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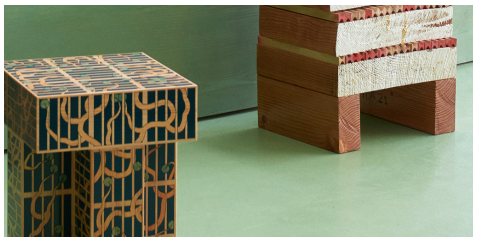



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ECO-INNOVATION IN THE SCANDINAVIAN AND FINNISH FURNITURE INDUSTRY:

INVESTIGATING DRIVERS, BARRIERS AND THE ROLE OF COMPANY AGE AND SIZE

Master Thesis

M.Sc. Management

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ABSTRACT

Title: Eco-Innovation in the Scandinavian and Finnish Furniture Industry: Investigating Drivers, Barriers and The Role of Company Age and Size

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Keywords: Product eco-innovation, environmental sustainability, Scandinavian and Finnish furniture industry, drivers and obstacles, company age and size impact.

Thesis Purpose: This study explores the major drivers and barriers to eco-innovation in Scandinavian and Finnish furniture companies, examining the influence of company size and age. The findings benefit stakeholders including businesses, policymakers, professionals, investors, and consumers.

Theoretical Perspective: This study's theoretical framework was developed through an exploration of eco-innovation literature and the effects of firm size and age on innovation. Central theories incorporated include Technological Determinism (Veblen, 1921), Institutional Theory (DiMaggio & Powell, 1983), and Resource-based view (Barney, 1991), shaping the study's framework. The size and age of firms were considered through the Schumpeterian Hypothesis (Schumpeter, 1942), the entrepreneurial firms perspective (Acs & Audretsch, 1990), the age-dependent and independent innovation views (Sørensen & Stuart, 2000; Zhou, Yim and Tse, 2005), and the contingent/contextual perspective (Nooteboom, 1994; Cohen & Klepper, 1996). These guided the hypothesis formulation and analysis within the target industry.

Methodology: Utilising a mixed-methods approach, the study combines the breadth of survey data with the depth of semi-structured interviews, capturing insights from industry professionals across different company sizes and ages. The the survey responses averaged across the industry are analysed together with the interview insights to answer the research questions.

Data Scope: This study used non-probability purposive sampling, selecting participants for their industry experience. The sample included 34 survey respondents and 8 interviewees from various furniture companies in the geographical location of interest.

Findings: This research uncovered a multitude of drivers and barriers to eco-innovation within the Scandinavian and Finnish furniture industry. Predominantly, market demand, environmental factors such as climate change and resource scarcity, and corporate strategy emerged as key drivers. On the other hand, resource capabilities, availability of skilled staff, and supply-side market issues posed significant barriers. Interestingly, the study found the majority of the proposed hypotheses applicable to this context, with company size considered more influential for successful eco-innovation than company age.

Implications: The insights gained from this study carry important implications for the future of the furniture industry in Scandinavia and Finland. These include the need for targeted policies and strategies to stimulate eco-innovation. To do this effectively, attention should be paid to enhancing resource capabilities, addressing skill gaps, and improving supply-side market conditions. By aligning with these findings, industry and policy stakeholders can better support businesses of different sizes and ages in their eco-innovation pursuits.

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LIST OF ABBREVIATIONS

C2C	Cradle to Cradle
CAGR	Compound Annual Growth Rate
CLT	The Central Limit Theorem
EPD	The Environmental Product Declaration
EUTR	The European Union Timber Regulation
FSC	The Forest Stewardship Council certification
OECD	The Organisation for Economic Co-operation and Development organisation
PEFC	The Programme for the Endorsement of Forest Certification
R&D	Research and Development
RBV	The Resource-Based View
SDG	Sustainable Development Goals
SDGs	UN's Sustainable Development Goals
SME	Small and Medium-Sized Enterprise
TBL	The Triple Bottom Line Framework

1. INTRODUCTION

1.1 BACKGROUND

1.1.1 CLIMATE CHANGE AND ITS CONSEQUENCES

Climate change has emerged as a pressing global issue, with mounting evidence of its impact on ecosystems, human health, and the economy (Intergovernmental Panel on Climate Change, 2022). Global temperatures have increased as a result of human activities such as the burning of fossil fuels, deforestation, and industrial operations, which generate greenhouse gases, notably carbon dioxide (CO2) (Friedlingstein et al., 2022). This temperature increase has led to altered ecosystems, rising sea levels, and more frequent and severe weather conditions (Intergovernmental Panel on Climate Change, 2022). The consequences of climate change are wide-ranging and disproportionately affect vulnerable populations, particularly in developing countries where adaptive capacities are limited (Watts et al., 2015; Hallegatte, 2016).

