UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

The Climate Case versus The Business Case

The Drivers and Motivations for Early Market Adoption of Renewable Energy Innovations

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Abstract

The world has committed to a low-carbon global economy where renewable energy is believed to be one key enabler in the green energy transition. However, the adoption of renewable energy innovations is currently too slow to reach the Paris Agreement by 2050. This study examines drivers and motivations for the adoption of renewable energy innovations in the business-to-business market and which strategies start-ups set up to boost early market adoption. To investigate this research area, a qualitative study has been conducted with empirical results gathered from semi-structured interviews with eight Swedish renewable energy innovation start-ups. The empirical analysis indicates start-ups' perceived drivers and motivations being; regulatory pressure, technological development, cost aspects and willingness to contribute to sustainability. Moreover, strategies start-ups set to meet these forces are; cost-competitive selling points, proof of concept, strategic partnerships and certain sustainability positioning. In conclusion, the findings expand existing literature with a business-to-business market perspective, demanding profitable climate cases. This thesis contributes with a better understanding of how Swedish innovation start-ups set their strategies to boost an early market adoption. As well as contributing with indications that can accelerate the transition towards a green energy supply to help the global economy to collectively reach the Paris Agreement by 2050.

Key words: Adoption, Early Market, Eco-Innovations, Renewable Energy, Start-ups, the Paris Agreement.

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Acronyms

B2B = business-to-business

B2C = business-to-consumer

B2G = business-to-government

EU = the European Union

IRENA = International Renewable Energy Agency

IEA = International Energy Agency

LCOE = levelized cost of energy

MoU = memorandum of understanding

OECD = Organisation for Economic Co-operation and Development

OEM = original equipment manufacturer

PA = the Paris Agreement

RE = renewable energy

REI = renewable energy innovation

RET = renewable energy technology

R&D = research and development

SMEs = small- and medium-sized enterprises

TBL = triple bottom line

TNC = transnational company

UNFCCC = United Nations Framework for Climate Change Council

WWF = World Wildlife Fund

Main Concepts

The following concepts are frequently repeated in the report and therefore relevant for the reader to acknowledge.

Adoption: "a decision to use and implement a new idea" (Rogers, 1983, preface)

Diffusion: "diffusion stage is when the innovation is used and adopted over time" (Rennings, 2000).

Early Market: represent the very first adopters of a new product, process or business model, which represent approximately 16% of the estimated market for a certain innovation (Rogers, 1983, Moore, 2014).

Innovation: "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations" (OECD, 2009, p.2)

Eco-innovation: "eco-innovation represents innovation that results in a reduction of environmental impact, no matter whether that effect is intended or not." (OECD, 2009, p.2)

Renewable Energy: "the widespread adoption and sustainable use of all forms of renewable energy, including bioenergy, geothermal, hydropower, ocean, solar and wind energy in the pursuit of sustainable development, energy access, energy security and low-carbon economic growth and prosperity" (IRENA, 2021, p.2)

Renewable Energy Innovation: "Environmental innovation resulting from continuous investment in research and development helps switch the economy to renewable energy sources" (Li et al., 2020, p.1)

Start-up: Defined as a company characterized by innovation and high growth, operating in young industries striving for commercialisation of innovations (European Commission, 2015, OECD, 2018).

1. Introduction

The first chapter of the thesis will begin with a background discussing the connection between the Paris Agreement and renewable energy innovations. After this, the problem discussion is presented divided into the practical problem and the scientific problem, where the research area for this study is identified. Followed by the purpose and the research questions. Lastly, the contributions of the study are presented along with some delimitations.

1.1 Background

In 2015 the world committed to the Paris Agreement (PA), a legally binding international treaty on climate change (UNFCCC, 2015). A historical agreement where 196 parties of the United Nations joined together to combat the multilateral event of climate change. The goal of the PA is to limit global warming to well below two degrees Celsius, preferably to hold global average temperature at 1.5°C and thereby reach a climate neutral world by 2050. To reach these goals, the PA is built upon a framework for all the parties with appropriate and enhanced financial, technical and capacity support. As for the technical pillar, article 10.5 of the PA underlines critical factors of innovations to reach the common goal of a low-carbon global economy that promotes economic growth and sustainable development. Article 4 of the PA highlights the emerging climate crisis, and that time is scarce in combating climate change. Therefore, to reach the goals the parties have to make rapid reductions of greenhouse gas emissions. Where accelerating and encouraging innovations are one key enabler to reach a low-carbon global economy (UNFCCC, 2015).

In an outlook by IRENA (2021), a pathway for the 1.5°C goal is discussed. The international agency evaluates the opportunities of scalable renewable energy innovation helping the world transform towards a low-carbon global economy. A green energy transformation can have a positive impact on the climate, since the power sector itself stands for 40% of all energy-related carbon emissions in the world (IRENA, 2017). An immediate deployment of REIs can help reduce emissions and manage the crising factor of time. Therefore, renewable energy is a way to decarbonize the world's energy production and to reach the PA by 2050 (IRENA, 2021).

States all over the world have committed to transform their energy supply by abolishing fossil fuels and making rapid increases in renewable energy shares already by 2030. During 2010-2019 $2.7 trillion of private and public funds were invested in renewable energy globally (UNEP, 2020). These regulatory policies and commitments push the market towards innovation, where renewable energy patents have increased with a growth rate of 12% per year since 1995 (IRENA, 2017). However, deploying renewable energy has several challenges, factors like limited capacity and unstable grids cause volatile pricing of green energy. Lowering the incentives for renewable energy and thereby slowing the transition towards a low-carbon global economy. The volatile pricing is problematic since investment decisions are to a large extent made upon energy costs (IRENA, 2021). Innovations can help companies and governments overcome challenges by reducing cost, improving performance and integration of energy systems (IRENA, 2017). Empirical evidence shows that eco-innovations can facilitate an accelerated deployment of renewable energy helping countries achieve the targets set in the PA (Li et al., 2020).

Despite governments' commitments, trillions of dollars of public and private investments, and increased REIs, countries still have to speed up the pace of renewable energy deployment to meet the PA by 2050. Currently, renewable energy stands for only 14% of the world's energy supply and must grow to 74% by 2050. Present and future policies are not enough to reach the deployment required. Meanwhile renewable energy systems are ahead of policies, being technologically viable, ready to be accelerated and to have a widespread adoption (IRENA, 2021).

IRENA (2019) presents a case of an extensive acceleration towards renewable energy where different actors have to cooperate and create synergies between sectors and components of energy systems to increase the deployment. Four focus areas can boost market adoption of innovations; new business models, development of market designs, incentives from government policies and increased financing. Although many governments are committed to renewable energy and execute so-called supply-push policies and demand-pull policies (Itze & Solis, 2019), IRENA (2017) highlights the need for collaboration with the private sector in order for the engagement to have full impact. Renewable energy projects driven by the market are mainly dependent on two variables, energy cost trends and policies in place. This is evident

for wind and solar power that have become more mature over the last years, due to decades of development and declining costs. Therefore, corporates have significantly signed commercial purchase agreements for these RETs, outside government policy schemes to hedge against future energy price volatility and climate liabilities. Compared to marine renewable energy being less mature with greater technological uncertainties and price volatility, requiring government support to foster deployment (IEA, 2020).

Reaching the PA from one country's perspective, Sweden has one of the world's most ambitious targets in abolishing fossil fuels in their energy policy mix[1], as the Swedish government has committed to have 100% renewable energy in their total energy supply by 2045 (Swedish Energy Agency, 2018). Currently, Sweden is one of the leading countries moving towards a low-carbon global economy with the lowest share of fossil fuels in their primary energy supply among the IEA member countries (IEA 2019). In terms of innovations and eco-innovation, Sweden is the second most innovative country in the world (WIPO, 2020) and the fourth most eco-innovative country in the EU (European Commission, 2019). Furthermore, Sweden is ranked in third place in the Global Cleantech Innovation Index, achieving top scores in successful cleantech[2] start-ups relating to high degree of cleantech deployment and the number of initial public offerings of cleantech companies in the last three years. Awareness and proactive environmental regulation together with the innovative culture have made Sweden a global leader in cleantech (WWF, 2017). Further, Western Sweden is ranked as the 12th most innovative region among the 220 regions in Europe (European Commission, 2019) and Gothenburg is regarded in the forefront of cleantech development having a cluster of renewable energy, energy efficiency, waste systems and electromobile companies (Business Region Göteborg, 2020).

[1] Energy policy mix = policy instruments to support diverse renewable energy technologies and policy instruments to destabilize the lock-in of coal-based energy technologies (Swedish Energy Agency, 2018)

[2] Clean technology "cleantech" = are innovations and technologies with a positive environmental contribution, often associated with sectors like water and waste management, renewable energy and energy efficiency and air quality (WWF, 2017).

1.2 Problem Discussion

1.2.1 Practical Problem

Despite governments' commitments and ambitious sustainability agendas, the challenge of deploying renewable energy is slowing the acceleration towards the mutual climate goal of the PA. This practical problem can partly be explained by Wüstenhagen et al. (2007) meaning that the adoption of REIs involves three parties; governments, market and society. Each party serves a vital role for the transition towards green energy being closely interdependent in their engagement and adoption. For instance, innovation start-ups are dependent on private and public actors to adopt their innovations at a certain rate of time to contribute to a low-carbon economy. While governments have to push and pull the private market in the right direction with policy incentives, in order to comply with their time scope of the renewable energy transition. Moreover, civil society's acceptances also have an effect on the adoption, where REIs like wind power often suffer from the so-called "not in my backyard"-effect (Wüstenhagen et al., 2007), hindering installation motions (Swedish Energy Agency, 2018) and slowing the adoption rate.

The market is often regarded as the driving force of change and technological development in society (Freeman, 1987), seeking improvements to maximize value creation in all activities. In some regards, the market is one key enabler to transform the world's energy supply and reach the PA (IRENA, 2017). On the other hand, the conflicting party being torn between economic growth and social and environmental impact (Elkington, 1997). Outside government incentives, the private market adoption of REIs seems to be driven by declined costs and decades of development (IEA, 2020), requiring a long adoption process of new technology slowing the transformation towards a low-carbon global economy. The rate of adoption is crucial in order to accelerate global shares of renewable energy from 14% to 74% to reach the target of the PA by 2050. In order to speed up the adoption, it is necessary to consider all three parties' drives and motivations for adopting renewable energy.

