

# Renewing business models in the energy supply sector: the role of dynamic capabilities and ambidexterity

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## Preface

Dear reader,

The personal interest in this topic grew during a previous educational experience. Prior to starting this Master course in Strategic Management, I firstly obtained my bachelor's degree in International Business and Management Studies. During my studies, I went to London for an internship at an engineering consultancy multinational. Even though I was meant to do recruitment, after a while I was conducting research concerning complexities on onboarding, and how to improve the organisation's current practices. At the end of my research, I found out that the best practice in order to retain the engineers hired was to have an onboarding programme in the office in London. As many consultants were being hired from abroad, many of them did not have the chance to meet a business manager during their first two to three months. This was one of the factors leading to resignations, and out of the research I conducted, the multinational took this as best practice for new consultants. On top of that, I was also training new employees on the job. While doing all of this, I was so fascinated by the engineering industry. The multinational had a huge client-base from automotive, aerospace, to nuclear, and energy organisations. Yet, one of the most challenging industry was the energy sector. Many organisations within the energy sector were facing challenges set by the Paris climate agreement which had been set in 2015 to prevent further global warming.

It was not my job to conduct research for these organisations within the energy sector, but it triggered my interest. Seeing big multinationals being challenged, I was wondering how they could have not anticipated on changing laws and regulations.

For this reason, the thesis within Radboud University was the ideal moment to address the topic. The desire to do so is further filled since the topic fits the preferred future career after this Master's studies.

I hope that this thesis will help energy suppliers within the Netherlands struggling with the energy transition in implementing strategies. My personal thanks to Dr. Hans Schaffers for supervising me during this thesis. Additionally, I am thankful for all the companies and experts in the field that participated in my research. Ultimately, I would like to wish you good luck with reading this thesis, and hopefully, it reveals new insights and answers questions your organisation has.

With kind regards,

Tugce Eroglu

## **Abstract**

Ambidexterity is a concept where firms innovate by exploring new products and/or services, and at the same time optimize their current processes and/or products through exploitation of existing markets. Ambidexterity is defined as the firm's ability to simultaneously explore and exploit. Exploitation is about efficiency, increasing productivity, control, certainty, and variance reduction while exploration is about search, discovery, autonomy, and enhancing variation. Scientific literature finds that ambidexterity, being able to explore and exploit at the same time, can lead to a sustainable competitive advantage and can be essential for long term survival of the firm. Also, it appears that that 'dynamic capabilities', such as the ability of firms to integrate, build and manage internal and external competencies to address rapidly changing environments, is a crucial factor to understand the firms' ambidexterity strategies. However, the situation differs for small energy suppliers, which are often experiencing a lack of resources, which makes it difficult to invest in innovation capabilities. Also, the firm's business environment may affect its ability to build and manage dynamic capabilities that enable ambidexterity.

This thesis aims to understand more in-depth how the business environment of Dutch energy suppliers affects their ability to build and manage competences and achieve ambidexterity. In particular, the focus is on abilities related to the firm's innovation and knowledge management. The following research question is formulated: How do internal and external factors affect the way Dutch energy suppliers build and manage dynamic capabilities and achieve ambidexterity?

In addressing this research question, a comparative case study research approach has been used. Through a case study, the firm's approach to building and managing innovation and knowledge management capabilities is investigated within the real-life context of energy companies. Multiple sources of evidence are used including interviews and document analysis. The research has been conducted at three different Dutch energy suppliers.

This thesis leads to the recommendation for energy suppliers to foster bottom-up knowledge inflows by enabling employees lower on the hierarchical charts to share new ideas.

Employees lower on the hierarchical charts are closer to customers, they have a better understanding of what customers want and need. Their knowledge can lead to innovative ideas. Future follow-up research could investigate whether Dutch energy suppliers that are not exploring new innovative ideas and business models will survive in the future somehow.

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# 1. INTRODUCTION

## 1.1 Topic and problem statement

Due to several forces, such as the need to adapt energy production to renewable energy, the increasing use of solar panels by consumers and producers, and the entrance of new competitors, the Dutch energy sector is in a process of structural transformation. Moreover, the Netherlands also needs to replace existing fossil sources by renewable energy. A challenging aspect of the transition is the extensive use of wind- and solar energy. These renewable energy sources depend heavily on weather conditions (Stram, 2016). The problem occurs as there is not (enough) wind, and sun does not shine (as is always the case at night), which means that there is no possibility to generate enough renewable energy to meet the current demand (Mascini, 2020). Yet, energy suppliers such as Vattenfall, Eneco, and Pure Energie are investing in solar panels and wind turbines in order to supply sustainable energy (Eneco, 2021; Pure Energie, 2021; Vattenfall, 2021). However, the main challenge is that renewable energy systems differ greatly from non-renewable energy systems in power density, meaning that often energy suppliers cannot balance demand and supply. Additionally, increasing the renewable energy portfolio results into increasing land use, presenting challenges for other sectors, such as the agriculture sector (van Zalk & Behrens, 2018).

In this turbulent environment, energy suppliers need to find a balance between traditional fossil energy and renewable energy, and between long-term and short-term interests. This raises the issue concerning how energy suppliers are making trade-offs in strategic decisions in order to find such balance. In particular, how firms are building and managing dynamic capabilities may be essential in order to adapt to a new industry structure where short- and long-term goals can be achieved. Pisano and Shuen (1997) defined the concept of dynamic capabilities as “the firm’s ability to integrate, build and reconfigure internal and external competencies to address rapidly changing environments”.

In this context, the concept of ambidexterity seems highly relevant. O’Reilly and Tushman (2008) defined the concept of ambidexterity as the ability to combine ‘exploration’ and ‘exploitation’ in an organisation. Exploration comprises searching for and experimenting with options far from the existing knowledge base to enhance organizational flexibility. Exploitation, on the other hand, involves building upon and refining existing knowledge to foster efficiency. Ambidexterity in the end could lead to sustainable competitive advantage. O’Reilly and Tushman (2008) argue that dynamic capabilities are necessary for achieving ambidextrous business models. However, how exactly firms are deciding on dynamic

capabilities in relation to achieving ambidexterity, and how the business environment plays a role, is not fully clear. Therefore, this topic will be investigated in more detail in this thesis.

## **1.2 Background on structural change in the energy sector**

The energy sector in the Netherlands ensures the provision of energy to consumers. In the past, the Dutch energy market was characterized by an oligopolistic market structure with a few large companies that dominated the market and were able to achieve high margins (Van Damme, 2005). However, in recent years, there has been increasing competition between energy suppliers. This has been attributed to the increasing number of suppliers because businesses and individuals can install their own solar panels. One million homes in the Netherlands are connected to solar panels, which translates to 1 out of 8 homes. (Dutch News, 2020). Teije (2020) indicated that the Netherlands' solar panel industry experienced rapid growth in 2019. This was attributed to the need for homes to have solar panels. The Authority for Consumers and Markets (ACM) regulates the prices of the grid operators (Dingenen, 2019). Dingenen also noted that deregulation in the energy sector has encouraged the entrance of new companies in the market. This has led to increased competition because of the liberalisation of the market as everyone can start their own energy supply organisation nowadays. Eurostat (2021) stated that the Netherlands had the lowest share in 2020 in terms of using renewable energy among the EU Member states (Eurostat, 2020). In 2020, the Netherlands projected 14% energy consumption from renewable sources, and it was not attainable (Unen, 2020). In the future, Dutch energy suppliers might have to adopt new strategies to increase their share of renewable energy. However, energy suppliers keep investing in many windmills and numerous solar panels due to the decreasing demand for wind turbines, and increasing demand for windmills (Laconi, 2021). Some Dutch political parties are not in favour to see the landscape full of wind turbines, windmills, and solar panels. They anticipate new innovations as an alternative for solar panels and wind turbines (Van Unen, 2020). Moreover, the population is not asked whether they want to see the landscape full of windmills and solar panels. Nowhere was a referendum organized on this subject, as a consequence protests are being organized all over the Netherlands to protect the landscape against destruction (Zappeij, 2021). Therefore, it can be argued that investing in solar panels and windmills consist of exploiting current activities while energy suppliers also need to explore new possibilities to generate renewable energy in order to create sustainable competitive advantages in the Dutch energy supplier industry, and ultimately become ambidextrous.

### **1.3 Positioning in scientific literature and research gap**

Dynamic capabilities are at the core of strategic management in terms of how firms can ensure adaptation to changing environments over time (Strønen, Hoholm, Kværner & Støme, 2017). Teece et al. (1997, p. 415) defines dynamic capabilities as the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments. Dynamic capabilities thus reflect an organisation's ability to achieve new and innovative forms of competitive advantage (Strønen, Hoholm, Kværner & Støme, 2017).

Yet, existing studies in the energy sector seem to have shown little attention to the role of dynamic capabilities and ambidexterity in enhancing sustainable competitive advantage. One of the few studies investigating the role of dynamic capabilities in creating business models to ensure energy efficiency services is from Mourik and Bouwknecht (2017). Entrepreneurs in the energy sector tried to shift from delivering goods to delivering services, the entrepreneurs tried to shift by making use of dynamic capabilities by sensing, conceptualising, and orchestrating. Sensing the user needs' skill, and the skill to respond to changes is found to be essential in designing, developing, and delivering services that really provide the unique buying and using reasons that users want (Den Hertog., et al 2010). The study found that dynamic capabilities have a positive and significant influence in attaining energy-efficient services. However, this study concentrated on dynamic capabilities of entrepreneurs and how it enables business models to change. However, it did not address the relation between dynamic capabilities and ambidexterity.

Gupta et al. (2006) argued that exploration and exploitation are mutually enhancing for organizational performance. Exploration comprises searching for and experimenting with options far from the existing knowledge base to enhance organizational flexibility. Exploitation, on the other hand, involves building upon and refining existing knowledge to foster efficiency (March, 1991). While these modes compete for resources, March (1991) noted that organisations had to pursue both in order to be competitive in the short run, while ensuring long-term survival in times of environmental discontinuities.

A study by Ossenbrink, Hoppmann & Hoffmann (2019) investigated how the business environment as well as internal conditions are shaping ambidexterity in the transition to renewable energy in the period of 2005 – 2016 in Germany. While the engineers in energy companies had come to see reliability, technological efficiency, and cost-effectiveness as the most important criteria for judging the merits of energy generation technologies, managers saw renewables as a threat. Therefore, the transition to renewable energy was difficult from the perspective of the companies. According to this study, any attempt to develop renewables

would have caused ‘strong resistance’ from managers and would have instantaneously killed the initiative. In Germany, all firms except for Vattenfall set up initiatives that merged features of ambidexterity by providing renewable energy. As a German Vattenfall manager admitted, ‘In the new area, the other energy companies are much better positioned than us, to be fair’. Vattenfall’s lack of competitiveness and strong resistance was a consequence on not investing in renewable energy. The study found that a tailored approach to ambidexterity is essential in order to be competitive. Ambidexterity requires the ability to both explore new ideas and techniques and exploit current activities for efficiency purposes. However, resistance within the organization may occur as not everyone is willing or capable to change, which makes exploration often difficult to realize. Therefore, it is essential to investigate under which organizational conditions energy suppliers are capable for change and adaptation. This becomes all the more important as energy suppliers must explore new possible ways to generate renewable energy in order to be competitive, exploit current activities during a transition period, and at the same time address societal goals and expectations of the public as there are several protests against seeing the landscape full of solar panels and windmills.

#### **1.4 Research Objective and Research Questions**

Given the sketches background, the research objective of this thesis is to understand how the business environment of Dutch energy suppliers affect their ‘dynamic capabilities’ in terms of their ability to build and manage competences and achieve ambidexterity. Focus is, given the situational context of the energy suppliers, on their abilities related to the firm’s innovation and knowledge management and how these abilities are related to the firm’s joint exploration and exploitation activities. This way it is aimed to empirically investigate the relation between situational context, dynamic capabilities, and ambidexterity. The central research question in this study is: *How do internal and external factor affect the way Dutch energy suppliers build and manage dynamic capabilities and achieve ambidexterity?* As regards dynamic capabilities, the focus of this thesis is on energy firms’ capabilities for innovation and knowledge management. The following two sub questions will be investigated:

1. What is the role of the energy business environment in establishing capabilities for innovation and knowledge management? This sub-question addresses the impact of environmental factors in relation to the firm’s establishment of dynamic capabilities.
2. How do capabilities for innovation and knowledge management affect the energy firm’s approach to ambidexterity/ this sub-question looks into whether energy suppliers pursue

an ambidexterity strategy, and whether such strategy is related to the way the firms established dynamic capabilities.

### **1.5 Research Approach**

To answer the central research question, a theoretical base is established which defines all the used terms and concepts in the research question. Further, the relations between concepts as presented in the academic literature is discussed. For the present thesis it is essential to define dynamic capabilities, and get a clear view on what is already discovered in previous studies and how the results of these studies can relate to the research question as investigated in this thesis. Hereupon, a conceptual model is created which depicts the concepts and their relations as relevant for investigating this thesis' research question. Next, the research method is described. In this research, a qualitative research approach has been taken as it is difficult to answer the research question by statistical analyses. Instead, by conducting qualitative research, it was tried to gain insight in how certain energy suppliers explore and exploit the provision of renewable energy. The main questions and sub-questions are addressed by conducting semi-structured interviews with employees from energy suppliers. During the interviews, it was tried to get a better understanding on how energy suppliers explore and exploit the provision of renewable energy by particularly studying their knowledge management and innovation capabilities, and by investigating how energy suppliers implement changes in their business model.

### **1.6 Relevance of the Study**

This thesis aims at making a contribution to the empirical grounding related to dynamic capabilities and realizing ambidextrous business models in the Dutch energy supplier industry. Considerable research has been conducted on ambidexterity and dynamic capabilities. However, existing studies regarding the relation between dynamic capabilities and ambidexterity are incomplete and demonstrate a gap as regards the influence of business environment factors. This thesis aims at empirically investigating how dynamic capabilities affect the realization of ambidextrous business models of energy suppliers in the context of the firm's business environment. This study's findings practical aim is to present recommendations to Dutch energy suppliers regarding the role of dynamic capabilities to help achieve an ambidextrous business model as there is ample evidence on how energy suppliers can have ambidextrous business model. By becoming ambidextrous, energy suppliers may be able to more easily create a sustainable competitive advantage.

### **1.7 Thesis outline**

In chapter 2, a literature review will be conducted in order to define and explain the key theoretical concepts and their research gaps. In chapter 3, the methodology will be outlined which contains an explanation on certain techniques that are being used to enhance research reliability and validity. In chapter 4, the general results will be presented. In chapter 5, these general results will be set in a broader theoretical discussion combined with managerial implications and further research questions as this research also contains several limitations. All the formulated sub-questions and the formulated central question will be given a conclusive answer. Ultimately, these findings will be translated into theoretical and managerial implications.

## 2. THEORETICAL BACKGROUND

### 2.1 Introduction and overview of the state of the art

This second chapter of this thesis will describe the existing literature about dynamic capabilities and ambidexterity. It will dive deep into the major concepts that are stated in the research questions, and will try to give some body on how this topic is framed in current academic literature. Which knowledge has been found on dynamic capabilities and ambidexterity? Which relations have been discovered between certain concepts and what has been the cause of those relations? These concepts will be explained by existing literature. There are six articles that have been discovered in this literature review. Those articles are summarized below, indicating the relevance and the research gap that is stated.

Article	Relevant insights	Knowledge gap
Barney (1991)	Companies can exploit internal resources to gain competitive advantage through the use of VRIO framework.	The research did not take into account when companies undergo rapidly changing environments.
Teece et al. (1997)	The dynamic capabilities: sensing, seizing, and transforming help organisations to integrate and reconfigure their resources to cope with the changing business environment	This article does not consider how organisations can exploit and explore at the same time. Insights cover on how organisations can explore new territories.
O'Reilly & Tushman (2008)	Exploitation and exploration do not have to be strategic trade-offs, but can together lead towards a sustainable future. Exploration can be used interchangeable with innovation with regard to the topic of ambidexterity. In comparison, efficiency can be used interchangeably with exploitation.	The article did not make a link between ambidexterity and business model innovation.
Mom et al. (2007)	The influence of internal drivers on ambidexterity where they mainly focus on the manager level of analysis. Increasing managers' top-down knowledge flows are more likely to result in exploitation activities. On the other hand, increasing managers' bottom-up knowledge flows will more likely result in exploration activities.	The research solely focused on internal drivers whereas external bottlenecks were not considered.
Posen & Levinthal (2012)	The authors introduced the outside-in perspective by introducing turbulence as an external factor. Turbulence can affect a company in such a way that it needs to change radically.	The research solely focused on external drivers whereas internal drivers were not considered.
Udriyah et al. (2019)	The authors noted that firms should get involved in innovation to gain a competitive advantage. Udriyah et al. stressed that innovation helps organizations entail turning any business opportunity into a marketable idea. Organisations benefit if they adopt innovation in their processes. The authors also noted that innovation improves business performance and that organisations should ensure that they introduce innovative products to ensure sustainable business growth.	The extant literature, however, has not deeply explored the impact of innovation and competitive advantage in the energy sector, particularly in the Netherlands. Therefore, further research is needed to address this specific gap in the literature.

Table 1: Knowledge gap of the current academic literature

## **2.2 Energy transition from fossil energy to renewable energy**

### **2.2.1 General developments**

As part of the Paris Climate Agreement, governments are striving to replace fossil energy sources by renewable energy. This transition to an energy system based on renewable energy is called energy transition (Hölsgens, 2016). Energy transition involves a change in the composition of energy consumption that is deliberately pursued through all kinds of government interventions. With the transition policy, governments focus on achieving a change in the composition of the energy sector, but the energy transition is not an end in itself. These policy ambitions stem from the desire to reduce the risk of further climate change. Ultimately, it is about reducing greenhouse gas emission (EC, 2014). Because the possibilities for renewable energy with electricity are greater than for instance with fuels, these ambitions mean that the share of renewable energy in the total electricity consumption in the EU must be approximately 50% by 2030. It has been calculated for the Netherlands that the share of renewable energy in total domestic consumption must increase from approximately 14% in 2016 to more than 60% by 2030 (ECN et al., 2016). This growth in the share of renewable energy must be achieved partly through electrification in transport and partly through the heating of homes, while the total consumption of electricity will continue to increase (Mulder, 2017). In order to induce market parties to make different decisions than they would otherwise, governments are taking numerous measures to make renewable energy more attractive or in some cases even mandatory. These measures include subsidies for renewable energy, taxes on the use of fossil energy, the government forces closure of coal-fired power stations, trading system for Co<sub>2</sub> emissions, system of guarantees of origin for renewable energy, and obligations for suppliers to purchase a certain percentage of renewable energy. In addition, governments in various countries are taking measures to increase the flexibility of the electricity system, such as promoting investment in storage, and thus be able to absorb the perceived consequences of a more fluctuating supply of renewable energy. Under the influence of the measures taken in many countries, the share of renewable energy will increase sharply. It is often argued that such a strong growth of renewable energy will have major consequences for the functioning of the electricity market (EC, 2015). In order to assess whether this is indeed the case, the characteristics of renewable energy need to be studied.

### **2.2.2 Characteristics of renewable energy**

Renewable energy differs in a number of ways from electricity generated in a conventional manner. The supply is weather dependent, which means that the maximum production at any

time does not only depend on the installed capacity, but also on external conditions and is therefore less controllable. This weather dependence does not mean that the supply of sustainable energy is unpredictable. Even though supply has a greater variability over time, yet it is not necessarily much more uncertain. Improved meteorological analysis methods make the weather increasingly predictable in the short term (Ummels et al., 2006; Martinot, 2015). Renewable energy also differs in the fact that there are virtually no marginal costs involved in the production. If the wind turbines and solar panels have already been installed, the production of electricity from wind and sun does not incur any additional costs. Installing solar panels and wind turbines is of course not free, which means that renewable energy, just like conventional electricity requires coverage of the fixed capital costs. The actual costs per installation (wind turbine, solar panel) are usually significantly lower than with conventional installations. A modern coal-fired power station can easily cost 1 billion euros, a windmill can be installed on a land for 1 million euros and solar panels can be placed on the roof of a house for a few thousand euros (Mulder, 2017). Overall, the government has planned a large-scale investment in renewable energy. For instance, the investment costs of an offshore wind park of 35 windmills amount to approximately half a billion euros (Natuur en Milieu, 2016). In combination with the financial support schemes from the government, the increase of renewable energy is accompanied by decentralization. There will be more decision units (e.g., companies, households) that generate electricity due to the possibility to generate renewable energy on a small scale such a solar panel on a rooftop (Hirth et al., 2016).

