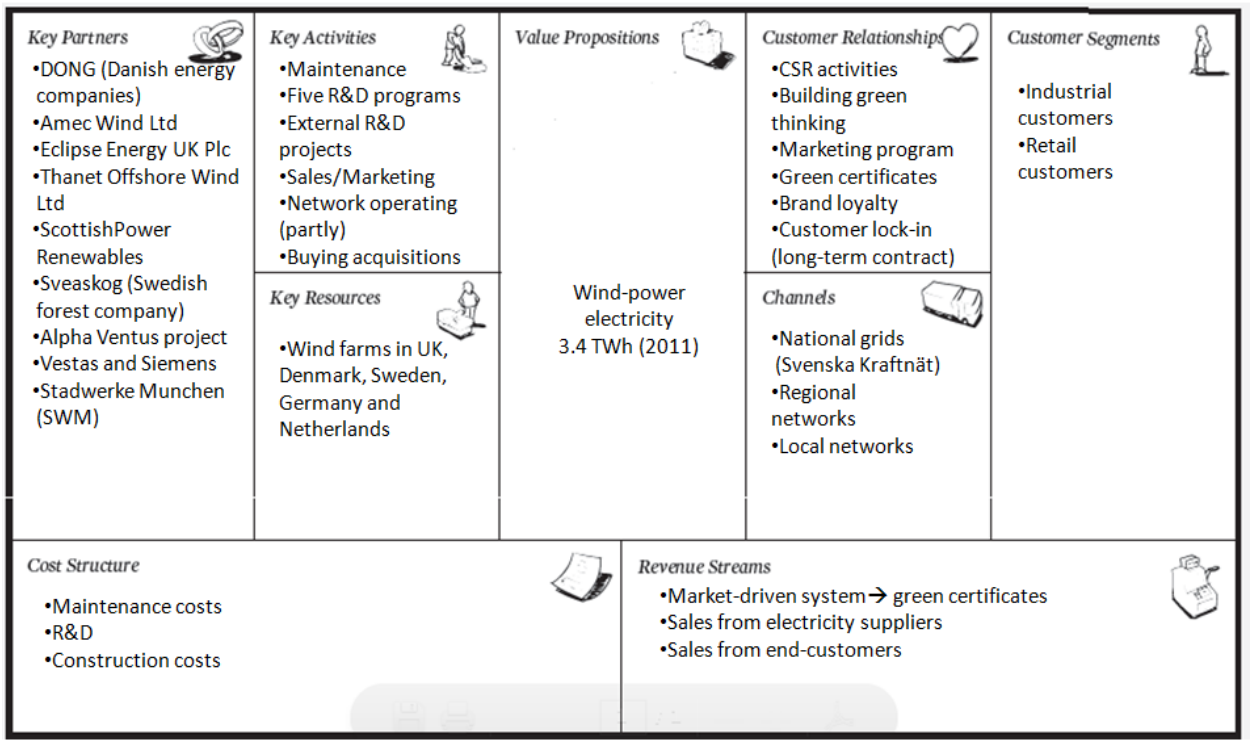

Figure 17 Business model of Vattenfall during 2005-2011

5.2.4.1 Value propositions

By considering wind-power electricity as a value proposition, it is true to claim that the value proposition of the company did not change. Even though the value proposition was green electricity in both of the periods, the amount of the generated wind-power electricity was increased. The fact that the production capacity had to be increased has affected the changes in other elements. During 1995-2001, Vattenfall already launched green electricity into the market but the amount of the green electricity from wind power was still little compared with the following decade. The amount of generation was only 0.014 TWh in 1997. The amount of green electricity sales of Vattenfall significantly increased during 2001-2011 compared to the period before. The amount of wind electricity generated in 2011 was 3.4 TWh. Although wind power had played a greater role as a product for a particular group of customers, the main sources of electricity produced by Vattenfall were conventional sources of energy including coal, oil, natural gas, hydro power and nuclear power. Since 2008, the fact that Vattenfall aimed to be a green energy producer implies that they have significantly considered wind power as one of the company's main value propositions.

5.2.4.2 Customer segments

According to the empirical data, the customer segments mainly include electricity suppliers, end customers and industrial customers. End customers or retail customers are the clients who buy the electricity for household purposes. The industrial customers are clients who buy electricity from Vattenfall for industrial purposes, usually manufacturing. However, electricity suppliers are actors who link between Vattenfall and users. The electricity suppliers are obliged to buy certain percent amount of green electricity or so called green certificates from Vattenfall and sell this amount of green electricity to the customers who will be normally charged by cost of the green certificates. The customer segments of Vattenfall wind power recently still mainly include the industrial and retail customers but the changes are more in terms of the number of customers that has been increasing due to the changing nature of market demands and the company's production efficiency. Regarding the increasing market demands, the green thinking has been led considerably by groups of Non-governmental organizations (NGOs). Therefore, the company has to build up relationships with these organizations with mutual understanding and respects. In addition, the expansion of production capacity of Vattenfall to many countries in Europe has resulted in the increasing number of customer base.

5.2.4.3 Revenue model

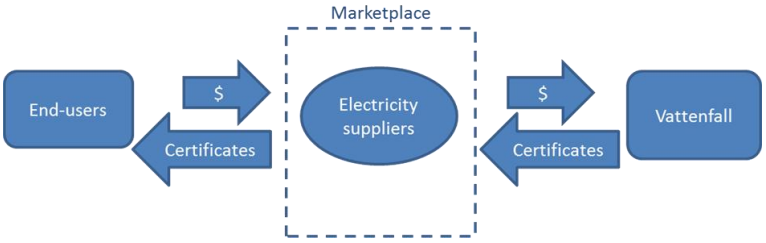

Figure 18 Revenue model of Vattenfall's wind power business

During the past, particularly before 1996, the company was mainly by the government. In order to make revenue, the electricity suppliers were actors that link between the end-users and the company. In addition, there was a system that guaranteed the quality of being green electricity, called “eco-labeling schemes”, introduced in 1996. However, the market demand was not sufficient to cover the cost in the production and development of the wind power electricity. One important reason that has made Vattenfall gain more profits in the past decade is the green certificate system implemented in 2003. In this system, electricity suppliers are obliged to purchase the certain quantities of certificates each year. Annual quotas for electricity suppliers 2003-2030 decided by Parliament are 7.4 % for 2003, 17.9% for 2010 and 4.2% for 2030. The higher electricity costs that result from green certificates are passed to the end-users. With the amount of money gained from the green certificates, Vattenfall can exploit it in the new investment for green electricity generation such as R&D units and wind farms.

5.2.4.4 Partner network

The business partners of Vattenfall mainly include other electricity producers, electricity suppliers, turbine and equipment manufacturers and governmental actors. The interaction between Vattenfall and other electricity producers is generally shown in the form of competition. However, there are also collaborations among these companies for the situations of resource switch or mergers and acquisitions. The relationship between Vattenfall and electricity suppliers mostly involves buyer/seller relationships. Moreover, electricity suppliers can come from a part of electricity producers. Turbine and equipment suupliers are considered as important actors for Vattenfall which do not invent and manufacture these technologies themselves. In addition to the fact that Vattenfall is a state-owned company, there are still several governmental actors being great support for Vattenfall, concerning renewable energy policies and regulations.

5.2.4.5 Key activities

Key activites of Vattenfall includes roles as an electricity producer, a network operator and a distributor or a sales company. During 1995-2001, The key activities were mostly involved in constructing demonstration projects which provided very little amount of electricity. In these projects, Vattenfall had to draw important resources from other actors in the industry since there were still small competences that the company could produce by itself. That made one key activity as finding relevant partners. These activities changed when the time moved into the next decade or 2001-2011. The industry and the market were more developed and expanded a lot in Sweden and other European countries in terms of technologies, policies and market demand. Hence, Vattenfall's key activities in the wind power business involves more in constructing the wind farms, making more mergers and acquisitions, building customer relationships and performing the maintenance of its wind farms. In addition to the activities relating to the production, Vattenfall has to manage its own network, both the regional and local networks.