1.2.2 Scientific Problem

Most literature on eco-innovations (Bossle et al., 2015, Hall & Clark, 2003, Rennings, 2000) and on renewable energy (Alvarez-Herranza et al., 2017, Craig et al. 2017, Hansson &

Nerhagen, 2017, Isoard, 2001, Itze & Solis, 2019, Li et. al 2020, Manukhina & Riazanova, 2019) focus on policy incentives and environmental regulation as the important factors for the market adoption. Some studies (Bossle et al., 2015, Hall & Clark, 2003, Rennings 2000) open up for further research in the business administration discipline as the authors mean it can enrich the discussion by contributing with an understanding on B2B relationships in the market adoption.

Some papers look into the drivers and motivations for adopting eco-innovations (Bossle et al., 2015, Nezvorova & Karakaya, 2020), however the first does not specifically look at renewable energy and the other is limited to biogas technologies in mature markets. One paper (Hall & Clark, 2003) discusses the commercial case of eco-innovations, but not specifically for the renewable energy sector. There are several papers studying the diffusion process of eco-innovation (Halila, 2007) and renewable energy innovation (Craig et al., 2017, Jacobsson & Johnsson, 2000, Wüstenhagen et al., 2007), however none of them examines start-ups' strategies to increase adoption of REI among B2B adopters. One paper specifically studies B2B relationships in the adoption of radical innovations (Vowels et al., 2011), but lacks the dimension of eco or renewable energy.

Other studies on market adoption of REIs focus on social acceptance by communities and households (Faiers & Neame, 2006, Wüstenhagen et al., 2007). A limitation in these papers is that they focus on the B2C attitudes and capabilities to adopt eco-innovations but lack strategies for pure B2B market adoptions. Papers examining RETs in Sweden (Hansson & Nerhagen 2019, Jacobsson & Johnsson, 2000, Ventosa & Qu, 2010), mainly focus on the technological challenges and barriers in market adoption. Moreover, one paper on Swedish start-ups in the renewable energy sector addressing the adoption of REIs (Ventosa & Qu, 2010) does not take the perspective of B2B strategies into account in the commercialisation process.

1.3 Purpose

This thesis aims to increase the understanding of what drives the B2B market to adopt renewable energy innovations and how start-ups set their early market strategies to meet market demand. To increase our knowledge the following research questions are formulated.

1.3.1 Research Questions

RQ1: What are the drivers and motivations for the B2B adoption of Swedish renewable energy innovations?

RQ2: Which strategies does a Swedish renewable energy innovation start-up set up to boost the rate of early market adoption?

1.4 Contributions

This research expects to contribute with an increased understanding of the drivers and motivations of REIs and which strategies start-ups set up to boost early market adoption. This can help immature firms to accelerate their market entry in the sector of RET and indirectly help committed parties to the PA speed up the transition towards a low-carbon global economy. This research expects to broaden existing literature on REI adoption by contributing with a B2B perspective. Moreover, the expected results might inspire other REI start-ups on how to strategically address their early market. The expected result might work as a reference case to spot any areas of improvement in the renewable energy transition, like which support, according to the interviewed start-ups, could accelerate the market adoption. Finally, the research expects to contribute with a broader perspective on renewable energy adoption by taking both the climate case and the business case into account.

1.5 Delimitation

The financial aspects, e.g., funding and capital resources, for start-ups in the commercialisation of REIs are intentionally not integrated in this analysis, since this study aims to examine renewable energy and business administration through a market strategy discipline.

2. Literature Review

This chapter will include a review of the relevant literature for the discussion. First, the triple bottom line approach is introduced. Second, definitions and types of innovations are presented. Third, drivers and motivations for the adoption of innovations and eco-innovations are presented. Fourth, drivers and motivations for market adoption are presented, followed by theories discussing aspects of the commercialisation process and rate of adoption. Finally, theories on early market adoption are discussed and which strategies a firm can set up to boost the rate of adoption.

2.1 Triple Bottom Line

The triple bottom line was first coined by John Elkington in 1994 (Henriques & Richardson, 2004). The approach extends the financial perspective by introducing economic externalities and social aspects by dividing corporate sustainability into three pillars (the 3Ps); people, planet and profit. People refers to the social dimension of conducting business by respecting human rights and contributing to social welfare. Planet concerns economic activity that has an external effect on the environment and climate change. Profit refers to the rule of capitalism and the central idea of the market's driving force to create profits and economic value. In this sense, this drive can result in protecting different sources of capital (e.g., human, cultural or natural) and foster incentives for innovation, improvement and cost reduction (Elkington, 1997). The concept of TBL is that sustainable development and environmental protection requires a comprehensive approach where businesses or governments have to balance the 3Ps. Where reaching a balance in investment decisions is a challenge for the private market since managers are torn between sustainability agendas and the traditional school of business (Henriques & Richardson, 2004).

2.2 Definitions and Types of Innovations

2.2.1 Definition of Innovation

OECD defines innovations as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in

business practices, workplace organisation or external relations" (OECD, 2009, p.2). One important distinction in the innovation scholar is the difference between radical and incremental innovations (Hall & Clark, 2003). The latter is something that can be introduced as an improvement of a technology that already exists and is used in a market, where the former is a discontinuous technology forcing society to behavioural change in order to adopt it (Freeman, 1992). A radical innovation is exemplified as a high-tech innovation that develops a whole new industry (Rogers, 1983, Moore 2014). One paper examining the adoption of concentrating solar power technologies in South Africa, defines renewable energy innovations as high-tech innovations requiring various levels of technological transfer in a sector (Craig et al. 2017).

When defining innovations, it is important to distinguish them from an invention, which is a new idea or model to improve a product or process (Rennings, 2000) and an innovation which is the actual implementation (OECD, 2009) or commercialisation of an invention (Hall & Clark, 2003). The process of new products or processes typically goes through three stages (figure 1); invention, innovation and diffusion (Bossle et al., 2015, Rennings, 2000). Generally, the invention is the idea, the innovation is the introduction of the invention, and the diffusion is when the innovation becomes used and adopted over time in a society or in a market.

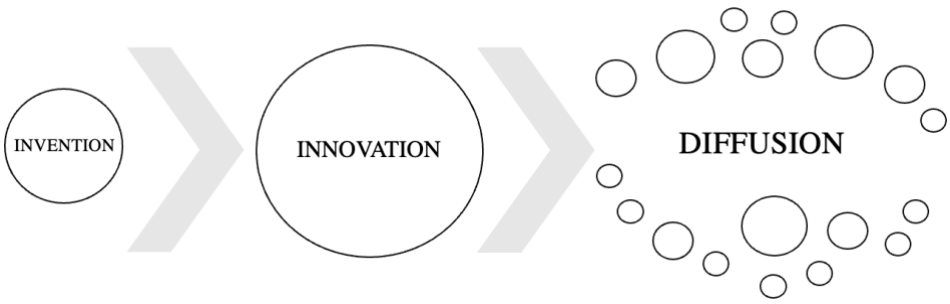

Figure 1- Illustration of the Diffusion Process - source: own elaboration

2.2.2 Definition of Eco-innovation

Eco-innovations often refer to an innovation towards sustainability and is frequently mentioned as either eco-innovations, green innovations, sustainable innovations or environmental innovations (Bossle et al. 2015). In this report the term eco-innovation is used. To define eco-innovations, it appears in a meta-analysis of 35 papers, where several address renewable energy

(Bossle et al. 2015), that the most used definition is the one by OECD (2009), which defines eco-innovations as an innovation but adds the additional meaning of eco. Being an innovation resulting in a reduction of environmental impact and generally an improvement that goes beyond organizational boundaries. Separating eco-innovations, a radical eco-innovation is a needed shift towards a sustainable future, whereas an incremental eco-innovation is steps towards environmental improvement (Hall & Clark, 2003). Moreover, another paper also defines REIs as an eco-innovation (Li et al., 2020).

2.3 Drivers and Motivations

2.3.1 Drivers for the Adoption of Innovations

A foundation in neoclassical and evolutionary economics is that technological change and innovation are improvement and optimization of a product or process, which can result in higher economic profit and growth (Rennings, 2000). Drivers for adopting innovations can be regarded to foster economic growth, as the classical literature on industrial innovations mean that technological innovations sustain economic development (Freeman, 1987). Further, Freeman (1987) argues that innovations are the pragmatic response to technological and social conditions, where individuals or corporations search for optimal solutions to every problem. An improved product or optimized process deriving from an innovation, is typically characterised to have relative advantages and perceived benefits for the adopter. Motivations can be economic profitability from cost reductions, time savings and operational efficiencies. Where in some regards, economic aspects are the single most important driving force for adopting innovations (Rogers, 1983).

2.3.2 Drivers for the Adoption of Eco-innovations

In the meta-analysis by Bossle et al. (2015), the authors discuss the drivers and motivations for the adoption of eco-innovations. Built upon different propositions the authors conclude different external and internal factors driving the adoption of eco-innovations. Which they mean can result in a positive effect for adopters' financial and sustainability performance, summarized as a win-win solution for companies and society. The external factors are regulatory pressure, normative pressure, cooperation and technological environment. The internal forces are efficiency, firms' environmental capability and also environmental strategy and culture (Bossle et al., 2015). An organisation can have different proactive attitudes towards

challenges in a society (Nezvorova & Karakaya, 2020), but also different abilities to adopt eco-innovations. Generally greater capacity in resources increases the internal drive for the adoption of eco-innovations (Bossle et al., 2015). Moreover, environmental leadership as an internal drive can foster proactive adoption of eco-innovations (Arnold & Hockerts, 2011, Chen et al. 2012). However, internal drive for sustainability is rare, since most drivers are reactive responses to regulatory pressure and market demand (Chen et al. 2012). Further, Rennings (2000) means that markets are incapable of proactive adoption of eco-innovations demanding specific regulatory support to push them in deploying environmental improvements.

In a paper examining the drivers for biogas innovations in European countries (Nezvorova & Karakaya, 2020), the results show similar drivers like Bossle et al. (2015) that support the adoption of eco-innovations. Nezvorova and Karakaya (2020) conduct a meta-analysis of 42 papers, where the authors identify four main system drivers; the proaction to challenges, policy support, cooperation and capability of technology. The system driver, proactions to challenges is the belief of technologies' functions to overcome challenges in society or organisations, like the adoption of biogas to combat climate change. These system drivers stimulate the functions of technological innovation systems, which enhance the adoption of eco-innovations.

Both papers (Bossle et al. 2015, Nezvorova & Karakaya 2020) emphasize on the importance of cooperation such as partnerships and having different networks to support the diffusion process. Not only among stakeholders but also external parties like academia and research institutions (Bossle et al 2015), or international cooperation among countries and companies (Nezvorova & Karakaya 2020). Cooperation contributes with knowledge and technology development, human resources and also enhances legitimacy for start-ups and eco-innovations. The drivers and motivations for adopting eco-innovations according to the literature are summarized in an illustration (figure 2).