### ***2.2.3 Changing market structure of renewable energy and its impact on strategy***

The energy market is changing rapidly due to technical developments and the energy transition. This offers opportunities for innovative solutions in which market roles can change and new roles can arise. For instance:

- Flexibility solutions that can accommodate (large) differences between electricity supply and demand. Think of data centres or solar parks that "automatically" use or generate less electricity at peak times. Parties that organize these flexibility solutions ('aggregators') are on the rise.
- Opportunities arise for (temporary) storage of excess electricity, for example through wind energy. The energy storage market is developing rapidly (Netbeheer Nederland, 2019).

The energy transition offers opportunities for the maintenance and development of the Netherlands' earning potential. Dutch offshore businesses are already involved in the construction of offshore windfarms at the global level. The cabinet wants the Netherlands to

get the most out of these opportunities by developing and implementing innovative solutions, which would also enable the Dutch business community to contribute to the global energy transition. The worldwide transition to low-CO<sub>2</sub> energy sources, production processes, products and services will change the Netherlands' economic structure. Innovative solutions will be required in many sectors, involving both existing and new businesses. The greatest challenge for existing businesses is to respond to the transition through innovation and where necessary by adapting their earning models. CO<sub>2</sub>-intensive businesses which fail to make the transition will eventually find that there is no longer a place for them in the low-CO<sub>2</sub> economy. To promote innovation, the cabinet will focus first and foremost on creating a healthy climate for entrepreneurship and innovation. A precondition for the transition on the road to 2050 is the provision of a clear, consistent and conducive framework (Ministry of Economic Affairs, 2016).

The energy transition is a system transition. Alongside the development of new and the improvement of existing technologies with new financing structures, it also involves implementing and incorporating these in society. A cost-effective energy transition can be achieved only if we commit fully to innovation. With regard to the requisite technology, many low CO<sub>2</sub> solutions cannot currently be implemented economically without market interventions. This applies to, among other things, offshore wind farms, geothermal energy, nuclear power, solar panels, innovative energy conservation measures, various biomass conversion solutions, CCS, energy from water and storage technologies. Further development will ensure that the price-performance ratio of such products and services continues to improve. Furthermore, innovation is important for finding new solutions for those energy functions that currently offer little potential for far-reaching CO<sub>2</sub> reductions. This applies particularly to mobility and transport and industrial process heat. The commitment to technological innovations applies to the entire chain, from fundamental research, through development and demonstration, to the roll-out of the product, with the aim of ensuring that promising new applications really find their way to the market. It is also important to ensure that the innovation phases follow logically from each other and that the new innovations are suitable for the methods of production, transport, storage and consumption envisaged as part of the transition. Innovations could serve to support or even drive the necessary societal changes (Ministry of Economic Affairs, 2016). Additionally, the changing environment has a significant impact on an organisation. Organisations face significant constraints and contingencies from their external environments and their competitiveness depends on their ability to monitor external environments and adapt their strategies accordingly (Boyd and

Fulk, 1996). The performance of an organisation largely depends upon the strategy-environment fit (Mintzberg, 1979). Scholars have argued that a cost-leadership strategy is appropriate for stable and predictable environments and a differentiation strategy is suitable for dynamic and uncertain environments (Porter, 1980; Hambrick, 1983). Firms adopting a cost-leadership strategy are likely to scan the external environment for opportunities and the ones adopting a differentiation strategy may scan for environment threats (Jennings and Lumpkin, 1992). Organisations implementing a cost-leadership strategy emphasizes highly efficient and low-cost production systems in order to minimise the prices. It may be difficult for organisations implementing such a strategy to achieve the desired levels of efficiency through specialised structures. The formal rules and procedures enforced by such structures help the organisations to standardise activities and minimise administrative costs (Ruekert and Walker, 1987). The strategy of differentiation aims at creating a product or service that is somehow unique. This can be done through design or brand image, technology, customer service, or other attractive features. Some scholars have extended Porter's strategies, particularly in 'differentiation' (Plant, 2000). The two most important ones are 'product-service' and 'marketing' (Miller, 1988). Product-service differentiation refers to offering innovative and up-to-date products and services to customers in terms of quality, efficiency, design, and the confluence of many unstructured marketing problems (Miller, 1986). All of this increases environmental unpredictability – the difficulty of forecasting the behaviour of competitors and customers (Khandwalla, 1977). It is difficult to know how customers and competitors will react to completely new offerings and to anticipate the various problems that might occur. Moreover, product innovation is generally more prevalent and useful in dynamic environment – for example, the software industry – in which products and practices change quickly (Duncan, 1972). Without innovation, firms in such settings fall behind, losing market share and sales. When innovations induce competitors to retaliate, the result is a still more dynamic and unpredictable environment, and the need for further change to maintain effective differentiation (Scherer, 1980). In stable, predictable markets where customers want a standard product at the lowest price, innovation is not often needed; it represents a costly luxury (Miller & Friessen, 1986). Marketing differentiation implies creating a unique image for a product via advertising, marketing, and prestige pricing. The pursuit of superiority in design does not necessarily accompany that attempt. The strategy requires that managers have a good understanding of customer preferences and competing products, since uniquely appealing offerings are sought to inspire buyer loyalty and reduce price elasticity (Davies & Lyons, 1982; Porter, 1980). Also, differentiation is likely to invite competitive responses,

thereby increasing not only unpredictability but market dynamism as well. Competitors may imitate successful practices, requiring further change.

### **2.3 The need for energy suppliers to achieve ambidextrous business models**

Firms in a dynamic environment are challenged to both explore new possibilities in order to cope with future changes in the business environment, and to exploit old certainties to meet today's business demands which is known as ambidexterity (March, 1991). O'Reilly & Tushman (2008) argued that dynamic capabilities are at the heart of the ability of a business to be ambidextrous. Ambidexterity means the ability of a firm to simultaneously explore and exploit. Exploitation is about efficiency, increasing productivity, control, certainty and variance reduction. Exploration is about search, discovery, autonomy innovation and embracing variation. Ambidexterity is about doing both. Ambidexterity acts as a dynamic capability that can lead to new combinations of resources which in their turn can lead to a competitive advantage (O'Reilly and Tushman, 2008). Furthermore, this article shows that efficiency and innovation don't need to be a trade-off but can effectively co-exist (O'Reilly and Tushman, 2008). However, according to Mom et al. (2007) firms face difficulties in managing exploration and exploitation as the two tend to drive each other out. Findings of a survey among managers indicate that increasing managers' top-down knowledge flows are more likely to result in exploitation activities. With this top-down approach, idea generation comes from the higher layers of the company, and are presented to the lower layers. On the other hand, increasing managers' bottom-up and horizontal knowledge flows will more likely result in exploration activities. The bottom-up approach indicates that knowledge flows of managers come from the lower hierarchical layers of the company upwards. Horizontal knowledge flows of a manager are associated with knowledge coming from peer managers in the same organizational unit, or coming from other units at the same hierarchical level. It is important to know that both activities are not mutually exclusive (Mom et al., 2007). Mom et al. (2007) focused mostly on Internal Drivers, which is closely related to exploitation. On the other hand, Posen & Levinthal (2012) emphasised on environmental change and turbulence. This fits the exploration side of the paradox. Posen & Levinthal (2012) incorporate an outside-in perspective by introducing turbulence as an external factor. Turbulence can affect a company's business model in such a way that it needs to change radically. Posen & Levinthal (2012) state that change is an ongoing process. Therefore, the more dynamic the environment, the more pressure for an organisation to adapt to this environment. An example of an external factor are competitors and their changing business

activities. The authors have labelled the changes that happen in the external environment as ‘turbulence’. This term has an impact on two factors: the business model of the company and the environment. Organisations experience decreased performance if they fail to respond to a changing environment. External factors impact the balance between exploration and exploitation. This balance is, however, influenced by the pace of the changing environment. A slow changing environment might promote exploitation, whereas a moderate changing environment might promote exploration (Posen & Levinthal, 2012). Andriopoulos and Lewis (2009) describe integration and differentiation tactics that foster ambidexterity.

#### **2.4 Ambidextrous business model as the ultimate goal**

Business models organize business processes toward driving performance. It articulates a firm’s understanding of customer needs, how best to fulfil those needs, and how to draw revenue and profits for doing so (Zott et al., 2011). Teece (2010, p. 172) defines business model as the firm’s “design and architecture of the value creation, delivery, and capture mechanisms.” Foss and Saebi (2017) identify four central components of many business model definitions: value proposition, target segments, value chain organisation, and revenue capture mechanisms. The relationship between these components differs in the degree of interdependence or “complementarity” (Ennen & Richter, 2010), which determines the business model’s architecture. Dynamic capabilities, specifically sensing, seizing, and reconfiguring enable firms to evolve and respond to changing market requirements (Fischer et al., 2010). A firm must sense new opportunities to improve, complement, or substitute components underpinning its business model (Achtenhagen et al., 2013). Through seizing, firms evaluate their existing business model architecture (Teece, 2007), including processes about value creation, delivery and/or capture. If a firm then decides to innovate its business model, the firm needs to reconfigure its resource base, comprising the acquisition, redeployment, and release of resources and ordinary capabilities to support an innovated business model (Wollersheim & Heimeriks, 2016). Dynamic capabilities may be deployed in a more exploitative or explorative way (Fischer et al., 2010). According to Teece (2007, p. 1320), dynamic capabilities embrace the enterprise’s capacity to design and implement viable business models. Amit and Zott (2016) highlight a potential connection between dynamic capabilities and business model innovation with their observation that such capabilities can align new business models with the changing market environments which can ultimately lead to ambidextrous business models. Ricciardi, Zardini, and Rossignoli (2016) identify the paradoxical dimensions of exploration-exploitation of firm behaviour and dynamic

capabilities as key drivers of adaptive business model innovation. This behaviour, coupled with a firm's dynamic capability deployment, form an integrated model of firm dynamism that enables the adaptive (re)generation of the firm's business model.

## **2.5 Resource-Based View leading to innovate products**

The resource-based view framework was developed by (Barney, 1991) who explained the relationship between a firm's strategic resources, and how firms can exploit their strategic resources to gain a competitive advantage in the market. Barney also asserted that organizational resources are vital because they contribute to sustainable change of a firm, eventually translating to long-term economic viability and enhanced sustainable competitive advantage. Barney (1991) highlighted those resources are all the assets and capabilities that an organisation has. Resources are managed by the firm to enable it to implement the organizational strategies, improving efficiency and effectiveness. These resources include: physical resources, organizational resources, and human resources. Physical resources comprise of location, technology, and equipment's of the company. Organizational resources comprise of culture, knowledge, reputation, relationship with the stakeholders. Human resources entail intelligence, judgment, training, and experience of organizational leaders and employees. Barney identified the VRIN framework to examine whether the organizational resources are valuable, rare, costly to imitate, and non-substitutable. Barney posited that all these factors have a positive and significant influence on the competitive advantage. According to Barney (1991), firms with such resources will often be strategic innovators, for they will be able to conceive of and engage in strategies that other firms could either not conceive of, or not implement, or both, because these other firms lacked the relevant firm resources. However, later Barney modified the VRIN framework to VRIO framework. The main intention of developing the VRIO framework was to find out whether companies are organised to exploit the available resources. Concerning the question of value, the model asserts that organisational resources are valuable if they increase the customers' value. Therefore, if the organizational resources are valuable, they lead to competitive advantage. Rarity occurs when a company produces rare products and services compared to its competitors. Unique products help organisations to gain a competitive advantage against their competitors. The Imitability concept states that a company's products must be costly to imitate. If a company's goods cannot be imitated, the company gains a competitive advantage. Non-substitutable goods are the best because they cannot be substituted with counterfeit goods. Therefore, getting similar products in the market is hard, which ensures non-substitutable. Companies that develop products that

cannot be substituted gain a competitive advantage against their competitors. In light of the resource-based view, companies can deploy internal resources to innovate products that ensure competitive advantage. The theory proposes that organisations should strive to produce products that are valuable, rare, costly to imitate, and non-substitutable. Barney (1991) further suggests that organisations internal resources are valuable in gaining a competitive advantage in the market. Therefore, the theory applies to this study because it will help to link organizational resources and the competitive advantage of Dutch energy suppliers by assessing how energy supply organisations exploit their capabilities.

## **2.6 Dynamic Capabilities Theory**

Teece et al. (1997) defined dynamic capabilities as the firm's processes that use resources, specifically the processes to integrate, reconfigure, gain and release resources to match and even create market change. Thus, dynamic capabilities are the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, and die. The dynamic capability theory was also developed by Teece et al. (1997). They argued that there was the need to develop the dynamic capabilities theory because the existing theories did not address the competition, and changing business environment in the twenty-first century. Teece et al. (1997) accentuated that the dynamic capability model is used to analyse the methods which firms can create wealth while operating in an environment that is undergoing rapid technological change. The dynamic capability theory was developed as an extension of the resource-based view. Teece et al. (1997) argued that the dynamic capabilities theory sought to interpret the importance of resources and capabilities of an organisation. According to Teece et al., dynamic capabilities help organisations to integrate and reconfigure their resources to cope with the changing business environment. Dynamic capabilities are responsible for gaining a competitive advantage and superior performance in the organisation. Teece et al. (1997) also asserted that dynamic capabilities help organisations to integrate, build, and reconfigure their internal and external competencies to adapt to the rapidly changing business environment. Dynamic capabilities of a firm consist of combining and utilising resources efficiently and innovatively. Teece et al. (1997) highlighted that dynamic capabilities are strategic routines that are deployed by organisations that help in the achievement of new resource configurations. These configurations help the organisations to be sustainable when markets emerge, evolve, split, collide, and wind up. The dynamic capabilities theory is anchored on three major micro-foundations, which include: sensing, seizing, and transforming. Sensing entails the identification and of new opportunities that are emerging in the market. Seizing entails getting

the required resources to capitalise on the identified opportunity in the market. Transforming entails utilising the organisation's tangible and intangible assets, developing new customer value propositions, and renewal of the company's core competencies. This helps to configure the entire organisation to conform to the changing business environment.

Denrell and Powell (2016, p. 2) stated that dynamic capabilities help to explain why there is organisational success and organizational failure in the market competition. Denrell and Powell also noted that the main aim of dynamic capabilities theory is to expound on competitive advantage sources compared to time. Firms should develop business models and design skills to adapt to the new opportunities in the market. The model is relevant to this research because it made a clear distinction between baseline capabilities and dynamic capabilities. The model established that baseline capabilities include knowing the market and manufacturing. Dynamic capabilities entail learning new technology to transform the market. The model is further applicable to this study because it supports the use of dynamic capabilities to drive the firm's success. Dynamic capabilities help the organisation to foresee future trends and learn new technology to enhance sustainability and competitive advantage in the market. This model is specifically suitable in this study because it will help in linking dynamic capabilities to Dutch energy suppliers to guarantee a sustainable competitive advantage. In this research, knowledge management and innovation capabilities will be used to assess the dynamic capabilities of energy supply organizations.

## **2.7 The role of knowledge management capabilities in enabling ambidexterity**

Knowledge management and continuous learning are pivotal in organizational success. Knowledge management is a process of continuously managing knowledge of all kinds, and requires a company-wide strategy which comprises policy, implementation, monitoring and evaluation. Such a policy should ensure that knowledge is available when and where needed and can be acquired from external as well internal sources (Quintas, Lefrere, and Jones, 1997). Knowledge management helps in the creation, sharing, and use of organisational knowledge. Kamy et al. (2011) indicated that organisations have acknowledged the importance of harnessing knowledge management from the external environment, which helped to gain a competitive advantage. Kamy et al. also found that knowledge is rare and valuable, and it helps to create differential satisfaction in the market. The differential satisfaction establishes the organisation as unique, and it helps to improve business performance. Syahchari and Sahban (2019) alluded that knowledge management helps to identify the procedures and practices in dealing with organisational intellectual resources. To realise competitive advantage, the study

recommended that organisations should use knowledge management in increasing intellectual capital. Intellectual capital entails intangible assets that organisations use to improve business performance. Intellectual capital includes organisational processes, organisational knowledge, and employee expertise. Intellectual capital contributes positively to business performance, which further enhances the competitive advantages of the organisation. Further, the study indicated that the use of knowledge management is a strong predictor of competitive advantage in an organisation. Knowledge management ensures that the organisation is transparent and harmonious, contributing to improved business performance. Syahchari and Sahban (2019) argued that knowledge management boosts an organization's decision-making ability, enhancing improved efficiency and business performance. This shows that knowledge management is a valuable resource in a company. As such, organisations that invest in knowledge management are most likely to gain competitive advantages in the market.

Rahimli (2012) indicated that creating, distributing, and utilising knowledge management helps companies gain competitive advantages. Rahimli (2012) also stated that it is very crucial to integrate knowledge management in the organisational processes. However, the author suggested that organisational managers should be knowledgeable on the kind of knowledge to use to gain a competitive advantage. Kamyra et al. (2011) agreed that knowledge management is the most crucial strategic resource in the organisation. This enhances the competitive advantage in the organisation. Akram et al. (2018) agreed that knowledge management processes are necessary for key business processes to improve business performance. Rahimli (2012) further suggested that knowledge management should be applied in competition because the market is changing rapidly, especially due to disruptive innovation. Therefore, organisations should use knowledge management to determine appropriate competition strategies, helping organizations gain a competitive advantage. Knowledge management should also be applied in customer focus. This will help to identify the customers' needs and develop suitable products and services to meet their needs. This will help in gaining a competitive edge in the market. The use of knowledge management is important in the global imperative. Globalisation has caused a paradigm shift in the entire world, such that businesses get clients from around the world. Knowledge management can be utilised to find appropriate mechanisms for offering the global clients the best products and services compared to their competitors, gaining a competitive advantage. As such, knowledge management can be viewed as a critical factor that has a positive and significant influence on competitive advantage. As such, organisations should adopt knowledge management to help them gain competitive advantages in the market.

According to Al- Nawafah et al. (2019), knowledge management is a source of competitive advantage. Al- Nawafah et al. (2019) noted that industrial companies should apply knowledge management in their organisational processes. This will help them to control the knowledge effectively by determining the knowledge to implement in order to gain competitive advantage. Companies should acquire useful knowledge to gain a competitive advantage. The study further posited that knowledge management is useful in solving problems, creating core competencies, and solving problems. Knowledge management helps to identify new positions which can be implemented in the organisation in the future to gain a competitive advantage. Knowledge management consists of the following elements: personnel, technology, processes, and strategy. Personnel focuses on the company's staff. They should have the required knowledge and skills to propel the company to the next level. Technology helps to generate and create knowledge from people. Processes are used in providing the necessary skills that are needed in acquiring knowledge. A strategy helps to exploit the market opportunities, considering their strengths and weaknesses. The strategy also helps to develop adequate measures to mitigate any potential threats in the market. Mahdi et al. (2019) added that organisations use knowledge management to identify and organise the necessary information and skills that help the organisation to improve its business performance. The author asserted that organisations should ensure that their knowledge assets are exploited methodically. The study concluded that organisations must generate knowledge, keep the knowledge, share the knowledge, and apply that knowledge to formulate goals to enable the company to gain a competitive advantage. Knowledge management consist of top-down and bottom-up knowledge inflows. According to Mom et al. (2017), findings of a survey among managers indicates that top-down knowledge inflows of managers positively relate to managers' exploitation activities, whereas bottom-up knowledge inflows would be of particular value for managers in places focusing on exploration. Top-down knowledge inflows proceed down the hierarchy and are associated with knowledge coming from persons and units at higher hierarchical levels than the manager (Gupta and Govindarajac, 1991). This implies that the scope of top-down inflows of knowledge is likely to be narrow (Winter and Szulanski, 2001), i.e., closely related and even restricted to the recipient's specialized area of expertise. Consequently, top-down inflows of knowledge increase the depth of the recipient manager's existing knowledge base rather than the breadth; they enable the recipient to increase, refine, or improve his or her expertise in a limited or specialized area (Katila and Ahuja, 2002). Therefore, top-down knowledge inflows allow the recipient manager to respond to problems in familiar ways, and to increase the manager's ability to effectively and efficiently perform existing

activities (Daft and Lengel, 1986). Bottom-up knowledge inflows are associated with knowledge coming from persons and units at lower hierarchical levels than the managers. Contrary to top-down knowledge inflows of a manager, bottom-up inflows of data are rather unambiguous and provide the recipient manager with data in standardized and formalized ways about, for instance, the current performance of the organisation; motivating the recipient manager to engage in exploitation activities (Brady and Davis, 2004; Sanchez and Heene, 1996). Regarding exploration, bottom-up knowledge inflows of a manager are likely to increase variety in experience: previous conceptual and case studies in the field of strategy research illustrate that front-line managers are directly confronted with new technological developments, unexpected problems, and changing market conditions and customer demands (Branzei et al., 2004; Burgelman, 1983; Sheremata, 2000) and that bottom-up inflows of knowledge provide higher level managers with an increased understanding of changes regarding existing technologies, products, processes, and markets and increased understanding of new or emerging technologies, markets, customer needs, or internal initiatives (Brady and Davies, 2004; Branzei et al., 2004, Burgelman, 1983). Drawing on the knowledge-based view (Grant, 1996), we first argue that organizational learning is an important source of knowledge and solutions for firms to solve various problems they face. This is because much of the knowledge and solutions are tacit, firm specific, and difficult to acquire by means of market transactions (Nonaka et al., 2001; Fjeldstad and Snow, 2018). Indeed, organizational learning (including both exploitative and exploratory learning) will be stimulated if the known solutions are below a focal firm's target (March, 1991)

## **2.8 The role of innovation capabilities in enabling ambidexterity**

Innovation marks a vital but challenging managerial responsibility. Innovates denotes intricate knowledge management processes of identifying and utilizing ideas, tools, and opportunities to create new or enhanced products or services (Subramaniam and Youndt, 2005). Innovation has a positive and significant relationship with competitive advantage (Anning-Dorson, 2018). According to Anning-Dorson, firms adopt innovation to improve their productivity, creating a competitive advantage in the market. Organisations explore external opportunities and internal strengths to identify any innovation opportunities. Organisations need innovation in order to be competitive when operating in markets with intense competition. The firm identifies an innovation gap and tries to address that gap, creating an innovation strategy, which leads to the development of competitive advantages. There are various types of innovation: product innovation, process innovation, and market

innovation. Product innovation entails the introduction of new products and services in the market, which disrupt the existing markets. These products contain new features that did not exist in the previous markets.