5.2.4.6 Client relationships

As mentioned in the part of customer segments, Vattenfall interact with end-customers and electricity suppliers. During 1995-2001, the interaction between the company and end-users in the wind power business was not found in a great extent. For the industrial customers, the relationships have been made in terms of long-term contracts and agreement in electricity trading. However, due to the fact that the company had been a governmental corporation and operated in the industry for a long time, the brand loyalty was a significant factor of client relationships. In contrast to the time during 2001-2011, the company was active in building positive images and increasing the market demand in electricity produced from wind power and other renewable sources. In order to present the positive image of an organization, it is a given that big corporations like Vattenfall has to actively exercise their CSR activities. Marketing activities such as holding exhibition and advertisement also make the company well-recognized to the public. Regarding the electricity supplier, it is not clear how Vattenfall manage their relationship capital but the contract signed between both parties can to some extent imply a customer lock-in.

5.2.4.7 Distribution channel

Distribution channel represents a way the value proposition is delivered to the customers. In the case of the electricity industry, it is related to physical distribution i.e. electricity transmission from field plants to end-customers. Electricity generated from wind power plants of Vattenfall is transmitted into national grids via the grid integration. Then the electricity is sent into regional networks which are connected with the national grids. Connected with

regional networks, the local networks deliver electricity to end-users. The electricity distribution has been done this way for both of the periods.

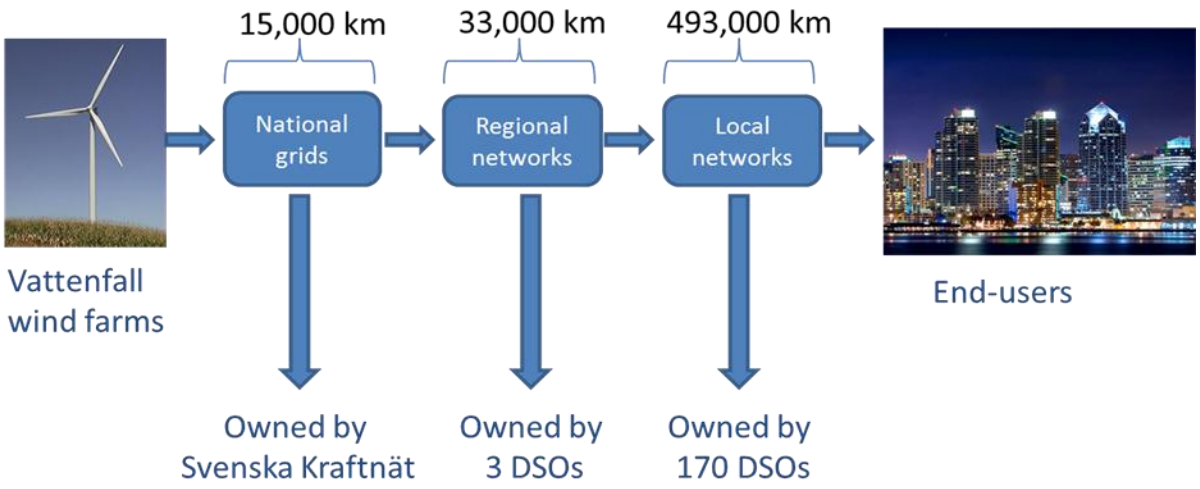

Figure 19 Distribution channel of electricity from Vattenfall's wind power

5.2.5 Dynamic capabilities of Vattenfall

While the previous sections provide analytical discussion about the ordinary resources and capabilities of Vattenfall, this part will focus on dynamic capabilities, that need to be exploded by the company. The aim of this analysis is to identify the importance of each type of dynamic capabilities mentioned in the literature review by matching with the empirical data obtained from Vattenfall but will not intend to determine the existing dynamic capabilities of Vattenfall. As mentioned by Winter (2003), dynamic capability is classified as the third-order capabilities. According to the literature, it is difficult to identify the extent determining whether a company develops dynamic capabilities. In the other words, it relates to the issue of distinguishing between substantive and dynamic capabilities and the issue of dynamic capability determinants. Since this thesis intends to only point out the importance of the dynamic capabilities to the firm, those mentioned issues will be of less concern. In order to understand whether and how each type of dynamic capability is important for the company, its activities will be analyzed. In this analysis, four types of dynamic capabilities described in the literature review part are used as a framework to understand whether or not Vattenfall has exploded these capabilities.

5.2.5.1 Adaptive capabilities

Adaptive capability is defined as the ability to identify and capitalize on emerging market opportunities. By recalling the model from Zahra et al. (2006), this type of dynamic capability

closely relates to the entrepreneurial activities of the company since it emphasizes the importance of exploiting market opportunities. The level of analysis of adaptive capability can be on the micro level e.g. interactions with individual customers or suppliers. In this sense, Vattenfall has dealt with the emerging demand of wind power in the market and also the technological development of the turbine suppliers. Regarding wind power business, Vattenfall was one of the very first players as a producer in the Swedish industry although at the beginning, demands from consumers of renewable energy could not be discovered in a significant number. The policy issued by the federal government in 1997 was a significant reason to the rapid increasing development of wind power industry during 1990s since it provides huge development on the supply sides i.e. turbine manufacturers in Sweden and their R&D programs. This means that Vattenfall chose to respond to the change not only in the market itself but also the policy and regulation that are enforced in the industry. It is very important for a firm to operate in favor of the governmental policies since it provides the firm with benefits of the first mover and prevents it from losing money from late investment and time to catch up with other players. However, it has been widely discussed that investing in developing this adaptive capability can incur high cost for firms. The reason for this problem is that when a firm focuses on both internal and external activities, it loses its focus and efficiency.

Similarly, after Vattenfall made the decision to operate in the wind power, it had to develop resources and competences for wind power despite having other types of energy businesses which were already strong and fertile. The number of mergers and acquisitions of Vattenfall also indicates the level of adaptive capacity of the company. Through merging and acquisition, a company can discover more business opportunities in the area and benefit from dealing with lower market uncertainty and resource/asset development time. According to the data, Vattenfall has acquired a significant number of wind power businesses in many European countries such as England, Germany and Netherlands. As mentioned, after the year 2008, Vattenfall has been very active in expanding its businesses regarding wind power and the company's strategy clearly states the emphasis on producing clean energy. These activities have resulted in the increasing performance in terms of both market and financial of the company. At the present, Vattenfall is the largest wind operator in Sweden and the second largest offshore wind operator in Europe. As perceived from the activities of Vattenfall, adaptive capacity is to some extent of use by the company, either the adaptation to the emerging market or to the needs in assets and resources.

5.2.5.2 Absorptive capability

Due to a lack of information from inside of the company, it is quite difficult to analyze the activities of Vattenfall concerning the way it recognizes and utilizes new external information.

However, according to annual report and one interview, a utility company like Vattenfall does not necessarily invest in acquiring as much external knowledge and information as other actors such as turbine manufacturers and research institutes. One main reason is that in general Vattenfall acts as a user of the technology developed by other companies in order to generate energy and electricity. Nevertheless, it has been found from the empirical data that the company has also put effort in the R&D activities for decades. On the one hand, there are activities that are related directly to wind power for example the Smart Grids development, the five technology platforms and other external wind R&D programs. On the other hand, some activities that indirectly support the wind power include the founded innovation center in which technologies and research for all sustainable energy sources have been initiated and developed. The mergers and acquisitions are also considered as ways to absorb external knowledge of the companies. Vattenfall has bought a lot of small companies and exploited the knowledge and resources from those companies in its main business.

5.2.5.3 Networking capability

In this thesis, the definition of networking capability defined by Walter et al. (2006, p.542) is chosen as a main definition since it matches and explains the networking activities seen from a company like Vattenfall properly. The definition is defined that "Network capability comprises a firm's ability to develop and utilize inter-organizational relationships to gain access to various resources held by other actors". The relationships of Vattenfall with other actors in the industry can be divided into different types according to the roles of those actors including (1) equipment suppliers (2) governmental actors (3) network operators (4) customers and (5) competitors. The number of partners, customer base and acquisition are to be used to determine the importance of networking capability for the company.