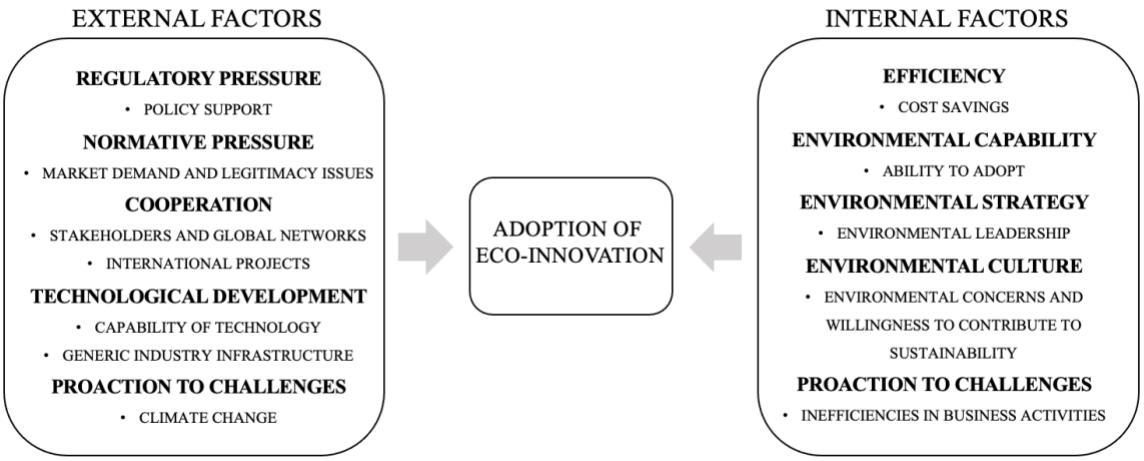

Figure 2 - Drivers for the Adoption of Eco-innovation - source: own elaboration based upon Bossle et al. (2015) and Nezvorova & Karakaya (2020)

A limitation in both meta-analyses on the adoption of eco-innovations (Bossle et al. 2015, Nezvorova & Karakaya 2020), is the lack of economical drivers. Some authors mean that in order for eco-innovations to be adopted in a market there has to be a business case or a commercial case, where the new product or service is sold to some profit (Hall & Clark, 2003). Meaning, the eco-innovation has to have other selling-points than only contributing to a reduction of environmental impact and include essential value propositions like profit and economic growth. Bossle et al. (2015) mean that adopters can indirectly gain such internal benefits, since cost savings can result from environmental improvements and motivate the adoption. Rennings (2000) explains that eco-efficiency can bring down costs by limiting resource usage, enabling smoother processes and transport.

2.4 The Commercialisation Process

2.4.1 The Diffusion Process

The market introduction of an innovation is the diffusion process (figure 1), where an innovation gets adopted and implemented over time (OECD, 2009). One classical literature on the commercialisation process of innovations is Rogers' model (1983), *Diffusion of Innovations,* cited over 7,000 times (Rogers, 1995). The diffusion process is described with the focus on different market segments' psychographic features and innovativeness to adopt innovations. In a bell curve (figure 3) Rogers (1983) divides adopters into five groups;

innovators, early adopters, early majority, late majority and laggards. Where the innovators and early adopters can be regarded as an innovations' early market (Moore, 2014), standing for 16% of the market.

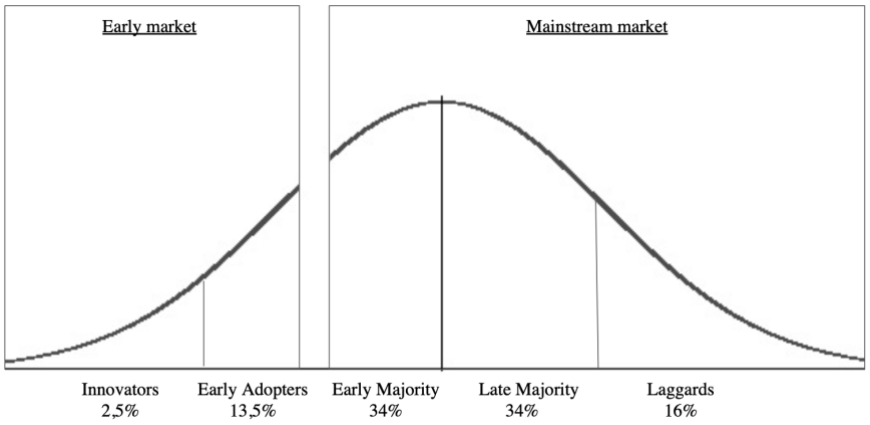

Figure 3 - Bell Curve of the Diffusion Process - source: own elaboration based upon Rogers (1983) and Moore (2014)

2.4.2 The Rate of Adoption

The rate of adoption is the relative speed an innovation gets adopted by different groups in a society (Rogers, 1983), referring to the time in the innovation-decision process, from initial awareness to the decision to actually implement an innovation. The rate is often illustrated as a S-curve (figure 4), where the adoption gradually increases among adopter groups until the innovation is 100% diffused in the market. The behaviour in the innovation-decision process depends on the perceived newness of the innovation and related uncertainties of the expected outcomes. Therefore, the slope can vary between different innovations depending on its attributes and how well adopters are persuaded in various communication channels.

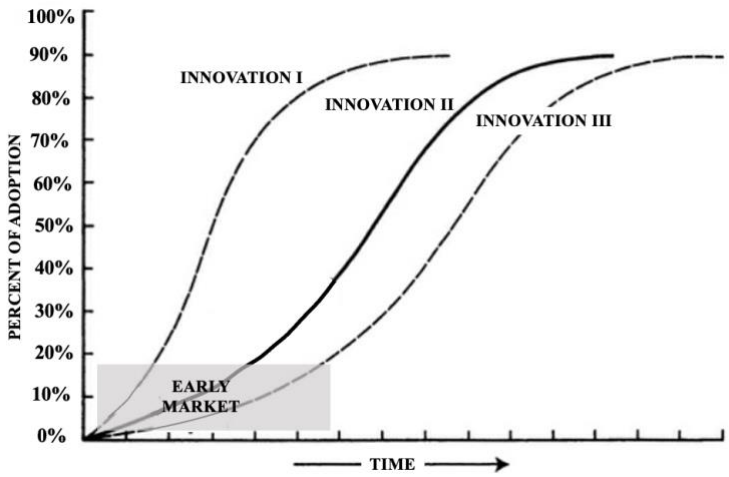

Figure 4 - The S-curve - source: own elaboration based upon Rogers (1983)

Early adopters can play a vital role to increase the innovation's market, since their decision making can send out positive signals towards more reactive segment groups (Rogers, 1983, Moore, 2014). But such adopters, having the willingness to risk investing in new technology are often limited to a niche market (Adner, 2002). The incremental adoption in an early market can also be explained by normative pressure (Rogers, 1983), where one group's adoption is an important reference case in other adopters' decision making (Moore, 2014). The effect of a reference group can relate to institutional theory where legitimate actors can influence peers in the same industry to behave in accordance with prevalent norms and standards (Bossle et al., 2015).

The rate of adoption can also be affected by the market segments' different capabilities to adopt an innovation (Peres et al., 2009). However, Rogers (1995) exemplifies such abilities as different pre-conditions depending on socio-economic factors primarily between developed and developing nations, not addressing firms. Which Moore (2014) does, stating that potential adopters in the B2B market can have different organisational capabilities to adopt innovations.

2.4.3 The Attributes of Innovations

There are often two great uncertainties concerning innovations that create barriers for the adopters. The first uncertainty is the lack of information, which concerns what the innovation is and how it can contribute to a market. The second uncertainty is the expected outcomes and consequences of the innovation (Rogers, 1983). Moreover, Rogers (1983) also describes five

attributes of an innovation that can determine the rate of adoption. *Relative Advantage* (1) is an innovation's perceived advantages that exceed existing solutions. Regardless of greater objective advantages of the innovation, the factor determining the likelihood of adoption is the individual's perception of the advantages. *Compatibility* (2) means to which extent an innovation is perceived to be coherent with existing systems or needs of the adopter. *Complexity* (3) is the degree of how difficult an innovation is to understand, the more complex technology the more developed skills and knowledge is required among the adopters, which raises the barrier to adoption. *Trialability* (4) is to which extent an innovation can be tested in order to limit the uncertainties of expected outcomes. *Observability* (5) is the degree of how visible the result of an innovation is to the market. Rogers (1983) takes solar panels on rooftops as an example of high observability increasing the likelihood of adoption since neighbours could observe a households' usage of renewable energy.

Craig et al. (2017) also enhance characteristics of innovations in their study of renewable energy, where they argue that different renewable energy innovations have different rates of adoptions depending on the technology's maturity. Generally, mature RETs having less uncertainties have come further in the technological transfer process than immature technologies having greater uncertainties. The study exemplifies concentrating solar power and wind power as mature or incremental RET due to years of trialability and observability. One paper analysing investment decisions in the renewable energy sector (Masini & Menichetti, 2012), makes similar remarks on innovations' attributes like Rogers (1983). Where a technology's feasibility and proven reliability affects the investment decision which explains why mature technology is more easily adopted compared to radical innovations. In addition, radical innovations may display a longer time horizon before reaching the financial breaking point, requiring greater upfront investment than incremental or mature RET (Masini & Menichetti, 2012).

In general, innovations that are less complex and have greater relative advantages, compatibility, trialability and observability, will be adopted more rapidly than other innovations (Rogers, 1983). Therefore, innovations have different rates of adoption (figure 4). Häggman (2009) and Craig et al. (2017) supports the diffusion model by Rogers (1983) when

examining early-stage companies, where the authors confirm the important influence of an innovations' attributes in the commercialisation process.

2.5 Early Market Strategies

There are certain marketing strategies firms can set up in order to enter its early market and boost the adoption rate (Rogers, 1983, Moore, 2014). Rogers theory (1983) speaks primarily of strategically communicating the innovations' perceived relative advantage and other attributes through two channels; mass communication and interpersonal network. The communication channels affect the innovation decision process which occurs in five steps; knowledge, persuasion, decision, implementation and confirmation (Rogers, 1995). The main issue in the adoption of innovations is uncertainties of the expected outcomes, which can be overcome by communicating the innovation's advantages (Rogers, 1983). The communication can be boosted by *homophily*, which is the degree of two interacting individuals finding similarities among each other. Rogers (1983) exemplifies this with having the same beliefs, educational background or social status. The author means that humans have a tendency to select someone who is like him- or herself to reduce uncertainties.

