The impact of climate policy on venture capital investments in greentech. Evidence from Europe.

Dina Jill Maya Mertens

Dissertation written under the supervision of
Prof. Dr. Nicoletta Corrocher

Dissertation submitted in partial fulfilment of requirements for the MSc in International Management, at Universidade Católica Portuguesa and for the MSc in Economics and Management of Innovation and Technology at Bocconi University, 29.05.2024.

RESUMO

Esta tese investiga o impacto da política climática nos investimentos de capital de risco (VC) em tecnologia verde, abordando uma lacuna significativa na investigação. Através de entrevistas semi-estruturadas com dez experientes investidores de capital de risco europeus, o estudo examina como as políticas climáticas influenciam suas decisões de investimento em várias dimensões de risco: mercado do produto, tecnologia, regulamentação, saída e risco pessoal. Os resultados indicam que a política climática é um fator de demanda crucial para as empresas de tecnologia verde, moldando significativamente a dimensão do mercado e as perspectivas de comercialização. Nas fases iniciais de I&D, o financiamento governamental através de instrumentos de incentivo à tecnologia, como subsídios, é visto de forma positiva, embora a elevada dependência nas fases posteriores suscite preocupações. O risco regulatório é apontado como o maior risco de investimento devido à incerteza quanto à duração e ao rigor das políticas, afetando tanto as fases iniciais de I&D quanto as de difusão no mercado. O risco pessoal é a única categoria que não é afetada pela política climática. O estudo revela que a estratégia de saída prevista para as empresas de tecnologia verde difere da das empresas de tecnologia não verde, uma vez que as aquisições estratégicas são preferidas às OPI. Em conclusão, os investidores em capital de risco reconhecem que a política climática pode catalisar oportunidades de investimento, embora a incerteza da continuidade da política continue a ser um fator de risco crítico.

Palavras-chave: Mudança Climática, Tecnologia Verde, Capital de Risco, Política Climática, Decisões de Investimento, Inovação Sustentável, Risco Regulatório, Impulso Tecnológico, Atração de Mercado, Incerteza Política.

Título: O impacto da política climática nos investimentos de capital de risco em tecnologias ecológicas: Dados da Europa.

Autor: Dina Jill Maya Mertens

ABSTRACT

This thesis investigates the impact of climate policy on venture capital (VC) investments in greentech, addressing a significant research gap. By conducting semi-structured interviews with ten experienced European venture capitalists, the study examines how climate policies influence their investment decisions across various risk dimensions: product market, technology, regulatory, exit, and people risk. Findings indicate that climate policy is a crucial demand driver for greentech ventures, significantly shaping the market size and commercialization prospects. In early R&D stages, government funding through technology-push instruments such as subsidies is positively viewed, though high dependency in later stages raises concerns. Regulatory risk is highlighted as the biggest investment risk due to the uncertainty of policy duration and stringency, impacting both early R&D and market diffusion stages. People risk is the only category not impacted by climate policy. The study reveals that the expected exit strategy for greentech ventures differs from that of non-greentech ventures as strategic acquisitions are preferred over IPOs. To conclude, venture capitalists acknowledge that climate policy can catalyze investment opportunities, while the uncertainty of policy continuity remains a critical risk factor.

Keywords: Climate Change, Greentech, Venture Capital, Climate Policy, Investment Decisions, Sustainable Innovation, Regulatory Risk, Technology-Push, Market-Pull, Policy Uncertainty.

Title: The impact of climate policy on venture capital investments in greentech. Evidence from Europe.

Author: Dina Jill Maya Mertens

ACKNOWLEDGEMENTS

First, I want to thank Católica Lisbon for giving me the chance to conduct this double degree and for the support I experienced during the last two years. Being accepted into this program fulfilled my dream to study abroad in a leading business school and taught me to believe in myself. It moreover allowed me to study alongside inspiring people, who became friends for life, and to be taught by exceptional professors.

I would also like to thank Bocconi University for allowing me to conduct the second academic year of my degree in Milan, surrounded by exceptionally smart, dedicated, and integer professors and students. I especially thank my thesis supervisor Professor Doctor Nicoletta Corrocher, for allowing me to research a topic of academic, but also personal, importance and supporting me with thoughtful advice.

Further, I would like to thank my parents, without whom my academic career would not have been possible: thank you for your tireless encouragement to nurture my curiosity. I might not always be there, but I am always with you.

TABLE OF CONTENTS

TABLE OF FIGURES

LIST OF ABBREVIATIONS

Abbreviation	Definition
BVC	Bank venture capital
CVC	Corporate venture capital
EU	European Union
GP	General partner
GVC	Government venture capital
INDC	Intended nationally determined contribution
IP	Intellectual property
IPO	Initial public offering
LBO	Leveraged buyout
LP	Limited partner
GHG	Greenhouse gas
M&A	Mergers and acquisitions
R&D	Research and development
US	United States
VC	Venture capital

1. Introduction

Climate change represents the paramount challenge of our era, compelling societies worldwide to reevaluate their economic paradigms and environmental stewardship (Stern, 2007). In response to the need for climate change mitigating private sector actions, policymakers deploy push-and-pull policies aiming to align private interests with broader societal objectives (Popp, 2019). These interventions seek to mitigate market failures and catalyze the development, diffusion, and investment in green tech innovation (Hojnik & Ruzzier, 2016). Nevertheless, despite the pressing need to decarbonize key sectors such as the energy sector, historical investment patterns indicate a disproportionate allocation of capital, often constrained by regulatory uncertainty and market dynamics, leading to an investment gap for early-stage eco-innovations (Grubb, 2004).

While governments combat the threat of climate change by using political instruments, the opportunities for private capital, particularly venture capital (VC), in fostering eco-innovation become increasingly recognized (Wüstenhagen & Teppo, 2006). Traditionally, venture capitalists invest in industries that can be defined as “new economic spaces,” according to Schumpeter's definition of entrepreneurship (Kenny, 2011), typically characterized by companies with fast growth potential (Zider, 1998). In contrast, greentech ventures often face unique challenges within their development and diffusion stage, making them an untypical VC investment case (Rennings, 2000; Visscher et al., 2020). Nevertheless, despite the decreasing capital deployed for start-up investments, the share of European climate tech investments increased from 2014 to 2022, with US$1.42 billion to US$11.75 billion of deployed capital. In 2023, the total number of European greentech investments are conducted in increasingly diversified industries, such as energy (32.53%), mobility (22.4%), and the built environment (10.36%) (PWC, 2023).

Historically, the research landscape surrounding policy and venture capital has predominantly focused on the role of venture capital in driving innovation (Wüstenhagen & Teppo, 2006). However, a significant research gap exists in synthesizing the impact of climate policy on venture capital investment decisions for greentech ventures. Initial studies have explored the influence of policy on greentech investments during the first greentech investment wave between 2006 and 2008 (Van den Heuvel & Popp, 2023). However, as the investment focus diversifies to sectors beyond green energy (PWC, 2023) and recent political initiatives such as the Paris Agreement and the European Green Deal launch, new empirical evidence on the funding mechanisms is scarce. Moreover, understanding the interplay between climate policy and its impact on venture capital investment decisions becomes pivotal in elucidating the trajectory of greentech ventures from inception to maturity.

This study endeavors to bridge the research gap by building theory with empirical evidence gathered from venture capitalists investing in European greentech ventures. First, the theoretical foundation based on secondary literature concerning climate policy and climate economics, the greentech market, and venture capital is presented in the second chapter. Besides outlining the current state of research in the areas corresponding to the research question, the risk framework of Wüstenhagen and Teppo (2006) is presented, which structures the findings of the primary research. In chapter three, the methodology employed in this study is explained, based on Saunders et al.'s (2007) research onion. A qualitative multi-case study approach is utilized to build a theory on the research question. Sampling strategies encompass purposive and convenience methods to ensure diverse perspectives. Semi-structured interviews with ten venture capitalists investing in European greentech ventures were conducted and presented in chapter four. Utilizing a case study approach, the results are presented in the clusters of product-market risk, technology risk, regulatory risk, exit risk, and people risk, following the introduced framework by Wüstenhagen and Teppo (2006). Further, data analysis is conducted using Mayring's (2003) qualitative content analysis method. This systematic approach enables the interpretation and identification of emerging themes within the data. The fifth chapter discusses the findings with existing literature to validate insights. Last, conclusions and limitations are drawn, and theoretical contributions are presented.

The study underscores the profound impact of climate policy on venture capital investments in greentech ventures and seeks to provide actionable insights for policymakers, investors, and entrepreneurs navigating the evolving landscape of sustainable innovation. By including insights from diverse fields, the study aims to provide a comprehensive understanding of how venture capital investments shape greentech ventures, revealing both obstacles and pathways to advancing sustainability agendas.

2. Theoretical Background

To determine the appropriate definition of the term and content framework, the following chapter explains the theoretical background of the topics relevant to answering the research question. Within this context, it explores the dynamics and economics of climate change and climate policy, the characteristics of environmental entrepreneurship and the greentech market, and introduces the economics of venture capital firms, and their decision-making processes. Ultimately, this chapter sets the theoretical base for the exploration of the research question.

2.1 Climate Change and Climate Policy

Climate change is a global externality, characterized by global warming due to increasing greenhouse gas (GHG) emissions (Popp, 2010). The consequent risks of climate change include long-term hazards, such as sea-level rise and heat waves, which result in socioeconomic problems for the global population (Kolstad & Toman, 2005). To mitigate this market failure, government intervention becomes indispensable to effectively reduce global emissions. Political instruments designed to fulfill the government's objectives are called regulatory policies and are expressed through laws and regulations (Popp, 2010; Nordhaus, 2019). Within the field of international policy regulation, climate policy aims to enable and compel private agencies of all types and industries to participate in climate change mitigation (Kolstad & Toman, 2005).

The 1992 Framework Convention on Climate Change represented the first step in global climate policy, addressing how and in what manner climate change is an issue and expressing the need for (economic) regulation (Kolstad & Toman, 2005; Falkner, 2016). On a global scale, the Kyoto Protocol (1997) is seen as a landmark achievement in implementing legally binding policy. It became clear that while the reduction of GHG emissions will lead to costs, the long-term effects on human welfare will be marginally greater, thereby necessitating government action against climate change. The protocol declares the reduction of GHG emissions, which include six different climate-damaging gases, as the primary goal to mitigate climate change. The quantitative understanding of climate change forms the basis for the numerical targets that represent climate reduction measures (Kolstad & Toman, 2005; McLaren & Markusson, 2020). Based on the carbon measurement approach, 196 countries committed under the Paris

Agreement (2015) to limit global warming to below two degrees Celsius above pre-industrial levels (Falkner, 2016; McLaren & Markusson, 2020).

While the Paris Agreement is a legally binding international treaty, it requires social and economic transformation on a governmental level. Hence, countries need to communicate their financial, technological, and capacity-building measures to reduce GHG emissions regularly, through releasing the “intended nationally determined contribution” (INDC). Further, governments have to develop their own legislation and policy frameworks to control climate action and foster the engagement of public and private sectors (Spain on behalf of the European Union, 2023).

On a regional level, the European Green Deal, launched by the European Union (EU) in December 2019, commits Europe to becoming the world’s first climate-neutral continent by 2050 (European Commission, n.a.). In this context, multiple regulatory, economic, financial, and informational instruments are deployed to encompass climate regulation. In the field of regulatory instruments, the EU follows a 'command-and-control' approach. This entails utilizing the legal system's coercive power to enforce specific behavioral standards. These standards encompass emission limits, defined targets, product specifications, process/production requirements, environmental quality standards, and prohibitions/bans (Fetting, 2020; Oberthür & von Homeyer, 2023). Generally, measures like carbon taxes and cap-and-trade systems incentivize the avoidance and reduction of greenhouse gas emissions (Fischer & Newell, 2008). In Europe, most EU members introduced carbon taxes and provided subsidies for renewable electricity (Frankhauser et al., 2010).

2.1.1 Economics of Climate Policy

Emissions contributing to climate change stem by two-thirds from energy use, followed by agriculture and deforestation. Addressing this challenge necessitates innovative approaches from the private sector (Grubb, 2004), “for the development and deployment of many of the relevant technologies” (Stern, 2007, p. 7). However, the presence of double externalities hinders appropriate incentivization for the private sector to develop and adopt eco-innovations (Rennings, 2000).

The first type of market failure, environmental externalities, arises from the absence of pollution pricing in the market, leading to insufficient incentives for firms and consumers to invest in emission-reducing technologies. The second type, knowledge market failures, stems from the public goods nature of knowledge (Jaffe et al., 2005). While the societal return is very high due to the generated knowledge, the resulting private costs of capital-intensive research and development (R&D) derive from the compensation (Beise & Rennings, 2005; Popp, 2010). Consequently, the double externality problem arises when the societal benefits of innovations are not fully reflected in the private returns to innovators (Rennings, 2000).

Policies addressing these failures, often known as demand-pull and technology-push policies respectively, aim to correct these market inefficiencies and stimulate investment in environmentally friendly technologies (Jaffe et al., 2005; Popp, 2019). Environmental regulations addressing the private sector provide financial support and incentives to develop and successfully diffuse GHG-reduced technologies, by using methods such as "regulations and standards, taxes and charges, tradable permits, voluntary agreements, subsidies, financial incentives, research and development programs, and information instruments" (Gupta et al., 2007, p. 747). Diffusion refers to the spread or adoption of new ideas, technologies, or practices within a society or a market. It's the process by which innovations move from being initially adopted by a few innovators or early adopters to being accepted and utilized by the broader population or market segments (Rogers & Williams, 1983).

2.1.2 Technological Innovation and Climate Policy

To reduce the emission impact of industrial countries, innovative solutions are needed (Grubb, 2004). Typically, innovations are driven by "technology push" or "market pull" processes. These processes involve both supply-side drivers such as research and development efforts and demand-side drivers such as consumer preferences and regulatory mandates (Chidamber & Kon, 1994). However, in the field of eco-innovations, the additional economic dilemma of the double externality complicates the process (Rennings, 2000). The innovation chain, first introduced by Grubb (2004), demonstrates the lifecycle of eco-innovation, from initial research and development to commercialization and market diffusion (*see Figure 1*). The framework also emphasizes the role of policy interventions and funding methods in shaping the trajectory of innovation, influencing factors such as cost per unit and market expansion (Grubb, 2004).