Vattenfall does not manufacture or develop any kinds of equipment and material for wind power plants. Therefore, the company has to rely strongly on the technologies and physical resources as well as services and maintenance supplied by the manufacturing companies. According to the collected data, Vattenfall has outsourced wind turbines from the suppliers such as Siemens, Vestas and GE.

Regarding the supply chain of the electricity production, although Vattenfall is the main actor and dominates almost the entire value chain in the production chain, that is not the case in the distribution chain. The electricity that is produced by Vattenfall will be transmitted to national grids, regional and local networks, respectively. This has made it necessary for Vattenfall to build relationships with the transmission system operators of national grids such as Svenska Kraftnät (Sweden) Energinet.dk (Denmark) and also distribution system operators (DSOs) in the regional and local networks.

End-users of Vattenfall can be divided into two types: industrial customers and individual end-users. Vattenfall has had built long-term relationships with industrial customers in order to gain more customer loyalty and maintain the existing ones. Moreover, for retail end-users, Vattenfall has provided guidelines and education about wind power for them to be able to use energy more efficiently and in the way that saves the environment.

Vattenfall also collaborates with its competitors in order to gain resources and competences by mergers and acquisitions. For example, the company signed a contract for asset swap with DONG in 2006 and acquired the companies AMEC Wind Ltd and Eclipse Energy UK Plc, as well as the Thanet Offshore Wind Ltd wind farm in 2008.

In conclusion, the activities of Vattenfall mentioned above to a great extent show that Vattenfall has intensively relied on the networking activities since it started the wind power business. It is also implied that the company has exercised some extent of the networking capabilities.

5.2.5.4 Innovative capability

There are several aspects regarding the innovativeness[1] of a company e.g. product, process and services. In this thesis, the areas of innovative capability that will be analyzed include product, process and strategic innovativeness.

Product innovativeness is defined as the newness, novelty, uniqueness and meaningfulness of the product. Vattenfall is a utility company; therefore it is not the case that they will have to be innovative in their product development all the time. Vattenfall operates its business in different energy sectors. The final product of these sectors are the same i.e. electricity or heat. Electricity produced from wind power or any types of energy is similarly delivered into the grids.

Process innovativeness refers to the introduction of new management and production processes. Regarding the management, Vattenfall has changed its organizational structure to cope with new strategies orientation and the new and existing energy businesses for a number of times. For example, during the period 1997-2000, the company restructured its organizational structure continuously. This implies the flexibility inside the management of the company. For the production process, process innovativeness can refer to technological innovativeness. Although Vattenfall has not developed technologies in wind power itself, it actively exploits these technologies developed from the suppliers. For example, the company has kept changing to new types of turbines that have more production capacity and efficiency.

[1] Wang and Ahmed (2004) categorized firm innovativeness into five areas: (1) product innovativeness; (2) market innovativeness; (3) process innovativeness; (4) behavioral innovativeness; (5) and strategic innovativeness.

Moreover, the types of turbine vary according to the conditions around which they are operated for instance in the Arctic location, turbines have to be designed tolerant of the severe condition. Moreover, recently Smart grids technology was developed and implemented in order to help in electricity generation and distribution from wind power. Vattenfall has put a lot of effort in R&D projects for the smart grid technology that will provide the system with secure and reliable network services.

Strategic innovation refers to the change in how to play games in the existing business. In this case, during the past decades, Vattenfall has led its wind power business as well as other sectors by means of two strategies for driving growth of the company: organic growth and growth through acquisitions. It is difficult for the company to grow organically, especially when running its businesses internationally. By mergers and acquisitions of robust wind producer companies, Vattenfall has quickly become one of the biggest players in the world. Moreover, in 2008, Vattenfall clearly announced the main goal to become a clean energy producer. The goal has driven Vattenfall to initiate and expand huge investments in renewable energy businesses for example acquiring wind power companies (e.g. AMEC Wind Ltd, Eclipse Energy UK Plc and Thanet Offshore Wind Ltd wind farm) as well as building partnership with Vestas and Siemens for signing equipment delivery agreement.

5.3 Göteborg Energi

5.3.1 Entrepreneurial activities of Göteborg Energi

Back in the early days of wind power in Sweden, there was an attempt by Göteborg Energi to build their own wind turbines at a small scale, but there was a lack of knowledge and expertise. Therefore, Göteborg Energi decided to buy them from wind turbine manufacturers.

Göteborg Energi was involved with a Scottish wind turbine manufacturer; this entrepreneurial activity resulted in a failure. The wind turbine provider could not make the wind turbine operate. The problem was that when testing a new technology, it is difficult for the electricity producer to determine the specifications of the wind turbines. In that sense there was an information asymmetry between the supplier and Göteborg Energi. This activity represented the first contact between the challenges for developing wind power. Then, Göteborg Energi engaged with some Danish manufacturers. In 1993 was built a turbine from Bonus manufacturer, they formed the cooperative Göteborgsvind. This cooperative owned 4 wind turbines that were operated by Göteborg Energi.

Göteborg Energi intended to invest in a project of 60 wind turbines with a 300 MV production at Fladen in Kattegat Sea, after 4 years in working in the project, in the feasibility and in the permit to build the wind farm. At the end the project was cancelled.

All these entrepreneurial activities mentioned before represented a period of trial and error for Göteborg Energi, as described before, some of the activities resulted with a failure outcome. However they represented learning processes for the organization.

5.3.2 Substantive capabilities of Göteborg Energi

Göteborg Energi has been very active in wind power topics since the introduction and diffusion of renewables became a priority for Sweden in order to diminish the CO2. We mean active in the sense that in their official documents state that wind power is a priority in the long term sustainable energy goals. Moreover, the introduction of renewables for Göteborg Energi was perceived as an effort to follow the Kyoto agreement and the Union European goals.

It is important to highlight that the core capabilities of Göteborg Energi is districting heating and electricity network distribution, both represent their most important sales. Göteborg Energi owns the distribution network in Gothenburg, this means there is no competition in this area business. The revenue stream from the distribution is constant and it represents no risk for Göteborg Energi.

When the wind power project at Fladen was cancelled, Göteborg Energi followed a path dependence towards their core capabilities in heating. All the efforts went to the Rya Combined heat and power plant. This plant generates electricity from the same heating that is produced for district heating purpose. With the construction of this plant some of the target goals of less Co2 emissions were met. Additionally, Göteborg Energi will become an electricity producer locally, and this type plant also received subsidies from the government. Once the Rya Combined heat and power plant was finished, it was seen again that Göteborg Energi put more effort in Wind Power investments.

5.3.3 Dedicated and leveraged resources /skills

It was not easy challenge for Göteborg Energi to enter to wind power production. In that sense, Göteborg Energi did not have the resources, skills for producing electricity themselves. These facts represented a huge challenge for Göteborg Energi. However, they want to produce electricity production from a renewable source because of the subsidies from the government and the green certificates. Additionally to this, Gothenburg City did not produce the enough electricity locally, this issue represented a risk for disruptions in the electricity in the city.

One of the skills, that are very important for companies that engage in wind power, is the ability to find de right place to build the wind turbines. In that sense, Göteborg Energi obtained experience from their entrepreneurial activities. Furthemore, Göteborg learned all the difficulties faced with different stakeholders when looking for the right places for wind power turbines for instance: they faced several times the not in my backyard phenomenon, where

different stakeholders in area were not opposed to wind power buy they do not want it in their communities.

The project with the collaboration of SKF and Chalmers is very important because under this agreement, Göteborg Energi benefits from the knowledge of SKF in operation and maintenance of wind power plants. Furthermore, they these actors are involved in the wind power research lab.

By now, Göteborg Energi in terms of physical resources regarding wind power has about 100 GWH in wind electricity production counting all the GE wind turbine erected at Risholmen.