Another author in the innovation scholar (Moore, 2014) expands Rogers' theory (1983), by introducing a strategic marketing tool for selling disrupting technologies and reaching different adopter groups. The *High-Tech Marketing Model* (Moore, 2014) illustrates how to initially reach the early market and eventually the mainstream market. In the early market, it is not necessary for the innovation to be fully developed yet. The main strategy is to have a compelling flagship application which showcases the uniqueness of the innovation. Moreover, the author also stresses the importance of partnerships in the early stages, since these are more likely to evolve in long-term business relationships, creating long-term value (Moore, 2014). Furthermore, strategies to gain legitimacy are also essential in convincing potential adopters to deploy the innovation, which can be done through lobbying activities or promotion of the technology. In addition, strategies to introduce innovations in a niche market can stimulate the adoption rate, since new technology generally cannot compete with existing technology (Nezvorova & Karakaya 2020).

One strategy to increase the rate of adoption is to exist in a *technological cluster* (Rogers, 1983), where an innovation can gain benefits being an interrelated element in a technological system. Two interlinked innovations can become more attractive in a cluster and therefore create a shared market with mutual adopters (Geffen & Rottenbergs, 2000, Oltra & Jean 2009). By existing in a technological cluster a firm can reach more adopters (Rogers, 1983).

3. Methodology

In this chapter the method is presented. First the qualitative method is presented and motivated, followed by the selection process of literature and the observed start-ups. Then, the data collection process is explained for the primary data of conducted interviews and the secondary data. At last, a discussion on the reliability and validity of the chosen method.

3.1 Qualitative Method

A qualitative descriptive analysis has been conducted to research the drivers and motivations for the adoption of REIs and explore early market strategies. A qualitative method was chosen to collect experiences and insights of the chosen start-ups through interviews. The qualitative method aims to give the reader a deeper understanding of the studied field (Patel & Davidson, 2011). The method included both collection of primary and secondary data. The chosen method was the most suitable one for answering the research questions since it enabled a content analysis of the conducted interview material. An abductive approach has been used by combining the empirical result with the theories presented in the literature review, which Bryman (2018) means can create a better understanding for the research area. The empirical result in the study has been conducted from qualitative, semi-structured interviews. The literature review consists of theories and previous research in the fields of market adoption and REI, being the foundation for the analysis of the primary data collected.

3.2 Selection Process

3.2.1 Selection of Literature

The chosen literature consists of earlier theories and studies within the fields of innovation, early market adoption and strategies. When searching for appropriate literature for this study, the keywords of the thesis were mainly used to search in databases; *adoption, early market, eco-innovations, renewable energy, start-ups, the Paris agreement.* The databases used were; the Gothenburg University Library database *Super Search,* Elton B. Stephens Company (EBSCO) Information Services and Google Scholar. In this process, we selectively only chose

peer-reviewed papers in order to ensure the articles' reliability (Patel & Davidson, 2011), with exception for master and doctoral theses. For some definitions, publications by international actors were assessed due to their widespread citation in similar fields of study. The literature has been selected in order to explain relevant definitions and theoretical concepts to provide the reader with the right interpretation for this study.

3.2.2 Selection of Start-ups

To investigate in this field of study with a limited number of companies doable for the limited timeframe of ten weeks, Region Västra Götaland (Gothenburg) and its cluster of cleantech firms was found applicable. To find renewable energy innovation start-ups in the Western region of Sweden, we used the database, *Swedish Cleantech*[3], a website developed and operated by the *IVL Swedish Environmental Research Institut*e (Swedish Cleantech, n.a). The selection process is summarised in figure 5. First, we chose the filter, *county*, where we received 215 hits on *Region Västra Götaland*. Second, we chose the filter, *cleantech sector*, where we received 36 hits on *Renewable Energy* and *Energy Storage*. Third, we chose the filter, *company size*, where we received 36 hits on *micro-, small- and medium-sized enterprises.* Lastly, we manually checked the companies and rejected inactive companies and all not being hardware innovations, which left us with eleven relevant start-ups for our research scope. After reaching out to these eleven start-ups, eight wanted to participate in this study. The selected start-ups are all operating within the sector of renewable energy, founded between the years 2007-2015, and are currently in their early market diffusing their innovations during the era of the PA. The REI start-ups have their headquarters in Region Västra Götaland (Gothenburg).

[3] Database: https://swedishcleantech.com/companies/

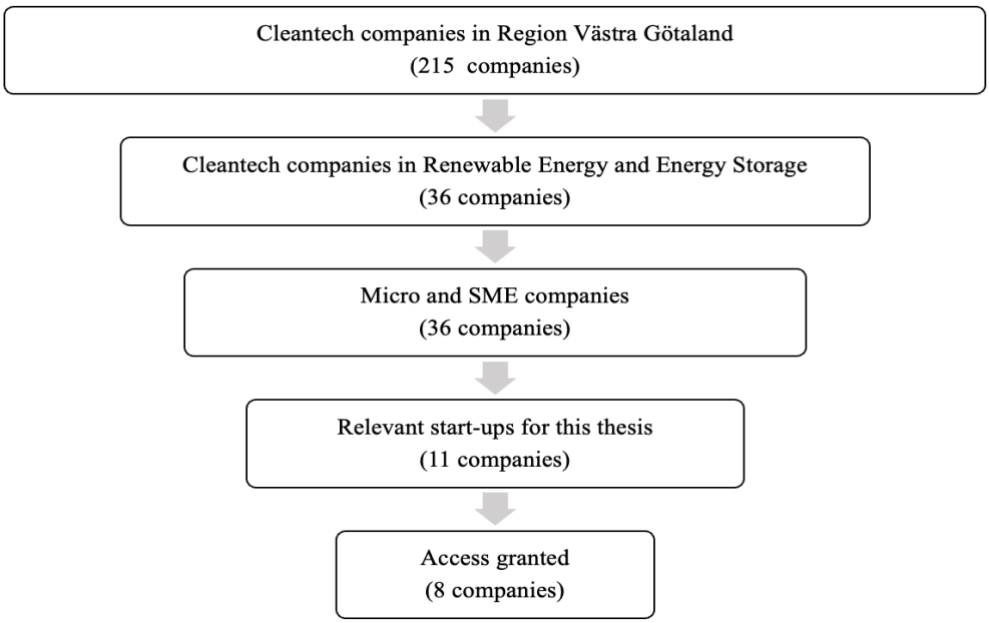

Figure 5 - Selection of Start-ups - source: own elaboration

3.3 Data Collection

3.2.1 Primary Data - Interviews

The primary data, constituting the empirical evidence of the study, consists of interviews with eight innovation start-ups in Region Västra Götaland (Gothenburg), identified to offer REIs to an early market. The interview questions were based on the literature where we aimed to confirm concepts in practice, formulated to a generic interview guide (Appendix 1). This was done in order to set a structure for how the result would be presented and how the analysis of the result would be formed. Before the interviews were carried out, all interviewees were sent the generic interview guide in advance along with some material presenting the scope of the thesis. The interviews were conducted with a qualitative semi structured method, which according to Bryman (2018), gives room during the interview for deeper reasoning and discussions, later being valuable for the analysis of the result. During the interviews, supplementary questions were asked when further explanations of a concept or reasoning were suitable. Interviews were carried out with one management representative from each start-up, digitally via Zoom. The interviews were limited to a timeframe of one to two hours upon the participants availability. However, given the grasp scope more time would have been preferred to dig deeper into the conversations with the start-ups. On the other side, notes were taken

during the interviews and additional questions were clarified through direct communication with the interviewees. The observations of the start-ups' early market strategies were intended to deliver insights of their experiences and perceptions regarding drivers and motivations for the early markets' adoption of REIs. The perspective will therefore be from the start-ups point of view in which strategies are necessary when entering the early market and reaching adopters.

The method was carried out taking the ethical principles presented by the Swedish Research Council (2017) into account, where we identified the anonymity and confidentiality aspects as applicable to our research. Anonymity in this case was important since some innovations are completely unique to Region Västra Götaland (Gothenburg) and even in the world. Therefore, their identity would not have been able to be concealed if each start-up and its business model would have been separately presented. Instead, the material from the conducted interviews has been presented in two sections, incremental and radical REIs, through that we have succeeded to conceal the identity of the start-ups while presenting their perceptions and strategies. The anonymity of the participants was promised when we first reached out to the start-ups, repeated when the interviews were carried out and confirmed before submitting the finalised text. Confidentiality was considered by not mentioning the participants' names nor the names of the start-ups they represented. Including essential background information needed for the reader to fully understand the result presented when the start-ups were divided into two groups. The start-ups allowed us to mention their different fields of renewable energy.

3.2.2 Secondary Data

The secondary data consists of information collected through external sources, such as literature on the chosen theories which constitutes for the literature review, and publications provided by the start-ups. Before each interview a thorough and detailed review of the start-up's website and publications was made. This made it possible to save time and focus the interview questions on the start-ups' experiences regarding perceived drivers and motivations by the B2B market and their strategies for their commercialisation process.

3.4 Validity and Reliability

Patel and Davidson (2011) address the aspects of a qualitative study's validity and reliability. This is questioned for the qualitative method since we cannot repeat what we did expecting the

same result or confirming the quality and relevance of the empirically collected data to fulfil the purpose of the study.

3.4.1 Interviews

From a critical perspective, Bryman (2018) criticises the qualitative method based on the perception that subjective and biased results can be created. Bryman (2018) further explains these limitations to be caused by semi-structured interview methods where the data collection can vary between the conducted interviews lowering the reliability. Including the fact that interpretation of the conducted interview material rarely becomes completely objective. With this in mind, a qualitative approach is still the most relevant method for this study, collecting insights and perceptions for answering the research questions. To investigate perceived drivers and motivations including specific strategies, the most convenient method to extract such individual knowledge from each start-up was to personally interview them and observe their commercialisation process. Further, this has enabled the study to draw conclusions based on all selected start-ups' experiences. On the other side, the validity of the result can be questioned since Patel and Davidson (2011) mean it is hard to make sure that the empirical results correspond with the purpose of the thesis. To counter this potential pitfall and to strengthen the validity of the result we formulated the generic interview questions based upon previous research and theories within the studied field to avoid differing from the purpose.

3.4.2 Empirical Analysis

The limitation of qualitative studies is that the result is difficult to repeat (Bryman, 2018). If the same start-ups were to be interviewed again and asked the same questions, the empirical result could be different due to the fact that companies are constantly evolving. Since the start-ups' commercialisation process is constantly accelerating, several start-ups have gained additional commercial contracts and MoUs[4] with new adopters along the process of writing this study. However, all information presented in this study are results from the conducted interviews. Such post-interview development could weaken the result from the conducted interviews and the conclusions drawn from the analysis.