Čirjevskis (2019) added that product innovation occurs when a firm complements the existing products by introducing new products in the market. Čirjevskis also discovered that product innovation contributes significantly to competitive advantage. Process innovation occurs when organisations alter their services by adopting new elements to improve the service delivery method. This helps to gain a competitive advantage in the market. Market innovation involves creating new markets according to the needs of that market. This occurs when firms identify the potential of new markets according to the market trends. Therefore, product innovation, process innovation, and market innovation contribute significantly to innovation in the market. Thus, it can be argued that innovation is a vital part of an organisation's capacity to create and achieve sustainable competitive advantages in the market. According to Lee and Yoo (2019), innovation contributes to competitive advantage in firms. Lee and Yoo further suggested that innovation must consider organizational capabilities to secure a competitive advantage. The authors also advised that innovation is a critical way to ensure the organisation's survival. Further, the authors advised that organizations should have the required capabilities before considering innovation. This will ensure successful innovations, guaranteeing a sustainable competitive advantage. Gürlek and Tuna (2017) added that innovation begins with identifying the organizational capabilities and how the company can utilize its resources to respond to the changing business environment. This implies that organisations that realize their organizational capabilities have a chance of realizing competitive advantage. Lee and Yoo also noted that innovation requires firms to restructure their resources in a dynamic capability to gain a sustainable competitive advantage. The authors emphasized that innovation occurs when companies respond swiftly to the technological changes in the market. Companies can deploy innovation by collecting the necessary information and using that information to innovate unique products in the market. The results of this study imply that innovation has considerable implications on the overall sustainable performance and competitive advantage of the organisations. Udriyah et al. (2019) stressed that innovation helps organisations entail turning any business opportunity into a marketable idea. Organisations benefit if they adopt innovation in their processes. The authors also noted that innovation improves business performance and that organisations should ensure that they introduce innovative products to ensure sustainable business growth. Companies with better innovation capabilities have higher chances of creating a competitive

advantage than companies with poor innovation capabilities (Widyanti & Mahfudz, 2020). Therefore, this implies that organisations should develop innovation capabilities to compete with competitors. Dereli (2015) argued that innovation activities help to increase the productivity and profitability of the organisation. Dereli also found that innovation capabilities help organisations to improve new market shares and gain new markets significantly. Organisations should exert innovative capabilities because they are essential elements of gaining a competitive advantage. To incorporate innovative capabilities, Dereli advised that organisations should ensure that the production of new goods and services occur in a new and unique way. Organizational restructuring should also be adopted to ensure the development of new skills in the company. Service innovation and quality services have a positive impact on competitive advantage (Kusumadewi & Karyono, 2019).

Mulder and Willems (2019) accentuated that product innovation characterizes competition in the market. Mulder and Willems further discovered that product innovation in renewable energy is important because it ensures a competitive advantage in the energy sector. Product innovation is also important because it ensures business sustainability. The research showed that innovation has a positive and significant influence on the competitive advantage of organisations. The extant literature, however, has not deeply explored the impact of innovation in the energy sector, particularly in the Netherlands. Therefore, further research is needed to address this specific gap in the literature.

## **2.9 Achieving ambidexterity in renewable energy business model**

Innovation and knowledge management were linked to explicate tensions surrounding exploitation and exploration. Both forms entail combining knowledge. Exploitation demands efficiency and convergent thinking to harness current capabilities and continuously improve product offerings. Exploration, in contrast, entails search, variation, and experimentation efforts to generate novel recombination of knowledge (Andriopoulos and Lewis, 2009). On the one hand, only emphasizing exploitative learning while neglecting exploratory learning may foster structural inertia and reduce firms' capability to adapt to future environmental changes and new opportunities (Hannan and Freeman, 1984). On the other hand, solely strengthening exploratory learning without increasing exploitative learning to an appropriate level may reduce the speed at which existing competencies are improved and refined (March, 1991). Instead, exploration and exploitation may add value to each other due to the synthesizing effect (He and Wong, 2004; Xiao et al., 2020). Indeed, exploitative learning helps firms achieve static efficiency by using local search, while exploratory learning helps firms achieve dynamic efficiency by using

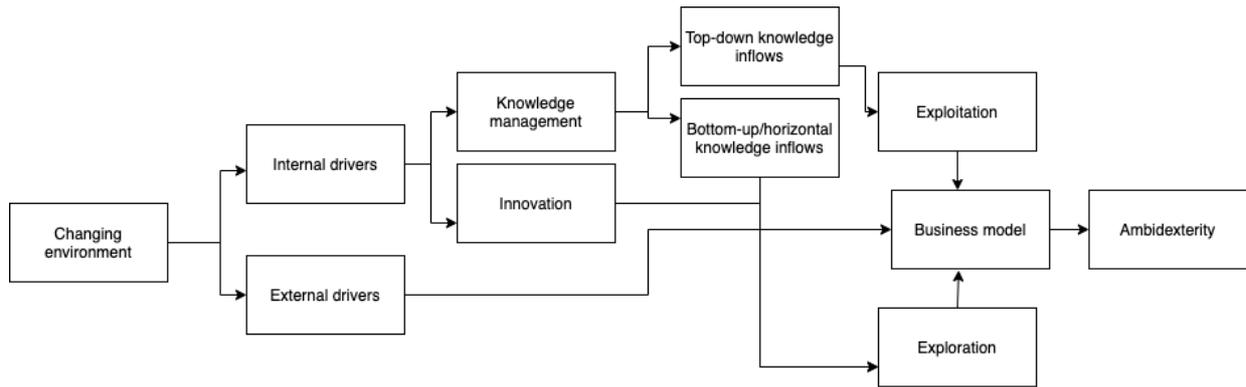
the distant search or long jump (Lopez-Vega et al., 2016). Achieving exploitation and exploration enables success, but raises challenging tensions. Ambidextrous organisations excel at exploiting existing products to enable incremental innovation and at exploring new opportunities to foster more radical innovation (Andriopoulos and Lewis, 2009). To prosper, or even survive, firms must excel at both, exploitative and exploratory innovation (Tushman and O'Reilly, 1996). Organizational ambidexterity is prized as a means of managing innovation tensions. Studies encourage top management to create supportive structures, strategies, and contexts. The ideal outcome has been as described as balance. Such balance denotes truly excelling at both exploitation and exploration (Tushman and O'Reilly, 1996). It is found that top-down knowledge inflows of managers have a positive effect on the number of exploitation activities the managers. In contrast, bottom-up knowledge inflows positively relate to the exploration activities of managers, while having no effect on the exploitation activities (Mom et al., 2008 & Volberda, 1998). Andriopoulos and Lewis (2009) approach ambidexterity in terms of the tension between differentiation versus integration in the innovation paradoxes on strategic intent (profit emphasis vs. breakthroughs emphasis), customer orientation (tight coupling vs. loose coupling), and personal drivers (discipline vs. passion). Results indicate three factors that interact to reinforce and sustain organizational ambidexterity: a multilevel approach, complementary tactics, and learning synergies. A multilevel approach ensures compliance with innovations across the organisation, while complimentary tactics ensure that integration and differentiation are executed simultaneously, and learning synergies highlight the role of exploitation and exploration as mutually reinforcing modes of innovation.

According to Tushman and O'Reilly (2008) integration and differentiation tactics were lauded as vital to managing each paradox. Integration efforts stress interdependence between seeming opposites and enable coordination. Differentiation focuses efforts on either exploitative or exploratory qualities of the paradox. O'Reilly & Tushman (2008), identified a management that encourages learning, provides for the integration and transfer of knowledge, and with competence at exploratory learning, as part of dynamic capabilities related to ambidexterity. As response to the inconsistent organizational alignments faced when applying explorative and exploitative strategies, organisations can use spatial separation to be engaged in both at the same time, but in different areas, for example by creating business units. Another approach is to implement temporal separation to differentiate periods of time where activities shift from pursuing stability to pursuing radical innovations. Finally, synthesizing takes place to reconcile the tensions between exploration and exploitation, by creating new organizational units (Mom et al., 2007). Constructing an outside-in perspective on how change impacts

knowledge, Posen and Levinthal (2012) follow an opposite direction of general research in the area of ambidexterity, stating that an exhortation to action in dynamic environments is not always appropriate. Turbulence is used by the article to embody the frequency and unpredictability of environmental change. Such an aspect has the capacity to erode existing and new knowledge while changing the perception of probabilities and rewards of alternatives. In order to respond to environmental changes, it is conceptualized that organisations increasingly engage in explorative initiatives. Therefore, this article contributes to the discussion by placing an externality as a moderator in the usability of knowledge, and as an alert to decision-makers about the “failure trap”, where constant shifting in alternatives drives out exploitation (O’Reilly & Tushman, 2008). Organisations need the ability to reconfigure by, for instance, the willingness of the management team to commit resources to projects in the long term. So, to conclude, the strategic tensions resulting from pursuing exploration and exploitation simultaneously can be resolved by the senior management team.

## **2.10 Conceptual Model**

Based on previous literature analysis, the research question can be specified in more detail. This thesis aims to investigate how the firm’s business environment relates to the ability of energy suppliers to build and manage dynamic capabilities and achieve ambidexterity. As regard to the business environment, relevant factors include the level of competitive pressure, the speed of energy transition adoption, government laws and regulations, the shortage of renewable energy and other. As regards to dynamic capabilities, focus is on the routines and processes that represent innovation and knowledge management capabilities. The concept of ambidexterity can be identified by investigating the exploitation and exploration activities of the firm. Regarding exploitation, emphasis is on forms of top-down knowledge management inflows. Regarding exploration, emphasis is on innovation and bottom-up knowledge inflows. Further details about operationalization of concepts are being presented in chapter 3. The conceptual model in Fig.1 visualises the relationship between the identified concepts based on key findings extracted from the current literature. The insights, relations, and central concepts represented in this diagram serve as a guide for conducting this research.



*Figure 1: Conceptual framework based on academic literature*

Point of departure based on current studies is that organisations require ambidexterity to be competitive, through ambidexterity organisations can achieve short-term goals and long-term goals by exploitation and exploration. However, exploration through innovation, and exploitation through knowledge management might be difficult to achieve at the same time. The aim of this thesis is to reveal how and whether organisations explore innovative solutions, and also whether they exploit their current capabilities through knowledge management. In following the approach is clarified how organisation explore and exploit at the same time to achieve ambidexterity. As a guidance for the empirical study, four specific propositions are being formulated:

- Proposition 1: Development of innovation capabilities within the organisation stimulates exploration activities within the business model.
- Proposition 2: Developing top-down knowledge inflows leads to a stimulation of exploitation activities within the business model.
- Proposition 3: Developing bottom-up knowledge inflows leads to a stimulation of exploration activities within the business model.
- Proposition 4: Situational context leads organisations to change their business model.

### **3. RESEARCH METHODOLOGY**

#### **3.1 Introduction of the research approach**

To answer the research question “*How do Dutch energy suppliers make decisions regarding dynamic capabilities given the characteristics of their business environment*”? a qualitative research approach has been used. Underexplored topics, such as how energy suppliers explore and exploit the generation of renewable energy needed to be approached with an open view in order to gather relevant information about these topics. To gain insights in underexplored topics and test the existing theory, rich information is needed, which can be best be gathered by using a qualitative research approach.

Interviews have been taken by several energy suppliers in order to gain insights about their method to exploit and explore innovation and knowledge management capabilities. Within these organisations, semi-structured interviews have been held with people either responsible for innovation, knowledge, or strategies. Moreover, interviews have been taken with consultants working within the energy sector. This has been done in order to discover the possibilities and usage of knowledge management and innovation.

Through qualitative research, interview transcriptions, observation reports, and documents can be produced, making statements about a specific phenomenon using only a few observation units (Bleijenbergh, 2013). Qualitative research has an exploratory character allowing more in-depth data collection, new interpretation and new insights, enriching further proposition building leading to more accurate theory building. Additionally, qualitative research seeks to more relevant dimensions and so far undisclosed variables in the studied environment. In this research this implies the studying of the phenomenon innovation and knowledge management capabilities in 3 organisations. This approach fits this research project best for several reasons. First of all, the research is a combination of inductive and deductive research in which is moved between the two approaches iteratively. Deduction has been used in order to test the existing literature. In contrast, induction has been used as the interviews yielded new observations and understanding, and helped in building a new theory (Vennix, 2019). Findings from literature and new empirical findings are used and compared with each other in developing or extending theory (Halecker, 2015).

Interviews have been taken at several energy suppliers that are working on a transition to renewable energy. The interviews have provided lots of textual data on how energy suppliers explore and exploit the generation of renewable energy. Within these organisations, semi-structured interviews have been held with people responsible for the organizational strategy,

innovation, knowledge management, but also with employees that are responsible for the energy transition. This has been done in order to discover whether these energy suppliers are considering other renewable energy sources rather than solar panels and wind turbines. The motive for choosing semi-structured interviews is to have the same questions answered and to compare the different energy supplier organisations, and be open to asking new questions that emerge during the conversation. This enabled the collection of unexpected information, provided rich and varied information. It also enabled the researcher to control which information will be discussed in the interview, and contribute to the data's reliability as the different interviewees answered the same topic (Myer, 2013). Before conducting the interviews, documents have also been analysed. The participating energy suppliers' websites have been studied. Based on the website's data, the interview questions have been prepared to get a clear picture of the organisation, and close the knowledge gap that could not be answered from the website. Documents gave insights into how the energy suppliers tried to make the energy transition occur, their investment plan, and which strategy they followed. This resulted in answering the sub-questions and consequently the central question which laid the foundation for the theoretical contributions, and managerial implication to fulfil the research by providing insights on how energy suppliers explore and exploit the generation of renewable energy.

## **3.2 Research design**

### **3.2.1 Overview**

To answer the central research question on how Dutch energy suppliers make decisions regarding dynamic capabilities given the characteristics of their business environment, a comparative case study research approach has been used. A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, when the boundaries between phenomenon and context are not evident; and in which multiple sources of evidence are used (Yin, 1989, p. 23). The purpose of case study is to explore a phenomenon in depth, describe a phenomenon extensively or explain a phenomenon (Vennix, 2019).

Multiple cases were needed to be able to compare the innovation and knowledge management capabilities of different energy supply organisations. Therefore, the selected organisations in this research were based on the best performing sustainable energy suppliers, and energy suppliers that have been operating for decades. The main aim of this research is to investigate how energy suppliers explore, and exploit the generation of renewable energy in order to achieve ambidextrous business models. As a consequence, it is essential to receive insights into energy suppliers that are performing well in renewable energy because it is more

likely that these organisations have better capabilities than their competitors. According to Hage (2020), the most sustainable energy suppliers do more than going green through their certificates; they actively participate in the transition to a clean energy supply. To make the correct choice, data from the Consumentenbond has been used. Based on the best performing energy suppliers in terms of sustainability, the following energy suppliers have been selected: Pure Energie, Vrijopnaam, Energie VanOns, Om | nieuwe energie, and Powerpeers. All of these energy suppliers were contacted in order to conduct the research, Energie VanOns and Vrijopnaam permitted for research purposes. In contrast, according to Ap van den Berg (2016), the biggest energy supply organisations are Nuon (Vattenfall), Essent, Eneco, and DELTA. From this list, Eneco permitted for conducting research and performing interviews with employees. By selecting the most sustainable energy suppliers and the biggest energy suppliers, the correct comparison could be made. The purpose is to compare the best performing energy suppliers with the bigger energy suppliers in order to compare whether the best-performing energy suppliers in terms of dynamic capabilities differed significantly compared with the bigger energy supplier, Eneco in this case.

With regard to this research, the studying of multiple cases enables the studying of dynamic capabilities in depth, in different contexts and from multiple perspectives (Vennix, 2019). Furthermore, studying multiple cases contributes to the strength and reliability of the research, on top of that it also increase the chances to find more relevant information (Swanborn, 2013; Vennix, 2019). Data collection addressed the following main topics and relations:

- How does knowledge flow into the organisation? Does knowledge flow from higher hierarchical layers or hierarchies lower in the chart?
- Which departments are involved with innovation and what are their role?

Organisation	Function of the interviewee	Documents	Interview duration
1. Eneco	1. Account manager 2. Innovation Leader	Website, strategic vision and mission document, and videos	39 minutes 39 minutes
2. Vrijopnaam	1. Project Lead Developer 2. Director	Website and news articles	48 minutes 44 minutes
3. Energie VanOns	1. Business Development manager 2. Director	Website, news articles, and video	37 minutes 30 minutes

*Table 2: Overview of the interviewees*

### **3.2.2 Data sample**

In line with the constructed research question of this thesis, the research population of this research was: Dutch energy suppliers that are providing energy to customers and other businesses (B2B). From the 9 Dutch energy suppliers that were approached for a possible

interview, 3 of them agreed for an interview. These Dutch energy suppliers are Eneco, Energie VanOns, and Vrijopnaam. First, the organisations are introduced in order to better understand the organisation’s environment and business model.