5.3.4 Changes in Business model of Göteborg Energi

In order to analyze and understand business models and capabilities regarding wind power, it is important to highlight that Göteborg Energi could be analyzed from different perspectives because Göteborg Energi is a company that engages in different types of business. In that sense, our main focus for the business model and capabilities analysis is electricity as the main service offered to customers. Concerning electricity, the role of Göteborg Energi can be seen as a producer, distributor of the local network and as operator. First, the role as a producer happens when Göteborg Energi is producing electricity in their facilities for instance wind turbines. Second, Göteborg Energi is the local distributor of electricity in Gothenburg City. Finally, Göteborg Energi owns a company (DinEl in charge of selling the electricity to end users). This company works as an virtual operator in the deregulated electricity market. This Göteborg Energi entity can buy or sell electricity from other energy producers, sell through Nord Pool (Energy market for Norway, Denmark, Sweden and Finland). For the purpose of this master thesis, the role of Göteborg could be any of the roles described above. This situation means when explaining business models or capabilities, Göteborg Energi is seen as a producer, operator, or as distributor of the electricity network. In the **Figure 20** and **Figure 21** it is possible to see the changes of the business model of Göteborg Energi since they included wind power electricity to product portfolio.

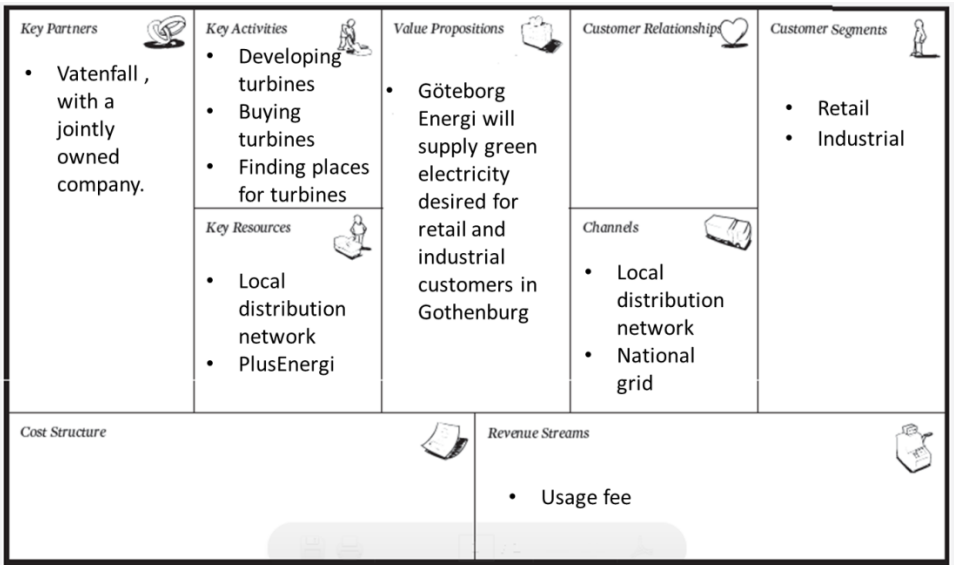

Figure 20 Göteborg Energi late 90s

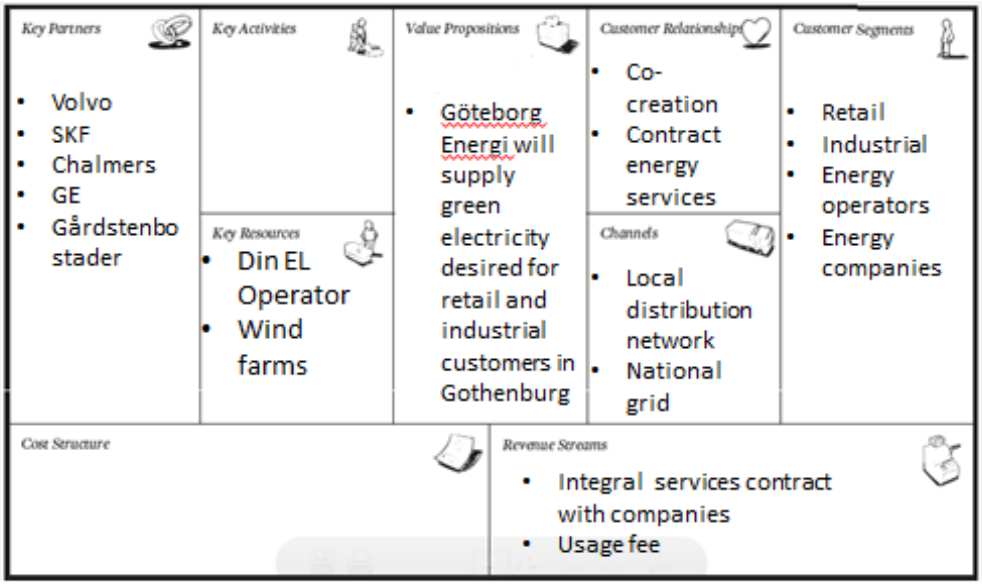

Figure 21 Göteborg Energi 2010-2012

5.3.4.1 Value proposition

The value proposition from a unit business perspective for Göteborg Energi is to supply wind power electricity to retail and industrial customers of Gothenburg. This wind power electricity is in accordance with the strategic goals of producing energy but as well to generate electricity without generating CO2 emissions

5.3.4.2 Customer segments

First, wind power electricity was sold directly to companies like Volvo and SKF, Göteborg Energi does not only sell the electricity to these companies, they sell complete energy solutions that include heating, cooling, maintenance, etc. Second, Göteborg Energi provides wind power residential customers through Gårdstenbostader. Third, recently by the adquisition of more wind turbines electricity

5.3.4.3 Revenue model

Regarding with the revenue model will focus in the selling of electricity to end users. Before being a producer of electricity, Göteborg Energi had an agreement with Vattenfall, they created an organization named Plusenergi. In this company, they could buy energy from renewables from producers or other sellers and later sell to end users. However, when they started to generate electricity themselves, they created a new entity (Din EL) without Vattenfall doing the same business. Furthermore, Göteborg Energi sells the wind power electricity through contracts to companies such as Volvo and SKF.

5.3.4.4 Partner network

The partner network has been increased due wind power. At the beginning it was just a relationship supplier-buyer between Göteborg Energi and wind turbine manufacturers such as Howden and , in that sense we cannot called this types of relationships as partner network but it was a start that leads to other collaborations. We can separate the partner network in three sublevels: buyer-supplier relationship, commercial agreements with companies and resource-sharing partnership.

First, the buyer-supplier relationship implies just buying the turbines from the wind turbine producers such as Howden and Bonus wind turbine manufactures. Second, the partnership of commercial agreement with companies involves offering complete solutions to Volvo Group, including these solutions were the producing electricity from wind power. These commercial agreements also helped to Göteborg Energi to gain knowledge in the wind power electricity production. Finally, the more complex relationships are the ones in where resources (human, knowledge) are shared between the other actors. The clear example of this is the creation of the Göteborg Windlab with the collaboration of Chalmers, SKF, General Electric and SWPTC (Swedish Wind Power Technology)

5.3.4.5 Client relationships

The most important client relationship regarding wind power was the pilot wind power plant built with the partnership of Gårdstensbostader at the Framstiden group. This project provided

electricity to a residential area in Gardstens. For Göteborg Energi was important how people reacted to wind power. From this project, Goterborg Energi acquired knowledge about residential users from wind power.

5.3.4.6 Distribution channel

The electricity produced from the wind turbines goes directly to the network owned by Gotenburg Energi through the final customer in Gothenburg region. In the last years, they sell wind electricity through other areas of Sweden, as well, using the national grid via the energy operator Din EL.

5.3.5 Dynamic Capabilities of Göteborg Energi

5.3.5.1 Adaptive capability

It is possible to say that Göteborg Energi has been trying to pursue actively in wind power activities but the development of the wind power has been characterized with a slow process of diffusion. Moreover, Göteborg Energi identified the emerging market opportunities of wind power, but, they did not capitalize in terms of wind power production. The adaptive capability has improved in terms of the number of entrepreneurial activities, pilot wind turbines, collaboration with key industry clients. It is important to highlight that Göteborg Energi could followed not a first mover strategy in terms of wind electricity production because they did not have the financial, human or physical resources to accomplish a faster development of wind power. Sometimes for companies is better to wait and benefit from the free rider effects such as less expensive technology, more competition between wind turbine producers. However, we assume that is not the case, because Göteborg Energi was involved in a massive off-shore wind turbine project in Fladen that did not took place because the project was cancelled by the proper authorities. This means that Göteborg intention was to develop wind power in a fast way.