Governments apply technology-push and market-pull policies to stimulate technological innovation (Bürer & Wüstenhagen, 2009). In the first step of the innovation chain, technology-push policies foster the development of eco-friendly technologies (Grubb, 2004). Research shows that policies dealing with knowledge market failures, like patent protection and R&D tax credits, support overall innovation rates (Popp, 2019). Further, market-pull concepts incentivize the commercialization of innovation, through the allocation of property rights. These policy frameworks generate market demand for environmentally friendly products and contribute to the diffusion of green technologies in various industries (Grupp, 2004; Popp, 2010; Popp, 2019).

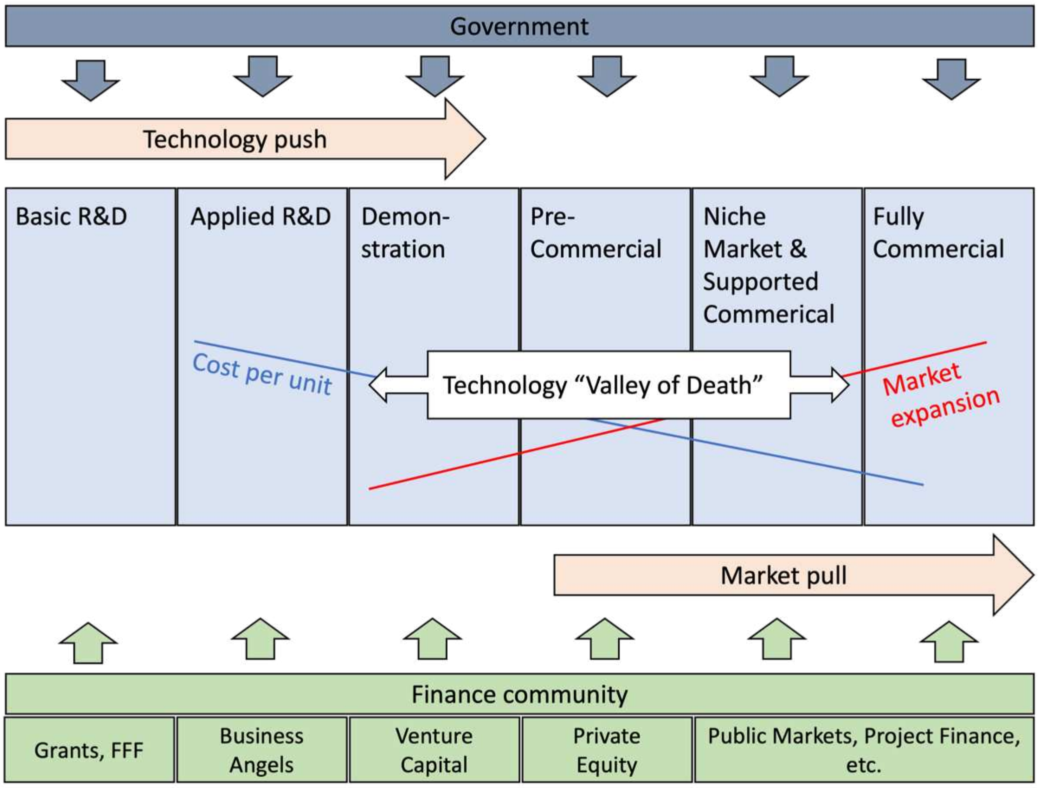

Figure 2: The innovation chain and the technology "Valley of Death" (adopted from Grupp, 2004 and Wüstenhagen and Teppo, 2006)

The shift from government-supported R&D funding towards privately financed operations leads to the "technology valley of death" (Grupp, 2004). The technology valley of death refers to the gap in financing faced by early-stage companies, particularly technology startups, that typically occurs between the applied R&D and the full commercialization of the innovation (Bürer & Wüstenhagen, 2009). While significant capital is required to develop and commercialize the innovations, traditional sources of financing, such as banks or angel investors, may be hesitant to invest due to the high risk and uncertainty associated with early-stage ventures (Budi & Aldianto, 2020). At this stage, venture capitalists typically invest as they are willing to take on these risks when they expect a return from the innovation at later stages (Moore & Wüstenhagen, 2004).

2.2 Environmental Entrepreneurship and Greentech

Environmental entrepreneurship links entrepreneurial opportunities to act upon market failure dynamics, aiming to solve environmental issues (Bergset & Fichter, 2015). It is often connected to Schumpeter's notion of entrepreneurship as an innovative process of generating market disequilibria. Schumpeter (1939) claims that entrepreneurs “create new economic spaces” and are therefore actively creating new markets (Kirzner, 1997; Hockerts & Wüstenhagen, 2010). Entrepreneurship is characterized by innovation and value creation that often leads to the foundation of a start-up (Estay et al., 2013).

Entrepreneurship focusing on environmental aspects is defined as the realization of “business ideas created by environmental problems and solutions” (Schaltegger & Wagner, 2011, p. 229). Firms commercializing environmental innovation serve as catalysts for positive environmental change by challenging traditional business models and promoting the adoption of sustainable practices across industries (Trapp & Kanbach, 2021; Vedula et al., 2022). Topics of public awareness, such as energy efficiency, reduced carbon footprints, and the pursuit of circular economy principles, contribute to fostering a culture of environmental responsibility and impact the growth of the greentech market (Kenny, 2011; Gaddy et al., 2017). Nevertheless, despite its transformative potential in emission reduction, economic success often hinges on societal and market consumption patterns (Schaltegger & Wagner, 2011).

2.2.1. Definition of the Term Greentech

The term greentech is an umbrella term encompassing a wide array of environmentally friendly technological innovations and has become central to discussions on sustainable development (Kenney, 2011). While there was limited research on the topic before 1990, pioneering research focusing on “environmental innovation” was conducted until 1997. After 2000, "sustainable innovation" gained popularity, becoming the predominant term with over 400 publications in 2009 (Schiederig et al., 2012). The concept of sustainable innovation originates from the concept of the “triple bottom line,” which suggests that companies should generate economic, environmental, and social welfare (Hall et al., 2010). From 2005 onwards, the terms "green" and "eco-innovation" saw a rising trend in scientific publications, with an average of 150 and 230 publications per year, respectively (Schiederig et al., 2012). Other terms frequently used to describe this type of innovation include “eco”, “environmental” and “sustainable” (Hall et al., 2010). The three different concepts of green, ecological, and environmental innovation are used largely synonymously and agree on reducing negative impact (Schiederig et al., 2012).

While the number of concrete definitions in the academic literature is limited, common definitions are based on the EU definition of eco-innovation, which enables the transition to a circular economy by “reducing impacts on the environment, increasing resilience against external pressures and using resources more efficiently (...)” (European Union, n.a., p.1). Moreover, the definition of environmental innovation distinguishes it from the definition of “sustainable innovation”, as it includes environmental and ecological considerations but not social considerations (Schiederig et al., 2012). Further, Chen et al. (2006, p. 332) define green innovation “as hardware or software innovation that is related to green products or processes, including the innovation in technologies that are involved in energy-saving, pollution-prevention, waste recycling, green product designs, or corporate environmental management,” hence adding the requirement of a technological characteristic. According to Hojnik and Ruzzier (2016, p. 36), green technologies “can be divided into clean technologies (driven primarily by regulations, demand-pull factors, government subsidies, cost savings, and R&D intensity, as well as by organizational capabilities, technological opportunities and capabilities, taxes, voluntary agreements, economic risk and uncertainty, social pressure, general management systems, and competition) and end-of-pipeline technologies (driven primarily by regulations, as well as by the stringency of environmental policies, equipment upgrade motives, price of energy and raw materials, firm size, and ISO14001).”

Following these definitions, the term greentech also includes innovations that fall under the terms “cleantech” and “climatetech”. The cleantech sector involves companies working in the field of sustainable “energy generation, storage, distribution, and efficiency” (Gaddy et al., 2017, p. 386). Climatetech can be seen as a synonym for greentech and hence describes technology companies with climate change mitigating technologies (Ahmad et al., 2023). In this study, the definition of Chen et al. (2006) will be used to refer to profit-oriented companies commercializing environmental innovation with a technological aspect.

2.2.2 Characteristics of Greentech Companies

Research shows that innovations with a higher level of breakthrough technologies have a stronger impact on climate change mitigation (Barrett, 2009). Further, eco-innovation can emerge in all types of products, for example, by making them more resource-efficient (Carrión-Flores & Innes, 2010; Ahmad et al., 2023). Moreover, it is associated with radical innovation, due to its R&D-intensive character and the challenge of finding lead customers (Hockerts & Wüstenhagen, 2010). The latter can be explained through the dilemma of "climate equity", which describes the disparity between those who are most affected by the impacts of climate change and those who contribute more to greenhouse gas emissions but are not willing to change their consumption habits (Schaltegger & Wagner, 2011). This ultimately leads to the double-externality problem mentioned before, making eco-innovation not as financially attractive as traditional innovation. Research suggests, that regulation stimulating the development and demand represent the strongest driver for the emergence of eco-innovation (Hojnik & Ruzzier, 2016).

As environmental innovations are considered radical innovations, research suggests that smaller companies are better at overcoming potential challenges due to their agile and less autocratic character (Hockerts & Wüstenhagen, 2010; Marra et al., 2015; Schaltegger & Wagner, 2011). However, it also shows that incumbents have opportunities due to their financial leeway to adapt to rapidly changing market situations and can also benefit from network effects (Hockerts & Wüstenhagen, 2010; Schaltegger & Wagner, 2011). This results in a two-staged mechanism, where young and "idealistic" companies initiate sustainability measures within a potentially underserved market segment, followed by established corporates reacting to stakeholder pressure by distributing miscellaneous, "sustainable", products through established channels (Hockerts & Wüstenhagen, 2010). Nevertheless, firm-specific or individual success factors of environmental innovations are only lightly researched and mostly derived from theories of classic innovation (Hockerts & Wüstenhagen, 2010; Bjornali & Ellingsen, 2014).

2.3 Venture Capital

VC is a type of private equity investment that serves as a pivotal component within entrepreneurial finance, playing a crucial role in fostering innovation and supporting the growth of nascent enterprises. Characterized as an alternative asset class (Da Rin & Hellmann, 2020), VCs provide funding for "high-risk, potentially high-reward" startups by acquiring equity or equity-linked stakes while the firms remain privately held (Gompers & Lerner, 2001, p. 145). VCs are typically run by investors who act independently or on behalf of a corporation (CVC), bank (BVC), or government (GVC) (Bertoni et al., 2015).

Entrepreneurial firms are "typically small and young" companies characterized by high levels of uncertainty (Gompers & Lerner, 2001). As the financial consideration requires an estimated return on investment (ROI) of at least 10 times within an average of 10 years, VC investments are commonly directed towards startups operating in technology-driven sectors, where innovation and scalability are paramount (MacMillan et al., 1985). Research shows that European VCs mostly invest in scaling companies aged three to five years within the Internet and TLC industries (Bertoni et al., 2015). Typically, these companies have no tangible assets and are not yet profitable (Denis, 2004) and tend to prioritize those engaged in later-stage developmental innovation projects that promise short-term returns (Demirel & Parris, 2015). Moreover, VCs invest either industry-agnostic or industry-specific, in entrepreneurial firms and markets that meet the fund's investment criteria (Zider, 1998). Investing in a diverse portfolio reduces industry-related investment risk (Murphy & Edwards, 2003).

Venture capitalists are positioned in the intermediary stratum of the investment process, denoted as the general partner (GP), alongside their fund vehicle. They deploy the investments of institutional investors, represented by the limited partner (LP). Hence, the VC firm takes responsibility for managing the investment process, while the fund, serving as the legal conduit, receives capital from investors and directs it towards entrepreneurial companies (Da Rin & Hellmann, 2020). VC funds are usually structured as a 10-year partnership, where investments are made within the first five years of the fund's life, and returns are realized within the last five to ten years (Gaddy et al., 2017).

Invested companies progress through various growth stages, from early-stage funding to seed and later-stage rounds, and result, if the venture's shares are sold within the exit process, in substantial returns for both the venture capitalists and the entrepreneurs (Gompers et al., 2020). The VC is compensated through a management fee of the managed capital (usually 2%), as well as the so-called "carry", a share of the returned profits (Da Rin & Hellmann, 2020; Gaddy et al., 2017). Consequently, two conditions must be met to map a successful investment cycle. Firstly, GPs must invest in profitable companies in the interests of the LPs. Secondly, the investors (LPs) must be able to expect a profit from their investment (Kenney, 2009).

2.3.1 Decision-making in Venture Capital

Academic consensus exists on the overall investment success goal of venture capital investment: providing a return of about 10x the initial investment to compensate for the risk taken and the time of capital illiquidity (Cochrane, 2005). However, VCs are not typical risk-takers but use methods along the investment process to mitigate investment risk within their decision-making (Zider, 1998; Gompers & Lerner, 2001). Besides diversifying within their investment vertical to mitigate the impact of individual failures, VCs follow specific steps to assess the investment opportunity (MacMillan et al., 1985; Murphy & Edwards, 2003). According to Fried and Hisrich (1994), the investment activity consists of multiple steps, starting with deal origination, screening, evaluation, structuring, and post-investment activities (*see Figure 2*). Research by Gompers et al. (2020) supports this process and defines the activities with the terms: deal sourcing, pre-investment screening, evaluation, structuring investments, post-investment monitoring, and advising.

Figure 2: Venture capitalist investment activity
(adapted from Fried & Hisrich, 1994)

Within the pre-investment cycle, VCs first begin with deal sourcing, where they gather multiple companies that correspond to their investment criteria (Da Rin & Hellmann, 2020). Referrals and technology scans are the main drivers of contact for investment opportunities (Fried & Hisrich, 1994). Typically, venture capitalists invest in markets they are educated in to reduce asymmetric information (Zider, 1998). After further reducing the possible investment targets, investment professionals evaluate a small number of possible companies and conduct due diligence on those ventures (Fried & Hisrich, 1994; Camp, 2002). According to research by Teppo and Wüstenhagen (2006), there are five main risk clusters, threatening the success of VC investments: product-market risk, technology risk, regulatory risk, exit risk, and people risk. These risk categories represent the main risk sources in venture capital decision-making and are derived from research by Ruhnka and Young (1991). Tyebjee and Bruno (1984) present a similar framework of risk dimensions that VCs need to consider within their investment process: market attractiveness, product differentiation, managerial capabilities, environmental threat resistance, and cash-out potential. Venture capitalists analyze potential investment targets in these fields, to avoid investments with too high risk or too little return.