[4] MoU = is a non-legally binding agreement between two parties, which expresses a convergence of will moving forward with a contract (United Kingdom Department of Education, n.a)

4. Empirical Analysis

Presented in this section are the empirical observations from the conducted interviews with the start-ups together with the secondary data provided by the start-ups. The start-ups are divided into two groups; incremental REIs and radical REIs. Each section consists of background information, followed by three subheadings; drivers and motivations, market characteristics and strategies. Lastly, the result is summarised in a table.

The interviewed start-ups operate within the renewable energy sector, as a renewable energy producer or as a component provider in a renewable energy system. In order to maintain the anonymity of the interviewed companies, the result will be presented in two groups, depending on the innovation's level of radicalness. The first group consists of four incremental REI start-ups, where the innovations are identified as an improvement of existing processes or products. The second group consists of four radical REI start-ups, where the innovations are identified as discontinuous technologies demanding new markets or requiring organisational adaptation in order to adopt them.

4.1 Incremental REI

Four Incremental REI Start-ups:

- **Function**: hardware component or energy storage
- **Source of RE**: biomaterial, biogas and thermal energy
- **Targeted market**: industries and wind/solar photovoltaic power OEMs
- **Geographical market:** International (2 of 4) and Sweden (2 of 4)
- **Founding years**: 2008-2015
    - 3 out of 4 had originally other business models for the technology
- **Commercial contracts**: 3 out of 4 start-ups
- **MoUs**: 3 out of 4 start-ups
- **Average rate of adoption**[5] ≈3 years

[5] Estimated from the founding year to first commercial contract. The average only includes the companies with commercial contracts.

Table 1 – *Background Information* – source: own elaboration

4.1.1 Perceived Drivers and Motivations

External factors: General external factors to adopt these incremental REIs rely on expanding markets and demand for upgraded technology in the respective RE sector. The adopters have incentives to adopt the innovations to improve processes and products to be competitive in technology and sustainability aspects. There is a normative pressure to follow and adopt innovation due to constant technological change. The adopters of incremental REI are generally not pushed by regulatory pressure, but some incremental REI adopters are facing stricter policies concerning greenhouse gas emissions. Where the start-ups perceive monetary penalties has the most effect among adopters. Further, the start-ups also mean normative pressure in the industry pushes adopters to accelerate the adoption rate due to sustainability liabilities.

Internal factors: All start-ups mean that the internal drive for sustainability is a strong motivation for adopting incremental REIs as some adopters have sustainability images to uphold. Therefore, the adopters are motivated to control their own environmental impact, seeking innovation to enable reduced ecological footprint. All start-ups mean that their adopters have an internal drive for cost-effectiveness, like overcoming intermittency issues of renewable energy systems to stabilize volatile energy prices, or to enable smoother processes to reduce costs.

4.1.2 Market Characteristics

Niche: The observed start-ups have a clear niche to solve issues among a specific group of early adopters. All adopters are either industries, OEMs or energy producers. Most adopters are often TNCs with extensive resources to invest in high-technological innovations, but intermediate in risk taking. Several adopters operate in sectors with a significant climate impact being focus areas for private and public politics, which both force and motivate the adoption of incremental REIs.

Market maturity and technology feasibility: Incremental REI have an advantage in the commercialisation process since their technology can often coexist with current systems having lower barriers for the adoption. Two innovations enable constant supply of renewable energy

by overcoming intermittency issues with their energy storage solutions. Another innovation enables smoother transportation and assembly of wind towers. The fourth innovation offers a hybrid biogas burner enabling the burning of different raw materials. All being an incremental innovation in a technological cluster improving existing processes and can together with other technological elements enhance the benefits of an entire system. Therefore, their respective markets are intermediate to mature, which also increases the rate of adoption. All start-ups mean their respective innovations have no or some competition, increasing competitive advantages in the targeted markets.

Sustainability agendas and policies: All four incremental REIs share a common perception of the trend that industries want to become self-sufficient in their energy supply to control their energy costs and environmental impact. By either converting industry waste to energy or introducing an industry-scale renewable energy system on site. This is largely motivated by increased energy and emission policies for industries making it more expensive to utilize fossil fuels and to pollute.

Social acceptance: Social acceptance for the incremental REIs might have an indirect impact on the commercialisation, since one of the start-ups have faced opposition concerning their usage of forestry materials. However, the start-up experienced no difference in the rate of adoption, arguing that the innovation outcompetes existing solutions with more negative environmental impact.

4.1.3 Strategies

Choosing the niche market and geographical market presence: All start-ups strategically target the B2B market due to faster processes and investment decisions compared to the B2G market. Two start-ups had initially different business models targeting other renewable energy markets until realising the entry would become too price competitive for a start-up. Instead they both changed directions and targeted a new market. One of the start-ups strategically looked after the “blue ocean”, a gap in the market with no existing competition to gain first-mover advantage. Further, none of the incremental innovations are limited to specific geographical conditions, strategically positioning themselves where the attractive clients exist. Two of the start-ups primarily target the international market and see Sweden as a small and

secondary market. The other two start-ups see Sweden as a sufficient market for the commercialisation. One of them aims to piggyback on Swedish TNCs' global production networks for an international market growth and the other one has enough market potential in Sweden due to the Nordic countries' niche in wind power manufacturing.

The commercialisation process: To enter the early market all four start-ups have restructured its organisation to some extent, by employing new managers with previous commercial experience in the B2B relations. Three out of four start-ups have commercial contracts in place with early adopters, but still working with proof of concept and R&D. One start-up has reached contracts with two large TNCs, which is sufficient to meet their potential market including a steady market growth within the TNCs' global production networks. Two other start-ups mean that they had a relatively quick adoption by TNCs compared to the average adoption rate and their own expectations. The start-ups believe the market adoption occurred since the innovation requires small or no adjustments to adapt the technology in existing systems. To take advantage of technology clusters and decrease barriers for the adoption, all start-ups strategically design and develop their product to match the adopters' existing systems. Which they mean lowers possible uncertainties with the technology and investment costs for the adopter. Another common strategy to reach adopters is to sell commercial contracts like partnerships, where the start-ups go side by side with adopters until the innovation is fully diffused in the adopter organisation. Not only does this help gain valuable client relationships, but it can also promote the innovation when trying to reach more adopters. All start-ups stress the milestone to reach a large well-known actor on the market, which leads to more commercial contracts with other adopters.

Strategies to overcome uncertainties: All start-ups stress the importance of trialability and observability of the technology. The start-ups have worked actively with prototypes and pilot installations to demonstrate the quality and function of the technology, along with third party verifications and complying with industry standards. However, since most of them target mature markets seeking improvements, introducing incremental technologies as solutions have been well received by the adopters.

Strategic partnership and legitimacy: The start-ups regard gaining legitimacy as the most central part in the early market adoption. To gain legitimacy all start-ups have strategic partnership, often with well-established companies with acceptance by the market. Strategic partners have contributed with supporting technologies, human resources and financial capital in their diffusion process. One recurring strategic partner for all innovations is the EU, mainly as financier of public grants. Another common strategic party is universities or research institutions. The start-ups mean having the EU on board works as a verification towards stakeholders. Moreover, all start-ups have international cooperation either to facilitate international market entries or to work with specific suppliers. Legitimacy is also gained when the start-ups have received awards or media attention. Two start-ups receive media attention since energy storage is a trending topic.

4.2 Radical REI

Four Radical REI Start-ups:

- **Function:** Complete hardware technology for energy production/harvest
- **Source of RE**: wave, tidal, offshore wind and vibration
- **Targeted market**: offshore industries and energy producers (3 of 4), heavy duty industries (1 of 4)
- **Geographical market**: International (4 of 4) and Sweden (1 of 4)
    - 3 out of 4 companies are dependent on markets with certain marine conditions.
- **Founding years**: 2007-2014
    - 2 out of 4 are spin-off technologies invented by the same Swedish military goods company.
- **Commercial contracts**: 2 out of 4 start-ups
- **MoUs**: 4 out of 4 start-ups
- **Average rate of adoption**[6] ≥10 years

Table 2 – *Background Information* – source: own elaboration

[6] Estimated from the founding year to first commercial contract. The average only includes the companies with commercial contracts.

4.2.1 Perceived Drivers and Motivations

External factors: The most evident external factor for the adoption of radical REIs is the global transition towards green energy. The start-ups in marine renewable energy[7] sector mean that the drivers arise from increasing energy policy and environmental regulation, forcing the adopters to find solutions to lower their environmental impact. Another perceived external force is the national concern for securing energy supply and having low energy prices facilitating adopters with support to invest in renewable energy. The start-ups find governmental support like subsidies and grants in research and development phase to enable the start off to a commercialisation phase. However, most start-up experience a lack of government support in the actual commercialisation process to make their REIs more competitive than existing solutions in the market. Supporting incitements or regulatory pressure in the early market can convince adopters towards renewable energy and innovations. Besides the stimulation of regulatory pressure, some start-ups' find external pressure among their targeted markets to be a limitation of a certain renewable energy source due to limited options in diverse natural resources, in this case better option to adopt marine REIs than wind and solar technologies. Another start-up finds market expansion and technological change as the external drivers for their particular REI.

Internal factors: Efficiency motivations like reduced cost, improved processes and upgraded equipment drive the adoption of radical REI. The start-ups mean that they need to have strong selling points arguing a low LCOE[8] as the learning curve increases, justifying the riskful investment in radical REIs. Competitive pricing is essential to pursue adopters since implementing these technologies requires some behavioural change according to the start-ups. One leverage is the more predictable sources of energy increasing the radical REIs competitiveness on the RE market. The start-ups find environmental leadership and sustainability culture to motivate adoption of radical REIs. However, all agree that their adopters' internal sustainability effort is limited to frames of profitability or the constraints from regulation.

[7] "Marine renewable energy refers to renewable energy that is installed and operated at sea and requires access to offshore grid and distribution systems. This can include offshore wind, tidal stream, tidal range and wave energy technologies" (Harper et al., 2016, p.217)

[8] Levelized Cost of Energy = "is an economic measure used to compare the lifetime costs of generating electricity across various generation technologies" (Raikar & Adamson, 2020, p.220)

4.2.2 Market Characteristics

Niche: All REI start-ups target large industrial companies or energy producers with extensive resources to adopt such complex technology. Moreover, the start-ups have government support in market entry and also mean that adopters receive financial assistance for transitioning towards RE, increasing the adoption. The niche includes very few or no competitors, since the innovations are radical for the market. Instead, adopters have today alternative solutions for the problem, many relying on fossil fuels. Which the start-ups find as low hanging fruits since the innovations are more competitive in LCOE and sustainability aspects. However, the adoption rate is characterised to be relatively slow since most adopters are risk averse, demanding several years of trials and observation before investing in such complex technology.