5.3.5.2 Absorptive capability

It is not possible to say much about the absorptive capability because information from inside the company about this matter is unavailable. However, in one interview performed to one employee expressed the importance of the experience gained by Göteborg Energi in the last years in terms of the procurement of technology, equipment and services. In wind power, usually energy companies are the users of technology developed by others. In that sense, the way the procurement team of energy companies chooses the supplier and the agreement with them, is very important for the success of the projects. Although is very important to highlight that not everything relies in the suppliers, energy companies are still in charge of the integration of the electricity from the turbines to the network. With the introduction of bigger

capacity wind farms, this represents a challenge for energy companies in terms of capacity of the electricity networks.

5.3.5.3 Networking capability

Göteborg Energi has acquired relationships with other partners. These partners are wind turbine producers, established companies, wind farm developers and owners, cooperative. Göteborg Energi has acquired recently knowledge and sources recently through partnership with SKF and Chalmers, they jointly developed a new lab for research in wind power (Göteborg WindLan) with the erection of the largest wind turbine in Sweden. Before that, the relationships between Göteborg Energi and other actors were more commercial agreements than partnerships, for instance, the Volvo and the Gärdstenbostader partnership. These kind of partners are also important for learning processes but there are not as important as the SKF partnership in terms of knowledge creation and R&D competence. In a few word, the network capability it seems it has improved by the latest integration of partnerships that adds value to the network processes of Göteborg Energi.

5.3.5.4 Innovative capability

The product and market innovativeness in Göteborg Energi relies in that users can buy green electricity from wind power if they want to. Din EL is the operator that make this possible, the can supply green energy from the own production from Göteborg Energi but as well they can buy from other wind power producers. Around 20% of the electricity sold from local wind power goes to a DinEl Enviroment Fund, entity that carries out environmental projects. This funding was in response to what customers want it in relation to wind power. The fact that users of electricity can buy electricity from wind power represents innovativeness in the product and in the market.

6 Using the conceptual model to explain the changes of business model

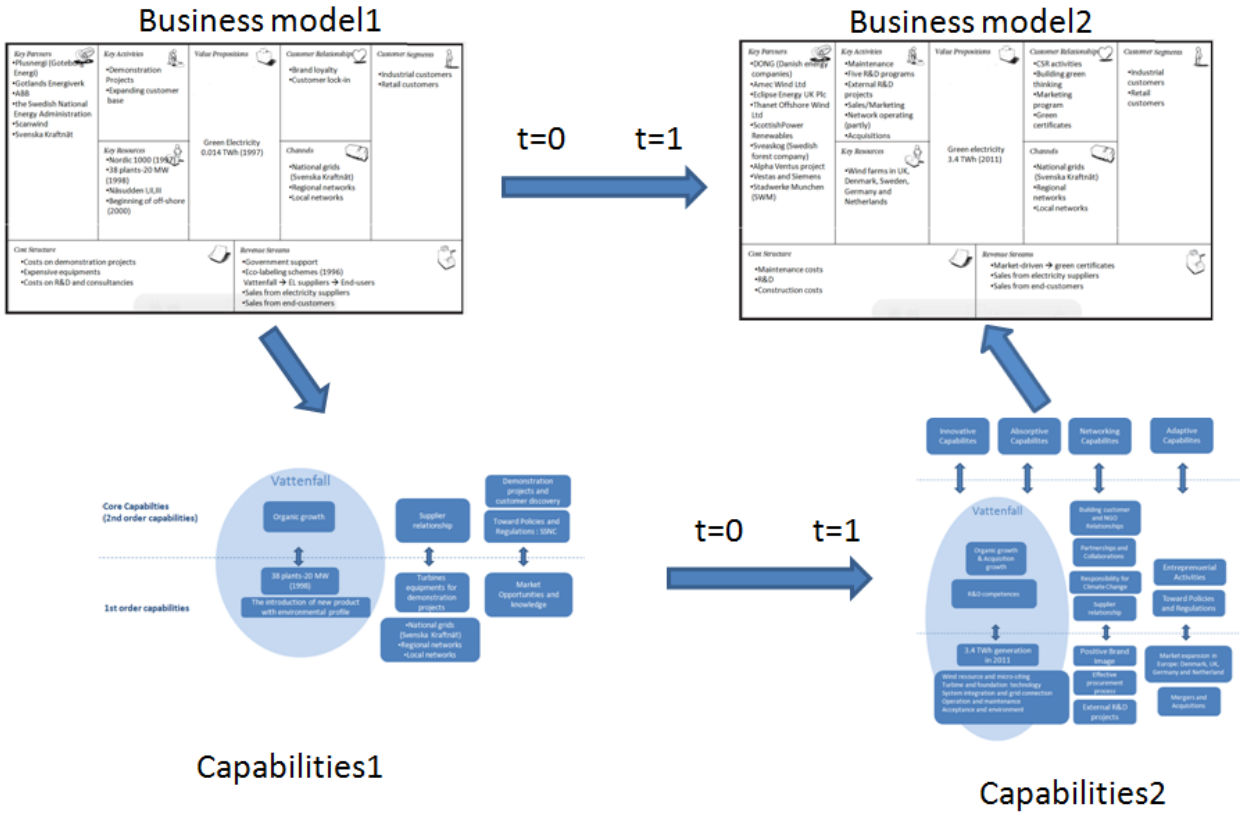

Figure 22 The illustration of the changes in the business models and capabilities

After developing the conceptual model, it was used to help in the analysis that explains how the business model of the companies changed during a period of time . For Vattenfall, the focused period of time includes the time during 1995-2001 and 2001-2011. On the other hand, for Göteborg Energi, it is the time in late 90's and during 2010-2012. The time frame was set according to the availability of the information and the level of activity in the companies' wind power business.

From the business model analysis, it is found that the business elements have changed but it is not possible to see it in terms of capabilities. Using the business model mindset is not enough to study capabilities. However, it is known as a given that the business model is related to the capabilities. Therefore, the researchers bring in the model to help visualize the changes in capabilities. This will explain how the business models change during a period of time (**Figure 22)**.