In the next step, VCs calculate the financial evaluation of the company, based on methods such as the multiple of invested capital, IRR, or NPV to assess the future performance and possible exit scenario (Da Rin & Hellmann, 2020; Gompers et al. 2020). If the potential investment passes due diligence, VCs negotiate deal terms with the entrepreneur, which may include equity stake, valuation, and governance rights (Fried & Hisrich, 1994). Upon reaching an agreement, the venture capitalist provides funding to the startup, typically in multiple rounds as the company progresses (Da Rin & Hellmann, 2020). Post-investment, venture capitalists provide ongoing support and guidance to the startup, leveraging their networks, expertise, and resources to help the company grow and succeed (Ghosh & Nanda, 2010). Finally, they aim to realize returns on their investment through exits such as acquisitions, initial public offerings (IPOs), or secondary sales of their equity stake (Gompers, 1995; Cumming et al., 2006; Gompers et al., 2020). Research shows that "the average VC firm reports that 15% of its exits are through IPOs, 53% are through mergers and acquisitions, and 32% are failures" (Gompers et al., 2020, p. 185).

2.3.1.1 Product Market Risk

According to a study by Gompers et al. (2020), the business model is the second most important factor for the VC investment decision. Of the interviewed venture capitalists in this study, 83% name the market as the most important factor within the business model factor. Analysis of the market risk provides insights into the venture's commercial opportunities (Bertoni et al., 2015), and "depends upon the size, growth, and accessibility of the market, and on the existence of a market need" (Fiet, 2022, p. 552). Markets are considered attractive when industry competition is unconcentrated and demand is fast-growing, as the availability of potential customers increases (Hambrick and Lei, 1985; Sandberg, 1986). Hence, market attractiveness is impacted by rivalry among competitors and market entry barriers (Porter, 1980).

According to Porter (1980), market entry barriers are represented by product differentiation, capital requirements, switching costs, access to distribution channels, and cost disadvantages independent of scale and government policy. To ensure fast scaling of the venture and a subsequent high return on investment, investing in attractive markets is crucial (Chandler & Hanks, 1994; Zider, 1998). Therefore, product-market analysis by venture capitalists often involves a deep analysis of the target market's size, growth rate, and competitive dynamics (Da Rin & Hellmann, 2020; Gompers et al., 2020). Once venture capitalists have identified a market with promising potential, they focus on assessing the traction (Murphy & Edwards, 2003). Signs of customer adoption of the startups ensure that the startup's product or service resonates with customers and effectively addresses their needs (Glücksmann, 2020).

2.3.1.2 Technology Risk

VCs understand the product as an important success factor for an investment. Within the technological risk assessment, they analyze the technical team's expertise, the technology's stage of development, possible monetization, and intellectual property protections (Gompers et al., 2020; Tyebjee & Bruno, 1984). To mitigate risk, venture capitalists prefer investments within their investment profile, including known technologies. This ensures familiarity with the product and facilitates assessing uncertainty regarding the technological feasibility and scalability of the product (Zider, 1998).

For hardware or commodity investments, technology risk typically revolves around product development and manufacturing processes. Ventures with those products may encounter challenges in achieving economies of scale and maintaining competitive pricing in a market with rapidly evolving technologies and changing consumer preferences (Pearson et al., 2020). However, VCs typically invest in companies that show high technology risk but low capital intensity, such as software ventures (Zider, 1998). Their risk is rather associated with product development, market acceptance, and scalability (Da Rin & Hellmann, 2020). Nevertheless, the rapid pace of technological change and the need to stay ahead of competitors can also contribute to technology risk in software startups (Mann & Sager, 2007).

2.3.1.3 Regulatory Risk

Regulatory risk represents the risk of changes in laws and regulations impacting the venture's business operations or market potential. It is addressed by an analysis of the current regulatory landscape and upcoming changes (Zider, 1998; Da Rin & Hellmann, 2020; Gompers et al., 2020). Moreover, venture capitalists address evaluating the venture's ability to adapt to regulatory changes, mitigate risks, and stay compliant to ensure sustainable growth and success (Fried & Hisrich, 1994). In contrast to corporations, which typically deal with corporate governance issues, the innovative nature of startups results in a higher risk of regulatory uncertainty (Wright et al., 2007).

2.3.1.4 Exit Risk

The performance of VCs is primarily measured through their exit strategies, with IPOs being the most profitable according to various studies (Gompers, 1996). At an IPO, the company sells shares to the public for the first time on a stock exchange, allowing both the venture capitalist and founders to realize returns on their investment. Other exit options include mergers and acquisitions (M&A), leveraged buyouts (LBOs), secondary sales, and liquidations (Gompers, 1995; Amit et al., 1998; Tyebjee & Bruno, 1984). In a company acquisition, the venture is acquired by a larger firm, with both the venture capitalist and the founders selling their stakes in the company. In a leveraged buyout, the founders repurchase the stake from the venture capital firm, potentially with external financing, or management buy-outs/in-buy-ins occur (Cumming et al., 2006). If the VC fund sells its share to a third party while the entrepreneurs retain their ownership in the company, it is called a secondary sale (Amit et al., 1998). As 32% of venture-backed startups fail, the downside scenario mostly represents a write-off, where venture capitalists exit with minimal or no returns by liquidating their stake (Gompers, 1995; Gompers et al., 2020). Additionally, regulatory uncertainty impacts venture evaluation and may deter potential acquirers or investors, affecting exit opportunities and valuations (Cumming et al., 2006). In contrast, a strong institutional environment increases the likelihood of an IPO. Additionally, a low number of competitors creates a favorable IPO environment (Stuart & Sorenson, 2003).

2.3.1.5 People Risk

People risk concerns the potential of the management team and represent the main risk affecting the investment decision of venture capitalists (Tyebjee & Bruno, 1984; Gompers et al., 2020). This risk encompasses various factors related to the founders, management team, and key personnel, including their skills, experience, leadership capabilities, and ability to execute the business plan successfully. This risk is mitigated by venture capitalists through rigorous management team evaluation, including their experience, track record, and leadership skills. Venture capitalists often require ventures to strengthen their teams as a condition of investment and may assist in recruiting additional management talent (Da Rin & Hellmann, 2020). Mentoring and leadership development are also employed to enhance the team's capabilities and align their interests with the investors (Zider, 1998).

2.3.2 Venture Capital Investments in Greentech

Historically, two waves of VC investments in greentech can be identified. The first wave occurred between 2006 and 2009 when US and European VC funds focused on green energy transition were raised (Kenny, 2011; Gaddy et al., 2017). Most recently, there was an investment peak in greentech startups in 2021, with a total global investment volume of a cumulative US$120 billion. After this peak, funding fell sharply, down to a cumulative value of deals of US$40 billion. The global number of deals has more than halved, from 4,918 in 2021 to 2,216 in 2023. In Europe, investments are mainly made in the energy and mobility sectors and have also increased in the industrial and build environment sector since 2021 (PWC, 2023).

To date, the academic literature in the field of venture capital and greentech is limited and controversial (Wüstenhagen & Teppo, 2006). Research by Maiti (2022) and Van den Heuvel and Popp (2023) state, that from an economic perspective, venture capital supports the adoption of sustainable technology, bridges funding gaps of governments, and supports climate change mitigation. Moreover, according to Hockerts and Wüstenhagen (2010), support VC greentech investments in the transformation of the economic environment towards a more independent and bias-free investment landscape that is not influenced by entrenched interests, such as traditional energy firms (Hockerts & Wüstenhagen, 2010).

In contrast, academic literature also addresses the high-risk potential of the Greentech industry (Lüthi & Wüstenhagen, 2012). Teppo and Wüstenhagen (2006) were the first to analyze the sector-specific investment risks of the green energy market and ways to manage them (*see Figure 3*). The findings of Teppo and Wüstenhagen (2006) are supported by other researchers, showing that, especially for greentech ventures in the energy sector, the high capital intensity and long development timeframe make the industry not typically ideal for VCs, who normally invest in non-tangible and fast-scaling industries, such as high tech (MacMillan et al., 1985; Van den Heuvel & Popp, 2023). Academic literature argues that greentech ventures, especially green energy, do not provide an adequate business model for venture capital investments (Van den Heuvel & Popp, 2023). Additionally, while specific management approaches are suggested to mitigate the risk, returns do not compensate for that and fail to materialize in the exit scenario, as the number of successful IPOs is limited, and returns are not sufficient (Gaddy et al., 2017). Kenny (2009) also argues that greentech investments correlate strongly with volatile energy prices. The investment is therefore based on systematic risk and is very susceptible to market movements. Moreover, the associated regulatory uncertainty of public policies impacting greentech companies is perceived as a risk to investors (Lüthi & Wüstenhagen, 2012).

Category of risk	*Perceived problem*	*Potential solution*
Product market risk	Conservative utilities as customers	Addressing more than one market segment
	Societal vs. private benefits	Identify clear customer value
Technology risk	Long lead times	Appropriate business model
	Capital intensity	
	Infrastructure	
People risk	Few serial entrepreneurs	Time
	Good engineers, poor managers?	Market liberalisation increases human mobility
	'Green' image	
Regulatory risk	Energy policy framework seems unpredictable	Increase understanding
		Lobbying
		Diversification
Exit risk	Few success stories (IPOs)	AIM
	Utilities unlikely candidates for trade sales	Power technology manufacturers as potential trade sale buyers

Figure 3: Sector-specific risks for energy VC investments and ways of managing them (Wüstenhagen & Teppo, 2006)

2.4 Research Question

The existing research on policy and venture capital often concentrates on macroeconomic impacts and VC's influence on innovation (Wüstenhagen & Teppo, 2006). Moreover, there is a significant body of literature examining the impact of climate policy on various aspects of environmental initiatives and eco-innovation (Fischer & Newell, 2008; Rennings, 2000; Popp, 2010; Popp, 2019). However, a notable research gap exists in synthesizing the realms of climate policy and venture capital.

The nature of the greentech industry, marked by rapid technological advancements and changing policy landscapes, adds complexity to the research gap. While interest in VC investments in the greentech sector has recently increased within the academic literature, the understanding is still limited (Kenny, 2011; Bjornali & Ellingsen, 2014). Typically, green technologies face challenges for VC investments due to long gestation periods, high capital requirements, and uncertain consumer adoption, attributed to the public good character of environmental innovation (Wüstenhagen et al., 2009). In contrast, the primary goal of VCs is to achieve significant financial returns on their investments (Da Rin & Hellmann, 2020).

Consequently, despite the sector's potential for positive environmental impact, its distinctive features may not conform to the typical expectations of VC investments.

Pioneering research was conducted by Teppo and Wüstenhagen (2006, 2011) and Bürer and Wüstenhagen (2009) to understand the risks and opportunities of VC investments in greentech ventures, building on learnings from the first greentech investment wave between 2005 and 2008. However, current developments in climate initiatives, such as the Paris Agreement adopted in 2015 (Falkner, 2016) and the European Green Deal adopted in 2019 (EU, 2019), are now increasing the relevance of climate protection on the European political agenda. Moreover, venture capital investors today are no longer focused solely on the energy sector as they were in the past but are diversifying their investments into other areas, including mobility, industry, and the built environment (PwC, 2023).

This creates a research gap in updated literature explaining the rationale behind the decision-making process of venture capital investments in greentech within the current state of politics and investment trends. Given the urgent need to accelerate the transition to a low-carbon economy (Stern, 2007), it is essential to explore this gap to better understand how policy interventions shape investment dynamics in greentech ventures. Consequently, the following research question emerges: *How does climate policy impact VC investment decisions in greentech?*

To address this research question, a semi-structured interview approach will be employed to gather insights from venture capitalists actively investing in European greentech companies, with a particular emphasis on understanding the mechanisms through which climate policy affects investment strategies and decision-making processes. Further, this study will make several significant contributions to the existing body of research on climate policy and venture capital investments in the greentech sector.

Firstly, by examining the impact of contemporary climate policies, such as the Paris Agreement and the European Green Deal, on venture capital decision-making, this research will provide updated insights into the dynamic relationship between policy frameworks and investment strategies. This is particularly relevant given the evolving nature of climate policies and their increasing prominence on the global and European political agenda. The findings will help bridge the gap in understanding how modern policy interventions influence VC activities in the greentech domain, thereby extending the work of Teppo and Wüstenhagen (2006, 2011) and Bürer and Wüstenhagen (2009) into the current context.

Additionally, this research will contribute to the broader literature on eco-innovation and entrepreneurial finance by highlighting the role of venture capital in funding innovation. By examining the intersection of policy, finance, and technology, the study will provide a comprehensive overview of the factors that enable or hinder the growth of greentech ventures. This, in turn, can inform the development of more effective policies and investment strategies that support the transition to a low-carbon economy.

3. Methodology

This chapter outlines the methodology employed to investigate the research question by applying qualitative methods. This chapter outlines the methodological framework employed in this study, detailing the research philosophy, approach, design, data collection methods, and analysis procedures. Finally, the chapter addresses ethical considerations and truth criteria, ensuring the research adheres to high ethical standards and maintains the validity and reliability of the findings. By providing a detailed and transparent account of the research methodology, this chapter lays the groundwork for the subsequent presentation and discussion of the study's results.

3.1 Research Philosophy and Approach

The structure of the methodology follows the "research onion" as outlined by Saunders et al. (2016), representing a multilayered methodological framework that guides researchers through the systematic process of academic research *(see Figure 4)*.

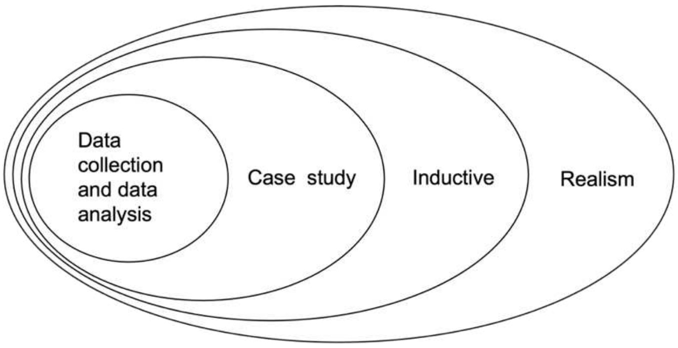

Figure 4: The research "onion"
(adapted from Saunders et al., 2007)

The first two outer layers of Saunders et al. (2016) "research onion" are represented by the research philosophy and the research approach. The research philosophy encompasses the foundational beliefs guiding the researcher's understanding of reality, shaping the overall approach of the study. The different paradigms that cluster the philosophy are described through the concepts of ontology, epistemology, and axiology (Sobh & Perry, 2006; Saunders et al., 2016).

Ontological assumptions guide the understanding of the reality faced in the investigation, while axiological assumptions refer to the researcher's beliefs about the influence of their values on the research process, emphasizing what is deemed essential and valuable in the research. In contrast, epistemological assumptions underpin the beliefs about knowledge and its acquisition (Guba & Lincoln, 1994). As this study aims to contribute to a deeper understanding of the foundations that shape the research domain, an epistemological philosophy reflecting the position of realism is adopted.