Market maturity and technology feasibility: The start-ups experience challenges operating in an immature market, for instance the marine renewable energy sector is immature and has only recently been developed. The challenges they experience are related to uncertainties and risk due to lack of previous trialability, supporting infrastructure and regulation. Moreover, the start-ups experience difficulties in getting the right permits and authorization to operate at sea being radical innovations. Technological feasibility of radical REI can be facilitated when incorporating them in existing infrastructure and grid systems, like technological clusters. The start-ups have experienced an increased probability of adoption when co-existing in the established grid systems, like sharing the same subsea cables with offshore wind parks. Furthermore, the start-ups see a positive trend towards energy parks where complementary renewable energy sources can co-exist and enable energy grid stability and harmonized energy prices. Such joint projects are believed to enhance the rate of adoption. The radical REI harvesting vibrations have less complex technology, demanding less trialability and supporting infrastructure than the marine REIs. Having a faster rate of adoption and therefore deviating from the average rate of adoption among the radical REIs.

Sustainability agendas and policies: The marine REIs all share the perception of their adopters wanting to become energy self-sufficient. The markets' rising concern for their environmental impact is mainly motivated by controlling future costs of being unsustainable. Furthermore, one start-up contributes by improving work conditions in heavy duty industries, which motivates adopters concerned about social sustainability. The start-ups experience their

REIs attract conscious early adopters and government support since their innovations contribute to sustainability.

Social acceptance: One start-up mentions the potential restraints in getting social acceptance for distributing recreation sites at sea, which might affect the commercialisation process as installations increase. In addition, concerns regarding environmental impact, such as collisions with marine mammals or birds have given rise to new research areas to study the effect of the REIs. However, due to lack of data and lack of trialability, the start-ups have not yet experienced any constraints in their market entry. Some start-ups regard this uncertainty as an advantage in the installation and commercialisation process, as they have no hindering politics or activism.

4.2.3 Strategies

Choosing the niche market and geographical market presence: Three out of four innovations are limited to certain geographical areas due to the dependence on specific ocean conditions, while the fourth innovation has no limitations in their global market presence since they harvest vibrations from a mechanical process. High-income, industrial countries are regarded as attractive markets for all start-ups, due to the benefits of solid infrastructure and extensive capital and human resources. Further, countries with great access to the ocean and expertise in marine operations, have been a specifically attractive market for an early commercialisation. In terms of launching and demonstrating projects, the start-ups mean Western Sweden is suitable due to great ocean access and supporting infrastructure but overall lack market potential. Besides natural resources, the start-up regards the Swedish government as being slow to implement marine energy lacking possibilities and interest to include marine renewable energy in national energy policy mix. Therefore, marine REI start-ups seek the international market demanding marine REIs and willing to adopt uncertain technologies. The fourth innovation sees Sweden as a rather small market and targets the international market immediately. Although the start-ups experience advantages originating from the Swedish innovative culture and existing in Gothenburg's REI cluster, some experience disadvantages with Sweden having a weak capital market. Therefore, radical REI start-ups seek foreign markets for the commercialisation, having stronger capital markets and more risk-taking investors to boost the adoption rate.

The commercialisation process: To commercialise the innovations all start-ups had replaced or included managers with previous commercial experience in the B2B relations. Two out of four radical REIs have commercial contracts but are still working with proof of concept and R&D. Whereas the vibration REI is today a diffused product with adopters all over the world. The other two without commercial contracts, have reached MoUs, meaning they have informal agreements of commercial interest from potential adopters. One strategy for reaching the adopters and to facilitate the commercialisation process according to the start-ups have been to develop the product together with the adopters. One way of doing this is to have international branches where they can be close to the targeted markets and include local expertise. For instance, one start-up strategically aims to reach joint ventures with local industries to increase the rate of adoption. The most common market entry strategy for the radical REI start-ups is to first be its own customer showcasing the technologies through prototypes. Then with proof of concept, the start-ups can then enter commercial contracts and develop the innovation together with its adopters. Which they refer to as "going side-by-side" with the adopters. This two-step strategy to reach adopters, is a way for the radical REI start-ups to lower uncertainties and create strong customer relationships.

Strategies to overcome uncertainties: All projects start off with a pilot installation to increase trialability and observability for adopters which lowers uncertainties for reaching commercial contracts. One start-up strategically implements pilots at all adopters' sites to test and develop the system to meet specific conditions. The start-up also mentions the reluctance to change as a potential obstacle in reaching the adopters but means this is due to lack of knowledge. Another way to reduce uncertainties is to use as many existing engineering principles as possible in the systems. Therefore, start-ups find constructing systems with high technological feasibility is favourable for a market entry. Grants and funding projects for REIs, have been deal breaking for the radical innovations to develop their innovations during conditions of such high uncertainty. Most of these pioneering technologies have taken over ten years to develop and without generous stimulation from governments, the start-ups would not have the opportunity to showcase and create prototypes for the private market. The start-ups mean that even in the earliest stages of R&D there is barely any access to private equity or venture capital, which have made the start-ups dependent on states' support. Gaining public grants and

participating in public projects have also served as a verification of the innovation to stakeholders, which the firms strategically communicate.

Strategic partnership and legitimacy: All start-ups mention the value of strategic partners to gain legitimacy and to have collaboration in every business activity. This is of importance when being an unknown actor in the market. The start-ups all have global partnerships including the EU as a common strategic partner. Moreover, all work with parties like universities and research. One start-up also means they receive attention for just contributing to sustainability and perceive that some adopters regard renewable energy as a legitimate or obvious investment. Recognition and media attention contribute to gain legitimacy since it increases the visibility of the start-ups and boost the adoption rate. Radical REIs tend to get media attention due to their technological disruptiveness. Moreover, the start-ups experience that being a completely new and disrupting innovation without previous trialability, can result in the issues of receiving the wrong classifications. The start-ups fear being stuck in obtuse legislation associated with other industries, which slows the commercialisation process. This is particularly evident for the marine REIs, as the market is new and the majority of the environmental regulation at sea refers to the oil and gas industries.

4.3 Summary of the Results

The general observation when comparing the average adoption rate between radical and incremental REIs, is that an innovation's radicalness and technological feasibility affect the commercialisation process (figure 6). Hence, incremental REI has a faster rate of adoption.

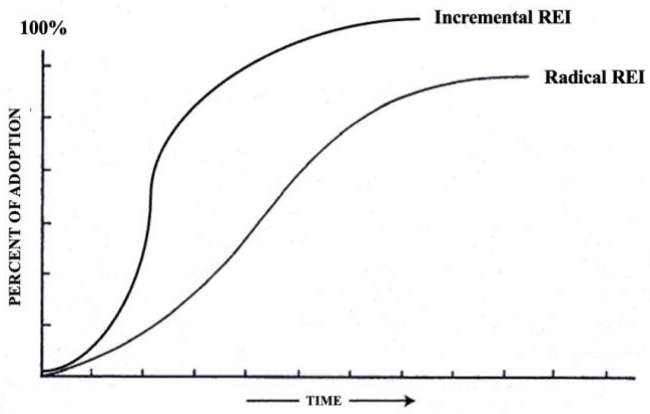

Figure 6 - Incremental and Radical REIs' Adoption Rates - Source: own elaboration based upon Rogers (1983)

Although the result consists of Swedish REI start-ups, the majority of the interviewees consider Sweden as a secondary market meaning the result refers to an international B2B market adoption. One disclaimer for this reason, is that some REIs are dependent on certain environments to exploit the renewable energy source. Moreover, the start-ups that do not directly target an international B2B market, indirectly globalise its commercialisation since they piggyback on Swedish TNCs' global presence.

	Incremental REI	**Radical REI**
External drivers and motivations	Market expansion and changing technology environment	Market expansion and changing technology environment
	Environmental regulation with monetary penalties	Limited options to deploy mature RE solutions
	Normative pressure	Complying with sustainability agendas and environmental policies
Internal drivers and motivations	Cost-effectiveness and improved processes and systems	Low LCOE and more sustainable processes
	Image concerns and control ecological footprint	More predictable source of energy
Market characteristics	Intermediate to mature markets	Immature markets
	Sustainability trend in becoming energy self-sufficient	Lack of supporting infrastructure and limited technological feasibility
	Heavily subsidized sector and focus sector for the PA	Heavily subsidized sector and focus sector for the PA
	Large resources, but low risk appetite	Large resources, but low risk appetite
	High social acceptance due to being better than existing solutions	Intermediate social acceptance due to unknown outcomes and uncertain impact
Strategies	Clear B2B niche segment and narrow adopter groups	Clear B2B niche segment and diverse adopter groups
	1-3 years of observability and trialability of the technology	>10 years of observability and trialability of the technology
	Technology feasibility with existing systems	Two-step market entry strategy
	Strategic partnerships as commercial contracts	Strategic partnership in all business areas
	Clear selling points in both the business and the climate case	Clear selling points in both the business and the climate case
	Legitimacy through partnerships and verification	Tendency to receive interest and attention for its radicalness

Table 3 – *Summary of the Result* – source: own elaboration

5. Discussion

In this chapter the results collected from the primary and secondary data will be discussed with a theoretical perspective. Similarities and differences between the empirical analysis and the literature is presented in a discussion based on the two research questions. The first part discusses the drivers and motivations, followed by the second part discussing the main strategies. Finally, a discourse of the climate case and the business case is presented.

5.1 Drivers and Motivations

The most evident drivers and motivations for the B2B adoption of renewable energy innovations are regulatory pressure, technological development, cost aspects and willingness to contribute to sustainability.

External drivers are in first hand, regulatory pressure and normative pressure. The result from the empirical observations agrees to a large extent with Bossle et al. (2015) conceptual model on the motivations for adopting eco-innovations. Regulatory pressure like carbon pricing, taxation and penalties for having unsustainable business activities, is according to the start-ups the strongest argument for adopting REI. Making it increasingly expensive for firms to pollute and emit greenhouse gases. The start-ups find such regulatory measures, like Rennings (2000) argues, as a support for the market's adoption. This perceived argument harmonizes with Rogers (1983) generalisation of the fastest rate of adoption, which the author means results from authority decisions. The start-ups experience normative pressure in the B2B market which influences adopters to acquire sustainable operations, since organisations compare themselves to peers (Bossle et al. 2015) and experience pressure to comply with norms in a social system (Rogers, 1983). Like Bossle et al. (2015) and Hall & Clark (2003) discuss, encouragement of sustainability is a way to respond to external pressure and meet social demand. By complying to regulatory and normative pressure, adopters can gain competitive advantages in environmental, economic and social pillars (Elkington 1997, Henriques & Richardson, 2004). Therefore, an adoption of REIs can give positive signals to stakeholders and increase an adopter's sustainability performance like Bossle et al. (2015) mention. Like Rogers (1983)

discusses common goals in a society, where members seek to some extent solutions on mutual problems, this is evident in actors' motivation for adopting REIs to combat climate change and to reach the PA. To reach these targets, the cooperation between the start-ups and the adopters goes beyond its B2B relationship, working together with external parties like universities and research centers similar to what Bossle et al. (2015) discusses.