Given the urgency of addressing climate change and reducing greenhouse gas emissions, international agreements such as the Paris Agreement have been established to coordinate global efforts with the goal of limiting global temperature rise to below 2 degrees Celsius above pre-industrial levels (UNFCCC, 2022). However, in order to accomplish these goals, considerable adjustments must be made in energy production, land use, transportation, and industrial processes (Rogelj et al., 2016; Creutzig et al., 2018).

1.1.2 SUSTAINABILITY AND ECO-INNOVATION

As a response to the challenges posed by climate change, the concept of sustainability has gained momentum. According to WCED (1987) and Elkington & Rowlands (1999), sustainability is a multifaceted concept that includes the integration of economic, social, and environmental goals in order to ensure the welfare of both present-day society and future generations. In the business context, sustainability involves the adoption of corporate strategies and practices that create value for stakeholders while minimising the negative impacts on the environment and society (Dyllick & Hockerts, 2002).

Furthermore, as a means to address environmental challenges and promote sustainable development the concept of eco-innovation has gained considerable attention. Eco-innovation is generally understood as any innovation that leads to environmental improvements by reducing resource use, decreasing pollution, or enhancing the overall environmental performance of products, processes, or systems (Kemp & Pearson, 2008; Rennings, 2000; Del Rio, Romero-Jordan & Peñasco, 2015). According to Rennings (2000), the term "eco-innovation" refers to a broad variety of activities, including the creation of new technology, the adoption of creative management techniques, and the introduction of green goods and services. Moreover, eco-innovation can generate new market opportunities, enhance competitiveness, and stimulate economic growth, while addressing pressing social and environmental challenges (Porter & van der Linde, 1995; Nidumolu, Prahalad & Rangaswami, 2013).

1.1.3 PRODUCT ECO-INNOVATION

Product eco-innovation refers to the development and commercialization of novel or significantly improved goods and services that possess environmental benefits throughout their life cycle (OECD & Eurostat, 2018). These products ofter aim to decrease the use of natural resources, lower emissions and waste, improve energy efficiency, and support recycling as well as the circular economy principles (Rennings, 2000). By incorporating sustainability goals into product design and development, product eco-innovations contribute to the overall environmental performance of firms and industries, while also responding to consumer preferences for greener and more sustainable consumption (Triguero, Moreno-Mondéjar and Davia, 2013).

Several instances of product eco-innovations have emerged in a variety of industries, demonstrating the rising interest in and demand for environmentally sustainable products. The introduction of electric vehicles into the automotive sector is an important eco-innovation designed to lower the air pollution and greenhouse gas emissions produced by traditional internal combustion engine cars (Li et

al., 2017). The electric car revolution has been led by companies like Tesla, who have created vehicles with increased battery life, sophisticated energy management systems, and advanced charging infrastructure (Stringham, Miller & Clark, 2015).

In order to improve the environmental performance of the built environment and lessen its ecological footprint, green building materials have been developed in the construction industry, such as low-emission paints, insulation made from recycled or renewable materials, and energy-efficient windows (Kibert, 2016). For instance, Saint-Gobain and other businesses have developed novel glass solutions that enhance thermal insulation and lower energy use (Record 2022 outcomes, 2023).

Consumer electronics industry has also seen the emergence of product eco-innovations, such as smartphones and laptops made with recycled materials or designed for easier repair and disassembly, which can prolong their useful life and facilitate recycling (Bakker et al., 2014). For instance, Fairphone has created a smartphone that is modular and lets users to swap out individual parts, encouraging repairability and reducing electronic waste (Fairphone's impact 2021, 2021).

These cases show how product eco-innovation is becoming increasingly important as a way to address the environmental issues brought on by traditional manufacturing and consumption patterns. Businesses can increase their environmental performance, capitalise on new market opportunities, boost their competitive advantage, and contribute to the transition towards more sustainable and circular economies by creating and implementing eco-innovative products (OECD & Eurostat, 2018; Rennings, 2000).

1.1.4 FURNITURE INDUSTRY

A considerable 20% of the world's carbon emissions are produced by the manufacturing sector, which includes the furniture industry (Vaskovich, McCreesh, & Farbstein, 2023). With a predicted CAGR of 5.7% from 2022 to 2030 and a market value of around $ 648.12 billion in 2021 (Grand View Research, 2021), the furniture industry has been criticised for its negative environmental impact. The sector plays a significant role in deforestation, greenhouse gas emissions, and waste generation (Meyfroidt, & Lambin, 2009; World Wildlife Fund, 2015; Linkosalmi et al., 2016; Top, 2015). Despite this, the furniture industry holds significant potential for mitigating climate change processes through the adoption of eco-innovative products (Lieder & Rashid, 2016). By incorporating sustainable materials, employing energy-efficient production methods, and using circular economy principles such as reuse and recycling, it can substantially reduce its environmental footprint (Bocken et al., 2016).