6.1.1 Capability illustration of Vattenfall (1995-2001 VS 2004-2011)

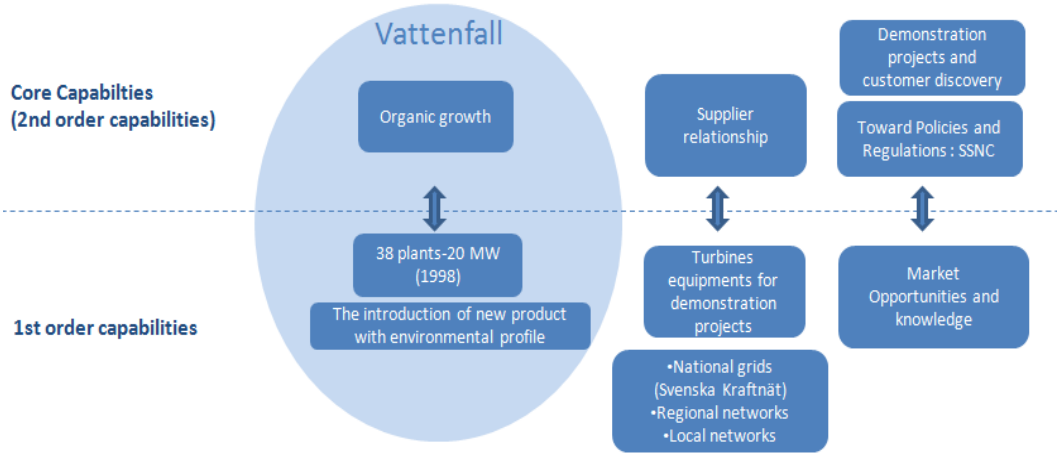

Figure 23 Capabilities of Vattenfall's wind power business during 1995-2001

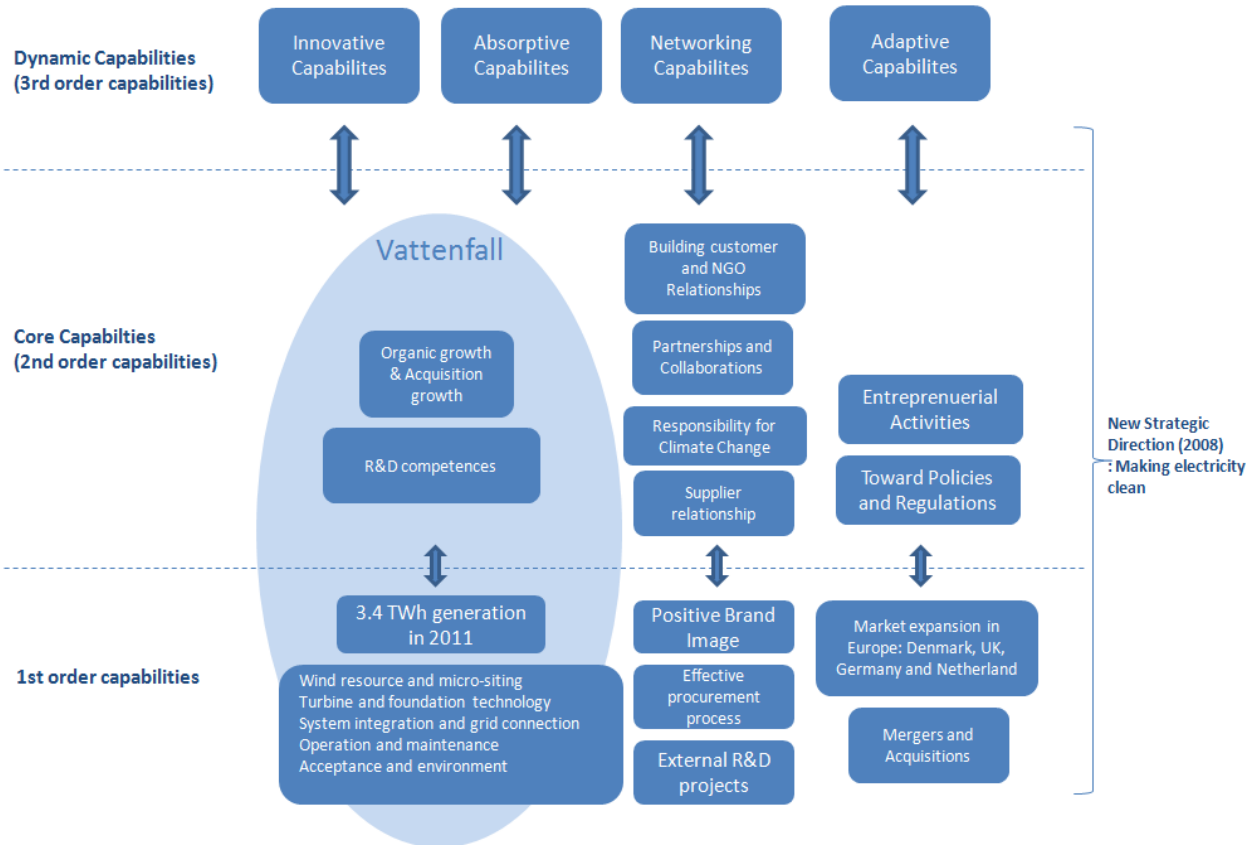

Figure 24 Capabilities of Vattenfall's wind power business during 1995-2001

The developed conceptual model is used to visualize the capabilities of Vattenfall and it is found that there were a lot of changes in its capabilities from the period 1995-2001 to the period 2001-2011 (**Figure 23** and **Figure 24**). Regarding the entrepreneurial activities, Vattenfall's

activities in 1995-2001 that reflect this issue include constructing the demonstration projects and committing with the new policies and regulations. During that time, Vattenfall was considered as the very first producer who started the wind power business. It was challenging for the company since there were not many actors that could provide it with the necessary resources. Furthermore, the customer discovery process was in the main agenda of the firm in order to find new customers that accepted the green electricity. In addition, by putting effort in following the new policies, this to some extent provided Vattenfall with first-mover advantages in the way that the company has built the capability base greater and faster than other competitors. Relating to the networking capital, Vattenfall mostly collaborate with the suppliers which could not be found in the industry. The management strategy was to grow by organic growth from expanding the customer base and sales profit. The project developing product with environmental profile started during those years.

During the year 2001-2011, there were activities related to the dynamic capabilities and the increase in developed competence was obvious for Vattenfall. Relevant to adaptive capability, Vattenfall's entrepreneurial activities mostly dealt with the mergers and acquisitions with international organizations in many European countries including Denmark, Netherlands, the United Kingdom and Germany. This means that the company's resources and assets were also developed in those countries. Networking activities were more active than the period of 1995-2001 in which the relationships were mostly built with the suppliers. Vattenfall also put effort in building relationships with its customers, NGOs and the media to be more recognized as a green energy producer. However, the relationships with the suppliers did not become less significant in this period since they helped improve the procurement process. For the activities relating to absorptive capability, Vattenfall collaborated with other actors in the external R&D projects and also the R&D projects inside the company where the external knowledge was drawn and exploited. In 2011, in order to increase R&D competences, there were five R&D programs conducted in Vattenfall. Those programs were intended to cover the issues of wind technologies, turbine maintenance and environmental regulations.

According to the conceptual model, the continuously developed and changing capabilities can lead into the new strategic direction and goals of the company. In this case, Vattenfall has developed resources and capabilities for its wind power and renewable businesses for the past two decades. Therefore, this led to the change in the strategic orientation of the company in 2008 when it changed from relying mainly on conventional types of energy to renewable energy.