<p><b>Eneco</b> has been active in the field of energy for more than 100 years. Eneco’s roots go back to the 19th century. At that time, gas and electricity were produced on a ‘large’ scale for the first time and local energy companies were established. These local energy companies grew and ultimately merged in the 20th century. After a history of cooperation and mergers of the municipal utility companies Rotterdam, The Hague, and Dordrecht, the current Eneco was created in 1995. Currently, Eneco is active in the Netherlands, Belgium, Germany, and the United Kingdom. Yet, the head office is located in Rotterdam. Eneco has several subsidiaries. The largest are focused on solar panels, charging stations, electric cars, electric charging, heat products, and district heating. However, Eneco currently still also supplies partly fossil energy sources. On top of that, due to a lack of energy sources, Eneco also buys energy from competitors in order to supply their own consumers energy. Yet, Eneco aims to become climate neutral by 2035. Therefore, Eneco is currently investing a lot in solar parks and wind parks. Shortly, the business model of Eneco includes producing sustainable energy sources through wind and solar energy sources. Additionally, Eneco still relies on fossil energy sources through Enecogen which is a gas-fired power station in Europe. Ultimately, Eneco also buys energy sources from competitors as they cannot balance their supply and demand all the time (Eneco, 2021).</p>
<p><b>Vrijopnaam</b> is an energy supply organisation founded in 2015 with twelve employees. Vrijopnaam has a participatory business model. From production to delivery in a cooperative context focused on local involvement and local benefit. The organization focuses on three parts: firstly, the project developer Vrijopnaam develops and operates solar parks. For each solar park a separate exploitation BV is established. Local parties can become co-owners of up to 50% of an exploitation company. Secondly, Vrijopnaam exclusively supplies 100% Dutch solar electricity and Co2 compensated gas. The cooperative Vrijopnaam issues a Paneelopnaam to its members. A Paneelopnaam is a right to a portion of the electricity produced by a solar farm for a specific period. When you buy a Paneelopnaam for €99, you are allowed to receive at least 250kWh annually for the period of 9 years. The electricity production of a Paneelopnaam is deducted from the energy bill. Vrijopnaam aims to supply fully from their own solar panels within four years, and not having to buy from competitors. However, due to a lack of solar energy this is currently not possible (Vrijopnaam, 2021). Vrijopnaam’s business model includes producing sustainable energy through solar panels and solar parks. Besides supplying sustainable energy to their consumers, Vrijopnaam also enables their consumers to buy a Paneelopnaam which holds a solar panel in a solar parks where consumers can make use for a period of 9 years. Due to a lack of sustainable energy, Vrijopnaam buys compensated Co2 gas in order to supply energy at peak moments. While Eneco and Energie VanOns relies on several renewable energy sources.</p>
<p><b>Energie VanOns</b> supplies green energy that is generated locally by approximately one hundred energy cooperatives from 2014 on. Energie VanOns supplies 100% green energy. The energy cooperatives themselves decide how to generate green energy. Locally, in your village, district or city. Energy cooperatives with solar panels, solar roofs, and wind turbines generate local electricity for instance via the village windmill, and windmills of farmers in the region. The energy is locally generated and locally supplied. Therefore, you choose for green energy from your own soil. Energie VanOns takes care of the administration and customer service. In addition, the organisation develops and arranges the central communication, such as the websites, press releases and social media. The profit Energie VanOns generates is returned to the region on sustainable projects. Such projects include projects in order to improve the Co2 footprint without making a major investment, 100% genuine green power, and 100% locally generated electricity. Within Energie VanOns you choose for green energy and at the same time you support your village, district, or city. Concerning Energie VanOns’ business model, on the one side, Energie VanOns is an intermediary for energy cooperatives. On the other side Energie VanOns has a subsidiary company that focuses on building wind turbines and solar panels themselves (Energie VanOns, 2021).</p>

Table 3: Short description of the participating energy suppliers

### **3.2.3 Research process**

As mentioned earlier, this research consists of a combination of inductive and deductive approach to test extant insights, and to potentially gain new insights. As a consequence, this research consists of an iterative process rather than a linear process. During the execution of the research, some adjustments have been made to the research questions in order to ensure feasibility and good fit with the collected data. Firstly, the research project started with a literature study. The motive for starting with the literature study was to reveal the state of literature on ambidexterity and dynamic capabilities in the energy supply industry, and, to find gaps in the existing literature that could aid in performing the research which could be addressed with this research. Hereafter, the main and sub questions were constructed. The sub questions helped in finding the needed insights to answer the main question, as the main question was very broad and kept intact. Even if the sub questions helped in splitting the main question in parts, the sub questions were also very broad and were therefore operationalized and constructed in an interview guide. The operationalization of the interview questions can be found in Appendix 3. Thereafter, nine organisations were approached for a possible co-operation. Ultimately, 3 organisations granted co-operation for the research. Prior to the interviews, a preparation was done by studying the websites of the participating organisations. Then, the first interviews with the first organisations were conducted. After this interview, transcripts of the interview were written and were read through. Essential information from the interviews such as innovation capabilities and insights about the knowledge management of these energy suppliers was taken along for the follow-up interviews with these organisations. This enabled studying the dynamic capabilities of the energy suppliers more deeply. Hereafter, the interviews that were conducted were also transcribed and read through. By gathering the total amount, a lot of useful information was collected. The insights gathered with the interviews and some additional literature study helped with specifying the research questions. Within those organisations, two interviews were conducted per organisation. After the conduction of the interviews, the recordings of the interviews were transcribed. Hereafter, with the collected data, a first analysis was performed. Then, all the data was analysed and the results were written down. The findings were presented and conclusions of the research were drawn.

## **3.3 Data Collection**

### **3.3.1 Research methods**

The data collection methods for this research projects are analysing documents and conducting interviews with Dutch energy suppliers. For case studies it is usual to combine multiple

methods, also, these two methods are popular methods for collecting data for qualitative research (Bleijnbergh, 2013). By combining multiple interviews and relevant documents, data triangulation has been achieved. Through data triangulation, a 'fuller picture of the situation can be created as data triangulation prevents relying only on the organisation's gathered information (Myers, 2013). Additionally, by making use of data triangulation the reliability of the findings improves (Eisenhardt, 1989).

Prior to conducting the interviews, documents are used for this research. The websites of the participating organisations have been studied. This has been done to filter relevant information for the research and for preparing the interviews. The websites of the participating organisations contains what the organisation offers for their customers and what their core values are. Furthermore, one of the organisation also offered a presentation containing the mission and vision of the organisation which was useful for preparing for the follow-up interviews, and also for the general analysis of the research.

The interviews for this research are open, semi-structured interviews. In open questions, the answer is left entirely up to the respondent, they are free to formulate their own answers to the questions asked. Furthermore, open questions increases the validity of the answers given (Vennix, 2019). Therefore, new and relevant information about innovation and knowledge management capabilities can be gathered in energy suppliers which enables the generation of new insights. Through interviews, respondents are enabled to explain for instance how the organisations anticipates to situational factors in their business environment.

The interview questions have been based on the central research question and then on this research project's compiled sub-questions. The first questions were based on the bottlenecks and situational factors that affected the organisation. These questions were formulated to get an overview of how energy suppliers were adapting their business model towards situational factors. Then, questions concerning the knowledge management capabilities were asked. These questions were formulated to get an overview of how energy suppliers were making strategic choices to use and create knowledge for their business model. After this, organisations were asked about their innovation initiatives in renewable energy and how they managed to be sustainable suppliers in their industry. Interviewees were asked about the measures taken to use renewable energy. Moreover, the interviewees were asked about the difficulties the organisation faced when making the energy transition happen. The complete overview of the interview guide for each compiled sub-question can be found in Appendix 3.

The interviews are semi-structured meaning that the researcher uses pre-formulated questions, but no strict adherence to them. New questions might emerge during the conversation

(Myers, 2013). As the same questions was asked across to different participants, a consistency across interviews will is achieved which increases validity. Yet, the researcher was allowed to ask new questions which might emerge during the conversation (Myers, 2013). The characteristics of the data collection method were important for the research because it enabled the exploration of new insights and the collection of rich information.

### ***3.3.2 Procedure of the interviews and the operationalization***

The interview procedure started by following an interview guide with the participating organisations. These interviews were done in order to get to know the energy suppliers better, to introduce the research project clearly and to get insights about the innovation and knowledge management capabilities of these organisations. The participating organisations of this research are energy suppliers, more specific people within these energy suppliers that are responsible for innovation, strategy, innovation, technology, and, the energy transition. The respondent has to be able to provide relevant information about the capabilities of the organisation and should therefore experience a part of the energy transition. The interviews were prepared by studying the websites of the participating organisations, using information of documents, and constructing an interview guide. Prior to the interviews took place, the interviewees were approached about the research by LinkedIn and through e-mails. Through a LinkedIn message and e-mail, the topics that were to be discussed in the interview were introduced and the opportunity to ask questions was given. Also, after the interviews an email was sent, to thank the interviewee for participating and to pose another opportunity for questions or remark with regard to the interview and research. The interviews took approximately between 40 to 50 minutes and were held through Zoom and Teams due to Covid-19. The participation of the interviewees were voluntary. Moreover, the interviewees were asked whether they wanted to remain anonymous. The interviewees permitted to record the interviews, as a consequence the transcriptions of the interviews could be made for later analysis of the collected data.

The participating organisations and interviewees were Dutch. Therefore, the interview guide was prepared in Dutch as well. Yet, the operationalization is translated into English. The interview guide can be found in Appendix 2. The interview guide was used during the interviews. While this research aimed to answer how energy suppliers exploit and exploit the generation of renewable energy in their organisation. In order to measure the exploration and exploitation, the dynamic capabilities theory is used. Within dynamic capabilities, several concepts that stand out in the resource-based literature and ambidexterity theory is looked at, as are discussed in chapter 2. The focus was on how knowledge management and innovation is created and managed in energy supply organisations.

The interview guide was constructed to include all the aspects that needed to be revealed to ultimately answer the central question. The first questions were about the organisation, its mission and vision, and about the role of the interviewee. After this, questions were asked to go to more specific answers about the innovation and knowledge management capabilities and find out what was important there. Therefore, questions were asked about the knowledge management of the organisation, what they did in terms of innovation, and how did they tackle bottlenecks. To finish the interview, questions were asked about the outcome of dynamic capabilities, to get an idea of the consequences and possible success. Ultimately, questions were asked concerning the agility of the organisation and how different business units were managed. Moreover, interviewees were asked about the challenges of the environment and how they tried to cope with a changing environment.

<b>Concepts and propositions</b>	<b>Assessment</b>
P1: Development of innovation capabilities within the organisation stimulates exploration activities within the business model	Elements: R&D department, innovation business unit, external consultancy organisation, networking, important resources, effect on the organization internally, organizational capabilities, technical capabilities, cooperation capabilities, outcome
P2: Developing top-down knowledge inflows leads to an stimulation of exploitation activities within the business model	Elements: decision making unit at higher hierarchical level, improving current products and services, efficiency, supporting factors, outcome, expectations for future, evaluation, vision sharing / vision support
P3: Developing bottom-up knowledge inflows leads to an stimulation of exploration activities within the business model	Elements: enabling employees on the bottom to share opinions and feedback, implementing changes through the feedback of employees on the bottom, involved parties / people, effect on the organization internally, changes, cooperation capabilities, supporting factors, outcome, expectations for the future
P4: Situational context leads organisations to change their business model.	Elements: energy transition, competitive pressure, laws and regulation, pressure from society, geographical location of the Netherlands, lack of renewable energy, weather conditions. Change in business model because of external factors
C1: Ambidextrous business model	Elements: Exploration and exploitation, simultaneously exploring and exploiting, expectations for future, outcome, important resources, involved parties / people
C2: Dynamic capabilities	Elements: Bottom-up knowledge inflows, top-down knowledge inflows, innovation, R&D, consultancy bureau, capability development, expectations for the future, preparation, strategy for dynamic capabilities
C3: Exploration	Elements: Bottom-up knowledge inflows, innovation, R&D department, finding new products and services, and new markets and customers, involved parties / people, changes, organizational capabilities
C4: Exploitation	Elements: Top-down knowledge inflows, improving products or services, supporting factors, feedback surveys, sharing of information, involved parties / people, vision sharing / vision support, cooperation capabilities

*Table 4: Concepts and propositions*

Through the formulated concepts and proposition above, the gathered data has been measured and evaluated.

### **3.4 Data analysis**

Once the material had been prepared for analysis through transcription, the analysis has been carried out in a narrower sense. Qualitative data analysis is a process in which existing or self-produced texts are interpreted from an empirical question, by labelling certain fragments of texts in multiple phases with concepts and giving these labels meaning (Bleijenbergh, 2013). These concepts are called codes and will help to relate between empirical observations and possible general statements based on these observations (Bleijenbergh, 2013). Interpretation should relate to matters that are in principle observable (and therefore verifiable) (Wester, 1995). To analyse the data, a coding scheme has been used. Coding means assigning 'keywords' to the material. These 'keywords' are derived from analytical or theoretical framework. The codes therefore provide a clear link between the empirical material and the theoretical framework (Vennix, 2019). Hereby, the researcher used a coding scheme based on the operationalization of the interview. In the coding process, the gathered data are compared to identifying similarities from secondary data. The complete coding scheme can be found in Appendix 4. Through the comparison of secondary and primary data, patterns could be found that form the basis for extending the current literature about dynamic capabilities. The results are further discussed in chapter 4.

### **3.5 Quality of the research**

To ensure the quality of the research, the researched tended to use sources from mainstream data sources (e.g. CBS, Consumentenbond, Eurostat) along with scientific literature. Overall, the researcher used credibility, transferability, dependence, and confirmability as the four criteria (Myers, 2013). Credibility has been applied by systematic operationalisation of the concept, along by finding patterns in the data to attempt to refine the theory. Hereafter, concerning transferability, the context is described in detail in order to apply the data to different contexts. Third, by a coding scheme and completeness of the data analysis process dependency has been pursued. Ultimately, confirmability has been pursued by employing peer review and a described critical methodological reflection by the researcher as shown in chapter 5. Moreover, according to Rowley (2002), four tests are widely used to assess whether the research is of quality. The first element is construct validity which consists of the correct operational measures for the concepts being studied and thereby reducing subjectivity. To meet the first element, a table has been constructed in Appendix 3 including the assessed

concepts and related research questions. Secondly, by conducting a semi-structured interview, the research remained open for new questions that were not included based on theory, yet, by following a semi-structured interview guide, the researcher also ensured that essential elements will be discussed during the interview (Bleijenbergh, 2015). The third test is the external validity which is achieved when the research results can be generalized. Due to a relatively small sample size, there are limitations of the research and its generalizability. Yet, in order to increase the external validity, maximization of controllability of the data collection can be provided. In Appendix 5 and 6, the codes and a summary of the interviews conducted are provided. This provides transparency in the way the data is collected, which will improve the controllability and external validity. Through this transparency, the fourth test, reliability can be achieved. Reliability consists of how well the study can be repeated, creating the same results. Reliability can be achieved and increased by proper documentation of the procedures and an appropriated recording keeping (Rowley, 2002). Reliability has been achieved by recording the interviews and transcribing the conducted interviews combined with the relevant documents in order to build an extensive case study database.

### **3.6 Research ethics**

During the research, multiple ethical considerations were taken into account. To start off, organizations that participated, and the interviewees were well informed about the research and the interviews. The organizations that were studied in depth were approached with a LinkedIn message and through an e-mail. In the message and e-mail, the researcher, the research project were introduced along with the aim of the research. Hereafter, the interviewees were asked whether they were willing to participate in this project. The researcher searched for employees that were responsible for the energy transition, innovation, or strategic planning of the organization as they were most likely to be responsible for the dynamic capabilities. At the end of the data collection, all the interviewees were thanked for their contribution on the literature. Additionally, key insights were shared with the participating organizations and interviewees. Hereafter, the interviewees were given the option to make remarks or ask questions concerning the given data.

As the research project will have to be published in Radboud University's library, the participated interviewees were asked whether they wanted to participate anonymously or if the name of the organization could be used. The researcher also wanted to ensure that the researcher could contribute anonymously due to the GDPR law. All participants were informed about how and where the report would be saved and shared. Ultimately, at the end

of the master thesis project, the report was shared with all the participants to ensure that they complied with the research report.

## 4. RESULTS AND ANALYSIS

### 4.1 Introduction

This chapter presents data regarding the formulated sub-questions. The largest part of the data comes from semi-structured interviews conducted with employees of the organizations. Some supporting data were gathered from documents provided by the organizations or that have been found on the website of the organizations. In this chapter, Eneco is assigned as Organisation #1, Vrijopnaam as Organisation #2, and Energie VanOns as Organization #3. Given the research questions, the presentation of data is structured as follows:

- Section 4.2 presents data about how and to what extent energy suppliers are affected by business environment factors, and how that relates to their level of awareness of the role of dynamic capabilities and ambidexterity.
- Section 4.3 presents data about the energy supplier's actual establishment of dynamic capabilities (specified by capabilities for innovation and management of knowledge)
- Section 4.4 presents data about the relation between the exploration and exploitation activities of the energy suppliers, the level of ambidexterity achieved, and the relation with established innovation and knowledge management capabilities.

### 4.2 The role of business environment factors in firm's approach to dynamic capabilities

#### 4.2.1 External factors and business position

The first sub-question of the overall research question was: *'What is the role of the energy business environment in establishing capabilities for innovation and knowledge management?'* Table 5 summarizes the data about business environment factors affecting the selected energy suppliers. Of the three organizations interviewed, one has experienced the energy transition. The other two organizations directly entered the energy supply industry by supplying sustainable energy. Therefore, their challenges differ slightly. As a first step data will be presented below regarding how the identified factors affect the energy suppliers

External business environment	#1	#2	#3
<b>Pressure of competitors</b>	X	X	X
<b>Energy transition</b>	X	-	-
<b>Pressure from society</b>	X	X	-
<b>Geographical location of the Netherlands</b>	X	X	X
<b>Governmental laws and regulation</b>	X	X	X
<b>Lack of renewable energy</b>	X	X	X
<b>Weather conditions</b>	-	X	-

Table 5: The role of situational context on dynamic capabilities

### ***Pressure of competitors***

The first thing that stood out during the interviews with the organizations is the fact that all of the interviewees recognized the pressure of competitors. While the energy supply market used to be oligopolistic, right now competition is increasing. This makes it easy for consumers to switch from energy supply organization. This can be observed from the following quote: *“Every year we lose about 7% of our consumers, so they switch to another supplier. The market average is about 48% percent”* (Organization #3). This switching effect has led energy suppliers think about their differentiation strategy. As stated by the Account manager of Eneco: *“The government has decided not to create a monopolistic market anymore. Instead, the government is working on distributing the market more, so that everyone can be profitable. As a result, Eneco hired an account manager two years ago. Previously, Eneco did not have an account manager or customer service manager. However, two years ago Eneco hired an account manager as they see that the market does not change. Therefore, they hired an account manager to provide customization and have a contact person for our customers.* Hiring an account manager in order to retain your customers is the outcome of the pressure of competitors. It makes it clear that organizations are facing intense competition. Ultimately, this quote from Vrijopnaam’s director sums up the situation concerning competition: *“The competition makes it difficult. The more the competition is increasing, the more difficult it becomes to gain and retain customers.* While Vrijopnaam and Energie VanOns are trying to gain more customers, Eneco focuses more on retaining their current customers and expanding their customer base. Yet, Vrijopnaam and Energie VanOns do not have the resources to invest in marketing in order to gain more customers. However, it can be argued that Eneco has been affected more than Vrijopnaam and Energie VanOns by the pressure of competitors. Eneco has been operating for over a century, mostly in an oligopolistic structure with a few competitors. After the deregulation of the government, the energy supply market opened for everyone and Eneco has been extremely affected by this change.

### ***Energy transition challenges***

The second situational context that energy suppliers are facing is the energy transition. The energy transition requires energy supply organizations to transit from fossil energy sources to renewable or green energy sources. The energy supply organizations differed in their energy transition experiences., not all of the organizations are affected by the energy transition. While Vrijopnaam and Energie VanOns entered the energy supply market in the past decade. Eneco has been operating for a century. Vrijopnaam and Energie VanOns entered the energy

supply market directly by solely supplying renewable and green energy which can be observed from the following quote: *“We have been supplying renewable energy, we supply a small portion fossil energy. However, we are compensating that part with Co2”* (Organization #3). This statement shows that Energie VanOns has not been affected by the energy transition. The same can be observed from Vrijopnaam due to the following quote: *“We have directly been supplying renewable energy by solar panels as we believe that is the best option for supplying renewable energy. If we had a long history, there would have been a chance that we would have a fossil energy background. Yet, we want to commit ourselves more to sustainability and we do that through our solar parks.* In contrast, Eneco has been supplying renewable energy, yet also fossil energy sources. Eneco is currently experiencing the energy transition from fossil energy sources to renewable energy sources. Therefore, they have been affected the required energy transition. This can be observed from the following quote: *“We have not gotten rid of fossil energy sources yet. However, the largest part of our portfolio must consist of renewable and green energy sources. Now you notice with the energy transition and from the government that we need to adjust because all customers now want it all electric. Therefore, now we ask for some behavioural change from the employees and the older generation on how they have been working for years. The changing environment requires our employees to change their behavior”* (Organization #1). The results showed that Eneco has been affected by the energy transition mainly due to operating for over a century in the energy supply market. Vrijopnaam and Energie VanOns have not been affected by the energy transition as they have entered the energy supply market by directly supplying renewable or green energy sources.

### ***Pressure from society***

Another situational context that stood out is the pressure of society. Energie VanOns supplies renewable and green energy through energy cooperatives. Therefore, they do not decide where energy, e.g. solar panels are built. In contrast, Vrijopnaam is actively investing in solar parks, and the same goes for Eneco, they are also actively investing in several renewable energy sources. As a result, Eneco and Vrijopnaam are facing pressure of society as society does not want to see the landscape full of solar parks and wind turbines. Vrijopnaam sums the situation as follows: *“Many municipalities are currently drafting policies with many criteria’s. In some places solar parks are more promising and in other places we find that less suitable, for example in a nature reserve. We try to look at it through the same lens, because we know that otherwise the project would not be possible. On the other hand, it is*

*also about local support. We are a consumer brand and we don't want half the village to revolt. If you look at the places where we generate our energy, you will see that the location can be used several times for different ends. Think of a closed waste dump or a vacant baseball field. In this way you do not intervene harshly on the environment, but the transition to sustainable energy needs space. It is up to the municipalities to create a good spatial framework with several conditions. We look at areas where the number of direct residents is not too large. We also look at the location of the power grid. What we like ourselves is that it is encased between a highway or a large ditch. Moreover, that it can be better concealed in the landscape. On top of that, currently we see the regional energy (RES) strategies that have been drawn up. Currently, the task is huge for municipalities to generate sustainable energy. As we can see now, the wind turbines in particular have the most resistance. Therefore, we expect that offshore wind turbines will work perfectly and that many more solar parks will be built on land” (Organization #2).* These statements address the resistance energy supply organizations face due to the space wind turbines and solar parks take. While the government has built a RES (Regional Energy Strategy) in order to find the perfect location, energy supply organizations still face pressure from society to find locations that will not damage the landscape. While Vrijopnaam feels pressure from society concerning their solar parks. Eneco also feels pressure from society concerning wind parks as the following quotations illustrates: *“There is now a pressure that the environment finds it polluting. There you see a social pressure. We experience this a lot with wind parks. We experience resistance from the local residents” (Organization #1).*

While Eneco and Vrijopnaam are building their own solar parks and wind parks, they face pressure from society to not damage the nature. In contrast, Energie VanOns operates as an intermediary and therefore do not have to build their own solar parks nor wind parks. As a consequence, they do not face pressure from society.