Further the results strengthen Bossle et al. (2015) meta-analysis identifying the external forces, the technological change and expanding markets, where the start-ups perceive adopters being motivated to adopt REI to maintain competitive strengths in its specific industry. This is revealed in the result, as adopters approach the start-ups wanting to adopt their REIs in order to gain competitive advantages and follow the pace of technological development.

To comply with normative pressure regarding sustainability, the adopters have an internal drive to become environmental leaders in their industry to gain competitive advantages and legitimacy, as one internal driver mentioned by Bossle et al. (2015). Several start-ups experience large companies to initiate the first contact with them, instead of the other way around, which is largely motivated by taking control of their ecological footprint and increasing their sustainability performance. This internal drive confirms the challenge of balancing the 3Ps (Elkington, 1997, Henriques & Richardson, 2004) and being proactive to challenges (Nezvorova and Karakaya, 2020), where Bossle et al. (2015) propose adopting eco-innovations is a win-win solution where firms can increase both their financial and sustainability performance. However, the start-ups perceive its adopters being torn between the 3Ps, as the results disclose that this willingness to contribute to sustainability and global prosperity is limited within the frames of cost efficiency and profit maximisation. Confirming Chen et al. (2012) that internal drive for sustainability is rare.

The internal drive for greater efficiency in business activities to save costs and have smoother processes, show coherency between the result and the literature (Bossle et al. 2015, Freeman, 1987, Rennings, 2000, Rogers, 1983). Challenges and inefficiencies create market opportunities for the start-ups' to strategically address and deliver innovative solutions.

5.2 Strategies

The most common strategies to boost the rate of early market adoption are cost-competitive selling points, proof of concept, strategic partnerships and certain sustainability positioning. However, the rate of adoption is most dependent on the type of innovation and the degree of radicalness. The result shows that incremental REI have on average a faster rate of adoption by seven years compared to radical REI. This finding confirms theories of the rate of adoption being dependent on an innovation's attributes (Craig et al. 2017, Hall & Clark 2003, Häggman 2009, Rogers, 1983). On the contrary the result shows that complexity and compatibility have, in this case, more influence on the S-curve than the perceived relative advantages. Different from Rogers (1983) theory meaning all characteristics have an equal effect on the adoption rate. Hypothetically speaking, an REI with the best relative advantages in business and climate selling points, can still have a slower rate of adoption if the technology is radical. The radical REIs are more complex and less compatible with current systems like Rogers (1983) characterise innovations having different attributes, which the start-ups perceive increases the risks and uncertainties in the adoption. Further, lack of supporting infrastructure and competencies also have an effect on the adoption rate according to the start-ups, when comparing radical REIs to incremental REIs, which can co-exist with mature technology.

Radical REIs also require a longer time horizon before reaching the financial breaking point compared to incremental innovation like Masini & Menichetti (2012) discusses, which the interviewed start-ups confirm affect the adoption rate since it requires financially strong adopters. These adopters have generally a low risk appetite requiring years of proven technology, which the radical REIs start-ups strategically meet by being its own first adopters, financially supported by public grants and loans. As for the incremental REIs, the adoption by large B2B clients is experienced to be faster, due to their compatibility with existing systems, similar to Rogers's (1983) discussion on attributes of innovations affecting the rate of adoption. Technological feasibility and proven reliability affect the commercialisation process which explains why incremental innovations are more easily adopted compared to radical innovations. For the same reason investors prefer mature technologies when investing in renewable energy (Masini & Menichetti, 2012). An innovation's radicalness sets the starting point for the commercialisation process. Despite different preconditions in radical technology,

four dominating strategies seem to boost the adoption rate for both incremental and radical REIs.

First and foremost, being price competitive is a necessity to even enter the market and reach early adopters in a B2B market according to the start-ups. Since the main driving force to adopt REIs is based upon economic factors, they mean having a strategic business case is a hygiene factor and the most relevant selling point in the commercialisation process. Therefore, without a profitable value proposition there is no degree of adoption. Hall & Clark (2003) supports this as they mean environmental innovations must be sold to some profit as in any business. While other literature (Bossle et al. 2015, Rennings 2000) speak of economic profit and growth as a bonus for adopting eco-innovations. Overall, this essential strategy for adoption observed from the conducted interviews is not stressed enough by the literature.

The second dominating strategy is to enable trialability and observability of the technology to reduce risk and uncertainties regarding the innovations. All start-ups stress the importance of demonstrating the innovation, like presenting prototypes of the technology and implementing pilot installations. This is particularly relevant for all REIs, since the adopters require reliability and validation of the technology to reduce uncertainties and risks of expected outcomes (Rogers, 1983). The extent of the start-ups' strategies regarding trialability and observability depends on their innovations' level of radicalness. Masini & Menichetti (2012), mean firms with proven feasibility have a faster adoption rate, explaining why incremental REIs in a mature market are easier adopted than radical REIs. On the other side, Moore (2014) means that in the early market it is not necessary for the innovation to be fully developed yet and instead argue that the compelling flagship application is more important on the adoption rate, explaining why most of the start-ups have reached commercial contracts or MoUs before complete proof of concept. Some start-ups strategically aim to exist in technological cluster to become more attractive for the adopters confirming what Geffen & Rottenbergs, (2000), Oltra & Jean (2009) and Rogers (1983) discuss.

The start-ups work actively with gaining legitimacy to overcome uncertainties having no credibility and previous delivery, like Nezvorova & Karakaya (2020) mean is essential for diffusing innovations. All work actively to establish strategic partnerships and cooperation in

their early stages with key partners like the literature proposes (Bossle et al 2015, Rogers, 1983), to boost the commercialisation process and reach early adopters. The start-ups agree that partnerships are essential for the commercialisation process as well as for the R&D stage. However, this strategy appears to be different between the incremental and racial REIs. Where incremental REIs generally have strategic partners for the initial commercial contracts, while radical REIs seek strategic partnerships in all business areas to build a legitimate network when approaching early adopters. On the other hand, both types of innovations have international partnerships including one common strategic partner, the EU, which provides the start-ups with grants and favourable loans. Having the EU onboard is a verification stamp which enhances the legitimacy of the firm and its innovation. All start-ups strategically market their strategic partnerships, since one partner can open up for new relationships with other actors (Moore, 2014), but most important potential adopters. This is similar to homophily, in which Rogers (1983) means a common denominator enables the communication when approaching adopters.

The fourth recurrent strategy is having a strong sustainability positioning, where the start-ups strategically target certain sustainability agendas and communicate potential contributions of the REI to the adopters. Some firms do it intentionally, others neglect this strategy and freeride on these selling points by belonging to a certain category of sustainable business, in this case being a REI. Start-ups experience this strategy to have different effects depending on the adopter's motivation for adopting sustainable operations, similar to Rogers's (1983) description of an innovation's relative advantages being perceived differently among adopters depending on their preferences. Moreover, all start-ups have a clear niche to facilitate the market entry and find adopters like Adner (2002) discuss having the willingness to adopt new technology, and like Peres et al. (2009) and Moore (2014) discuss the capabilities to adopt. Therefore, some start-ups strategically position themselves in trending markets, like energy storage, to exploit growing markets that are becoming increasingly important for reaching the PA. To reach early adopters and meet their drivers and motivations for balancing the 3Ps (Elkington, 1997, Henriques & Richardson, 2004), the start-ups strategically create profitable climate cases.

5.3 The Climate Case versus the Business Case

It is clear when examining the early market adoption of REI, there are two main aspects that lead up as the drivers and motivations in the B2B market and steer start-ups' strategies. One being the business case, which consists of the traditional motivations for adopting innovations and meeting market demand with maximizing value propositions. The other one being the climate case, which adds the layer of sustainability driving the adoption of eco-innovations and meeting market demand with more sustainable solutions.

In order for governments to steer resources in the right direction and for start-ups to set the right strategies, an analysis of the drivers for adopting REI is essential. So what comes first? The climate case or the business case? According to the start-ups, the B2B market is solely driven by the business case, where adopting REIs is about finding cost efficient solutions and improving current processes. In this case, the start-ups are forced to deliver competitive business propositions towards its adopters since the innovations in the early market might not compete with mature technologies. Adopting immature technology like REI usually demands more risk-taking and greater upfront investment costs by the adopters, relating to the longer time horizon before reaching the financial break-even point. On the contrary, most interviewed start-ups have reached commercial contracts before delivering fully viable innovations to their adopters. Questioning the start-ups' argument for the business case being the sole driver in the B2B market. Moreover, comparing the REI business case to more established alternatives in the energy sector it is generally cheaper for firms to maintain business-as-usual. Meaning, there must be some external force that pushes the market to look beyond the cheapest alternatives, as eco-innovations tend to need regulatory support. Hence sustainability agendas i.e., the climate case, sets borders for where change and growth shall head. In that case underneath the umbrella of climate targets, then the business case becomes a deal-breaker for adopters seeking commercially viable opportunities.

Furthermore, in the result we found that different REIs have different conditions for their rate of adoption, depending on the technologies' radicalness. In that sense, innovations in wind and solar photovoltaic power have more mature markets and supporting infrastructure than for example marine renewable energy. But looking at the renewable energy market as a whole, standing for only 14% of the world's energy supply, the sector itself is radical and immature.

Demanding a larger effort by governments and the private market to adjust and deploy REIs than sticking with business-as-usual. Therefore, global climate goals like the PA serve a vital role in society, taking common prosperity into consideration and connecting the 3Ps. Where the private market mechanism is the movement for profit and change, while the government policies are the countermovement steering change in the right direction for the planet and the people. Therefore, the climate case and the business case are mutually exclusive, but collectively exhaustive[9] (figure 7). The principles of the capital market drive individuals to seek value maximized business cases which are the motivations for change and innovation. While states and civil society guard the market with regulation and social movements, setting the drivers for the climate case. Despite operating under the pressure of sustainability agendas and environmental laws, the market still seeks profitable climate cases to maximize value creation.