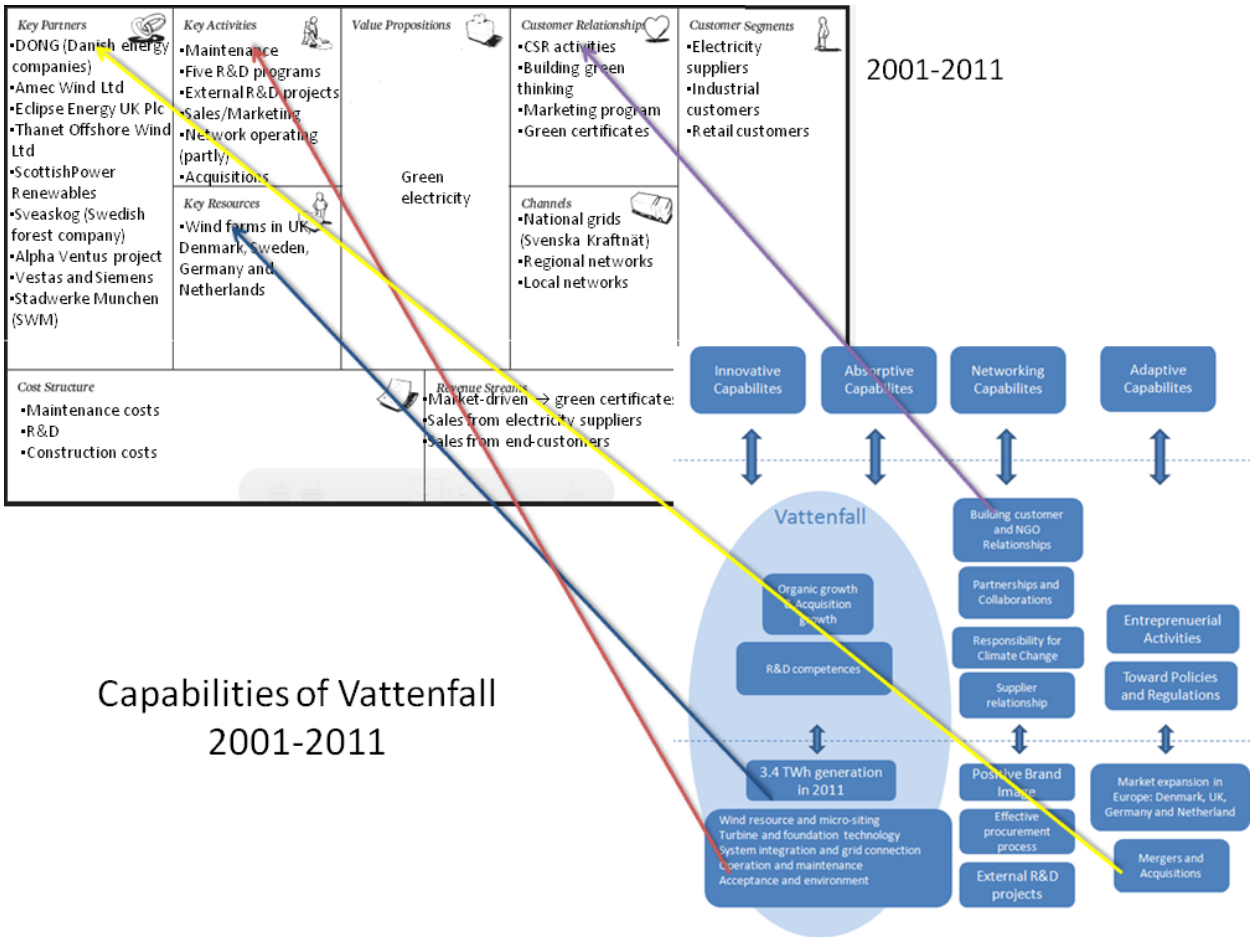

Figure 25 The developed capabilities during 2001-2011 resulting in the new business model

After using the conceptual model to visualize the capability changes of Vattenfall, relating back to the business model canvas and pointing out which capability developed during 2001-2011 relates to the business elements during the same time show how the business model changed over the time frame (**Figure 25**).

6.1.2 Capability illustration of Göteborg Energi (1995-2001 VS 2004-2011)

In the **Figure 26** and **Figure 27**, it is possible to see how a change in the value proposition can change the Göteborg Energi in terms of capabilities. As shown in the pictures the resources and capabilities related to the networking and adaptive capabilities. Customers have evolved to partners in order to create value in the wind power industry. For instance SKF and Göteborg Enegi in developing a state of the art wind turbine lab in Gothenburg. Furthermore, stakeholder management has improved in order to a better understanding of the wind power business.

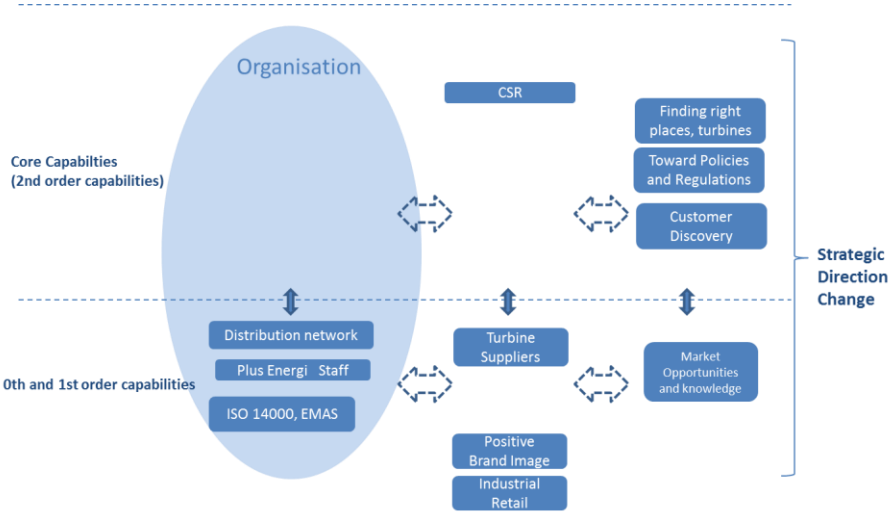

Figure 26 Capabilities late 90s

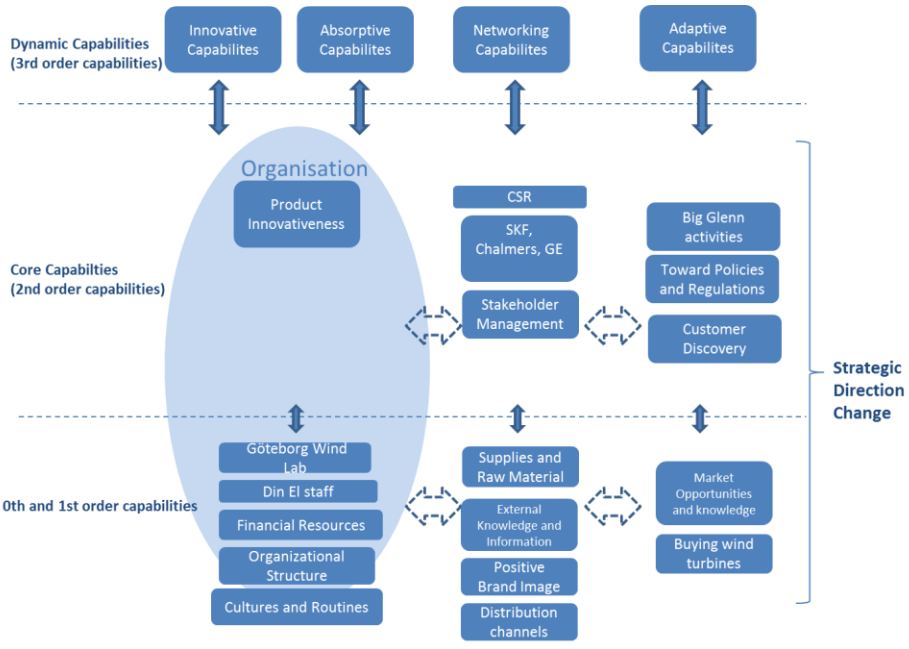

Figure 27 Capabilities 2010-2015

7 Discussions

7.1 Generalization of the model

The conceptual model is considered as an academic contribution of this thesis. The expectation of the researchers goes to the point that it can at least clarify the relationships between the general capabilities and dynamic capabilities. The model has been developed from the information discovered from the analysis which is the mapping between the empirical data and the literature. By generalizing the analysis and combining it with concepts from the literature, a new theoretical framework is formulated visually as a conceptual model. However, the issue of generalization of the model can be of concern for readers. The model is intended by the researchers to be applicable when analyzing the activities and capabilities taken place in other industry. Although it might be difficult for use it in practice, it helps practitioners view their resources and capabilities holistically. The model is attempted to include all basic resources and capabilities ranging from the lower to the higher orders of capabilities. Furthermore four types of dynamic capabilities are not confined to a firm in particular industries. Although each type of capabilities can be differently essential for each type of firms, readers and practitioners can decide by themselves what types of capabilities to be concerned. However, the model might be of less importance for companies that rarely involve in technology or rely greatly on sale and marketing department.

7.2 The need for business model concept in formulating the model

The business model concept proposed by Osterwalder entails the nine important business elements all of which in total describe the characteristics of a firm's business. Those nine elements consists of value proposition, key resources, key activities, partner network, cost structure, revenue model, distribution channel, customer segments, client relationships. During the work of this thesis, the definitions of these business elements are studied and it is found that the descriptions to a great extent overlap with the concepts of capabilities and resources. For example, the partner network is defined as external companies who provide resources or activities for the organization. The partnership and collaboration built among this network are therefore considered as capabilities that help the production of the company. The networking capability is mentioned in literature as a type of dynamic capabilities that will help develop these capabilities. Zott and Amit (2010) claim that the business model is aimed to exploit business opportunities by creating values for the involved parties including its customers and partners. They also mention the 'activity system' in which the activities of the focal firm are engaged with other parties' activities and resources.