One key strength of realism is its recognition of an external, objective reality that exists beyond subjective interpretations, and understanding of underlying structures and mechanisms (Sobh & Perry, 2006). In the context of investment decisions, this is particularly crucial as understanding the impact of policy on investments requires the exploration of the decision-making process of investment managers. Consequently, realism's commitment to identifying causal mechanisms (Easton, 2010) aligns well with the need to comprehend the rationale behind investment choices in startups.

The second outer layer of the "research onion" (Saunders et al., 2016) is represented by the research approach, explaining if the study is either based on a theory or aiming to generate one. Inductive reasoning is chosen due to its suitability for exploring complex and context-specific phenomena. Unlike deductive reasoning, which starts with a hypothesis and tests it against existing theories, inductive reasoning involves deriving general principles from specific observations (Saunders et al., 2016). As there exists no theory for the impact of regulation on venture capital in greentech that considers the latest regulatory updates and changed investment landscape, inductive reasoning is a suitable choice for this study.

3.2 Research Design

In the pursuit of understanding complex phenomena, researchers employ various approaches to data collection, as noted by Creswell and Poth (2016). Research approaches in the field of business and economics can be broadly categorized into three main types: qualitative, quantitative, and mixed methods. Each approach offers unique perspectives and methodologies for investigating and understanding different aspects of a research question (Saunders et al., 2016; Basias & Pollalis, 2018). Qualitative research is exploratory and focuses on gaining an in-depth understanding of complex phenomena (Saunders et al., 2016). Strauss and Corbin (1998) define qualitative research as research that explains results using text-based techniques. In contrast, quantitative research is deductive and employs statistical and numerical data to analyze patterns and relationships. Mixed methods research combines elements of both qualitative and quantitative approaches in a single study (Saunders et al., 2016).

In recognizing the inductive and context-dependent nature of decision-making processes in venture capital, qualitative research methods are deployed to enable a deeper exploration of subjective experiences. Academic literature does not suggest one specific approach among qualitative research approaches, as the choice of an adequate method depends, among others, on the research question and goal, type of data collection, and scope of the analysis (Tomaszewski et al., 2020). Typical research methods are case studies, ethnography studies, and phenomenology studies (Saunders et al., 2016).

Yin (2018) suggests choosing the type of research method based on the form of the research question and the control over behavioral events. In this study, the research question aims to investigate the "how" and decision-making process. For this reason, the method of case study is chosen due to its ability to provide an in-depth and contextual understanding of a specific phenomenon (Yin, 2018; Tomaszewski et al., 2020). According to Eisenhardt (1989, p. 534), a case study contributes to "understanding the dynamics present within a single setting." As the boundaries between the context and phenomena are not completely clear (Yin, 2018), applying a case study allows us to closely examine the context of how climate policy impacts VC investment decisions in the greentech sector. By applying an exploratory multi-case study design, the study seeks to go beyond a singular, narrow perspective and instead investigate patterns within investment decisions. This also aligns with the chosen research paradigm of realism, which suggests case study as an adequate methodology to create a theory in rather novel research fields (Easton, 2010).

3.3. Sampling Strategy

The sample of this research is a deduction of the population selected on criteria and boundaries best suited to answer the research questions (Saunders et al., 2016). Given its exploratory nature and the industry-specific topic, the population is limited to venture capital professionals. This criterion ensures that participants possess direct experience with the investment decision-making process and can provide valuable insights into the practical considerations, challenges, and dynamics of greentech venture capital investments.

The decision not to limit the population to venture capitalists exclusively investing in greentech firms but to include professionals working for VC funds whose investment hypothesis also covers investments into non-greentech firms is a deliberate choice. This not only allows insights from VCs who are experts within the field of greentech investments but also includes the perception from professionals who can compare this with the decision-making process of other industries. This approach provides a unique opportunity to explore similarities and differences in decision-making processes, adding layers of depth and understanding to the research findings.

Second, the population is geographically limited to VC investors within VC firms conducting investments in Europe. The decision is driven by the desire to contextualize the findings within the European landscape. Climate policies vary across regions, and focusing on Europe allows for a more specific understanding of how these policies influence venture capital decisions in the greentech sector within a defined and relevant context.

To guarantee the quality of the study, the adequate sample size to answer the research question using this methodology was interrogated. It is advisable for a general study to undertake between 5 and 30 interviews (Saunders et al., 2016). Generally, the sample size depends on the objective of the study. Hence, data collection is recommended up to the point where enough data is present to answer the research question. Saunders et al. (2016) suggest having a minimum sample size of 5-25 participants when conducting semi-structured interviews. The sample size of ten venture capitalists was therefore considered sufficient to answer the research questions, after receiving holistic insights from the interviews.

There are two different sampling strategies: probability and non-probability sampling. A probability sample is a random selection of participants; thus, the wider population has an equal chance to participate in the study. A non-probability sample selects a specific portion of the population that will be able to give responses in connection to the study at hand (Taherdoost, 2016). The small population size, as well as the limited access to investment professionals, makes non-probability sampling methods an adequate choice. This is aligned with the majority of business studies, which rely on non-probability sampling methods (Yang et al., 2006).

Within non-probability sampling, a mixed approach was used to select participants. First, purposive sampling allows for the selection of participants based on specific criteria, allowing for the best quality answers (Saunders et al., 2016). In this research, selecting investment professionals at a higher career level enables access to a higher level of experience and more precise answers. Prospects meeting the sampling criteria were researched and contacted using the professional social media platform "LinkedIn" and informed about the objectives and outlines of the study. Second, convenience sampling was applied to contact participants that are convenient to reach, allowing the inclusion of participants from the personal network of the researcher (Saunders et al., 2016). Practical constraints include facilitated access to participants (Taherdoost, 2016). Eight out of the ten participants were contacted using purposive sampling, including three venture capitalists at the partner level. Two out of the ten participants were contacted using the convenience sampling method. While a limitation includes that the sample composition is contingent on the initial choices made by the researcher and participants, the limited accessibility of the population makes it a practical choice.

3.4 Sample Description

Out of the ten interviewed participants, all work in eighter greentech or industry-agnostic venture capital funds investing in Europe and have experience with at least one greentech investment within their professional career. 30% of the participants were at partner level and had more than 5 years of venture capital investment experience. The other 70% were in junior or mid-management positions with each less than two years, but more than one year of professional experience in venture capital investments (*see Appendix*).

3.5 Primary Research: Semi-Structured Interviews

Multiple data collection techniques can be applied within a case study, such as interviews, document reviews, or observations (Eisenhardt, 1989; Creswell & Poth, 2016). Due to the confidential nature of the investment processes, internal documents provide limited applicability for the study. To receive firsthand insights without requiring investment-specific information, no company internal data should be needed. Also, as managers prefer to be interviewed rather than complete a survey, choosing interviews as the data collection medium is a practical choice (Saunders et al., 2016).

Saunders et al. (2016) recommend semi-standardized interviews for case studies, as the method is applied "not only to reveal and understand the 'what' and the 'how' but also to place more emphasis on exploring the 'why'". Also, they provide insights into organizational phenomena and subjective experiences and anomalies (Eisenhardt, 1989). The method follows a pre-designed set of open-ended questions (*see Appendix*), allowing for a dynamic and in-depth exploration of participants' perspectives. As the research question only provides a limited explanation, having reciprocity between interviewer and participant is a key advantage, allowing for the improvisation of follow-up questions (Saunders et al., 2016).

After exploring the existing literature of the research topic, the sampling strategy and interview guidelines were developed, outlining the overarching themes and topics to be explored during data collection. Further, the semi-structured interviews with ten venture capitalists were conducted using a digital medium, such as telephone or video call. According to Janghorban et al. (2014), online interviews represent a supplement to face-to-face interviews. As semi-structured interviews should be recorded, interviews held on a digital medium increase the speed of data collection (Saunders et al., 2016). Practical implications include that the interviewee could choose the time and date of the interview easily and no travel was required to conduct the interview. This made it possible to collect data cross-border and widen the pool of adequate participants. The process of the semi-structured interviews was based on the interview guide and was recorded digitally. All interviews were subsequently transcribed using the software "Otter.ai". Accurate transcription is a fundamental process of conducting interviews, as it represents the base for the following data analysis (Saunders et al., 2016). Further, each interview transcription and the subsequent field notes were saved within their digital folder, structured after the participant's name.

Additionally, field notes were taken, allowing us to track relevant points for follow-up questions. Field notes are descriptive notes taken within the interview process to capture thoughts and insights (Eisenhardt, 1989). Moreover, they facilitate easy identification of informational patterns during the subsequent data analysis (Saunders et al., 2016).

3.6 Data-Coding and Data Analysis

The analysis of the ten transcripts was conducted using Mayring's (2003) qualitative content analysis. Qualitative content analysis aims to combine the methodological concepts of theory-guided research and openness (Gläser & Laudel, 1999) by systematically analyzing recorded communication within categories (Mayring, 2003). First, the ten interviews were conducted and transcribed before starting with the coding process. Coding, a pivotal aspect of the process, involves the systematic categorization and labeling of data to identify recurring patterns and themes. According to Miles and Huberman (1994), initial codes can be based on previous research. To provide a more framework-driven approach, initial categories were identified based on the five risk categories introduced by Wüstenhagen and Teppo (2006): product-market risk, technology risk, regulatory risk, exit risk, and people risk. Further, the qualitative data was analyzed line by line, allowing for the identification of new categories and the assignment of data to existing categories. The analysis proceeded iteratively in different coding rounds until a satisfactory combination of codes and themes was found. After analyzing an initial portion of the data, the inductively formed categories and codes were revisited and refined based on emerging patterns and insights. All remaining data was thoroughly analyzed, ensuring comprehensive coverage of the dataset and capturing the full range of themes and perspectives. Related codes are grouped under these main categories to facilitate data interpretation. Finally, the results were visualized *(see Appendix*) and presented in Chapter Four (Eisenhardt, 1989; Mayring, 2004). To guarantee the anonymity of the participants, direct quotes are anonymized, enumerated, and referred to with I1 – I10. Each of the ten codes stands for one of the participants. Further, comparing the results with evidence from supporting or contrasting research is a key step in building theory within a case study (Eisenhardt, 1989). For this reason, the results presented were compared with academic literature in the discussion chapter.

3.7 Ethical Considerations

Ethical considerations are paramount throughout the research process (Saunders et al., 2016). First, consent and transparency are guaranteed by providing participants with clear written information about the study's purpose and the exact usage of their data. Moreover, the anonymity and privacy of the participants are safeguarded by not revealing their identities if desired in the data collection, analysis, and reporting, and by removing sensitive data that could reveal the identities of the participants.

3.8 Truth Criteria

According to Yin (2009), four conditions impact the quality of case study research: reliability, construct validity, internal validity, and external validity. Understanding potential threats helps to develop mitigating strategies for potential data quality issues (Saunders et al., 2016).

Reliability refers to the consistency of findings upon replication or under similar conditions (Golafshani, 2003; Saunders et al., 2016). Achieving reliability involves ensuring that the research methods, procedures, and measurements used are consistent and produce consistent outcomes (Moisander & Valtonen, 2006). Consistency is ensured by conducting the interviews within the same test environment and by using a predefined set of open-ended questions, with flexible follow-up questions based on participants' responses.

Construct validity relates to the extent to which the measures used in the research accurately capture the theoretical constructs or concepts under investigation and ensure that questions relate to research objectives and are understandable to participants (Golafshani, 2003). This criterion is addressed by using a clear conceptual framework as a base for the interview questions. Additionally, during the interview, clarifying questions are used to confirm the essence of the statement. By recording the interview and taking field notes at the same time, it can be guaranteed that all data are considered.

Internal validity refers to the extent to which the observed effects or relationships in the study can be attributed to the variables being manipulated or measured, rather than to confounding factors or biases. It assesses the degree to which the study design and procedures minimize alternative explanations for the observed results (Golafshani, 2003). Applying multiple research methods, namely interviews and field notes, strengthens the credibility of the findings.

External validity questions the generalizability of the findings when there is variation within the people, setting, or variables of the experiment. In qualitative research, issues regarding generalizability arise due to the limited sample sizes. The nature of semi-structured interviews generally does not allow the making of general assumptions, due to the limited size of the participants (Saunders et al., 2016). In contrast, Tsang (2014) states that case studies can be generalizable and even have advantages over quantitative research when aiming to understand contextual information. Further, the participants' perspective represents "a window to reality through which a picture of reality can be triangulated with other perceptions," according to the research philosophy of realism (Healy & Perry, 2000, p. 13). In this study, external validity is controlled by providing detailed descriptions of the research context and by exploring similarities and differences between the case study findings and existing literature to contextualize the generalizability of the results.

4. Results

This chapter presents and describes the data collected from the ten conducted interviews with venture capitalists, explaining their beliefs and experience of the impact of climate policy on the investment risk of venture capital investments in greentech. The chapter is subdivided into each of the risk clusters: product-market risk, technology risk, regulatory risk, exit risk, and people risk, following the categories of the risk model of Wüstenhagen and Treppo (2006) (see Figure 3). The results are described and presented with supporting exemplary, direct quotes from the transcribed interviewees.