### ***Geographical location of the Netherlands***

Another situational context is the geographical location of the Netherlands. All the energy suppliers were asked the same question: *“A study from Eurostat (2021) showed that the Netherlands scores the worst in terms of the usage of renewable energy. How come the Netherlands scores so low? All the energy suppliers gave the same reasoning: “It is because the Netherlands is so little, especially in Europe where other countries use much more renewable energy than the Netherlands, while the topic of sustainable energy is quite big in the Netherlands. The advantage is that we have been able to develop wind without it taking up*

*a lot of space and taking up the entire country. Our downside is that we don't have mountains, so we can't work on hydropower like they do in Sweden and Switzerland. We cannot do that while you can get a lot of renewable energy from there. We also don't have large forests that we can hijack and plant again so that you have biomass power from them. We have to do a lot with such a limited space. Therefore, we can solve a lot with sun and wind, yet we just don't get enough sustainable energy” (Organization #3).* The Netherlands does not have mountains nor large forests. Therefore, the current solution in order to generate renewable energy is through solar parks and wind turbines. Next to the geographical location, the Netherlands has heavy industries which use a lot of renewable energy as can be observed from the following quotation: *“Finally, you also have relatively heavy industries in the Netherlands, such as the port of Rotterdam. There is still some consumption and in the transport sector you see that a lot of energy is also used there. That is a challenge to make that sustainable and that all counts within that 14% of renewable energy, and in order to solve all that by wind energy, that will be difficult” (Organization #3).* Both citations show the impact of the geographical location of the Netherlands on the generation of renewable energy. Moreover, as stated by Organization #1: *“We are still relying on fossil energy sources”*. This quote shows the effect of the lack of renewable energy sources. Ultimately, as mentioned earlier, there is pressure from society, they do not want to see the landscape full on solar parks and wind parks which makes it even more difficult to generate sustainable energy.

### ***Governmental laws and regulations***

All the energy suppliers are dependent upon governmental laws and regulations. The energy suppliers are affected by the ACM (The Consumer & Market Authority, which is a Dutch independent public supervisor responsible for monitoring competition, telecommunications, and consumer law. As Organization #3 stated: *“The ACM is a very important party which controls us. If we charge too high rates then you get the ACM on you. Fortunately, that did not happen but with other suppliers it did. So, there is a lot of power. The government has a lot of power, they determine a lot of investment agenda and also determine the subsidies”*. The same arguments were given by the other energy suppliers. Organization #2 supplies solar energy and is therefore dependent upon the government's allowance to build solar parks as can be observed as follows: *“It is currently incredibly difficult to find a location for a solar park and not to make a loss because the subsidy is decreasing sharply. Moreover, many municipalities are currently drawing up policies with many criteria”*. Ultimately, Eneco is also affected by governmental regulations and laws. However, they are also socializing with

the government to discuss current topics. The following quotation illustrates how Eneco is affected and tries to socialize with the government: *“We have a special team that is constantly socializing with the government. They are constantly discussing how things are going on and what we expect within the government. The government informs us about laws and regulations. By having good ties with governments, we always try to be ready for change. Sometimes we are faster than usual. Yet, sometimes the government requires at the last moment to adjust our rates. Then we also have to change and adjust a lot of things. However, usually, you know what's going to happen because you're constantly talking to governments and construction companies to prevent big changes”*. While all the energy supply organizations are affected by governmental laws and regulations, only Eneco does something against this factor. Only Eneco tries to socialize with the government in order to prevent big changes and to be up to date concerning the latest topics. Another reason why Organization #1 has close ties with the government is that as mentioned before the energy supply market used to be a regulated market by the government characterized by an oligopolistic structure. Since the deregulation, Eneco has been actively socializing with the government.

### ***Lack of renewable energy***

The research of Eurostat (2021) concluded that the Netherlands has the lowest share in using renewable energy among all EU member states. As mentioned before, the geographical location of the Netherlands makes it difficult to supply renewable energy. In the Netherlands, there are no mountains, so the Netherlands cannot work on hydropower. Moreover, the Netherlands does not have large forests that can be hijacked and planted again so that you can have biomass power from them. On top of that, the Netherlands has limited space to build wind turbines and solar parks. This affects the supply of renewable energy. As Vrijopnaam sums it up: *“We are buying fossil energy from the market, we supply this energy to our consumers. However, we want to get rid of this process. Yet, at the moment we cannot get rid of this process as there are not enough renewable energy sources”*. Eneco experiences the same problem: *“We currently cannot stop supplying from our fossil energy sources as we simply do not have enough renewable energy sources”*. Another quote from Organizations #2: *“The goal is to supply all our energy sources within four years by ourself, without buying it from other supplier's”*. It can be observed that the geographical location of the Netherlands indirectly also affects the supply of renewable energy sources. Therefore, all of the energy supply organizations are buying energy sources whenever they experience a shortage.

### ***Weather conditions***

Wind turbines are dependent upon wind, and solar panels are dependent upon the sun. Eneco and Energie VanOns have a diversified portfolio, yet are dependent upon weather conditions. In contrast, Vrijopnaam solely relies on solar parks. Therefore, they are extremely dependent on weather conditions. Organization #2 also admits that they are dependent on the sun: *“We cannot supply energy every moment because we depend on the sun. Therefore, it is better if the consumers’ electric cars are charged when the sun is shining and not at night”* (Organization #2).

Table 6 summarizes the selected firms’ responses to the external factors affecting their business position.

Situational context	#1 Eneco	#2 Vrijopnaam	#3 Energie VanOns
Pressure of competitors Response / action	<b>High.</b> Hiring an account manager in order to provide better customer service and increase the retention rate.	<b>High.</b> Trying to provide excellent customer service in order to retain customers.	<b>High.</b> No action was taken
Energy transition Response / action	<b>High.</b> Changing their business model by starting to supply renewable energy sources as well, and not solely relying on fossil energy sources.	<b>Not applicable</b>	<b>Not applicable</b>
Pressure from society Response / action	<b>High.</b> Waiting for municipalities to make a decision on the (RES) on where to build solar parks and wind turbines.	<b>High.</b> Waiting for municipalities to make a decision on the (RES) on where to build solar parks and wind turbines.	<b>Not applicable</b>
The geographical location of the Netherlands Response / action	<b>High.</b> Trying to build more solar parks and wind turbines. However, Eneco is dependent on where the Regional Energy Strategy enables them to build solar parks and wind turbines.	<b>High.</b> Trying to build more solar parks. However, Vrijopnaam is dependent on where the Regional Energy Strategy enables them to build solar parks.	<b>High.</b> No action was taken
Governmental laws and regulations Response / action	<b>Medium.</b> Eneco socializes with the government. They are constantly discussing about how things are going and what they can except from laws and regulations.	<b>High.</b> No action was taken, they follow the laws and regulations.	<b>High.</b> No action was taken, they follow the laws and regulations.
Lack of renewable energy Response / action	<b>High.</b> In order to meet demand, Eneco buys fossil energy sources from the market and supplies them to their customers. This holds that Eneco cannot	<b>High.</b> Vrijopnaam is trying to invest more in solar parks in order to meet demand. However, Vrijopnaam needs approval for building solar parks in certain locations and therefore is dependent on the municipalities. As a	<b>High.</b> No action was taken.

Situational context	#1 Eneco	#2 Vrijopnaam	#3 Energie VanOns
	rely solely on its own energy sources.	consequence, they buy energy to meet current demands.	
Weather conditions of the Netherlands Response / action	<b>Medium.</b> Buys from the market when there is a shortage of energy supply.	<b>High.</b> Vrijopnaam solely supplies through their solar parks and is therefore extremely dependent by the sun. The only way of providing energy when there is no sun is by simply buying energy from other suppliers, and that is what they do.	<b>Medium.</b> No action was taken.

Table 6: Energy suppliers' response towards business environment factors

#### 4.2.2 Business environment and energy suppliers' awareness of dynamic capabilities

The second step is to present more detailed findings about how the identified external developments are affecting the firm's awareness of the role of dynamic capabilities. To what extent are they aware, giving their changing environment, of the importance of building up capabilities for innovation and knowledge?

As already stated, the Dutch energy supply market used to be an oligopolistic market with a few large players such as Eneco. However, after the deregulation, many new players entered the energy supply market such as Vrijopnaam and Energie VanOns. This made Eneco realize that they continuously need to innovate themselves. Due to the competitive environment, Eneco is well aware that they need to continuously work on new innovative ideas. A well-known example is the project where they build parking spaces that work on solar panels. There is a special internal innovation business unit that continuously researches on new techniques and ideas. While Energie VanOns and Vrijopnaam have been directly supplying renewable energy sources, Eneco has been supplying fossil and renewable energy as they have been operating in the Dutch energy supply industry for over a decade. As a consequence, they have felt the needed to switch to renewable energy sources due to the Paris Climate Agreement of 2050.

Additionally, Eneco faces pressures for building solar parks and wind turbines as the Dutch society does not want to see the landscape full of solar parks and wind turbines. This made the Dutch energy suppliers aware that they need to re-think their investment portfolio on how to create and manage renewable energy. Eneco is trying to achieve this partly through building off-shore wind turbines on sea which does not damage the environment. Vrijopnaam tries to build solar parks at places such as closed waste dumps and a vacant baseball field, and they decreased the size of a solar park in order to not damage the environment. Based on the conducted interviews, both parties are aware that they need to identify and implement new technologies to build up solar parks and wind turbines. As an example, Eneco's innovation

business unit is constantly researching on the technique of renewable energy. They look at the technological side of windmills, solar panels and storage, and how they can optimize their technology. Also, Vrijopnaam's CEO is well aware that they cannot continue on buying energy from the market when they lack renewable energy sources. However, they have not come up with a solution and they do not have the resources to invest lots of money in R&D and innovation as they are an organization with 12 employees.

Moreover, Dutch energy suppliers are also aware that due to the geographical location of the Netherlands, they cannot use hydropower nor biomass power as there are no mountains nor large forests. Therefore, when they run out of renewable energy, they buy fossil energy from the market and supply this to their customers and compensate the Co<sub>2</sub>. Even if the energy suppliers are well aware that this is not a sustainable and favourable solution, they have not created capabilities to solve this issue. The only solution for the lack of renewable energy is currently buying fossil energy sources and compensating for the Co<sub>2</sub> they use.

It appears that Energie VanOns is lacking the awareness of the importance of innovation capabilities. They do work on a new project where people can charge their car in public loading stations, they do this along with four other energy suppliers. However, they admit that they ignore ideas they receive from the energy cooperatives because they do not feel that it can add any value to possible new business ideas. Therefore, at Energie VanOns, attention to building up innovation capabilities is relatively limited. This can also be concluded from the interviewee which admits that through the years the organization has become more hierarchical which in his opinion made the organization more complex and not sufficiently agile to implement new changes.

#### ***4.2.3 Awareness of ambidexterity***

As a third step, data regarding the awareness of the role of ambidexterity is presented. To what extent are the selected energy suppliers aware of the importance of being able to both exploit and explore?

As stated, after the deregulation from the government, many new energy suppliers entered the Dutch energy supply market as it became accessible for everyone. Eneco has been extremely affected by the deregulation as they used to operate in an oligopolistic market with a few large players. Eneco is well aware that if they want to survive in the long term they need to continuously improve their current business model and explore new innovative ideas. This can be seen from several actions they have taken. For instance, Eneco hired an account manager which sets them apart in the competitive environment. Through an account manager they provide customization for their customers and try to increase their customer retention

rate. Eneco also introduced a happy power loyalty program for their customers to bind their customer. Moreover, Eneco has a special team that socializes with the government continuously to be aware of what is going on in the Dutch energy market and how they can lobby for their own benefits. Additionally, in order to optimize their current business model they receive and implement information and recommendations from their technicians who are directly in contact with customers on how they can improve their current business model. Ultimately, Eneco works with an external organization that conducts research for Eneco on new techniques concerning renewable energy which increases their innovation capabilities. Therefore, it can be argued that Eneco is aware of the importance of being able to both exploiting the current business model and at the same time making changes and explore new technologies and services.

Vrijopnaam is well aware that they need to explore new ideas and exploit their current business model. However, it evidently appears that Vrijopnaam does not have the resources to invest as they wish into new innovative ideas. Vrijopnaam's new ideas mainly come from the directors as there is not a budget for an external organization who can keep an eye on the market. Vrijopnaam has done a thoroughly research on the market and with the resources they have they try to explore new ideas such as a service where consumers can make use of a solar park for nine years without having to invest in a solar panel on their roof. They are also work on a new service where they can offer a flexible contract for consumers. However, as the director of Vrijopnaam admits, they do not have the resources to spend money on innovation as they wish. So, even if they are aware of the importance of ambidexterity. They simply do not have the resources to invest a lot of money in explorative ideas. Therefore, most of the new ideas and services they offer reflects exploitation rather than exploration.

Energie VanOns is not aware of the importance of ambidexterity, while the energy cooperatives request Energie VanOns to enter into new markets related to energy supply, they ignore these request. In contrast, innovation is very limited at the organization as they do not believe that they can add value in new markets. Therefore, it can be said that they are not well aware of the importance of ambidexterity.

### **4.3 Building the capabilities for innovation and knowledge management**

#### ***4.3.1 Policies and activities aimed at capability building***

The second step is to identify whether, and to what extent, the selected energy companies have implemented concrete policies and activities regarding capabilities for innovation and knowledge management, and what level of such capabilities has been achieved.

Starting off with Eneco, first of all it can be observed that Eneco switched their business portfolio from fossil energy sources to renewable energy sources. Eneco still relies on fossil energy sources, however, there has been a major shift from fossil energy sources to a portfolio heavily invested in renewable energy sources. Besides that, in order to renew and optimize their business model, Eneco has created an innovation business unit that researches not only the latest trends in the energy supply market but also new techniques related to the technological side of windmills, solar panels and storage, and how they can optimize their technology. They do this in collaboration with an external organization that assist them on the technological side of windmills, solar panels and storage. Another innovation business unit researches on how they can improve their services they provide. All the inputs Eneco receives from the two innovation business units, the technicians who go to homes of customers and receive valuable information which they pass on to Eneco, and eventually the external organization that conducts research for Eneco. All these elements together demonstrate how Eneco has created dynamic capabilities related to innovation and knowledge. The offshore wind park on sea is a well-known example of their realization of dynamic capabilities. The latest project Eneco worked on along with the external organization was on how to store energy in order to use it on a later stage when needed. Eneco managed to implement this project on their business model.

Concerning Vrijopnaam, they are well aware of the environment they are operating at, and the needs of to their situational context. However, they do not systematically work on dynamic capabilities. They do receive new ideas from the developer they work along with. However, most of the decisions come from the three directors, and they mainly conduct research about the market. For instance, the flexible contract they want to offer their consumers is an example of the decision that comes the directors. When it was asked whether the other employees also gave input, the director admitted that most ideas come from the three directors. Additionally, Vrijopnaam is extremely dependent upon sun, as they only generate renewable energy through the sun. They tried to enter the wind park market. However, as the wind park market consist of several large players, they decided not to enter this market. This also shows that they do not implement all the projects and it makes it questionable whether Vrijopnaam will be able to survive in the long term.

Ultimately, Energie VanOns does not create nor manage dynamic capabilities related to innovation and knowledge. As an energy intermediary, they mainly focus on the administrative part of supplying the energy from the energy cooperatives to the final consumer. They do receive new ideas from energy cooperatives which they some take into

consideration, but they also ignore a lot of new ideas. The public charging station they worked on along with four other energy suppliers, they have come to the final stage of this process. So, the projects they work on are implemented in real life. However, as mentioned, they do not systematically work on dynamic capabilities.

#### 4.3.2 Actual capabilities deployed

We now turn to the actually realized capabilities for innovation and knowledge management. Such capabilities are identified by the organizational and strategic routines by which firms achieve new resource configurations as markets, emerge, collide, split, evolve, and die (Teece et al., 1997). Table 7 presents an overview of the type of capabilities as established by the energy companies. Of the three organizations interviewed, one has been operating in the energy industry for over a century whereas the other two organizations entered the energy supply market in the past decade. Therefore, it is understandable that their challenges and decisions concerning knowledge management and innovation capabilities differ.

Situational context	#1	#2	#3
Internal R&D department / innovation unit	X	-	-
Bottom-up organizing knowledge inflows	X	X	-
Top-down organizing knowledge inflows	X	X	X
External collaboration (consultancy organization)	X	-	X

Table 7: Deployed Knowledge management and innovation capabilities per organization

#### **Internal R&D Department / Innovation business unit**

Out of the three energy suppliers, only Eneco has an internal R&D Department / innovation business unit that constantly researches new techniques, new products, new energy sources et cetera. This can be observed from the following quotations: *“We have a team that is constantly working on new techniques and ideas. At Schiphol, for example, they have developed a new project. This project includes parking spaces that work on solar panels. You have solar panels at the roof and electric poles at the bottom. The sun shines on those parking spaces which then can immediately be used to electricity for the electric cars”* (Organization #1). Another quotation from the Innovation Business Unit leader from Eneco confirms that the organization is constantly working on innovation: *“We try to spot things for Eneco technology, we scan things that are interesting. For example, we look at the technological side of windmills, solar panels and storage, and how we can optimize our technology* (Organization #1). In contrast, Vrijopnaam and Energie VanOns do not have a special R&D department that constantly researches new techniques and ideas. Vrijopnaam admits the following: *“There are twelve of us and we do not have a special team”*. Vrijopnaam simply does not have the resources to invest in innovation. It can be observed that Vrijopnaam and

Energie VanOns do not have an internal R&D department due to a lack of resources. Vrijopnaam also mentioned the following: *“We do not have the sources for marketing. We cannot do campaign on television, because that is too expensive”* (Organization #2). Therefore, the resources and size of the organization seems to affect the innovation capabilities.

### ***Bottom-up organising of knowledge inflows***

Concerning bottom-up knowledge inflows, Eneco and Vrijopnaam do have bottom-up knowledge inflows. Eneco receives information from their technicians as illustrated: *“Our technicians go to consumers’ homes and know exactly what is going on and what their needs are. Therefore, we certainly look into the studies and the knowledge to adjust our services. We receive a lot of useful impulses from the technicians that we can use, we for instance adjusted our app after the feedback from our technicians”* (Organization #1). Vrijopnaam receives beneficial information from their developer as stated as follows: *“From the solar park side, we have hired an excellent developer who himself understands the market very well and also comes up with ideas. In this way we have drawn in knowledge from outside, from which ideas come to innovate”* (Organization #2). The technicians from Eneco and the developer from Vrijopnaam can be considered as bottom-up knowledge inflows. As the technicians from Eneco directly receive feedback and information from consumers, and as this information is being applied to the organization, it can be observed that Eneco has a better bottom-up knowledge inflow than Vrijopnaam. This can also be observed as Vrijopnaam admits that most of the knowledge comes from the three directors on top. In contrast, Energie VanOns ignores bottom-up knowledge inflows, this can be observed from the following statements: *“What we currently see is that there is a lot of questions from the cooperatives, mainly from bottom-up, so we see that they come up with ideas for new market. For instance, the request was to enter the heat market but we consciously do not enter the heat market because our role spectrum is not large enough for it, we cannot provide added value there and also get too little out of it, so we leave innovation behind”*. This confirms that Energie VanOns does not make use of bottom-up knowledge inflows and therefore do not explore new markets. As a consequence, it is questionable whether Energie VanOns can survive within the energy supply market as competition is intense, and competition requires for innovation. Yet, innovation is left behind at Energie VanOns.

### ***Top-down knowledge inflows***

All of the energy suppliers make use of top-down knowledge flows. To start off, this can be observed from Vrijopnaam which admits that most of the knowledge comes from the three directors: *“Input and innovation mainly comes from three directors. We have three directors and shareholders, these are the people with the visions who keep a close eye on the market, who look at what the competitors are doing and also what the consumer needs”* (Organization #2). Energie VanOns also has knowledge flowing in from the top, yet, they also make use of an external consultancy bureau. This can be observed from the following quotation: *“We just had a report completed this week by an external party that actually validates what we also think”* (Organization #3). Eneco has also knowledge flowing in from the top, this can be observed from the decision-making unit. As the following quotation illustrates: *“The CEO’s vision was that he wanted to move towards sustainability. That’s when we started. Then there was a great deal of disbelief within the organization. Until we actually developed the first offshore wind farm, which enabled us to supply the city of Leiden with electricity”* (Organization #1).