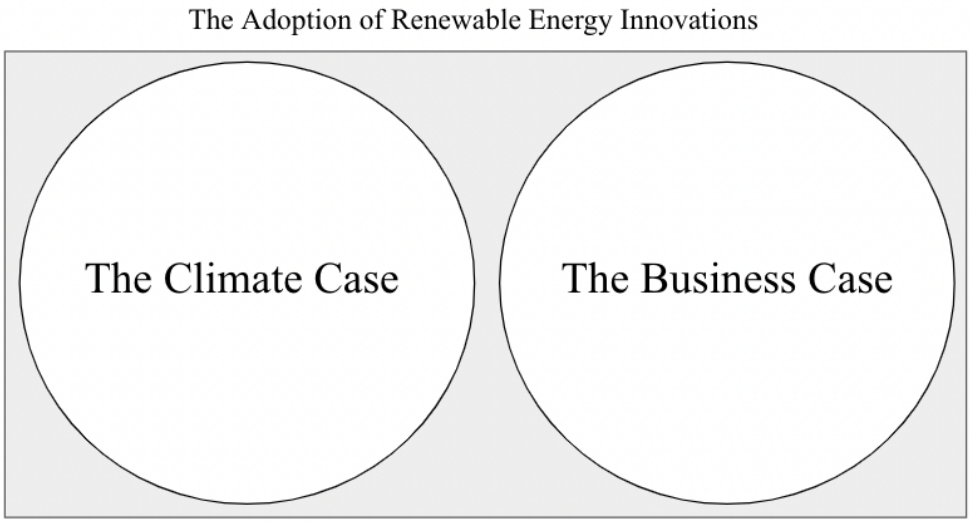

Figure 7 – *Mutually Exclusive Collectively Exhaustive* – source: own elaboration

[9] Mutually Exclusive, Collectively Exhaustive (MECE) = distinctly different, together they make a complete whole (McKinsey & Company, n.a)

6. Conclusion

This concluding chapter presents a summary of the thesis, answers to the research questions, contributions of the thesis and lastly limitations from the result suggesting further research.

The world has committed to a low-carbon global economy where renewable energy is believed to be one key enabler to reach the PA by 2050. Innovations in the energy sector can help overcome inefficiencies to boost the deployment of renewable energy. However, reports indicate that the acceleration is currently too slow to reach the required transition towards green energy. Therefore, to boost the adoption rate of REI, this thesis aimed to examine the drivers and motivations for early market adoption and start-ups' strategies to meet those forces. Interviewing Swedish start-ups with innovations in different fields of renewable energy helped gain insights on perceived drivers and motivations of early market adoption of REIs in the B2B market.

The drivers and motivations for the B2B adoption of Swedish REIs are external forces like regulatory pressure and technological change together with internal forces like economical aspects and willingness to contribute to society. However, these perceived drivers by the start-ups differ depending on their type of innovation, including which sector and companies they address. In terms of expanding markets and technological change, adopters are more concerned with the business case of REIs neglecting sustainability agendas. Although adopters express a willingness to contribute to the environment and society, the will is more of a reactive response to regulatory and normative pressure than a proactive initiative. Furthermore, like most literature on REIs conclude, most start-ups agree that government policies and environmental regulation serve an important role for the early market adoption, however when it comes to the B2B market the motivation of low costs and high profits is the determining factor. In addition, since B2B adopters are risk averse towards the attributes of REIs, additional governmental support in the B2B market can foster the commercialisation process as monetary policies and authority decisions are perceived to have the most effect on the adoption rate.

The strategies a Swedish REI start-up set up to boost the rate of early market adoption are profitable business proposals, proven technology, strategic partnership and certain sustainability positioning. Despite start-ups having these strategies to boost the rate of

adoption, it is inevitable to disregard the different starting points for the commercialisation process depending on the innovations' radicalness. The radicalness also affects how much start-ups have to work with proof of concept to overcome uncertainties. The way to reach adopters is partnerships, both to gain legitimacy as a young enterprise but also to initiate commercial contracts by developing the innovation together with the adopters. To meet the strongest force in the B2B market, start-ups strategically create profitable climate cases when commercialising renewable energy innovations.

This thesis contributes with a qualitative analysis on the renewable energy cluster in Gothenburg by interviewing eight innovation start-ups within different RE fields targeting the B2B market. The report contributes with a better understanding of the drivers and motivations for the REI adoption and broadening existing literature by taking the B2B perspective into account and highlighting the business case. The result also confirms other literature examining the adoption of eco-innovations and REIs, indicating the importance of regulatory and normative pressure to steer the market towards the climate case. The observed drivers and strategies contribute with practical implications that can help immature firms accelerate their market entry and indirectly help committed parties to the PA to speed the transition towards a low-carbon global economy. Besides, this thesis also expands existing literature discoursing innovations' attributes affecting the rate of adoption, by identifying different S-curves for radical and incremental REIs. Finally, the report strengthens the perception of Sweden being an international innovation leader, by addressing Swedish REIs and their international B2B market adoption.

One limitation in the result is the observation of diverse fields of REIs making the conclusions unspecified and broad. To make the results more comparable, looking into each field of renewable energy separately and including more similar start-ups could validate the findings from each interview. Further, a quantitative study examining the cause-effect relationships could strengthen the findings on the REIs' attributes and strategies' effect on the adoption rate. Further research could also address the market segments' different psychological attributes like Rogers (1983) and Moore (2014) characterize, to investigate the B2B market's willingness towards change. This would broaden the discussion on REI adoption by taking the psychological factor into account.

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8. Appendix

Appendix 1: Generic Questions - The Interview Guide

1. **When was the company founded? Which year did you estimate your eco-innovation was "invented"?**
    a. Are the founders of the innovation/company still operative? If so, how many of them and which positions?
    b. How did you come up with the eco-innovation and for which purpose? Do you see direct or indirect connection with the global commitment to Agenda 2030 or the Paris Agreement, as some causing factors to the invention of your eco-innovation?

2. **How did you strategically develop your business model?**
    a. Did the commitments to Agenda 2030 or the Paris Agreement, help you formulate your value proposition?

3. **Describe your market and your strategic positioning on the market.**
    a. Why and how did you choose this market segment?
    b. Did you compare different market segments with different aspects of pros/cons?
    c. Do you sell B2B and/or B2G? If not B2G, why?
    d. Do you target both the international market and the Swedish market?
        i. If yes, have you experienced any differences in the response to adopt your eco-innovation due to different incentives/policies in the specific market. (Swedish government's policies contra international markets' policies, EU-members or non-EU members)

4. **Do you have a niche?**
    a. How did you formulate this niche?
    b. Do you find any risk of being "too much" in a niche?

5. **Where are you right now in your commercialisation process?**
    a. If you would estimate your current share of your total market/potential market, how much have you reached?

6. **Describe your *diffusion process* of how you create initial awareness of your eco-invention, to your marketing that leads to adoption by your early market.**
    a. Which steps are critical in your marketing process?
    b. How do you work with mass media (news platforms, LinkedIn etc) and interpersonal networking (peer-to-peer)?
    c. Which selling points are essential to reach a MoU or commercial contract?

7. **From the date of your initial start and R&D to the date when you reached your first MoU or commercial contract, how fast did it go?**

8. **Describe the process of MoU turning into a commercial contract.**
    a. How will you strategically work to close your announced MoUs to a commercial contract?
    b. Is it on your capacity/resource end or on a partner that the MoU right now has not commercialized yet?
    c. Do you lack any resources to scale-up to commercial installation? E.g Lack of financial capital? Human resources? Technological verifications/obstacles that need more R&D? Time?

9. **Estimation of the percentage or absolute number of processes with potential early adopters that have not led to a MoU or a commercial contract.**
    a. How many "none gone through MoU" or even processes that did not lead to a MoU have you had? What are the reasons for that?

10. **What feedback do you get from early adopters, of <u>their</u> reasons why they do not/can not adopt your innovation yet?**
    a. Which support do you need to increase the adoption of your innovation? (e.g. gov policies, more financing etc)
    b. How do strategically work to overcome their obstacle of adoption? (e.g more mass communication, networking etc)

11. **How "legitimate" would you say <u>your innovation</u> is on the market? Globally and in Sweden.**
    a. How do you build legitimacy and gain trust with your early adopters?
    b. What types of risks and uncertainties does your eco-innovation have? and how do you strategically try to overcome these obstacles and communicate that to your stakeholders?
    c. How important is academic research of your eco-innovation to gain legitimacy among your early adopters?

12. **How socially accepted is your innovation in society?**
    a. Have you faced any negative reactions or uncertainties towards your innovation from your adopters, due to controversial debate about your innovation and other dimensions of your business case?
    b. Is there something with your business case or eco-innovation that are not deemed fully sustainable for certain stakeholders? E.g non-governmental organisations, private/public activism, investors, suppliers, customers, media etc

13. **Do you cooperate with different actors to gain legitimacy and to boost the likelihood of early market's adoption of your eco-innovation?**
    a. e.g. strategic partners, suppliers, academia and research institutions, government,

14. **Do you consider yourself in a technological cluster?** e.g where your innovation can thrive on other existing solutions and complement or improve certain areas with your value proposition? For example being energy storage to renewable energy power, or being a supplier to parts in an energy system.
    a. Have you experienced any advantages of being in a technological cluster?
    b. How can you decrease uncertainties and risks by being in a technological cluster?

15. **The target customers, do they have existing alternative solutions to your innovation today?**
    a. If the client has an existing solution or competing substitute to your eco-innovation, how do you motivate/sell the initial investment costs for the client to change or add the technology?
    b. How do you experience your target market's willingness to adopt **innovation** versus **eco-innovation**? Is it a difference in the market segments innovativeness contra sustainability attitude?
    c. If you experience a difference, how do you strategically counter that?

16. **The potential customers that show interest in your eco-innovation, which incentives or motivations do they have to adopt the technology?**
    a. E.g., sustainability commitments like Agenda 2030, Paris Agreement, ISO-certification etc

17. **What is your value proposition to your customers?**
    a. How do you sell your business case? In what terms are your eco-innovation better or more cost-effective than existing alternatives?
    b. Would you say that your business case of your eco-innovation, is a *win-win solution*, where clients can both lower costs and lower its ecological footprint?
        i. If yes! Why are not every potential customer adopting your eco-innovations then? What is your experience of the customers' obstacles?

18. **How much support from government incentives have you gained / experienced?**
    a. Which impact has it had on your early market's adoption of your innovation?

19. **Are the sustainability aspects of your eco-innovation the <u>main</u> selling point? How much do you push on the overall climate impact improvement for a customer?**

a. Does this selling point gain legitimacy or increase the incentives to adopt your innovations?
b. If not, what is the absolute main focus/motivation for your early adopters to adopt your innovation?

20. In your industry, are there any standards or criterias you have been forced to comply with to be relevant on the market?

a. For example, specific ISO-certification, environmental laws etc.
b. How do you strategically communicate the compliance to your customers?
c. Have you met "all" industry standards? Or do you lack resources to fully comply with those, and therefore lag in the adoption of your eco-innovation?