4.1 Findings on Product Market Risk

All participants underscore the necessity for companies to align their practices and operations with environmental regulations due to climate policy, leading to the purchase of eco-friendly products and services. This supports the commercial performance of greentech ventures through sales, as startups that provide green products and services can meet the demand generated by these regulatory requirements. Startups with this regulatory-driven growth potential, represent an attractive investment opportunity for VCs:

"Sustainability is increasingly becoming a priority for heavily regulated industries due to penalties and regulatory pressures, driving a push for innovation." (I7)

"And it shows that the companies need now sustainable solutions, they need startups that have those solutions. So we invest in them because we bet on many clients for the startups and good revenue." (I10)

"Therefore, the government has a great impact on the performance of the startup. It is very important that the government continues to push here and can bundle all the resources and use them as a springboard. This is very valuable to get the first traction." (I2)

Investors conduct comprehensive market analysis, to understand the current state of climate policy. They state that regulatory stability is essential for the sustainable growth of greentech startups. Moreover, anticipating regulatory developments enables foresight into the emergence of new markets and offers insights into shifts in market demand. The presence or absence of regulatory frameworks can significantly influence the market viability and scalability of greentech startups. Active regulation, accompanied by stringent penalties for non-compliance, is viewed as a robust market driver, stimulating demand for environmentally friendly solutions. The absence of regulation or regulatory uncertainty poses investment risks, as scalability cannot be assured in such conditions:

"So, if there's no regulation, there might still be some customers who buy it, but it won't be the breakthrough you can achieve when regulation exists. So, it's a significant factor; if you're unsure whether the regulation will come into effect, it can affect the investment decision. That is especially true for software and regulation." (I3)

"Yes, in the Greentech sector, if you have a policy that helps you to sell the product, you can sell faster and to as many clients as possible, while you do not have a policy, a lot of possible clients find the startup interesting, however, they say "let us talk again in 6 months". Because if it is not required for them to buy the product, or to fit in a regulation. So in this field, it is a huge help to have a regulation." (I9)

Moreover, government tenders serve as indicators of emerging needs for specific technologies. Venture capitalists use these tenders to identify early signals of market demand and potential investment opportunities in the greentech sector. By staying up-to-date on regulatory developments and leveraging government signals, venture capitalists aim to make informed investment decisions and capitalize on evolving market trends:

"There are global opportunities for their technology, such as tenders where their solutions can be applied. By anticipating regulatory developments, we took a calculated risk and seized the opportunity. We understood that their technology would align with upcoming regulations, making it an attractive investment prospect, as the demand will grow." (I5)

Venture capitalists analyze the penalties for not complying with climate regulation, as well as the opportunity costs of using them, as companies are not expected to purchase eco-innovations without price advantages. Successful commercialization is only expected, if a product or service is cheaper or enables cost savings through increased efficiency, compared to non-greentech products or services. Participants state, that the price and revenue of greentech products and services can be impacted by financial instruments, such as subsidies:

"I believe policy supports hardware tech, such as new fuels or CO2-neutral cement, the extremely important technologies. They will benefit from regulation. Especially the cement issue is extremely relevant, but as long as the alternative cement isn't cheaper, there's no reason for a real estate company to use it. And that's something policy can create." (I3)

"Product performance isn't influenced by policy; it has to meet certain requirements. But definitely, on the commercial side. For example, direct subsidies count towards the topline per product sold. I believe the impact there is significant." (I3)

"However, regulatory aspects also play a significant role in creating markets, whether in carbon credit markets, material usage or CO2 goals, or synthetic fuel utilization. Regulations can shape markets significantly." (I4)

4.2 Findings on Technology Risk

All venture capitalists state that they analyze the availability of subsidies as part of their technology risk assessment. Subsidies allocated for research and development (R&D) are viewed as non-dilutive funding sources that support the development of competitive technological products. Venture capitalists aim to understand how this additional funding can support their investment strategy:

"In earlier stages, such investments with a certain climate impact may not necessarily be economically viable and require time to develop further. (…) Hence, regulatory support is necessary to make such technologies competitive. To bridge this early phase, we consider not only financial potential but also potential support, whether at the national or European level. We assess how far regulation can bridge this gap until the point where climate motivation alone is not enough, and performance becomes the selling point." (I4)

"First, regulatory regulation supports the development of the technology, for example through subventions." (I7)

Participants state, that while regulatory support can enhance the market environment for greentech innovations, the high R&D costs represent a risk to the scalability of the venture. Some venture capitalists state, that the technological success of ventures is not secured, independently of the invested money:

"So, the markets we look at already exist, but in climate tech, the question is when the technology will reach the scale where it can serve the market." (I4)

"Because if we look at a capital-intensive startup like Climeworks, for example, direct carbon air capturing. You need 100 million euros to build such a small plant. And then it turns out, like with Climeworks, that it doesn't really do much. It doesn't capture that much carbon after all. And you're putting so much money into developing something, but at the end of the day, you don't even have guaranteed scalability, which is actually the business model of venture capital. What I mean is that the invested money is not scalable. So you always have to put more money in, and then maybe at some point, there's a breakthrough. But that's not guaranteed." (I6)

4.3 Findings on Regulatory Risk

Venture capitalists assess regulatory risks of climate policy during the due diligence. They highlight the importance of strong regulatory enforcement to drive significant impact within the market. If penalties for non-compliance with climate policy are deemed insufficient or absent, venture capitalists may view regulatory-driven greentech ventures as facing challenges in achieving commercial success:

"Therefore, for sure, it is important how strict the regulation is. The regulation must be fully binding to actually create an impact. And we must be sure that it is enforced to consider it within the investment." (I7)

"If it is not decided on, or the compensation penalty for not following the law is super low, we don't believe that the incentive is strong enough to actually create a new market." (I9)

Regulatory uncertainty poses a significant investment risk, as potential policy changes or removals can significantly impact the performance of startups. While stringent climate policies can serve as an accelerator by reducing competition, the absence or weakness of regulatory frameworks represents a threat to companies. Investors may hesitate to inject further funds into ventures if the regulatory landscape becomes unpredictable or unfavorable:

"It's when there's uncertainty due to the absence of regulations or ongoing discussions that things become more uncertain. In such cases, you're left with ambiguity until regulations are solidified." (I5)

"But of course, there's a risk if you invest in pre-seed, and there's new regulation, and it disappears for the next round; then there's a risk whether there will even be a follow-up round." (I3)

"It's always crucial to consider because you don't want to invest and then find out a year later that it's no longer viable due to policy changes, leading to the collapse of the entire company. It's always top priority." (I4)

Furthermore, venture capitalists state that regulation can significantly influence the technological viability of an existing product or service. For example, climate policy may require the measurement of the consumption of certain chemical substances or release specific assessment limits. As regulations evolve, so do the requirements for greentech solutions, potentially reducing the competitiveness of companies unable to offer technologically qualified products:

"The regulation sets certain thresholds (for emission impact) that can be measured. And you know the competing products and how accurate their measurements are. If the regulation is interpreted more generously, and the threshold is raised, then three competitors become more relevant to you. And if it's lowered, and only your product can measure it, you're the only one in the market. So, you can somewhat estimate the risk based on that." (I3)

"So that also comes down with being an investment risk, as it could be that the product does not comply with a future regulatory, in a market that is strongly driven by regulatory." (I10)

Furthermore, venture capitalists indicate that a heavy reliance on government funding and grants represents an investment threat, particularly if the performance and competitiveness of greentech ventures hinge solely on such support. Additionally, in the long term, companies must be capable of operating independently without ongoing government assistance. Startups need to transition to a phase where they can sustain themselves without relying extensively on external funding sources. Dependence on government funding introduces risk, as the continuity and level of support for such initiatives can fluctuate unpredictably. Companies that persist in relying on subsidies for profitability demonstrate a heightened vulnerability to fluctuations in the company's financial stability, as noted by participants.

“The startups must still run without the (external) funding at some point. And the government is always quick in cutting down such fundings, so we see it as a red flag if the company is too dependent on it.” (I10)

“If you're still dependent on them (the subsidy) to be profitable, it's a risk for the company.” (I3)

4.4 Findings on Exit Risk

All interviewed venture capitalists underscore the role of regulations in the assessment of exit risks for greentech companies. They highlight that IPOs are not typically anticipated as viable exit scenarios for greentech investments. This is primarily attributed to the geographical constraints imposed by demand-driving regulations, which limit the scalability of greentech ventures beyond regions covered by such regulations:

“So IPOs are unlikely in the space.” (I7)

“However, IPOs are rather unlikely, as the product only performs where the regulatory is in place. So companies struggle to scale internationally as the market pull is not intrinsic, to say so.” (I10)

However, venture capitalists anticipate strategic acquisitions of greentech ventures by industry incumbents. This expectation arises from the growing need for sustainability solutions among corporations, driven by both regulatory mandates and societal pressures. As corporations seek to align with sustainability goals and fulfill regulatory obligations, they are inclined to acquire greentech ventures to leverage their intellectual property and innovative solutions. According to the participants, this trend reflects a strategic approach by corporations to enhance their sustainability offerings and remain competitive in a rapidly evolving market landscape:

“We mostly see a strategic buyer for the startups. (…) But big corporates need increasingly the sustainability solutions because policy pushes them but also because the society pushes

them. And mostly it is cheaper to buy the IP than to develop the innovative solutions themselves." (I7)

"As much as it drives the commercialization, it shows that companies also have an interest to purchase sustainable solutions, to add the IP in their company." (I10)

Moreover, venture capitalists highlight the intersection of sustainability and corporate strategy within the business landscape. One participant underscores that purely sustainable products, that lack operational benefits beyond their environmental advantages, may be viewed as costly investments, especially if the adoption of their products is primarily driven by brand-related motivations:

"Purely sustainable products that don't bring any operational value to a company, so basically products that would only cost if bought for brand reasons. Strategic exits mostly come when a product can be replaced by a sustainable product." (I6)

Consequently, strategic exits are more likely to be executed when sustainable products provide concrete operational advantages or can substitute the purchasing companies existing products. Greentech companies that offer eco-friendly products and services that also provide efficiency or cost-saving benefits are considered to have a higher chance for a strategic exit:

"The initial phase is always challenging, but once these technologies overcome the funding valley of death, the investments tend to perform well. We take significant risks, but once they reach a certain scale, these investments are economically more sustainable than, say, SaaS investments, which may collapse once the trend fades. Typically, there is infrastructure involved in the climate tech sector. And that promises long-term value." (I4)

"And I definitely think that especially in this area, with impact companies, if you achieve a breakthrough, the return can be much greater than with the next average B2B SaaS solution. If you look at the next groundbreaking company, for example, Fusion Energy, if companies like Marble Fusion succeed, the return on the fund won't be achievable in other areas." (I3)

4.5 Findings on People Risk

According to the interviewed venture capitalists, analyzing people risk and understanding the strengths and weaknesses of the leadership team is an important step of the people risk assessment. While leadership quality is a critical factor in investment decisions, venture capitalists generally do not expect climate policy to directly impact this aspect. Climate policy is considered to have a secondary impact on the quality of the leadership team, with other factors taking precedence in the evaluation process:

“Regulatory is not really impacting the team performance.” (I7)

“Climate policy is especially important in the field of go-to-market and technology. The only way how policy is impacting people is by the ability to keep up with them and how they deal with uncertainty.” (I8)

However, according to one interviewee, regulation is triggering the emergence of greentech ventures, resulting in the availability of potential greentech-investments:

"There are a lot of green tenders. So the government is actively setting incentives to build sustainable innovation." (I2).

5. Discussion

This chapter synthesizes and interprets the findings from the study, linking them back to the research questions. It critically examines the results obtained from the semi-structured interviews, exploring the implications of these findings for the broader context of greentech investments and climate policy. Moreover, the findings are contextualized within the theoretical framework outlined in the literature review, evaluating how the results align with or diverge from existing theories and studies. The first four subchapters are structured following the thematic structure within the risk categories identified by Wüstenhagen and Teppo (2006). Further, practical implications based on the findings are drawn.

5.1 Theoretical Implications of Product Market Risk

All of the interviewed venture capitalists emphasized the significant role of climate policy as a demand driver for greentech ventures and closely monitored existing and forthcoming regulations as part of their market analysis in the due diligence process. It is widely recognized that investors must stay informed about markets to ensure optimal growth potential for their ventures (Zider, 1998; Da Rin & Hellmann, 2020; Gompers et al., 2020; Fiet, 2022). Moreover, the participants highlight the relevance of climate policy as a market creator in the greentech sector. This is because companies, compelled to adopt eco-friendly practices under those regulations, need to buy and use greentech products and services. Venture capitalists expect this to result in successful commercialization and diffusion stages for the greentech ventures they are invested in. Therefore, the state of climate policy serves as one of the primary points of reference for venture capitalists to assess the market size. Research supports the notion that organizational eco-innovation and environmental strategy adoption and management are both influenced by regulation (Hojnik & Ruzzier, 2016).

Moreover, the academic literature suggests that regulation represents the strongest growth factor for eco-innovation (Banerjee et al., 2003; Popp, 2011). However, successful diffusion is only expected if active and well-enforced regulation is in place. As venture capitalists don't anticipate the adoption of eco-innovations to be solely driven by intrinsic motivation, the strength of the associated penalty for non-compliance is considered significant. This results in a notable dependency on demand-driving regulations, which, in turn, is recognized as an investment risk by venture capitalists.

For greentech products and services, which offer eco-friendly alternatives to existing technologies, venture capitalists anticipate demand to be primarily driven by incumbents seeking to replace non-greentech products and services with more efficient, green alternatives. As a result, the interviewed venture capitalists expressed their expectation for the commercial success of their invested greentech ventures to arise from the enhanced operational efficiency they provide to customers, rather than solely serving compliance-related purposes. This aligns with the idea behind the Porter Hypothesis, which posits that innovation introduced by environmental regulation can more than offset the costs of complying with it (Porter & van der Linde, 1995a; Dechezleprêtre & Sato, 2017). In other words, firms can achieve a net increase in competitiveness because of environmental regulation-induced innovation (Porter & van der Linde, 1995a). However, ongoing debate and empirical research persist regarding the validity of the Porter Hypothesis (Clift & Wright, 2000; Dechezleprêtre & Sato, 2017). While some studies provide evidence supporting the hypothesis (Jaffe et al., 1995), the neoclassical view implies that company performance decreases when complying with environmental regulations due to less management focus on the core business, especially for companies with high environmental cost-to-revenue ratios or significant upstream environmental impacts (Clift & Wright, 2000).

5.2 Theoretical Implications of Technology Risk

Besides promoting the diffusion stage of eco-innovation through accelerated demand, venture capitalists emphasize the relevance of climate policy within the R&D stages of greentech ventures. Especially additional government funding within early company stages is positively evaluated by venture capitalists, as greentech companies often require substantial upfront investments in R&D (Wüstenhagen & Teppo, 2006) that potentially exceed the funding abilities of early-stage VC funds. The funding gap for eco-innovations is caused by their public good character and results in less R&D investment than optimal (Cerulli, 2010). Technology-push instruments, such as subsidies and other governmental financial incentives, aim to address the market failure of eco-innovations by increasing the available capital for R&D (Beise & Rennings, 2005; Popp, 2010; Pary & Witmeur, 2018). Hence, venture capitalists anticipate those options and utilize them as additional, non-dilutive funding. Non-dilutive funding is characterized as capital that is "offered without the need to give up equity or control and most often comes in the form of loans, grants, prizes, or donations" (Lenzer, 2019, p. 372). Consequently, its usage does not require shares in exchange and therefore does not threaten the number of shares of existing investors, while still increasing the available capital for the venture. The availability of this additional government funding therefore represents a positive investment signal for greentech companies at an early R&D stage.