### ***External collaboration (consultancy bureau)***

Eneco and Energie VanOns are making use of an external consultancy bureau which conducts research for these organizations. This can be observed from the following statements: *“We just had a report completed this week by an external party that actually validates what we also think. So, the technologies we use or do not use are also partly derived from the advisory report”* (Organization #3). The same holds for Eneco: *“We do have an internal innovation department, so there is a lot of expertise in the organization. Yet, we also receive support from two parties that we work with. One that helps scrape the world to look for certain companies that are developing on a subject that we find interesting and another party helps with the analyses”*. In contrast, Vrijopnaam cannot afford to work along with a consultancy bureau that can conduct for the organization due to a lack of resources. Table 8 presents a summary of findings related to established capabilities for innovation and knowledge management.

Factor	#1 Eneco	#2 Vrijopnaam	#3 Energie VanOns
R&D department (innovation unit) Why and how?	<b>High.</b> Eneco has the resources and does invest in an R&D department which looks at the latest trends to improve their services they provide. Through their innovation unit Eneco hopes	<b>Not applicable.</b> Vrijopnaam does not have the resources to invest in an R&D Department.	<b>Not applicable.</b> Energie VanOns does not have the resources to invest in an R&D Department.

Factor	#1 Eneco	#2 Vrijopnaam	#3 Energie VanOns
	to improve their services and be competitive.		
Bottom-up knowledge inflows. Why and how?	<b>High.</b> Eneco enables their technicians to share feedback which they implement in their business model. The app they implemented for their customers was adjusted after the feedback from their technicians.	<b>Medium.</b> Vrijopnaam receives information from their developers which can be considered as bottom-up knowledge inflows. However, Vrijopnaam receives information from their developers who know the energy supply market very well and do not receive directly or indirectly information from their customers. Additionally, most of the knowledge still comes from the directors	<b>Low.</b> Energie VanOns receives innovative ideas from the energy cooperatives. However, they leave innovation behind as they believe that they can't compete in new possible markets due to a lack of competitiveness in new markets. Yet, it is questionable whether Energie VanOns can survive in the long term if they do not innovate their business model.
Top-down knowledge inflows. Why and how?	<b>High.</b> It's the director of Eneco who decided that the organization should move towards a sustainable organization and provide renewable energy.	<b>High.</b> All of the decisions are made by the three directors which have the vision and knowledge of the market.	<b>High.</b> The decisions are made at the top of the organization and knowledge come from the bottom is often ignored.
External consultancy organization. Why and how?	<b>High.</b> Trying to build more solar parks and wind turbines. However, Eneco is dependent on where the Regional Energy Strategy enables them to build solar parks and wind turbines.	<b>Not applicable.</b> Trying to build more solar parks. However, Vrijopnaam is dependent on where the Regional Energy Strategy enables them to build solar parks.	<b>Medium.</b> Energie VanOns does their own research but still uses a consultancy organization that conducts for the organization in order to verify whether their own research is valid. Yet, the new knowledge the consultancy organization provides is limited.

Table 8: The why and how for each knowledge management and innovation capability

### 4.3.3 Managing and coordinating capabilities for innovation and knowledge

The next step is to identify whether, and to what extent, energy companies are managing or coordinating capabilities for innovation and knowledge management. As regards Eneco, the best example identified is that they on purpose they conduct surveys for their technicians in order to receive valuable information and feedback which they can implement in their business. Eneco did make changes in their app they created for their customers after having received feedback from their technicians which are in close contact with customers. Besides that, they create dynamic capabilities through the business unit that continuously researches on techniques, and through the business unit that conducts research on how to improve their services. Ultimately, the external organization conducts research as well for Eneco in order to improve the technique of windmills, solar parks and storage. All of these elements together make sure Eneco creates dynamic capabilities, and manages the created dynamic capabilities.

For Vrijopnaam, the three directors continuously investigate and assess how they can improve their operations. However, besides the directors there is no one in or outside of the organization that consciously work on dynamic capabilities. The director admits that they do receive ideas from the developer they work along with, yet, most of the ideas come from the three directors. Concerning Energie VanOns, they are not consciously creating nor managing dynamic capabilities. They do receive ideas from energy cooperatives, but it is unknown how they select on which ideas that proceed on and which not. There is also not a special department that works on innovation nor dynamic capabilities. The interviewee also admitted that they mainly do the administrative part of supplying the energy to the final customer and that the organization has become more complex over time which makes it difficult to respond to new changes.

#### 4.4 The role of innovation and knowledge capabilities is ambidexterity

The second sub-question of the overall research question is: *‘How do capabilities for innovation and knowledge management affect the firm’s approach to ambidexterity?’*

This sub-question requires us to identify the firms’ ambidexterity strategies and activities and how these are enabled by the firms’ efforts to establish dynamic capabilities.

##### 4.4.1 Ambidexterity strategies

As referred to in Chapter 2, according to Mom et al (2008) and Volberda (1998) three strategies can be identified for achieving ambidexterity: temporal separation, spatial separation, and synthesizing. For the three energy suppliers studied, only spatial separation (organizational separation of exploitation and exploration) is relevant. Table 9 shows that only for one company, Eneco, one ambidexterity strategy type namely spatial separation has been observed.

Factor	#1 Eneco	#2 Vrijopnaam	#3 Energie VanOns
Temporal separation	-	-	-
Spatial separation	X	-	-
Synthesizing	-	-	-

Table 9: Comparison of ambidexterity strategies

Energie VanOns and Vrijopnaam are energy supply organizations that have not been in the energy supply industry for a long time. For instance, Vrijopnaam has a team of 12 members, and is limited in their resources. Therefore, it can be observed that Vrijopnaam and Energie VanOns are directly implementing changes within their organization as a strategy. This can also be observed from the following quotation: *“For expansion of our business model, we use the same people because we are a small organization. So, you will have to do it together”* (Organization #3). The same counts for Organization #2: *“We are in total with 12 employees,*

and innovation comes from the three of us”. In contrast, Eneco has a special team that works on innovation and applies these new ideas and techniques in a separate business unit.

Therefore, Organization #1 has a spatial separation strategy. This can also be observed from the following quotation: *“Innovation is partly with us, there are two areas. One business unit is looking at the asset side of innovation, so very much looking at the technology side of sun and wind. The other side looks at the services side. Concerning the innovation, everything is done at the business unit until it gets implemented at the organization” (Organization #1).*

While Eneco uses spatial separation as a strategy to implement changes, Vrijopnaam and Energie VanOns directly implement changes within their organization.

#### **4.4.2 Ambidexterity: balancing exploitation and exploration**

A second step in collecting and interpreting data regarding ambidexterity is to identify how the energy companies balanced exploitation and exploration activities. In order to conduct a limited investigation, it was observed how the companies addressed the development of new services (which we are linking to exploitation) and new projects (linked to exploration).

Concepts we used in order to analyse exploration are: bottom-up knowledge inflows, R&D department, finding new products and services, new markets and customers, involved parties and people, changes, and organizational capabilities. Concepts used in order to analyse exploitation are top-down knowledge inflows by improving products and services, supporting factors, feedback surveys, sharing of information, involved parties and people, vision sharing and vision support, and cooperation capabilities. The analysis of the concepts can be found below in table 10. can be found in Table 10.

Concepts	#1 Eneco	#2 Vrijopnaam	#3 Energie VanOns
Exploration-related concepts	Bottom-up knowledge inflows, R&D department, consultancy bureau, providing new services, feedback surveys, sharing of information, cooperation capabilities	Bottom-up knowledge inflows, providing new services	Consultancy bureau
Exploitation-related concepts	Top-down knowledge inflows, improving products and services	Top-down knowledge inflows, improving products and services	Top-down knowledge inflows

*Table 10: Concepts used to identify exploitation and exploration*

#### ***New services (exploitation)***

To start off with new services, the energy suppliers Eneco and Vrijopnaam are working on new services for their consumers. Eneco works on innovative projects in order to provide more services this can be observed from the following quotation: *“Nowadays we are of course working on solar panels, hydrogen and all kinds of other energy sources in order to*

generate energy. We are also now trying to store energy so that we can put it away to our consumers". Moreover, Eneco is also working on a new product which is called 'Happy Power': "This new service is created as a loyalty product to bind the consumer. With this 'Happy Power', we give free energy at certain times of the day" (Organization #1).

Ultimately, Vrijopnaam has a service where you do not need to have a solar panel on your own roof: "With us, you can generate energy yourself with panels that you do not have to be on your own roof" (Organization #2). Vrijopnaam has a different way of growing their business. They have built a project where you can buy a solar panel from their park where you have the right to use electricity for nine years. Through this service the organization believe that they can create a stable position in the market. This can also be observed from the following quotation: "We see that our eviction rate is quite low, through this service, we think that we can grow sustainably" (Organization #2). In contrast, Energie VanOns is not working on a new service.

### ***New projects (exploration)***

To start off with Energie VanOns is working on a project in order to balance supply and demand better. The organization tries to return as much profit as possible to the cooperatives, and these cooperatives are involved in new projects: "The cooperatives are working on a portfolio, in Ameland where they are experimenting with releasing a water kite on the Wadden Sea. We are also working on these kinds of projects and we also try to facilitate them" (Organization #3). Additionally, in order to charge your car Energie VanOns is working on another new project as can be observed from the following quotation: "You have to imagine in Groningen and Drenthe, a charging station will be placed there and they are all public. By holding your pass in front of it, you can fill your own electricity. All in all, you will be your own energy supplier by receiving electricity from your own energy supplier" (Organization #3). Yet, as was mentioned before, Energie VanOns does ignore innovation ideas from their cooperatives as well. Eneco has also recently worked on a new project which started in order to balance the demand and supply of energy: "We have now designed a large battery in which we can store the power and when there is more need at a certain time of a day, you can release that power" (Organization #1). Ultimately, Vrijopnaam is not working on new projects. This is mainly because they are solely relying on solar parks and solar panels.

The Dutch energy suppliers differ in the level of exploration. While Eneco has several elements that lead to exploration, Vrijopnaam and specifically Energie VanOns is limited in

the level of exploration. Through the gathered data it was revealed that organizational resources is a critical factor in determining the level of exploration. While Eneco has the resources to invest in a R&D department and an external consultancy organization that is capable of conducting research for them. Vrijopnaam and Energie VanOns do not have those resources. Table 11 below summarizes the findings.

Factor	#1 Eneco	#2 Vrijopnaam	#3 Energie VanOns
Exploitation: new services.	<b>High.</b> Eneco is constantly working on new innovative services. Currently they are working on a new service called Happy Power.	<b>High.</b> Vrijopnaam is offering a new service where customers do not need to have a solar panel on their roof. Additionally, they have a new service where customers can make use of the solar panel for 9 years as a subscription.	<b>Not applicable.</b> Energie VanOns is not working on new services. This is mainly because Energie VanOns is an intermediary, yet this might cause problems for their competitiveness.
Exploration: new projects	<b>High</b> Eneco is constantly working on new projects. They just finished a new project where they can store energy and later on supply when needed.	<b>Not applicable</b> Vrijopnaam is not working on new projects. This mainly has to do as Vrijopnaam solely relies on solar parks and solar panels.	<b>High.</b> Energie VanOns tries to return as much profit as possible to the cooperatives, and these cooperatives are involved in new projects. Therefore, they are constantly involved in new projects.

Table 11: Energy companies' activity in new services and new projects

### ***Ambidextrous business models***

The issue remains whether we may conclude about the presence of ambidextrous business models. This is analysed based on evidence regarding to what extent energy suppliers are exploring and exploiting at the same time. When inspecting the previous tables summarizing the collected data, it can be concluded that all of the organizations are to some extent both exploring and exploiting, however they differ in the level of exploring and exploiting.

#1 Eneco	#2 Vrijopnaam	#3 Energie VanOns
<b>High.</b> Exploring and exploiting a lot	<b>Medium.</b> Exploiting and exploring with the resources they have	<b>Low.</b> Nor exploring nor exploiting a lot

It can be analysed that Eneco has an ambidextrous business model as they are both exploiting and exploring new services. On the other hand, Vrijopnaam tries to compete and survive with the resources they have. They are working on new services in order to stay competitive. In contrast, Energie VanOns does not explore and exploit a lot. This can be observed from several elements. First of all, Energie VanOns is an intermediary which is dependent on the energy cooperatives and do not innovate their business model. Next, they do not have the same level of organizational resources as the bigger energy supplier to make a budget for

R&D. Additionally, Energie VanOns' business model differs as they are an intermediary. Therefore, they might not see the need to innovate their services. They even ignore new ideas from their cooperatives. Therefore, it is questionable whether they can survive in the long term as they are not ambidextrous.

## 5. CONCLUSION AND DISCUSSION

The final chapter will provide a conclusion to this research project and will discuss its findings, methodological limitation, and implications for theory and practice. In section 5.1, the answer for the formulated propositions of chapter 2 that cover the research question will be presented. Based on analysis in terms of the formulated propositions, eventually the main research question will be answered. Section 5.2 discusses various aspects of this research project, including the methodological limitations, its contribution to theory and practice, and recommendations for further research.

### 5.1 Conclusion

#### ***Proposition 1: Development of innovation capabilities within the organization stimulates exploration activities within the business model***

The results do support proposition 1. Concerning the innovation capabilities, innovation leads to exploration of the business model. Eneco has an innovation business unit that works on new techniques and ideas continuously. This resulted in several new innovative projects, e.g. the Schiphol electric charging station. This support the proposition that innovation capabilities lead to the exploration of new capabilities. However, even though Vrijopnaam and Energie VanOns do not have an innovation business unit, they still work on innovative new projects and services leading to the exploration of new services. Energie VanOns is along with four competitors setting up charging stations in public where everyone can charge their car from and pay their own energy supplier. Vrijopnaam also is looking for a new service where consumers can choose a flexible contract. This can encourage consumers to consume more energy during off peak hours. These are the periods when energy is barely consumed, and is therefore cheap. Through this initiative they hope to balance their supply and demand, and indeed encourage consumers to consume less during peak hours, and instead consume more during off peak hours. Overall, Vrijopnaam and Energie VanOns work on smaller and lesser explorative projects. Yet, they do work on the exploration of new projects and services.

Therefore, to conclude innovation does lead to the exploration of new services and products within the business model. While an innovation business unit is not required to search for new projects and services, an external consultancy bureau can conduct research as well in the case of Energie VanOns. Employees or directors as is the case for Vrijopnaam can stimulate innovation. Even though that is possible, it can be observed that Eneco is more exploring new projects and services as they are continuously looking for innovate services, and the optimization of the current techniques. So, it could be argued that resources do have an

influence on innovation. While Eneco does have the resources to invest in research and development and in innovation. Smaller energy suppliers do not have the same amount of resources to invest in innovation. This limits smaller energy suppliers in inventing new services and products.

***Proposition 2: Developing top-down knowledge inflows leads to an stimulation of exploitation activities within the business model***

The results partly support proposition 2. All the participating organization either have a special innovation department or have the higher management team that conducts research in order to gain knowledge about new techniques and ideas. Knowledge management boosts an organization's decision-making ability, enhancing improved efficiency and business performance. Therefore, knowledge management is a valuable resource in a company. Knowledge management helps to identify new positions which can be implemented in the organisation in the future to gain a competitive advantage. According to Mom et al. (2017), findings of a survey among managers indicates that top-down knowledge inflows of managers positively relate to managers' exploitation activities. Additionally, according to Winter and Szulanski (2001), top-down knowledge inflows increase the depth of the recipient manager's existing knowledge base rather than the breadth. The results partly support that top-down knowledge inflows lead to an increase in exploitation activities within the business model. While Eneco, has an innovation business unit, receive bottom-up and top-down knowledge inflows, and work along with several consultancy organization. When it comes to the exploitation of their current business model, this is mainly been achieved through their own technicians and the consultancy bureaus they are working with. These parties cannot be considered as top-down knowledge inflows. On the other side, Vrijopnaam exploits and improves their current business by the decision of the three directors. The same holds for Energie VanOns, the managers on top do their own research on new trends about new ways of improving their current business model. Later on, their research gets validated by a consultancy bureau. Therefore, the proposition is supported by Energie VanOns and Vrijopnaam, but not for Eneco. From the observations, it was observed that an organization as Eneco is more difficult to manage since it is a bigger organization, more complex and has a hierarchical structure which makes it more difficult to change compared with Energie VanOns and Vrijopnaam which are smaller energy suppliers. Therefore, the managers on top might be more overseeing strategic management activities rather than exploitation activities.

***Proposition 3: Developing bottom-up knowledge inflows leads to an stimulation of exploration activities within the business model***

The results support proposition 3. According to Mom et al. (2017), findings of a survey among managers indicate that bottom-up knowledge inflows would be of particular value for managers in places focusing on exploration. Bottom-up inflows are likely to increase variety in experience, confronting manager with new technological developments, unexpected problems, and changing market conditions and customer demands (Burgelman, 1983).

Therefore, to conclude Energie VanOns will receive the least knowledge concerning new technological development as they do not use information from the bottom. In contrast, Eneco and Vrijopnaam make use of bottom-up knowledge inflows. This can also be confirmed as both energy supply organizations work on new projects and new services for their customers. While Eneco receives new inputs from their technicians, Vrijopnaam receives new inputs from their project developers. The technicians and project developers provide feedback and ideas for new services and new projects. These technicians and project developers are closer to the customer, and are able to identify the needs and wants of customers. The results show that Eneco has for instance used their technicians feedback by implementing a new app for their consumers. Vrijopnaam also implement their project developer's new ideas into their business model. While Eneco and Vrijopnaam make use of bottom-up and top-down knowledge inflows which leads to the exploration of new ideas, Energie VanOns solely makes use of top-down knowledge inflows.

***Proposition 4: Situational factors lead organizations to change their business model***

The results support proposition 4. First of all, it must be concluded that not all of the organizations were affected by the same situational factors. All of the organizations are affected by the pressure of competitors, the geographical location of the Netherlands, governmental laws and regulations, and the lack of renewable energy. Some energy suppliers are affected more than other energy suppliers. For instance, pressure of competitors hit Eneco the most as they used to be in an oligopolistic market structure, and were regulated by the government with high subsidies. This is not the case anymore since the deregulation from the government, from then on they have to deal with intense competition. As a consequence, Eneco changed their business model slightly by hiring an account manager in order to compete with their competitors. By keeping customers happy and satisfied, they aim for an high retention rate. Due to the competition, Eneco has also increased their R&D activities in order to be up to date with the newest technologies and outperform their competitors. In

contrast, when it comes to governmental laws and regulations, even though all of the energy suppliers are affected by governmental laws and regulations, Eneco socializes and negotiates continuously with the government. Therefore, they are able to socialize in their benefits from time to time. This is not the case for the other organizations. Again, Eneco used to be regulated with the government, therefore they have the necessary network to negotiate and socialize with the government. When it comes to the turbulence of the environment and the energy transition, only Eneco has been affected by these factors. The cause of this is that Eneco has been in the energy supply market for over a century. Therefore, they have been relying on fossil energy sources, and had to transit from fossil energy sources to renewable energy sources. As a consequence, Eneco had to switch their business model towards a portfolio of sustainable energy sources and has to get rid of fossil energy sources. That is also the reason why Eneco is investing a lot of money in R&D and innovation to find new techniques to supply renewable energy sources. In contrast, Vrijopnaam and Energie VanOns have entered the energy supply market in the past decade. Both energy supply organizations started their operations by supplying renewable and green energy sources. As a reason, they did not have to switch from fossil energy to renewable energy and are not affected by the energy transition. Their business model did not change due to the energy transition. Concerning the pressure of society, Vrijopnaam and Eneco have been affected by this. Eneco and Vrijopnaam are actively investing in renewable energy sources, such as solar parks and wind turbines. These energy sources have to be built somewhere. However, the population is resistant against building the landscape full of wind turbines and solar parks. Therefore, these energy suppliers experience pressure from society on where to build wind turbines and solar parks. As a solution, the government has created the regional energy strategy (RES), where residents can decide where on the landscape to build solar parks and wind turbines. Yet, there are protest in the Netherlands against wind turbines and solar parks. Energie VanOns buys energy from energy cooperatives, they operate as an intermediary. Therefore, they do not actively invest in energy sources, and are affected less by situational factors compared with other energy suppliers. Ultimately, Vrijopnaam solely relies on solar parks and solar panels. This means that they are extremely dependent upon sun. When there is no sun, Vrijopnaam simply has to buy energy from the market in order to supply energy. The other energy suppliers have a more diversified portfolio and are therefore not extremely dependent upon sun. To conclude, all of the energy suppliers are affected by several situational factors, and these factors have an influence on the business model. Yet, these situational factors slightly

differs due to the history of the organization, the portfolio, and the business model of the energy supply organizations.