When viewing each element of business model from dynamic capability perspectives, it can be inferred that each element of the business can be enhanced by the development of different types of dynamic capabilities. The researchers noticed this relationship between the business model and dynamic capabilities and tried to develop a model that can visualize that relationship. However, later when the researchers found that the elements of the business model can be literally viewed as resource-based capabilities of a company, the focus of the analysis turned to the relationship between resource-based capabilities and dynamic capabilities of the company. Nevertheless, the analyses made on the business models of both of the companies were not discarded but exploited in the preliminary stage of the conceptual model development.

7.3 Interdependency and networking capability

During the stage of data collection, the researchers of the thesis found that the companies in the case studies i.e. Vattenfall and Göteborg Energi have been relying hugely on the other actors in the industry which means that they need various kinds of resources and competences that cannot be developed in house themselves. Therefore, the researchers decide to raise the issue of interdependence that will support the reasons why these companies need good exercise of networking capability. Moreover, this is intended for more understanding in the analysis regarding the dynamic capabilities and firms' resource allocation processes.

Interdependence happens whenever an action or the outcome desired from the action cannot be caused or achieved by one actor or a single causal agent (Pfeffer and Salancik, 1978). During the period of technological change, it is important not to focus only on the internal challenges inside firms but they also have to handle with the external challenges which involve other partners outside the firms (Adner and Kapoor, 2009). Partners in an ecosystem include upstream suppliers, downstream buyers and complementors. There are a number of different ways which affect a firm's ability to create value and those depend on whether it is upstream or downstream partners that face innovation challenges. When the innovation challenges are encountered by suppliers of the focal firm, then the components or resource input that the firm uses to develop or produce products for customers are affected. When the challenges happen in the case of complementors, they affect the potential of value that customers can perceive and appropriate with the level of complementary (Adner and Kapoor, 2009). Moreover, Foss (1999) also explains the concept of networking capability from resource-based perspective. In the article, it is claimed that the network firm can reap competitive advantages from acquiring resource and capabilities from networking with other actors.

7.4 The differences in capabilities between Vattenfall and Göteborg Energi

In this master thesis it was never an objective to do a comparative analysis between Göteborg Energi and Vattenfall, the aim was to analyze these companies in terms of activities in order to develop a theoretical framework. However, it is important to highlight some issues about the two companies. It is possible to discuss of the role of the companies analyzed in terms of new entrant or incumbent. Göteborg Energi could be seen as new entrant in terms of generating electricity, although they are involved in the electricity distribution network. On the other hand, Vattenfall can be seen as the incumbent or establish firm because they have been involved in the production of electricity for a long period of time, as well, it is interesting to see size of this companies in terms of financial value. However, since wind power is a relatively new source of electricity, we can see that they can be seen as new entrants in the wind power industry.

We can say that companies such as Göteborg Energi and Vattenfall, are developing dynamic capabilities while engaging in the wind power industry. It is very important to state that the revenue stream from these companies still come from other activities that represent their core competences and they have become efficient in order to be profitable, these core competences could become core rigidities. (Leonard-Barton, 1992). Tushman (1997) proposes an ambidextrous organization to overcome core rigidities when companies have to develop new ventures. With the information analyzed we could say that type of the organizations do not occur in Vattenfall nor Göteborg Energi, the wind power goals are linked with the organization structure of the companies. There are not signals of separate entrepreneurial entities working in wind power in these companies.

8 Conclusions

This chapter concludes the overall thesis work and answers the research questions. Furthermore, there are further studies stated later in the chapter.

This study investigates the relationships between capabilities and changes in business models of utility companies in the wind power business. Various theories and concepts in the area of strategic management were used in the analysis. First, the theories and concepts relating to capabilities and the business model were used to map with empirical data from Vattenfall and Göteborg Energi. Thereafter, the conceptual model was developed to visualize the relationships between each particular type of dynamic capabilities and lower-order resources/capabilities. Finally, with the help of the conceptual model, the snapshot explaining the changes in the business models from a capability perspective was presented.

The answers to the research questions are:

> ***RQ1*:** What capabilities and resources have been developed in the wind power business during the past two decades?

The capabilities developed in the wind power business can be found in two levels: general resources/capabilities and core capabilities. The former mainly includes physical resources (e.g. wind turbines and wind farm sites), relationships with stakeholders and market opportunities. On the other hand, the latter mainly includes the activities that the companies rely on in order to develop the general resources and capabilities to better off their competitors. These activities for example include the R&D competences, collaborations and entrepreneurial activities. Moreover, regarding the strategy, big companies like Vattenfall do not only rely on organic growth but also growth from mergers and acquisitions which are considered as a fast way to increase their competences and production capacity worldwide.

> ***RQ2**:* What dynamic capabilities are key for the utility companies in the wind power industry for the past two decades?

Although it could be disputable to claim that the utility companies exploit the dynamic capabilities, it is more rational to infer from the frequent changes in their activities that the companies show attempts in developing their dynamic capabilities. The four types of dynamic caapbilties that have been investigated in this thesis consist of adaptive, absorptive, innovative and networking capabilities. It is found that all of the four types are key though the importance of each type is different across some factors such as size and age of firms.

RQ3: How have the business models of the utility companies changed during a period of time?

There are in total nine elements in the business model. Over the past two decades, utility companies have changed each of the elements in different ways through either accumulation or alteration. For the key resources, partner networks and customers, it is obvious that the companies have put a lot of effort in order to increase production capacity, the number of partner companies and customers. In contrast, for the key activities, revenue model and cost structure, the companies kept changing them in order to fit with the maturity of the business and environment. Last but not least, it is worth to note that the value proposition which is wind-power electricity has been the same even though the increase of its amount has driven the changes in the other elements.

RQ4*:* How can the cases of the utility companies be explained by means of the developed conceptual model?

From the fact that the companies' business models changed, the conceptual model can help visualize the changes from a capability perspective in which the capabilities are categorized according to different levels and relationships with dynamic capabilities. By using the model as a framework, the mapping of the capability-related data in the two different periods was conducted. The changes of capabilities presented by the model were then used to compare with the business model changes over the time and finally provided more understanding about the relationship which of the business elements was developed by the effect of which capabilities.

8.1 Implications for researchers and future directions

We suggest that the analysis and conclusions in this study could work as starting point in the gap found in the dynamic capability literature: an explanation of the relationships between dynamic capabilities and business models in established companies. Moreover, in the model it is an attempt to bring dynamic capabilities in a more practical domain, in this case: resources and capabilities. However, our conceptual model does not explain in what conditions dynamic capabilities occur. It is still difficult to find dynamic capabilities.

Future research is needed in order to obtain a better understanding of how the relationships evolve between business models and dynamic capabilities. Particularly attention is needed in the dynamic capabilities used in our conceptual model: absorptive, innovative, networking and adaptive. As we mentioned before, we developed this model by the understanding of the authors that the electricity market is undergoing a process of rapid change due to the European

Union 2050 policy in CO2 reduction. The model developed in this thesis was thought in terms that dynamic capabilities have to be developed and best suited for fast changing industries.

Our model suggests that by having the right resources and capabilities it is conceivable to develop dynamic capabilities. The model was an attempt to have a robust way of explaining dynamic capabilities in terms of resources, capabilities and business models. However, it is important to study in detail and breadth which dynamic capabilities are better in order to change the strategic direction of companies. In the conversation of strategy management, dynamic capabilities have replaced the static view of capabilities. In our model, it is assumed that dynamic capabilities are existent inside the company. This according with most of the previous research but in the model we have dynamic capabilities that relates very much with the outside of the company, with other networks and the market place.

After some deliberations by the authors, it is very important to highlight that because of the complex nature of the model, it is possible that certain combinations of resources and capabilities could lead to path dependence and core rigidities. This issue raises other questions such as what type or capabilities lead to core rigidities or if certain dynamic capabilities could be obstructing the developing of other dynamic capabilities for instance: networking capabilities could be affecting the direction of research of some innovative capabilities.

Above all, future research is necessary to try the conceptual model in different contexts. The new insights will contribute to the conceptual model to be further developed for instance recognizing new dynamic capabilities. Since dynamic capabilities take time in developing in organizations, making longitudinal approach will be necessary. Furthermore, this conceptual model will provide some kind of assistance to develop scales for measuring dynamic capabilities.

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