However, while research shows that subsidized small companies exhibit an increased level of innovation and apply for more patents than non-subsidized companies (Bronzini & Piselli, 2016), venture capitalists view high government dependency at later R&D stages with skepticism. Research by Pary and Witmeur (2018) indicates that non-dilutive grants can jeopardize future dilutive support. Concluding, venture capitalists evaluate governmental financial incentives more positively in early R&D stages and require less government dependency as the company matures.

Moreover, some interviewed venture capitalists critically view the R&D process of decarbonization technologies, such as direct carbon air capturing, as factors such as capital intensity and infrastructure requirements challenge the successful scalability of those greentech companies. Fast scaling is paramount for venture capital investments as the aim of the investment is to multiply the company's value by an average of 10 times until the end of the fund's lifecycle (Zider, 1998). However, technologies like carbon capture facilities require extensive infrastructure for transporting and storing captured emissions, with uncertainties surrounding infrastructure development posing substantial challenges (Hardisty et al., 2011). In the case of renewable energies, projects rely heavily on supporting infrastructure such as transmission lines and storage facilities, whose availability and reliability directly influence the project viability (Bürer & Wüstenhagen, 2009). These costs can act as a deterrent for private sector investment (Ghosh & Nanda, 2010), considering that pre-seed tickets are on average up to one million US$ (Dealroom, 2024). Also, for later-stage funds, where the capital intensity of the technology represents a good opportunity for VCs to deploy a high amount of capital with relatively low management effort, the technological risk is not necessarily compensated by the high risk of low return through a successful exit (Wüstenhagen & Teppo, 2006).

5.3 Theoretical Implications of Regulatory Risk

In venture capital, regulatory risk is characterized by laws and regulations that impact the performance of startups (Gompers et al., 2020; Zider, 1998). Venture capitalists express that climate policy affects both the R&D and diffusion stages of greentech ventures, directly impacting the startups' performance either positively or negatively. A change in regulation would therefore have a strong impact on the investment. Consequently, the biggest risk of climate policy evolves from its uncertainty about duration and stringency. For regulation, stringency is defined by the level of enforcement (Koutalakis et al., 2010).

For greentech companies in early R&D stages, venture capitalists consider climate policy that enables substitutes as a positive investment signal due to potential additional and non-dilutive funding. However, evolving environmental regulations may require continuous adjustments to technology designs and operations, increasing compliance costs and potentially affecting product viability. According to the interviews, regulations that increase in stringency, such as tightening accounting thresholds for gas leakages, can render products obsolete if their technology cannot measure up to the new standards. This is supported by research indicating that technological obsolescence represents a significant risk to once-leading products as technology evolves (Ma, 2021). For this reason, the development and benchmark of existing and anticipating GHG measurement thresholds is analyzed within the regulatory risk analysis. Moreover, in later R&D stages, governmental funding is seen as an investment risk due to high dependency on regulation subject to uncertainty, threats of removal, and change (Hagspiel et al., 2021). Consequently, venture capitalists exhibit skepticism towards investments heavily reliant on government funding, as their performance can be challenged without regulation as a driver. Research supports that policy uncertainty has a direct, negative impact on the economy, including a decrease in investments (Baker, 2016). According to Chen and Funke (2003), investments under uncertain external factors are held back as the value of waiting increases, especially when facing political uncertainty (Bhattacharya et al., 2017). Bhattacharya et al. (2017, p. 1898) show that policy uncertainty “hurts the economy’s incentive to innovate.” Moreover, economic policy uncertainty leads to instability of future cash flows, resulting in higher risk premiums and higher financing costs for both investors (Bradley, Pantzalis, & Yuan, 2016).

For venture capital investments in the diffusion stage, participants explain that favorable regulation accelerates demand and can create new markets, depending on the type of eco-innovation. Given that the success of the R&D and the creation of the market for some eco-innovations depend solely on market-pull climate policies, venture capitalists evaluate the robustness of the anticipated or existing climate policy. Further, if the penalty for non-compliance is not sufficiently high to stimulate demand, venture capitalists do not anticipate promising performance prospects. Hence, only strong enforcement of such regulations, such as revenue-dependent penalties for non-compliance, is seen as a positive investment signal for the concerning venture. This is supported by research showing that stringent climate policy promotes the development of lead markets for eco-innovation (Beise & Rennings, 2005). Moreover, stringent climate policy supports the diffusion of eco-innovation (Jaffe et al., 2002), and penalties in the form of fines lead to compliance with regulation (Cordano, 1993). Conversely, if regulations lack strict enforcement or penalties fail to sufficiently deter non-compliance, venture capitalists expect the incentive to adopt green technology products or services to diminish. The resulting low demand reduces the attractiveness of potential investment opportunities.

5.4 Theoretical Implications of Exit Risk

The goal of venture capital investments is to achieve the highest return on investment (Gaddy et al., 2017; Da Rin & Hellmann, 2020). Therefore, venture capitalists only invest in companies where they project a successful exit event, such as an IPO, acquisition, or secondary sale (Gompers et al., 2020). IPOs are generally considered the most profitable exit strategy (Gompers, 1996). However, the interviewed venture capitalists express skepticism regarding the likelihood of IPOs for greentech startups due to the limited geographic areas where demand-driving regulation is in place. This limitation hinders ventures from scaling globally and decreases the likelihood of an IPO.

In contrast to IPOs, strategic acquisitions by established corporations are considered the primary exit strategy for startups within the greentech sector. This is because climate policy compels companies to adopt environmentally friendly business models, prompting them to purchase greentech ventures as they mature. Moreover, the participants state that a strategic acquisition of a greentech company would allow the integration of valuable and innovative intellectual property (IP) into their operations. Research supports that the exit performance of cleantech ventures is dependent on their demand (Van den Heuvel & Popp, 2023), and that the demand for greentech companies is highly impacted by regulatory policies (Popp, 2011). Additionally, research conducted about strategic acquisitions of non-greentech companies shows that the main acquisition driver represents access to technological resources (Phillips & Zhdanov, 2013). However, in the past, incumbents were rather reluctant to innovate within the field of eco-innovations. For instance, while 33% of European emissions are produced by the energy sector, electricity-producing companies only spent 1% of their turnover on innovation in 2012. This reluctance has been associated with high development costs, long development timescales, the homogeneity of the goods produced, and regulatory uncertainty

(Dechezleprêtre, 2017). Consequently, empirical evidence supporting the adoption of innovative greentech solutions via company acquisitions remains inconclusive.

Moreover, venture capitalists cite a strong value proposition as a necessity for a high return in the exit event. Particularly in the field of hardware and components, greentech ventures are expected to disrupt and replace existing technology with more efficient eco-innovations. Hence, in the case of a strategic acquisition, venture capitalists expect the strategic buyer to purchase greentech companies to utilize the IP of an innovative and efficient solution to replace existing technology. This contrasts with current findings showing that companies tend to acquire companies with similar technology, as it is easier to assess and therefore mitigates information asymmetry (Phillips & Zhdanov, 2013). Additionally, in capital-intensive industries like biotechnology or semiconductors, the exit strategy typically involves an acquisition by established companies "before commercial viability has been proven"; however, this mechanism cannot be observed in the greentech field (Ghosh & Nanda, 2010, p. 13).

Moreover, for technologies purely driven by regulatory demand, such as direct air capture companies, the participants question the likelihood of a successful exit, as the business model does not revolve around value maximization but only reduces the GHG emissions of the purchasing company. For this reason, the question emerges of who will purchase the company in the end, as the investment is high and there are no incumbents with compatible assets or strategies. Research supports that the value creation of strategic acquisition is based on merging complementary assets (Chondrakis, 2016). Moreover, historic returns on investment for greentech ventures are low. Gaddy et al. (2017) show that investors in the first "cleantech bubble" lost more than half of the money invested. However, those investments were mainly conducted in clean energy. As of today, the investment fields of greentech are more diversified, providing eco-innovation in multiple industries (PwC, 2023). Hence, while the doubts of venture capitalists can be confirmed by theory, the public good nature of eco-innovations, as well as the dynamic change in the greentech landscape, must be taken into account.

5.5 Theoretical Implications of People Risk

"People risk" encompasses a variety of factors related to the human element of entrepreneurship, including skills, experience, and leadership qualities. Studies highlight that people are the most crucial factor in venture capital investment decisions (Gompers et al., 2020). However, while regulatory-induced market dynamics impact venture capital decision-making, the interviewees emphasize that climate policy typically plays a secondary role when assessing people risk. Specifically, the performance of the founders' team is more influenced by their capabilities rather than regulatory instruments.

Nevertheless, venture capitalists expect climate policy to impact the supply side of venture capital by promoting entrepreneurship. The supply side refers to the availability of suitable greentech companies to invest in. Research conducted by Hojnik and Ruzzier (2016) suggests that regulation indirectly influences the availability of innovation by driving "new market opportunities." Moreover, according to the opportunity recognition theory, entrepreneurship emerges when individuals identify and act upon opportunities, a process involving observation, questioning, experimenting, and networking (Dyer et al., 2008). Additionally, Gompers' (2004) innovation chain explains how external R&D funding fosters sustainable innovation by providing initial investments. In the field of eco-innovation, regulations and market pull factors are identified as the main drivers for the emergence of eco-innovation (Patanakul & Pinto, 2014; Hojnik & Ruzzier, 2016). Consequently, regulation leads to the emergence of innovation and entrepreneurship, thereby impacting the availability of potential companies for venture capitalists to invest in. Thus, climate policy supports the emergence of greentech by offering new market opportunities and increasing the availability and competition of greentech ventures.

5.6 Practical Implications

This study offers insights for both policymakers and venture capitalists investing in greentech ventures. First, the relevance of robust policy becomes clear as venture capitalists are unwilling to invest in greentech ventures when regulations are not clearly formulated, executed, and non-compliance penalized. Building upon the research highlighting the importance of strong and robust policy (Porter, 1980; Jaffe et al., 2002; Beise & Rennings, 2005), practitioners should prioritize the formulation, execution, and enforcement of clear regulatory frameworks. By aligning policy objectives with long-term sustainability goals and addressing regulatory gaps, practitioners can enhance investor confidence and stimulate market-driven solutions to climate change challenges. Moreover, a homogeneous approach among multiple countries could increase confidence for a successful exit scenario for venture capitalists, as it would directly impact the total addressable market of greentech ventures.

Furthermore, for VC funds considering investments in greentech ventures, it is essential to align investment strategies with the unique characteristics of eco-innovations and the evolving policy landscape. Typically, VCs prefer investments where the commercial viability is established within the first five years (Gompers & Lerner, 1999). However, practitioners should recognize the public good nature of greentech innovations (Popp, 2010) and adopt investment approaches that accommodate extended development timelines and regulatory-driven demand. This may involve the long development timeframe or dependency on infrastructure and the public good nature of eco-innovations (Teppo & Wüstenhagen, 2006). Ultimately it calls for the exploration of fund structures that offer flexibility and alignment with the unique characteristics of greentech ventures. By understanding that greentech ventures differ strongly from typical VC-funded businesses, such as software companies, the potential inadequacy of investment funds with conventional 10-year lifespans becomes clear. Offering funds with a longer lifespan, although tying up invested capital for longer, would also make it possible to invest more efficiently in greentech technologies. These investments would have the chance to support technologies that, on the one hand, have a longer development time, but on the other hand, also have higher impact and return opportunities.

6. Conclusion

This final chapter addresses the research question by summarizing the findings of the study. Furthermore, the limitations of the study are acknowledged, providing a balanced perspective on the robustness and generalizability of the findings. Additionally, it discusses the theoretical contributions to the academic literature, offers directions for future research, and provides implications for policymakers and venture capitalists.

6.1 General Conclusion

The current study aims to close a research gap regarding the impact of climate policy on venture capital investment in greentech. Furthermore, it explores the general decision-making process of both greentech-exclusive and non-greentech-exclusive European Venture Capital funds, for greentech startups. Therefore, ten experienced venture capitalists were interviewed using semi-structured interviews. Out of the participating venture capitalists, three held partner-level positions, and seven had more than two years of investment experience in both the greentech and non-greentech sectors. Based on the risk clusters outlined by Wüstenhagen and Teppo (2006), the inductive research approach allowed for the clustering of content pillars, explaining how venture capitalists perceive the influence of climate policy on the product market, technology, regulations, exit strategies, and people risk within their investment process.

Through the analysis, the study revealed that climate policy significantly influences risk assessment and, consequently, can directly and indirectly shape investment decisions. However, investors evaluate political instruments differently along the lifecycle of greentech ventures, considering the underlying market dynamics inherent to various greentech technologies in their risk analysis. In the early company stage of the investment, technological risk is evident due to the high R&D costs of greentech products and services. Within early R&D stages, venture capitalists positively evaluate the availability of technology-push instruments, such as subsidies, as they potentially provide additional non-dilutive capital. Nevertheless, high government dependency in the later stages of the R&D stage is seen as an investment risk, as their removal could jeopardize the product before achieving market readiness. In further company stages of the potential investment, venture capitalists positively evaluate climate policy within the product-market risk assessment, as they expect demand-stimulating market-pull effects. However, the uncertainty around policy removal also represents an investment risk in the later stage of the diffusion stage. In the exit stage of greentech companies, venture capitalists do not anticipate initial public offerings (IPOs) but rather strategic acquisitions as the most likely exit strategy. This is due to the geographical restriction of regulations, which only drives demand within the area it applies and therefore does not allow global scaling of the venture. Moreover, in terms of demand and exit scenarios, investors expect that the customer or buyer of greentech ventures can enhance their efficiency through the use or acquisition of greentech products or ventures. Hence, regulatory uncertainty, stemming from potential reinforcement or weakening of legal enforcement, or the absence of climate policy, emerges as the most significant investment risk factor within all stages of the greentech venture. However, a strong value proposition represents a strong investment criterion to balance out the risk of policy removal and to increase the chances for a strategic acquisition.

In conclusion, regulation represents a double-edged sword for greentech ventures. While venture capitalists recognize the unique opportunities that strong regulation can have for greentech ventures, the associated uncertainty of policy removal represents a strong investment risk. However, after comparing the results with the state of literature, it is shown that the findings about product-market, technology, regulatory and people risk align with the current state of research regarding the impact of policy on innovation. In contrast, the expected exit scenario is not supported by existing research. Nevertheless, as recent greentech investments differ from the last "greentech bubble", the compared literature was researched under different market conditions. Lastly, the results call for public sector actions to further encourage the attractiveness of public sector investments and to satisfy the overarching need for eco-innovation for climate change mitigation.