### ***Conclusion regarding the Research Question***

This qualitative research shows that energy suppliers are subject to change their business model due to the increasing competition and several other situational factors. The results show that all the Dutch energy suppliers are aiming to innovate their business model through providing new services to their consumers or through innovating their way of generating sustainable energy, e.g. Eneco's electric charging station at Schiphol Airport. Energy suppliers are experiencing the need to innovative their business model to stay competitive and supply enough renewable energy which can meet the demand. Likewise, the organisations experienced pressure from society to not damage the nature by filling the nature full of wind parks and solar. These pressures caused the traditional energy supplier to renew their business model. According to Boyd and Fulk (1996), organizations face significant constraints and contingencies from their situational environments and their competitiveness depends on their ability to monitor the business environments, and their competitiveness depends on their ability to monitor the environments and adapt their strategies accordingly. Firms in a dynamic environment are challenged to both explore new possibilities in order to cope with future changes in the business environment, and to exploit old certainties to meet today's business demands which is known as ambidexterity (March, 1991). From the results, it can be concluded that the changing market environment and increasing competition causes energy suppliers to renew their business model to stay competitive.

Dereli (2015) argued that innovation activities help to increase the productivity and profitability of the organization. Dereli also found that innovation capabilities help organisations to improve new market shares and gain new markets significantly. To incorporate innovative capabilities, Dereli advised that organisations should ensure that the production of new goods and services occur in a new and unique way. All of the organizations do innovate their business model through the introduction of new services. However, it can be argued that the level of innovation differs for the energy suppliers. According to Barney (1991), firms with organizational, physical, and human resources will often be strategic innovators, for they will be able to conceive of and engage in strategies that other firms could either not conceive of, or not implement, or both, because these other firms lacked the relevant firm resources. Although the smaller energy suppliers are working on new service and project, e.g. the Flexible Contract service from Vrijopnaam, they do not have the

same resources, and therefore do not have the ability to foster bigger innovative projects. So, while innovation appears to be vital in renewing the business model, the organizational resources appears to be vital in determining the level of innovation. It can be concluded that Eneco performs the best on innovation. Yet, resources plays a crucial factor innovation.

Moreover, the results indicate that knowledge management is crucial to have in order to have an ambidextrous business model. Kanya et al. (2011) agreed that knowledge management is the most crucial strategic resource in the organisation. Knowledge management processes are necessary for key business processes to improve business performance. Rahimli (2012) suggested that knowledge management should be applied in competition because the market is changing rapidly, especially due to disruptive innovation. Therefore, organisations should use knowledge management to determine appropriate competition strategies, helping organizations gain a competitive advantage. Organizations that enable their employees or partners to share ideas have the benefit of receiving bottom-up knowledge inflows that can be used to explore new product and service ideas which is crucial. O'Reilly & Tushman (2008), identified a management which encourages learning, provides for the integration and transfer of knowledge, and with competence at exploratory learning, as part of dynamic capabilities related to ambidexterity. Eneco appears to be the only suppliers that encourages learning, and regularly asks their technicians for feedback. Therefore, Eneco's knowledge management capabilities perform better than the other suppliers.

In sum, this qualitative research has shown evidence that exploration and exploitation are needed in order to have an ambidextrous business model. Exploration can be stimulated through bottom-up knowledge inflows and innovation. Exploitation can be stimulated through bottom-up knowledge inflows. Research has also shown that innovation and knowledge management inflows are a necessary condition in order to renew your business model. Through innovation, new projects can be researched and be implemented in the business model. Through knowledge management, either bottom-up or top-down, new innovative ideas can be explored or current services can be exploited through efficiency. Yet, research has also shown that bottom-up knowledge inflows are not a must for exploration. In the case of Energie VanOns, managers do their research for new services and let their research be validated by an external consultancy organization. Yet in order to be competitive and survive, ambidexterity is needed which Energie VanOns lacks. Therefore, it is questionable whether they will survive in the long term.

## **5.2 Discussion**

### ***5.2.1 Theoretical Implications***

The findings of this research have particular implication for theory. This research provided further theory development on ambidexterity by showing how organizations create and manage knowledge management and innovation. This research shows that knowledge management and innovation have a positive impact on exploration and exploitation. Organizations are challenged to both explore new possibilities in order to cope with future changes in the business environment and to exploit old certainties to meet today's business demands which is known as ambidexterity (March, 1991). Firms that integrally apply innovation and knowledge management in their strategies are able to achieve ambidextrous business models. Ambidextrous organizations have a competitive advantage over their competitors by pursuing a balanced approach to exploration and exploitation. As a result, these organizations excel at exploiting existing products to enable incremental innovation and at exploring new opportunities to foster more radical innovation (Andriopoulos and Lewis, 2009). Furthermore, research showed that efficiency and innovation do not need to be trade-offs but can effectively co-exist (Tushman and O'Reilly, 1996). It is also found that knowledge management helps to identify the procedures and practices in dealing with organisational intellectual resources. To realise competitive advantage, the study recommended that organisations should use knowledge management in increasing intellectual capital. Intellectual capital entails intangible assets that organisations use to improve business performance. Intellectual capital includes organisational processes, organisational knowledge, and employee expertise. Intellectual capital contributes positively to business performance, which further enhances the competitive advantages of the organisation (Syahchari and Sahban, 2019).

### ***5.2.2 Managerial Implications***

The results provide some guidelines that can be used to foster innovation and knowledge management into the business model. First of all, organisations are advised to analyse their current processes together with the top management, and look whether they are exploiting their current processes efficiently. It is found that top-down knowledge inflows of manager have a positive relation on the amount of exploitation activities. Second, the organisation can, in consultation with employees lower on the hierarchical chart search for new explorative ideas. It is advised to enable employees lower on the hierarchical chart to regularly share new ideas. As employees lower on the hierarchical charts are closer to customers, they have a better understanding of what customers want and need. Yet, in order to benefit from the

knowledge of employees, employees must experience that they are heard. This research project could inspire managers to start thinking about bottom-up knowledge inflows, eventually contributing to innovation. Third, the results show that innovation is not universal and can potentially have a different meaning for each organisation. Smaller organizations with around 10 employees may opt for a consultancy organization that looks for innovative ideas and techniques or they can also internally conduct research for innovation. In contrast, bigger organizations opt for an innovation business unit along with a consultancy organization to look for new innovative ideas and techniques. This shows that resources play a crucial role for innovation. Fourth, organizations can achieve ambidexterity by exploitation and exploration which leads to competitive advantage and survival for the long-term.

### **5.3 Methodological Limitations**

This research has some limitations. First of all the research projects started with a too broad research aim and too broad research questions. Due to a broad start of the research and the collection of data in this research phases, very rich information was gathered, specific on ambidexterity and dynamic capabilities, but not on specific topics within innovation. Therefore, later in the research process the research aim and research questions have been adjusted and specified several times, in order to ensure feasibility of the research. Another limitation of this research is that the participated organizations differed significantly. While the researcher managed to conduct interviews with the organizations that did fit the criteria. Still the organizations differed slightly. While one organization has been operating over a century, and still has fossil energy sources in their portfolio, and therefore do experiences the energy transition. The other two energy suppliers have entered the energy supply market in the past decade, yet both of them differ in their operations as well. One of the energy supplier buys energy from energy cooperatives, and provides these energy while the other energy supplier solely relies on solar parks and solar panels. Another limitation of the research is the depth of research. While one the organizations was studied in depth through documents, articles, and interviews. The other two organizations did not have the same amount of relevant documents. For more depth and insights from more perspectives, more people within the organization could have been interviewed. As a result, the results are not very in depth, but might be a good starting point for organizations to investigate how knowledge management and innovation is being used at energy supply organizations.

#### **5.4 Suggestions for further research**

This research provides multiple suggestions for future research. First of all, firms in a dynamic environment are challenged to both explore new possibilities in order to cope with future changes in the business environment and to exploit old certainties to meet today's business demands which is known as ambidexterity. To prosper, or even survive, firms must excel at both, exploitative and exploratory innovation. The two selected and participated organizations are selected as the most sustainable energy suppliers, and the other participated energy supplier is one of the biggest energy suppliers which has been operating for over a century. Therefore, a comparative study may provide insight into whether organizations that are not exploring new possibilities and/or are not exploiting old certainties will be able to survive. Secondly, it would be interesting to zoom in more on specific activities that take place when new knowledge arises and when an innovative idea or technique arises. With this research was found that organizations invest in innovation and knowledge management, and that new knowledge and ideas lead to either new projects or new services that the organization is working on. However, it is not zoomed in what actually happens when new knowledge and ideas are provided. In such a topic appears to be a lot of interesting and useful information hidden. Ultimately, the selected organizations for this research differ slightly from each other, while one organization has been operating for over a century, the other two have entered this market in the past decade. Even then, one of the energy suppliers is an intermediary, and the other one is an energy supplier that is extremely dependent upon sun. For future research, it would be interesting to conduct research with companies that are more alike.

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**APPENDIX 1: Table on overall research approach**

Research Sub-Questions:	Data-collection method:	Research activities
What is the role of situational context in deciding about dynamic capabilities/	In-depth interviews combined with relevant documents	<ul style="list-style-type: none"> <li>• Pre-assessment of organisations</li> <li>• Conducting interviews</li> <li>• Data-analysis (coding procedure)</li> </ul>
How are energy suppliers deciding about dynamic capabilities?	In-depth interviews with relevant documents	<ul style="list-style-type: none"> <li>• Pre-assessment of organisations</li> <li>• Conducting interviews</li> <li>• Data-analysis (coding procedure)</li> </ul>
What is the role of the firm's ambidexterity strategy in decision-making regarding dynamic capabilities	In-depth interviews with relevant documents	<ul style="list-style-type: none"> <li>• Conducting interviews</li> <li>• Data-analysis (coding procedure)</li> </ul>

## **APPENDIX 2: Interview Guide**

### **Introduction**

Asking to record the interview

Introduction of the researcher

Introduction of the topic and aim of the research

Information about the interview guide

- Semi-structured, expecting around 45+- minutes, voluntary participation

Asking if the interviewee wants to remain anonymous

### **Interview**

1.1 What is your function at the organization?

1.2 Have you been involved in the energy transition process to renewable energy?

1.3 What was your role during the energy transition process?

### **Organisation and energy transition**

2.1 Could you describe the organization?

Follow up questions:

- Which services are provided to the customer
- What is the market that the organization is operating at?
- We are currently switching from fossil energy to renewable energy, what are the expectations in terms of generating and providing renewable energy for your customers?
- What were the challenges when making the transition from fossil energy to renewable energy?
- How did your organization face these challenges?
- Do other companies, maybe in the energy supply market or in the energy market in general have an influence with your energy transition?
- What is the strategy of your organization concerning renewable energy? What are the investment plans?
- We have seen a shift in the energy supply market which consisted of a few large players, but now is facing more intense competition? How do you aim on being competitive while competition is increasing?
- We have seen protest within the country as there is resistance against seeing the landscape full of wind turbines and solar panels. How are decisions being made concerning the societal role of the company vs. business strategies?
- According to Eurostat (2021), the Netherlands has the lowest share in using renewable energy amongst all EU member states? How does it occur that we have such a low percentage of renewable energy in your opinion?

### **Knowledge management**

3.1 We know that knowledge management can consist of top-down knowledge inflows and bottom-up knowledge inflows. Top-down knowledge inflows consist of knowledge flowing from the higher hierarchical managers, to manager, and ultimately to employees. In contrast, bottom-up knowledge inflows consist of knowledge coming from employees to manager and flows all the way up to the organization.

- How is knowledge being used at your organization?
- How is the organizational culture at your organization?
- Who makes the ultimate decision in the organization?

- Are employees lower in the hierarchical chart enabled to share their knowledge? Do they also share their knowledge? How is that knowledge being used or evaluated?
- Where does new knowledge come from, do you have for instance an external consultancy bureau that gives your organization advice?

### **Innovation**

4.1 The energy market has had a shift from fossil fuels to renewable energy. Innovation plays a key role in gaining competitive advantage over your competitors.

- Does your organization work on innovative new projects? If so, what are these innovative projects?
- Does your organization work into new services to your customers?
- Which departments are involved with innovation and what are their role?
- We see a shift from fossil energy to windmills and solar panels. Is your organization ready to rely on these renewable energy sources or are new renewable energy sources considered as well?

### **Ambidextrous business model**

5.1 It might be difficult to work on new innovative projects and at the same time optimize current processes and structures.

- Does your organization have different departments for innovation and regular optimization departments? For instance different business units?

### **Ending**

- Thank you for your cooperation
- Explaining the procedure: sharing the transcription and the results of the interview and thesis.

### APPENDIX 3: Operationalization Scheme

Concepts	Items	Interview Questions:
Knowledge management	Bottom-up knowledge inflows Top-down knowledge inflows	How is knowledge being used at your organization? Who makes the ultimate decision in the organization? Are employees lower in the hierarchical chart enabled to share their knowledge? Do they also share their knowledge? How is that knowledge being used or evaluated? Where does new knowledge come from, do you have for instance an external consultancy bureau that gives your organization advice?
Innovation	Strategy New technology Renewable energy sources	Does your organization work on innovate new projects? Does your organization work into new services to your customers? Which departments are involved with innovation and what are their role? We see a shift from fossil energy to windmills and solar panels. Is your organization ready to rely on these renewable energy sources or are new renewable energy sources considered as well?
Situational context	Competitive pressure Changing environment Pressure of society	Do other companies, maybe in the energy supply market or in the energy market in general have an influence with your energy transition? We have seen a shift in the energy supply market which consisted of a few large players, but now is facing more intense competition? How do you aim on being competitive while competition is increasing?

		<p>We have seen protest within the country as there is resistance against seeing the landscape full of wind turbines and solar panels. How are decisions being made concerning the societal role of the company vs. business strategies?</p>
<p>Achieving ambidexterity</p>	<p>Spatial separation  Temporal separation  Synthesizing</p>	<p>Does your organization have different departments for innovation and regular optimization departments? For instance different business units?  Does your organization create temporal teams for a certain period of time when working on new innovative projects?  If so, what happens at the end of such a project? How is the project integrated in your business units?</p>

#### APPENDIX 4: Coding Scheme

Dimension	Text	Code	Interviewee
Innovation & Ambidexterity	Als centraal bedrijf keren we zoveel mogelijk winst uit onze coöperaties die zijn met name ook bezig met nieuwe projecten, denk dus aan een opslag, denk dus aan het op en afregelen van zonneparken. Er werd heel veel zon op het net gezet, dat was net te veel, dus moet je ook terug proberen te regelen. Ze zijn bezig met ..... werkportfolio zitten, dus op Ameland wordt geëxperimenteerd met watervlieger op de Waddenzee los te laten op basis van hoe de stroming werkt. Dat soort projecten zijn we ook mee bezig en proberen we ook te faciliteren.	New projects & Exploration	#3
Knowledge management	We hebben net deze week een .....rapport laten afronden door een externe partij die eigenlijk valideert wat wij ook denken, dus de technologieën die je net hoorde waar we wel of niet op inzetten die komen ook deels uit het adviesrapport voort	External consultancy bureau & Top-down knowledge inflows	#3
Knowledge management	We hebben een aantal zaken onderzocht waar we nog niet mee bezig zijn zoals data gedreven bedrijfsmodellen, daar zien we op dit moment minder in.	External consultancy bureau	#3
Situational context	We hebben altijd al duurzame energie geleverd, meestal op het stroomgedeelte. Het gasgedeelte is nog wel fossiel, maar compenseren wij met CO2	Energy transition	#3
Situational context	Ieder jaar verliezen we ongeveer 7% van onze klanten, dus ze stappen over naar een andere leverancier. Het marktgemiddelde ligt ongeveer op 48 % procent.	Pressure of competitors	#3
Situational context	Dat heeft ook te maken met onze geografische ligging. Als voordeel is dat we wind hebben kunnen ontwikkelen zonder dat het veel ruimte en beslag heeft op het heel land. Ons nadeel is dat we geen bergen hebben, dus we kunnen niet aan waterkracht werken, zoals ze dat doen in Zweden en Zwitserland. Dat kunnen we niet terwijl je daar heel veel hernieuwbare energie vandaan kan halen. We hebben ook geen grote bossen die we kunnen kapen en die we weer kunnen aanplanten zodat je daar biomassa stroom uit hebt, dat hebben we ook niet.	Geographical location	#3
Situational context	Als laatste heb je ook relatief zware industrie in Nederland zoals de haven van Rotterdam. Daar wordt nog wel wat verbruikt en in de transport sector zie je dat daar ook veel energie wordt verbruikt. Dat is een uitdaging om dat te verduurzamen en dat telt allemaal mee binnen die 14% en kunnen we dat allemaal met wind oplossen, dat wordt lastig.	Geographical location	#3
Innovation & Ambidexterity	Wij doen mee in een project met x company en 4 andere energieleverancier waarbij innovatief kan laden aan de publieke laadpaal. Moet je voorstellen in de provincie Groningen en Drenthe/.....,..... Daar wordt een laadpaal geplaatst en die zijn allemaal openbaar maar door middel van je pasje ervoor te houden kun je dus bij de eigen energie leverancier stroom tanken en op dat moment krijg je ook echt stroom van je eigen energieleverancier	New services & Exploration	#3

Situational context	Dat zijn dingen waar wij nu allemaal over nadenken. Dat is wel handig, maar je bent wel afhankelijk van wet en regelgeving om dat wel of niet te kunnen.	Governmental laws and regulations	#3
Situational context	De ACM is een hele belangrijke partij die ook aan je sein moet hebben, die controleren ons ook. Als wij een te hoge tarieven rekenen dan krijg je de ACM op je. Dat is gelukkig niet gebeurd maar bij andere leveranciers heb ik dat wel gezien. Daar ligt dus veel macht. De overheid heeft veel macht in de zin van dat zij ook veel investeringsagenda bepalen en ook de subsidies bepalen. Dus dat zijn de belangrijkste spelers.	Governmental laws and regulations	#3
Ambidexterity strategy	Voor uitbreiding van onze business model gebruiken we dezelfde mensen want wij zijn een klein bedrijf. Dus je zult het met elkaar moeten doen.	Synthesizing	#3
Innovation & Knowledge management	Wat we op dit moment zien is dat voornamelijk veel vragen vanuit de coöperatie is van onderop, dus die komen dan bij het bedrijf terecht en kijken wij of wij daar iets mee willen of niet, dus je zou ook op andere markten kunnen richten. De warmtemarkt doen we bijvoorbeeld niet en ook bewust, omdat ons rolspectrum daar niet groot genoeg voor is kunnen we daar niet meerwaarde leveren en ook te weinig uithalen, dus innovatie laten we liggen.	Bottom-up knowledge inflows & Exploration	#3
Situational context	Wij hebben eigen traders. Een tradeteam doet dat. Een tradeteam houdt in dat de mensen zelf naar het bedrijf gaan daar groot inkopen en dat gebruiken wij natuurlijk voor onze klanten.	Lack of renewable energy	#1
Innovation & Ambidexterity	Tegenwoordig zijn we natuurlijk bezig met zonnepanelen, waterstof en allerlei andere ..... om energie op te wekken en dat proberen we nu op te slaan zodat we dat weg kunnen zetten bij klanten	New services & Exploration	#1
Innovation & Ambidexterity	Wij hebben nu een grote batterij ontworpen waarin we de stroom in ieder geval kunnen opslaan en wanneer er meer behoefte is op een bepaalde tijd van een dag kan je dan wat meer afgeven zodat je minder verlies hebt.	New project & Exploration	#1
Situational context	Eneco is al 100 jaar bezig met warmte en warmte is duurzaam. Ondanks dat er een nieuw wereldje ontdekt is, zijn wij er best lang mee bezig alleen hebben wij het opgewekt met gas. In die tijd was dat het meest duurzame wat je kan bedenken	Energy transition	#1
Situational context	Qua verandering is het voor ons niet heel gigantisch geweest, het gas was niet duurzaam, maar het was wel van grijze gas naar groene gas.	Energy transition	#1
Ambidexterity	We hebben verschillende dochteronderneming. De grootste onder Eneco zijn zonnepanelen, laadpalen, elektrische auto's, elektrisch laden, warmte producten, stadsverwarming, de grond en je hebt ook heel veel verschillende varianten bijvoorbeeld de wko's. Dat is een warme en koude pomp opslag en dat is eigenlijk dat je twee bubbels op de grond hebt.	Exploitation	#1
Situational context	Dat is een grote leverancier en concurrent voor ons. Zij leveren voor ons in bepaalde gebieden stroom aan. Hele grote hoeveelheden zelfs, omdat wij het transport regelen	Lack of renewable energy	#1
Knowledge management	We gebruiken bronnen van de overheden, want die hebben natuurlijk heel veel informatie over intermediair. Ook vanuit	External consultancy	#1