6.2 Limitations

In acknowledging the limitations of this study, several aspects warrant consideration. Firstly, the selection process for articles in the literature may be subject to criticism (Saunders et al., 2016). While efforts were made to provide a comprehensive overview, it cannot be guaranteed that all relevant work on climate economics, the greentech market, and venture capital investment decisions have been included, partly due to the time restriction of this study. Especially, the broad scope of greentech, encompassing ventures from infrastructure-intensive technologies such as green energy to low-code software solutions, poses a challenge. While past research focused primarily on companies in the energy sector (Gaddy et al., 2007), this study adopts a holistic approach to gain comprehensive insights. Conclusions are therefore also drawn with respect to existing innovation research, independent from the scope of eco-innovation. Additionally, understanding the impact of different policy types on various greentech technologies requires further investigation, which exceeds the scope of this study. While a thorough examination of diverse academic journals was undertaken to capture the most recent findings in the field, future research could explore specific technologies through comparative analysis.

Furthermore, the choice of sample size limits the generalizability of the results, potentially constraining the study due to the limited number of VC firms in the sample (Eisenhardt, 1989). Using an inductive research approach based on ten participants raises concerns about the validity of the study if these informants present a biased view of the case issue. First, the years of professional experience in greentech VC investments of the participants differ, potentially leading to opinions that are impacted by historical events (Saunders et al., 2016). Three participants were experienced partners with over five years of experience, and seven had between two and five years of experience. Furthermore, the venture capitalists hailed from four different countries, each with varying levels of sustainable awareness, which is proven to impact the investment decision in greentech ventures (Gutsche & Ziegler, 2019). To mitigate this threat, the number of interviews conducted aligns with the state of research, which indicates that a case study should involve 5 – 25 participants to present a representative number of cases (Saunders et al., 2016). Also, the conduction of interviews was only stopped, after a holistic picture of answers could be drawn. Moreover, the findings were largely aligned with academic research, as seen in the discussion chapter. According to Marshall and Rossman (2006), related research suggests wider significance.

Lastly, the nature of semi-structured interviews raises concerns regarding the reliability of the study due to the lack of standardization (Saunders et al., 2016). Reliability addresses whether other research could arrive at the same findings and is impacted by interviewer and interviewee bias (Saunders et al., 2016). Measures to mitigate interview bias were taken by researching and understanding the background of the participants and the VC fund, as well as the theoretical background of the research topic. Moreover, the interviews were conducted using active listening and summarizing questions to test understanding.

6.3 Theoretical Contributions

This study contributes to the literature in the fields of entrepreneurial finance and environmental entrepreneurship by providing insights into the decision-making behavior of venture capitalists towards greentech investments. First, this research adds to the understanding of climate economics, greentech companies, and venture capital by presenting an extensive review of the existing literature, uncovering the lack of up-to-date insights into the dynamic greentech venture capital investment market. Moreover, the findings concerning the role of regulation within the risk fields of product-market, technology, regulatory, exit, and people risk contribute to research on alternative investments in public goods. The high importance of private sector action against climate change mitigation (Stern, 2007), and the economic dilemma of the double externality problem of eco-innovations (Popp, 2007), increases the relevance of the findings.

Two implications for further research should be noted. First, the interviewed venture capitalists believe that besides the impact of climate policy, incumbents buy greentech products and services, as well as greentech companies, due to their ability to offer more efficient solutions. This represents a hypothesis similar to the Porter hypothesis (Porter & van der Linde, 1995a). However, this hypothesis is unproven, and there is no historical data explaining the change in efficiency after the acquisition of greentech ventures (Clift & Wright, 2000; Dechezleprêtre & Sato, 2017).

Secondly, the expectations of venture capitalists regarding the exit scenario do not match with research on historical exit events of greentech ventures (Dechezlepretre, 2017). While one could argue that past research was mainly conducted in the field of cleantech ventures, meaning ventures in the energy sectors, general research on the economics of mergers and acquisitions (M&A) also does not suggest strategic acquisition for greentech ventures. While research indicates that access to technological resources and value creation through merging complementary assets are typical drivers for strategic company acquisitions (Phillips & Zhdanov, 2013; Chondrakis, 2016), incumbents have historically shown reluctance to innovate within the environmental sector (Dechezlepretre, 2017).

One possible explanation for the investment behavior regarding both implications represents a “confirmation bias” of the investors. This means that the investors follow their existing beliefs about an investment opportunity while ignoring or downplaying contradictory evidence (Lockett et al., 2002). While environmental consciousness is worldwide increasing (Fraj & Martinez, 2007), research shows that private investors with high environmental awareness are more willing to sacrifice returns for sustainable investments (Gutsche & Ziegler, 2019). Hence, future research should explore this direction, as it can change the paradigm of greentech investments.

References

Ahmad, M., Ahmed, Z., Riaz, M., & Yang, X. (2024). Modeling the linkage between climate-tech, energy transition, and CO2 emissions: Do environmental regulations matter?. *Gondwana Research, 127*, 131-143.

Al Natsheh, A., Gbadegeshin, S. A., Ghafel, K., Mohammed, O., Koskela, A., Rimpiläinen, A., ... & Kuoppala, A. (2021). The causes of valley of death: a literature review. *INTED2021 Proceedings*, 9289-9298.

Amit, R., Brander, J. and Zott, C. (1998), 'Why do venture capital firms exist? Theory and Canadian evidence', *Journal of Business Venturing 13*(6), 441–466.

Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring economic policy uncertainty. *The quarterly journal of economics*, *131*(4), 1593-1636.

Banerjee, S., Iyer, E., Kashyap, R., 2003. Corporate environmentalism: antecedents and influence of industry type. *Journal of Marketing, 67*(4), 106–122.

Barrett, S. (2009). The coming global climate–technology revolution*. Journal of Economic Perspectives, 23*(2), 53-75.

Basias, N., & Pollalis, Y. (2018). Quantitative and qualitative research in business & technology: Justifying a suitable research methodology. *Review of Integrative Business and Economics Research*, *7*, 91-105.

Beise, M., & Rennings, K. (2005). Lead markets and regulation: a framework for analyzing the international diffusion of environmental innovations. *Ecological economics*, *52*(1), 5-17.

Bergset, L., & Fichter, K. (2015). Green start-ups–a new typology for sustainable entrepre-neurship and innovation research. *Journal of innovation management*, *3*(3), 118-144.

Bertoni, F., Colombo, M. G., & Quas, A. (2015). The patterns of venture capital investment in Europe. *Small business economics*, *45*, 543-560.

Bhattacharya, U., Hsu, P. H., Tian, X., & Xu, Y. (2017). What affects innovation more: policy or policy uncertainty?. *Journal of Financial and Quantitative Analysis*, *52*(5), 1869 – 1901.

Bjornali, E. S., & Ellingsen, A. (2014). Factors affecting the development of clean-tech start ups: A literature review. *Energy Procedia*, *58*, 43-50.

Bose, U., Gregori, W. D., & Martinez Cillero, M. (2023). Does green transition promote green innovation and technological acquisitions?. *JRC Working Papers in Economics and Finance.*

Bradley, D., Pantzalis, C., & Yuan, X. (2016). Policy risk, corporate political strategies, and the cost of debt. *Journal of Corporate Finance, 40*, 254-275.

Bronzini, R., & Piselli, P. (2016). The impact of R&D subsidies on firm innovation. *Research Policy, 45*(2), 442-457.

Budi, L. Aldianto, "Research and Development – Commercialization Bridge: A Refined Model", *The Asian Journal of Technology Management, 13*(1), pp. 47-62, 2020.

Bürer, M. J., & Wüstenhagen, R. (2009). Which renewable energy policy is a venture capitalist's best friend? Empirical evidence from a survey of international cleantech investors. *Energy policy, 37*(12), 4997-5006.

Camp, J. J. (2002). *Venture capital due diligence: A guide to making smart investment choices and increasing your portfolio returns*, *10,* John Wiley & Sons.

Carrión-Flores, C. E., & Innes, R. (2010). Environmental innovation and environmental performance. *Journal of Environmental Economics and Management*, *59*(1), 27-42.

Cerulli, G. (2010). Modelling and measuring the effect of public subsidies on business R&D: A critical review of the econometric literature. *Economic record, 86*(274), 421-449.

Chandler, G. N., & Hanks, S. H. (1994). Market attractiveness, resource-based capabilities, venture strategies, and venture performance. *Journal of business venturing*, *9*(4), 331 349.

Chen, Y. F., & M. Funke (2003). Option Value, Policy Uncertainty, and the Foreign Direct Investment Decision. *Hamburg Institute of International Economics Discussion Paper.*

Chen, Y. S., Lai, S. B., & Wen, C. T. (2006). The influence of green innovation performance on corporate advantage in Taiwan. *Journal of business ethics, 67*, 331-339.

Chidamber, S. R., & Kon, H. B. (1994). A research retrospective of innovation inception and success: the technology–push, demand–pull question. *International Journal of Technology Management*, *9*(1), 94-112.

Chondrakis, G. (2016). Unique synergies in technology acquisitions. *Research Policy, 45*(9), 1873- 1889

Clift, R., & Wright, L. (2000). Relationships between environmental impacts and added value along the supply chain. *Technological forecasting and social change*, *65*(3), 281-295.

Cochrane, J. H. (2005). The risk and return of venture capital. *Journal of financial economics*, *75*(1), 3-52.

Cordano, M. (1993). Making the natural connection: justifying investment in environmental innovation. *Proceedings of the International Association for Business and* Society, 530–537.

Creswell, J. W., & Poth, C. N. (2016). Qualitative inquiry and research design: Choosing among five approaches. *Sage publications.*

Cumming, D., Fleming, G. and Schwienbacher, A. (2006), ‘Legality and venture capital exits’, *Journal of Corporate Finance* 12(2), 214–245.

Da Rin, M., & Hellmann, T. (2020). Fundamentals of Entrepreneurial Finance. *Oxford University Press.*

Dealroom. (n.a.). The State of Global VC. *dealroom.co*. Retrieved January 30, 2024, from https://dealroom.co/guides/global

Dechezleprêtre, A., & Popp, D. (2017). Fiscal and regulatory instruments for clean technology development in the European Union. *CESifo Working Paper Series*, 5361.

Dechezleprêtre, A., & Sato, M. (2017). The impacts of environmental regulations on competitiveness. *Review of environmental economics and policy*.

Demirel, P., & Parris, S. (2015). Access to finance for innovators in the UK's environmental sector. *Technology Analysis & Strategic Management*, *27*(7), 782-808.

Denis, D. J. (2004). Entrepreneurial finance: an overview of the issues and evidence. *Journal of corporate finance*, *10*(2), 301-326.

Dyer, J. H., Gregersen, H. B., & Christensen, C. (2008). Entrepreneur behaviors, opportunity recognition, and the origins of innovative ventures. *Strategic entrepreneurship journal*, *2*(4), 317-338.

Easton, G. (2010). Critical realism in case study research. *Industrial marketing management*, *39*(1), 118-128.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of management review*, *14*(4), 532-550.

Estay, C., Durrieu, F., & Akhter, M. (2013). Entrepreneurship: From motivation to start up. *Journal of international Entrepreneurship*, *11*, 243-267.

European Commission (n.a.). *The European Green Deal. Striving to be the first climate Neutral continent.* Retrieved January 30, 2024, from https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

European Union (n.a). *Eco-Innovation at the hearh of European policies.* Retrieved January 30, 2024, from https://green business.ec.europa.eu/eco-innovation_en

Falkner, R. (2016). The Paris Agreement and the new logic of international climate politics. *International Affairs*, *92*(5), 1107-1125.

Fankhauser, S., Hepburn, C., & Park, J. (2010). Combining multiple climate policy instruments: how not to do it. *Climate change economics*, *1*(03), 209-225.

Fetting, C. (2020). The European green deal. *ESDN report*, *53*.

Fiet, J. O. (2022). Risk avoidance strategies in venture capital markets. In *Venture Capital* (pp. 219-242). Routledge.

Fischer, C., & Newell, R. G. (2008). Environmental and technology policies for climate mitigation. *Journal of environmental economics and management*, *55*(2), 142-162.

Fischer, C., & Sterner, T. (2012). Climate policy, uncertainty, and the role of technological innovation. *Journal of Public Economic Theory*, *14*(2), 285-309.

Fraj, E., & Martinez, E. (2007). Ecological consumer behaviour: an empirical analysis. *International journal of consumer studies*, *31*(1), 26-33.

Freeman, John, and Jerome S. Engel. "Models of innovation: Startups and mature corporations." *California management review* 50.1 (2007): 94-119.

Fried, V. H., & Hisrich, R. D. (1994). Toward a model of venture capital investment decision making. *Financial management*, 28-37.

Gaddy, B. E., Sivaram, V., Jones, T. B., & Wayman, L. (2017). Venture capital and cleantech: The wrong model for energy innovation. *Energy Policy*, *102*, 385-395.

Ghosh, S., & Nanda, R. (2010). Venture capital investment in the clean energy sector. *Harvard Business School Entrepreneurial Management Working Paper*, (11 020).

Gläser, J., & Laudel, G. (1999). *Theoriegeleitete textanalyse? Das potential einer variablenorientierten qualitativen inhaltsanalyse* (No. P 99-401). WZB Discussion Paper.

Glücksman, S. (2020). Entrepreneurial experiences from venture capital funding: exploring two-sided information asymmetry. *Venture Capital*, *22*(4), 331-354.

Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The qualitative report*, *8*(4), 597-607.

Gompers, P. A. (1995), ‘Optimal investment, monitoring, and the staging of venture cap- ital’, *The Journal of Finance* 50(5), 1461–1489.

Gompers, P. A. (1996), ‘Grandstanding in the venture capital industry’, *Journal of Financial Economics* 42(1), 133–156.

Gompers, P. A., Gornall, W., Kaplan, S. N., & Strebulaev, I. A. (2020). How do venture capitalists make decisions?. *Journal of Financial Economics*, *135*(1), 169-190.

Gompers, P., & Lerner, J. (2001). The venture capital revolution. *Journal of economic perspectives*, *15*(2), 145-168.

Grubb, M. (2004). Technology innovation and climate change policy: an overview of issues and options. *Keio economic studies*, *41*(2), 103-132.

Guba, E.G. and Lincoln, Y.S. (1994), "Competing paradigms in qualitative research", in Denzin, N.K. and Lincoln, Y.S. (Eds), Handbook of Qualitative Research, Sage, Thousand Oaks, CA, pp. 105-17.

Gupta, S., D. A. Tirpak, N. Burger, J. Gupta, N. Höhne, A. I. Boncheva, G. M. Kanoan, C. Kolstad, J. A. Kruger, A. Michaelowa, S. Murase, J. Pershing, T. Saijo, A. Sari, 2007: Policies, Instruments and Co-operative Arrangements. In Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], *Cambridge University Press*.