	bouwbedrijven en die praten met vastgoedeigenaren over nieuwe plannen. En klanten die nieuwe informatie delen en vergaren. Uiteindelijk kijken we naar de markt die laten wij onderzoeken doen met die onderzoeken heb je nieuw resultaat en nieuwe resultaat bepaalt hoe je toekomst eruit gaat zien.	bureau & R&D Department	
Knowledge management	Onze monteurs die komen echt bij klanten thuis en die weten precies wat er speelt en wat de behoeftes zijn. Dus we kijken zeker mee in de onderzoeken en de kennis om dingen gaan aan te passen. We krijgen heel veel bruikbare impulsen van de monteurs die we kunnen gebruiken.	Bottom-up knowledge inflows	#1
Knowledge management	Wij hebben een speciaal team dat constant bezig is met het socializen bij overheden. Binnen de overheid constant in gesprek zijn over hoe het gaat en wat we verwachten. De overheid informeert ons over wet en regelgeving. Door goede banden te hebben met overheden proberen wij altijd klaar te staan voor veranderingen	R&D department	#1
Situational context	Iedereen wilt elektrisch leven, maar ik denk niet dat daar genoeg elektriciteit zal zijn. Dus het is heel belangrijk dat er nieuwe uitvindingen komen als waterstof en dat dat ook wordt overwogen door de overheden.	Lack of renewable energy	#1
Situational context	Voorlopig hebben we gas nodig en je zult het ook altijd nodig hebben. Het is wel belangrijk dat gas niet de overhanden heeft.	Lack of renewable energy	#1
Innovation & Ambidexterity	We hebben een team die zich constant bezig houdt met nieuwe technieken en ideeën. Bijvoorbeeld bij Schiphol hebben ze een nieuwe project ontwikkeld. Dat houdt in dat er overkapte parkeerplaatsen zijn en dan heb je aan bovenkant zonnepanelen en aan de onderkant heb je elektrische palen. De zon die op die parkeerplaatsen schijnt, de stroom kun je gelijk gebruiken voor de elektrische auto's	New projects & Exploration	#1
Situational context	Waar Eneco de naam en technieken heeft, kunnen de kleineren wat meer maatwerk leveren. Je blijft met elkaar concurreren dat heeft Eneco ook door, vandaar hebben ze een accountmanager twee jaar geleden aangenomen. Maar voorheen hadden ze geen accountmanager, ze willen gewoon de klantenservice aanbieden. Ze zien dat de markt niet veranderd daarom hebben ze een accountmanager aangenomen om maatwerk te leveren en aandacht te geven aan de klant. Dus eigenlijk biedt Eneco het hele plaatje aan, van techniek tot relatie.	Pressure of competitors & Turbulence of the environment	#1
Situational context	Nu merk je wel met de energietransitie en vanuit de overheid en klanten willen natuurlijk all electric. Dus nu vragen we wel wat meer gedragsverandering ook vanuit de medewerkers en de oudere generaties en hoe ze het al jaren lang doen. Nu is het vooral gedragsverandering vanuit de Eneco medewerkers.	Energy transition & Turbulence of the environment	#1
Situational context	Consumenten kijken ook altijd naar prijs. De marges worden steeds dunner, dus we moeten een andere verdien model ontwikkelen rondom hoe we met die klanten omgaan en dat is echt een strijd, heel lastig.”	Pressure of competitors	#1
Innovation	Er is een ander product, die heet ‘Happy Power’, dat is een loyaliteitsproduct om de klant te binden. Hiermee geven we	New service	#1

	bepaalde momenten op de dag gratis energie, omdat we zien dat er veel productie is, de prijzen laag zijn en we de energie toch ergens kwijt moeten.”		
Innovation & Ambidexterity	“Nee, innovatie is gedeeltelijk bij ons, er zijn twee vlakken. Ik kijk vooral naar de asset kant. Dus heel erg naar de technologiekant van zon, wind en dergelijke en collega’s van mij kijken vanuit de service en diensten kant.” “Wij kijken vooral naar de technologische kant van windmolens, zonnepanelen en opslag. Daarin proberen we voor Eneco technologie dingen te spotten, te scannen die interessant kunnen zijn, waar we iets mee kunnen doen, die we kunnen toepassen, maar ook innovatiestrategieën te schrijven.”	New service and new projects & Exploration	#1
Ambidexterity	“Vooral innovatie over hoe je het efficiënter kunt maken, goedkoper kunt krijgen, minder impact op het milieu kan hebben, andere toepassingen in materialen.”	Exploitation	#1
Knowledge management	“We doen het zelf. Er zit best veel expertise in de organisatie. We krijgen ondersteuning vanuit twee partijen waarmee we samen werken. Eentje die helpt met het scrapen van de wereld om onderzoek te gaan naar bepaalde bedrijven die ontwikkelingen doen op een onderwerp wat ik interessant vind en een andere partij helpt me met het analyseren.”	Internal R&D team and External consultancy bureau	#1
Situational context	We zijn een dichtbevolkt land, niemand zou een windmolen twintig meter naast zijn huis willen.”	Geographical location	#1
Situational context	Er is nu een druk met dat de omgeving het vervuילend vindt, of de biodiversiteit. Daar zie je een sociaal druk. Met windparken maken we dat heel veel mee. Bezwaren vanuit de omwonenden.”	Pressure of society	#1
Situational context	We kopen de fossiele energie op de markt in. Dit geven we aan de zakelijke klanten, omdat zij grote verbruikers zijn. Maar hier willen we wel van af zijn. Dit komt vooral omdat er niet genoeg duurzaam energie is.	Lack of renewable energy	#1
Knowledge management	Moment dat ik binnenkwam, 12 jaar geleden, heeft de toenmalige CEO als visie gelegd dat hij richting duurzaamheid wilde. Daar zijn wij toen mee begonnen. Toen was er een heel groot ongeloof binnen de organisatie. Totdat we eigenlijk het eerste windpark op zee hebben ontwikkeld, waardoor we de stad Leiden konden voorzien van elektriciteit	Top-down knowledge inflows	#1
Situational context	Wel kopen wij het restant wat wij zelf niet hebben in op de groothandelsmarkt. Die balans proberen wij meer te gaan zoeken door de zonneparken meer te gaan ontwikkelen en te bouwen.	Lack of renewable energy	#2
Situational context	Het doel is om over vier jaar alle stroom van onze klanten zelf op te wekken. Stroom koop je altijd in. Qua duurzaamheid komt het deels uit onze parken en deels inkoop.	Lack of renewable energy	#2
Situational context	Er zijn heel veel gemeentes momenteel bezig met het opstellen van beleid met veel criteria.	Governmental laws and regulations	#2
Situational context	Als wij een hele lange historie hadden, dan was de kans er geweest dat wij vanuit fossielen achtergrond ons bestaansrecht hadden gehaald, want als je die in je portfolio hebt dan kan je die tien niet meer halen. Wij willen ons meer inzetten in de duurzaamheid en dat doen wij via de zonneparken.	Energy transition	#2

Situational context	Wij bestaan vijf jaar en het zijn langjarige trajecten met de raad van staat en de grondposities die lastiger te vergeven zijn als het gaat om windenergie. Die markt is in handen van een aantal partijen al jarenlang waar je lastig tussen komt. Je moet met concrete projecten aankomen. Een zonneparkproject duurt maximaal twee jaar.	Pressure of competitors	#2
Situational context	Wij willen vraag en aanbod beter in balans houden door mensen te stimuleren om geleidelijk energie te verbruiken. Wij kunnen niet elk moment energie leveren, omdat wij afhankelijk zijn van de zon. Het is daardoor beter als de elektrische auto's van de klanten worden opgeladen als de zon schijnt en niet in de nacht.	Weather conditions	#2
Knowledge management	Wij hebben drie directeuren en aandeelhouders die eigenlijk hun sporen in die wereld eigenlijk wel verdiend hebben. Dat zijn de mensen met de visies die de markt goed in gaten houden, kijken wat de concurrenten doen en ook waar behoefte naar is bij de klanten.	Top-down knowledge inflows	#2
Innovation & Ambidexterity	Als jij een paneel uit ons park koopt, koop je het recht om negen jaar stroom te mogen gebruiken. We zien dat ons weglooperpercentage vrij laag is. Op die manier denken wij wel te kunnen groeien en wij hebben niet de ambitie om zo groot te worden als een Nuon. Wij willen een stabiele positie in de markt creëren en de energietransitie helpen te versnellen door zelf te investeren in de zonneparken.	New Projects & Exploitation	#2
Ambidexterity	Wij hebben veel kennis over hoe systemen ingericht moeten worden, maatschappelijk en technisch. De projectontwikkelingskant proberen wij het verschil te maken, waarbij andere partijen zo'n case niet meer zien zitten, waarbij wij meer waarde willen bieden vanuit die leveranciersrol. Een energieklient op zichzelf is ook wat waard. Wij nemen genoeg met minder verdiensten, omdat wij weten dat het naar meer energieklienten zal leiden. Op die manier kunnen wij parken ontwikkelen, waarbij andere partijen zullen afhaken.	Exploitation	#2
Situational context	Wij gaan niet voor de winstmaximalisatie, maar wij leggen het park nooit helemaal vol. Hiermee houden wij ruimte vrij voor ecologische doeleinden. De perceptie in Nederland is anders, want het is makkelijk roepen. Er zijn regionale-energiestrategieën gemaakt, de opgave voor gemeentes om duurzaam op te wekken is gigantisch en je ziet nu, met name de windmolens hebben de meeste weerstand. Wij verwachten dat windmolens op zee top werkt en dat op land veel meer zonneparken gebouwd gaan worden.	Pressure of society & Energy transition	#2
Situational context	Alhoewel het bij een zonnepark op dit moment ongelofelijk moeilijk is om een locatie te vinden en om geen verlies te maken, want de subsidie neemt sterk af.	Governmental laws and regulations	#2
Innovation	Wij kijken continu naar uitbreiding. Wij hebben genoeg werk om zonneparken te bouwen de komende tijd, vijf tot tien jaar. Wij zijn continu aan het kijken of wij over twee jaar de boot niet missen. Wij kijken ook naar andere richtingen om nieuwe diensten te bieden als leverancier, zoals laadpalen of een laadpas	Exploration	#2

	voor elektrische auto's. Wij gaan ook een nieuw dynamisch tarifieren introduceren aan de leverancierskant. Dat wil zeggen dat je per uur wordt afgerekend voor de energie die thuis wordt gebruikt. Wij proberen wel de leverancierskant te blijven innoveren in diensten. Soms is het gunstiger om ons zonnepark uit te zetten, dan hem te laten draaien. Wij zijn nu aan het kijken of we hem kunnen afschakelen op het moment dat het niet gunstig is om hem te laten draaien. Naarmate dit gaat toenemen willen wij stroom niet weggooien, maar er bijvoorbeeld waterstof van maken.		
Innovation and Knowledge management	Wij zijn met zijn twaalfen en wij hebben niet een speciaal team. De innovatie komt vanuit ons drieën. Wij volgen de markt veel en hebben het erover met elkaar, welke kant gaat het op? En is het interessant voor ons? Het voordeel is dat wij zo klein zijn, kunnen wij het meteen doen.	Exploration & Top-down knowledge inflows	#2
Knowledge management	Input komt vooral vanuit ons drieën.	Top-down knowledge	#2
Knowledge management	Van de zonneparken kant hebben wij een uitstekende ontwikkelaar aangenomen die zelf de markt heel goed snapt en hij komt ook met ideeën. Op deze manier hebben wij kennis vanuit buiten naar binnen getrokken, waaruit ideeën komen om te innoveren.	Bottom-up knowledge inflows	#2
Situational context	Wij zitten er pas net in, waardoor wij niks fossiels hebben. Wij hebben een kleine organisatie, kleine ideeën, waardoor wij snel kunnen wenden en keren. Onze propositie zit midden in die energietransitie. Samen met de bewoners van Nederland kunnen wij helpen om die energietransitie vorm te geven. Hoe meer mensen bij ons een paneel kopen, hoe meer nieuwe parken wij kunnen aanleggen.	Energy transition & Turbulence of the environment	#2
Situational context	Ja de concurrentie maakt het moeilijker. Hoe meer concurrenten er zijn hoe moeilijker het is om aan klanten te komen. Wij willen niet hard groeien met extern kapitaal, want wij hebben gezien dat het moeilijk is om aan klanten te komen. Je kunt ze kopen, maar dan ben je ze ook zo weer kwijt. Als je eenmaal in dat bootje stapt, dan kom je er niet meer uit.	Pressure of competitors	#2
Situational context	Bij ons kan je zelf energie opwekken met panelen die niet op je eigen dak hoeven.	New service	#2
Ambidexterity	Elke keer als wij een zonnepark ergens opleveren, dan gooien wij lokaal in die stad gaan wij marketing doen. Dan krijgen wij veel goeie klanten binnen die panelen kopen. Hieraan willen wij geld besteden	Exploitation	#2
Situational context	Het is ontzettend lastig om aan klanten te komen en dat onderschatten de nieuwkomers. Ik denk niet dat wij grote dure campagnes gaan doen.	Pressure of competitors	#2

## **APPENDIX 5: Summary of the interviews conducted. Sorted to date.**

Date: 24 June 2021, Time: 16:00.

### **Organization 3: Business Development manager**

Organization three is an energy supplier. The company supplies green energy that is generated locally by approximately one hundred energy cooperatives from 2014 on. Energie VanOns supplies 100% green energy. Locally, in your village, district or city, the energy cooperatives with solar panels, solar roofs, and wind turbines generate local electricity for instance via the village windmill, and windmills of farmers in the region. The energy is locally generated and locally supplied. Therefore, you choose for green energy from your own soil. Energie VanOns takes care of the administration and customer service. In addition, the organization develops and arranges the central communication, such as the websites, press releases and social media. The profit Energie VanOns generates is returned to the region on sustainable projects. Such projects include projects in order to improve the Co2 footprint without making a major investment, 100% genuine green power, and 100% locally generated electricity. Within Energie VanOns you choose for green energy and at the same time you support your village, district, or city. On the one side, Energie VanOns is an intermediary for energy cooperatives. On the other side Energie VanOns has a subsidiary company that focuses on building wind turbines and solar panels themselves

Date: 28 June 2021, Time: 16:00.

### **Organization 1: Account Manager**

Organization one has been active in the field of energy for more than 100 years. Eneco's roots go back to the 19<sup>th</sup> century. At that time, gas and electricity were produced on a 'large' scale for the first time and local energy companies were established. These local energy companies grew and ultimately merged in the 20<sup>th</sup> century. After a history of cooperation and mergers of the municipal utility companies Rotterdam, The Hague, and Dordrecht, the current Eneco was created in 1995. Currently, Eneco is active in the Netherlands, Belgium, Germany, and the United Kingdom. Yet, the head office is located in Rotterdam. Eneco has several subsidiaries. The largest are focused on solar panels, charging station, electric cars, electric charging, heat products, and district heating. However, Eneco currently still also supplies partly fossil energy sources. On top of that, due to a lack of energy sources, Eneco also buys energy from competitors in order to supply their own customers energy. Yet, Eneco aims to become climate neutral by 2035. Therefore, Eneco is currently investing a lot in solar parks and wind parks. The account manager revealed about why the organization hired him as two years ago. Besides that, it was revealed that the organization is working on several innovative projects and services for their customers. However, more depth information concerning innovation was given during the second interview with Eneco which was done with the Innovation Leader.

Date: 2 July 2021, Time: 10:30.

### **Organization 2: Project Lead Developer**

Vrijopnaam has their own solar parks. They offer their customers the opportunity to participate in those solar parks. They can buy a panel from these solar parks, with which they also receive the energy from that solar panel at home. This is an alternative to solar panels on your own roof. Vrijopnaam thereby give something away and in order to be able to give something away, they have to manage those solar parks ourselves. They think that this is very important that they their own installations on both the production side, so that they have something to offer people on the supplier side. Yet, Vrijopnaam buys the remainder that they do not have themselves on the wholesale market, so when we face shortage of energy. They are trying to find that balance more by developing and building solar parks more.

If you look at the places where Vrijopnaam generates their energy, you will see that the location can be used multiple times. Think of a closed waste dump or a vacant baseball field. In this way you do not intervene harshly on the environment, but the transition to sustainable energy needs space. It is up to the municipalities to create a good spatial framework with conditions. Vrijopnaam themselves look at areas where the number of direct residents is not too large. They also look at the location of the power grid. What Vrijopnaam likes is that the location is encased between a highway or a large ditch. Also that it can be better concealed in the landscape. Vrijopnaam has three directors and shareholders who have actually earned their spurs in that world. These are the people with the visions who keep a close eye on the market, who look at what the competitors are doing and also what the customers need. If Vrijopnaam had a very long history, there would have been a chance that they would have achieved our right to exist from a fossil background, because if you have that in your portfolio, you cannot easily get rid of fossil energy sources.

Date: 9 July 2021, Time: 09:00

### **Organization 2: Director**

Vrijopnaam consists of two companies. On the one hand, the energy supplier, like any other energy supplier, and on the other hand, the project development side that tries to build their own parks. The aim is to generate all our customers' electricity themselves in four years' time. You always buy electricity. In terms of sustainability, it comes partly from our parks and partly from purchasing. Vrijopnaam doesn't go for profit maximization, they never fill the solar parks completely. This frees up space for ecological purposes. Regional energy strategies have been drawn up, the task for municipalities to generate sustainably is huge and as can be seen now, the wind turbines in particular have the most resistance. Vrijopnaam expects that windmills at sea will work perfectly and that many more solar parks will be built on land. Vrijopnaam favours solar panels because they also don't want a windmill in their backyard, therefore they favor windmills at sea and as little as possible on land. A solar park has almost no disadvantages and nobody is bothered by it. Vrijopnaam does not believe in very large parks of about 10 hectares. They build relatively small parks that can be nicely integrated from 2 to 5 hectares and that is a top solution. The reason why they choose sun is because there are almost no disadvantages.

Vrijopnaam is continuously looking for expansion. They have enough work to build solar parks in the coming period, five to ten years. They are also looking at other directions to offer new services as a supplier, such as charging stations or a charging card for electric cars. Vrijopnaam will also introduce a new dynamic pricing on the supplier side. This means that you are charged per hour for the energy used at home. Vrijopnaam tries to continue to innovate in services on the supplier side. They are now looking at whether they can switch their energy off when it is not favorable to let it run. As this increases, they don't want to throw electricity away, but turn it into hydrogen, for example. Vrijopnaam has 12 employees and do not have a special team. The innovation comes from the three directors. They follow the market a lot and discuss it with each other, which way is the market going? And is it interesting for Vrijopnaam? The advantage is that they are so small, Vrijopnaam can do it right away.

Date: 22 July 2021, Time: 11:00.

### **Organization 1: Innovation Leader**

Eneco is a somewhat longer player in the energy world. Eneco is a private company, sold to Mitsubishi last year. So they are in Japanese hands. The suppliers are all competing with price in the Netherlands, customers can also easily switch, so there is little loyalty in the customer.

Eneco tries to create loyalty with the products. There is another product, which is called 'Happy Power', which is a loyalty product to bind the customer. With this Eneco gives free energy at certain times of the day, because they see that there is a lot of production, the prices are low and they still have to get rid of the energy somewhere. Innovation is separated in an asset and service part. Where one part looks at the technology of sun and wind, the other part looks more into services side. Especially innovation about how you can make it more efficient, get energy it cheaper, have less impact on the environment, other uses in materials. Knowledge comes from ourselves. There is quite a lot of expertise in the organization. Eneco also receives support from two parties that they work with. One that helps scrape the world to look for certain companies that are developing on a subject that Eneco finds interesting and another party helps Eneco with the analysis of these new technologies.

Date: 10 August 2021, Time: 11:00.

### **Organization 3: Director**

Energie VanOns does exactly the same as what other energy suppliers do, so supplying energy, but how they do that is something that sets us apart. They have 20 energy cooperatives, mainly throughout the Netherlands, in Noord-Holland, Zuid-Holland, Overijssel and the first cooperatives in Noord-Brabant. Energy cooperatives are nothing more than people in town, village or surroundings who, in an organized and local way, try to boost sustainability. This can be done by realizing a solar roof or a wind turbine or by helping customers save. You have to imagine that they buy the electricity from all those projects of the cooperatives and they also resell that electricity to the customers of the same cooperatives, because they also recruit the customers of this company. For every customer Energie VanOns acquire, they receive an annual fee. They can invest that amount in local sustainability and in this way you can create a circular model, as it were. In short, we make a profit and we also pay out that profit so that good things can be done locally.

Date: 3 August 2021, Time: 11:00.

### **Consultant within the energy sector**

The consultant spoken has been a formal employee of Alliander and is currently working as an consultant within the energy sector. During this interview, the challenges faced within the energy sector had been interviewed. The consultant explained why it is extremely difficult for traditional energy suppliers to get rid of their portfolio of fossil energy sources. Next to that, he explained the parties they discuss with on a regular basis for the RES, and that it takes a very long period before decisions are made.