Gutsche, G., & Ziegler, A. (2019). Which private investors are willing to pay for sustainable investments? Empirical evidence from stated choice experiments. *Journal of Banking & Finance*, *102*, 193-214.

Hagspiel, V., Nunes, C., Oliveira, C., & Portela, M. (2021). Green investment under time dependent subsidy retraction risk. *Journal of Economic Dynamics and Control*, *126*, 103936.

Hall, J. K., Daneke, G. A., & Lenox, M. J. (2010). Sustainable development and entrepreneurship: Past contributions and future directions. Journal of Business Venturing, 25(5), 439–448.

Hambrick, D.C., and Lei, D. 1985. Toward an empirical prioritization of contingency variables for business strategy. *Academy of Management Journal 28*, 763-788.

Hardisty, P. E., Sivapalan, M., & Brooks, P. (2011). The environmental and economic sustainability of carbon capture and storage. *International Journal of Environmental Research and Public Health, 8*(5), 1460-1477.

Healy, M., & Perry, C. (2000). Comprehensive criteria to judge validity and reliability of qualitative research within the realism paradigm. *Qualitative market research: An international journal*, *3*(3), 118-126.

Hellmann, T., & Puri, M. (2000). *The Interaction between Product Market and Financing Strategy: The Role of Venture Capital. Review of Financial Studies, 13(4), 959 984.* doi:10.1093/rfs/13.4.95

Hockerts, K., & Wüstenhagen, R. (2010). Greening Goliaths versus emerging Davids Theorizing about the role of incumbents and new entrants in sustainable entrepreneurship. *Journal of business venturing*, *25*(5), 481-492.

Hojnik, J., & Ruzzier, M. (2016). What drives eco-innovation? A review of an emerging literature. *Environmental innovation and societal transitions*, *19*, 31-41.

Jaffe, A. B., Newell, R. G., & Stavins, R. N. (2002). Environmental policy and technological change. *Environmental and resource economics*, *22*, 41-70.

Jaffe, R.G. Newell, R.N. Stavins, A tale of two market failures: technology and environmental policy. *Ecolog. Econ. 54* (2005) 164–174.

Janghorban, R., Roudsari, R. L., & Taghipour, A. (2014). Skype interviewing: The new generation of online synchronous interview in qualitative research. *International journal of qualitative studies on health and well-being*, *9*(1), 24152.

Johnson, D. K., & Lybecker, K. M. (2012). Paying for green: An economics literature review on the constraints to financing environmental innovation. *Electronic Green Journal*, *1*(33).

Kenney, M. (2011). 11 Venture capital investment in the greentech industries: a provocative essay. *The handbook of research on energy entrepreneurship*, 214.

Kirzner, I. M. (1997). Entrepreneurial discovery and the competitive market process: An Austrian approach. *Journal of economic Literature*, *35*(1), 60-85.

Kolstad, C. D., & Toman, M. (2005). The economics of climate policy. *Handbook of environmental economics*, *3*, 1561-1618.

Koutalakis, C., Buzogany, A., & Börzel, T. A. (2010). When soft regulation is not enough: The integrated pollution prevention and control directive of the European Union. *Regulation & Governance*, *4*(3), 329-344.

Lenzer, J. (2019). Searching for green: Funding options to advance innovations. *Technology & Innovation*, *20*(4), 371-376.

Lockett, A., Murray, G., & Wright, M. (2002). Do UK venture capitalists still have a bias against investment in new technology firms. *Research Policy*, *31*(6), 1009-1030.

Lüthi, S., & Wüstenhagen, R. (2012). The price of policy risk—Empirical insights from choice experiments with European photovoltaic project developers. *Energy Economics*, *34*(4), 1001-1011.

Ma, S. (2021). Technological obsolescence (No. w29504). *National Bureau of Economic Research.*

MacMillan, I. C., Siegel, R., & Narasimha, P. S. (1985). Criteria used by venture capitalists to evaluate new venture proposals. *Journal of Business venturing*, *1*(1), 119-128.

Maiti, M. (2022). Does development in venture capital investments influence green growth?. *Technological Forecasting and Social Change*, *182*, 121878.

Mann, R. J., & Sager, T. W. (2007). Patents, venture capital, and software start-ups. *Research Policy*, *36*(2), 193-208.

Marra, A., Antonelli, P., & Pozzi, C. (2017). Emerging green-tech specializations and clusters–A network analysis on technological innovation at the metropolitan level. *Renewable and Sustainable Energy Reviews*, *67*, 1037-1046.

Marshall, C. and Rossman, G.B. (2006) Designing Qualitative Research (4th edn). *Thousand Oaks.*

Mayring, P. (2014). Qualitative content analysis: theoretical foundation, basic procedures and software solution.

Mayring, Philipp (2003). Qualitative Inhaltsanalyse, Grundlagen und Techniken (8th ed.). *Weinheim: Beltz, UTB.*

Mazzucato, M. (2016). From market fixing to market-creating: a new framework for innovation policy. *Industry and Innovation*, *23*(2), 140-156.

McLaren, D., & Markusson, N. (2020). The co-evolution of technological promises, modelling, policies and climate change targets. *Nature Climate Change*, *10*(5), 392 397.

Miles, M. B. and Huberman, A. M. 1994, Qualitative data analysis. 2nd edn. *Sage, Thousand Oaks.*

Moisander, J. & Valtonen, A. (2006), "Qualitative Marketing Research: a Cultural Approach", *Sage, London.*

Moore, B., Wustenhagen, R., 2004. Innovative and sustainable energy technologies: the role of venture capital. *Business Strategy and the Environment 13*, 235–245.

Murphy, L. M., & Edwards, P. L. (2003). Bridging the valley of death: Transitioning from public to private sector financing. *Golden, CO: National Renewable Energy Laboratory.*

Nordhaus, W. (2019). Climate change: The ultimate challenge for economics. *American Economic Review*, *109*(6), 1991-2014.

Oberthür, S., & Von Homeyer, I. (2023). From emissions trading to the European Green Deal: the evolution of the climate policy mix and climate policy integration in the EU. *Journal of European Public Policy*, *30*(3), 445-468.

OECD, 2005. *Oslo Manual. Guidelines for Collecting and Interpreting Innovation. Statistical Office of the European Communities, Luxembourg*. Retrieved January 30, 2024, from http://www.tubitak.gov.tr/tubitak content files/BTYPD/kilavuzlar/Oslo Manual Third Edition.pdf (29.04.2024.).

Pary, N., & Witmeur, O. (2018). New Technology-Based Firms and Grants: Too Much of a Good Thing?. *Technology Entrepreneurship: Insights in New Technology-Based Firms, Research Spin-Offs and Corporate Environments*, 177-200.

Patanakul, P., & Pinto, J. K. (2014). Examining the roles of government policy on innovation. *The Journal of High Technology Management Research*, *25*(2), 97-107.

Pearson, R. J., Costley, A. E., Phaal, R., & Nuttall, W. J. (2020). Technology Roadmapping for mission-led agile hardware development: a case study of a commercial fusion energy start-up. *Technological Forecasting and Social Change*, *158*, 120064.

Phillips, G. M., & Zhdanov, A. (2013). R&D and the incentives from merger and acquisition activity. *The Review of Financial Studies, 26*(1), 34-78.

Popp, D. (2010). Innovation and climate policy. *Annu. Rev. Resour. Econ.*, *2*(1), 275-298.

Popp, D. (2011). International technology transfer, climate change, and the clean development mechanism. *Review of Environmental Economics and Policy*.

Popp, D. (2019). Environmental policy and innovation: a decade of research.

Porter, M. E. (1980). Competitive Strategy. *New York: Free Press.*

Porter, M. E., and C. van der Linde. 1995a. Green and competitive: ending the stalemate. *Harvard Business Review, 73*(5), 120–34

PWC (2023). *State of Climate Tech 2023*. Retrieved January 30, 2024, from https://www.pwc.com/gx/en/issues/esg/state-of-climate-tech-2023-investment.html

Rennings, K. (2000). Redefining innovation—eco-innovation research and the contribution from ecological economics. *Ecological economics*, *32*(2), 319-332.

Rogers, E. M., & Williams, D. (1983). Diffusion of. *Innovations (Glencoe, IL: The Free Press, 1962)*.

Ruhnka, J. C., & Young, J. E. (1991). Some hypotheses about risk in venture capital investing. *Journal of business venturing*, *6*(2), 115-133.

Sandberg, W.R. 1986. New Venture Performance: The Role of Strategy and Industry Structure. *Lexington, MA: Lexington Books.*

Saunders, M., Lewis, P. and Thornhill, A. (2016). Research Methods for Business Students. *7th Edition, Pearson, Harlow.*

Schaltegger, S., & Wagner, M. (2011). Sustainable entrepreneurship and sustainability innovation: categories and interactions. *Business strategy and the environment*, *20*(4), 222-237.

Schiederig, T., Tietze, F., & Herstatt, C. (2012). Green innovation in technology and innovation management–an exploratory literature review. *R&d Management, 42*(2), 180-192.

Shaffer G, Pollack MA (2009) Hard vs. Soft Law: Alternatives, Complements and Antagonists in International Governance. Minnesota Law Review 94, 706–799

Sobh, R., & Perry, C. (2006). Research design and data analysis in realism research. *European Journal of marketing*, *40*(11/12), 1194-1209.

Spain on behalf of the European Union. (2023, October 16). *Update of the NDC of the European Union and its Member States*. Retrieved January 30, 2024, from https://unfccc.int/sites/default/files/NDC/2023-10/ES-2023-10 17%20EU%20submission%20NDC%20update.pdf

Stern, N. H. (2007). The economics of climate change: the Stern review. C*ambridge University press.*

Strauss, A., & Corbin, J. (1998). Basics of qualitative research techniques. *Sage.*

Stuart, T. and Sorenson, O. (2003), 'The geography of opportunity: Spatial heterogeneity in founding rates and the performance of biotechnology firms', *Research Policy,* 32(2), 229–253.

Taherdoost, H. (2016). Sampling methods in research methodology; how to choose a sampling technique for research. *How to choose a sampling technique for research.*

Technological Pull & Push : Bürer, M. J., & Wüstenhagen, R. (2009). Which renewable energy policy is a venture capitalist's best friend? Empirical evidence from a survey of international cleantech investors. *Energy policy*, *37*(12), 4997-5006.

Teppo, T., & Wüstenhagen, R. (2011). Why corporate venture capital funds fail: evidence from the European energy industry. *Handbook of Research on Energy Entrepreneurship*. Edward Elgar Publishing.

Tomaszewski, L. E., Zarestky, J., & Gonzalez, E. (2020). Planning qualitative research: Design and decision making for new researchers. *International journal of qualitative methods*, *19*, 1609406920967174.

Trapp, C. T., & Kanbach, D. K. (2021). Green entrepreneurship and business models: Deriving green technology business model archetypes. *Journal of cleaner production*, *297*, 126694.

Tsang, E. W. (2014). Generalizing from research findings: The merits of case studies. *International Journal of Management Reviews*, *16*(4), 369-383.

Tyebjee, T. T., & Bruno, A. V. (1984). A model of venture capitalist investment activity. *Management science*, *30*(9), 1051-1066.

Van den Heuvel, M., & Popp, D. (2023). The role of venture capital and governments in clean energy: lessons from the first cleantech bubble. *Energy Economics*, *124*, 106877.

Vedula, S., Doblinger, C., Pacheco, D., York, J. G., Bacq, S., Russo, M. V., & Dean, T. J. (2022). Entrepreneurship for the public good: A review, critique, and path forward for social and environmental entrepreneurship research. *Academy of Management Annals*, *16*(1), 391-425.

Visscher, K., Stegmaier, P., Damm, A., Hamaker-Taylor, R., Harjanne, A., & Giordano, R. (2020). Matching supply and demand: A typology of climate services. *Climate services*, *17*, 100136.

Wright M, Westhead P, Ucbasaran D. 2007. The internationalization of SMEs and international entrepreneurship: a critique and policy implications. *Regional Studies, 41*(7), 1013-1029.

Wustenhagen, R., & Teppo, T. (2006). Do venture capitalists really invest in good industries? Risk-return perceptions and path dependence in the emerging European energy VC market. *International Journal of Technology Management*, *34*(1-2), 63-87.

Wüstenhagen, R., Wuebker, R., Bürer, M. J., & Goddard, D. (2009). Financing fuel cell market development: Exploring the role of expectation dynamics in venture capital investment. *Innovation, markets, and sustainable energy: The challenge of hydrogen and fuel cells*, 118-137.

Yang, Z., Wang, X., & Su, C. (2006). A review of research methodologies in international business. *International Business Review*, *15*(6), 601-617.

Yin, R. K. (2009). *Case study research: Design and methods* (Vol. 5). Sage.

Yin, R. K. (2018). *Case study research and applications* (Vol. 6). Thousand Oaks, CA: Sage.

Zider, B. (1998). How venture capital works. *Harvard business review*, *76*(6), 131-139.

Appendices

8.1 Appendix: Participant Overview

Code	Name	Position	VC	Date
I1	Saish Rane	Partner	Edenia Capital	28.02.2024
I2	Lino Gandola	Partner	Riceberg Ventures	08.03.2024
I3	Simon Math	Partner	Rivus Partners	08.03.2024
I4	Felix Neubeck	Analyst	High Tech Gründerfonds	08.03.2024
I5	Sebastian Silvestri	Venture Capital Lead	A2A	08.03.2024
I6	Henry Waldersee	Venture Capital Investor	Redalpine	11.03.2024
I7	Lara Ebert	Investment & Founders Associate	Gründerfonds Ruhr	12.03.2024
I8	Anonym	Investor	Anonym	15.03.2024
I9	Giulio Piccione	Program Manager	LVenture Partners	19.03.2024
I10	Anonym	Anonym	Atlantics Labs	25.03.2024

8.2 Appendix: Interview Questions

- Can you guide me through your investment process?
- What aspects do you look at within your due diligence?
- How does climate policy impact the investment risk of the venture?
- Does the investment process differ for greentech and non-greentech ventures?
- What are the risks associated with climate policy for greentech investments?
- Is there a difference in the product-market assessment for greentech and non-greentech investments?
- How does climate policy impact the viability of the technology and product of the venture?
- What exit strategy do you typically project for greentech ventures and how are they impacted by climate policy?
- Do you expect the same return for greentech investments as for non-greentech investments?
- Is there an area in your due diligence that is not impacted by climate policy?
- Do you believe policy is relevant in every sector where greentech ventures operate?
- Is there any other topic we have not yet discussed that you think is worth mentioning?

8.3 Appendix: Content Clusters