1.1.5 THE SCANDINAVIAN AND FINNISH FURNITURE INDUSTRY

The Scandinavian and Finnish region's shared cultural, historical, and environmental characteristics offer a distinctive background for the study of eco-innovation in the furniture industry (Beer, 1975; Hilson, 2008). The 2022 Global Innovation Index showcases high innovation levels among Nordic nations, with Denmark, Sweden, Norway, and Finland scoring 55.9, 61.6, 48.8, and 56.9 points respectively. These Nordic nations provide noteworthy contributions to eco-innovation, with Switzerland leading the way with 64.6 points in the index (Global Innovation Index, 2022). Additionally, the 2021 Environmental Performance Index (EPI, 2022), the Global Green Economy Index (Dual Citizen, 2022), and the Sustainable Development Goals (SDG) Index (Sachs et al., 2022) all place these countries within their top ten.

In the furniture industry, for their eco-friendly practises Swedish furniture firms have received recognition on a global scale (Dodds & Shute, 2020). Additionally, a number of notable magazines, like Forbes (Clarke, 2020), Financial Times (Bayhan, 2022) and the Wallpaper (Bertoli, 2022) have also given the Danish furniture manufacturer Takt international aknowledgement for its sustainable business efforts. Moreover, many Nordic furniture companies have earned the Forest Stewardship Council (FSC) certification, a worldwide benchmark for ethical forestry management (FSC, 2021) indicative of their commitment to sustainability (IKEA, n.d.; Skagerak, n.d.; HAY, n.d.; Karl Andersson & Söner, n.d.).

Despite Finland's geographical non-aligned with Scandinavia, furniture from all of these Nordic countries is often classified as 'Scandinavian',

reflecting the similar aesthetics and ethics in the region's furnishing sector (McCrory, 2020). Thus, the commitment to eco-innovation in the Scandinavian and Finnish furniture industry, combined with their influential position in global sustainability rankings, make this an apt context for the research.

1.2 PROBLEMATIZATION

1.2.1 DRIVERS AND OBSTACLES FOR PRODUCT ECO-INNOVATION

While there are many compelling reasons for pursuing eco-innovation, such as decreasing the risks caused by climate change and improving resource efficiency (Rennings, 2000; Dangelico & Pujari, 2010), it is important to be aware that there are also obstacles that may hinder these efforts (Eiadat et al., 2008; Marin, Marzucchi, & Zoboli, 2015). Several studies have focused on exploring the barriers to innovation and eco-innovation, emphasising the importance of understanding both the drivers and the obstacles for effective sustainable development (Brunnermeier & Cohen, 2003; Dangelico & Pujari, 2010).

Dangelico and Pujari (2010) conducted an in-depth analysis of eco-innovation drivers and barriers within the context of product development, using a multiple case study approach. The research underscored the impact of both internal and external aspects on the eco-innovation process, including market forces, technology, and environmental policy (Porter & van der Linde, 1995; Kemp & Pearson, 2008), as well as internal factors such as organisational culture, strategy, and human capital (Dangelico & Pujari, 2010). The authors highlighted the importance of understanding these drivers to create an enabling environment for eco-innovation, ultimately leading to more sustainable product offerings and business practices (Rennings, 2000; Nidumolu, Prahalad, & Rangaswami, 2009), which is critical as we aim to achieve the UN's Sustainable Development Goals (SDGs) by 2030 (Horbach, Rammer, & Rennings, 2012; United Nations, 2015). Given the insufficient current rate of progress and the urgency of climate action, acknowledging the unique obstacles and opportunities in eco-innovation is vital for industries to drive sustainable change (Rockström et al., 2009; Kesidou & Demirel, 2012).

1.2.2 COMPANY AGE

The relationship of company age and eco-innovation efforts varies across industries (Coad, Segarra, & Teruel, 2016). In rapidly evolving sectors that include, for example, electronics and renewable energy, younger firms often excel in innovation, attributed to their adaptability and willingness to take risks (Acs & Audretsch, 1990; Sørensen & Stuart, 2000). Conversely, in established sectors such as pharmaceuticals and automotive manufacturing, older companies leverage their existing resources, market position, and economies of scale to support innovation (Scherer, 1965; Cohen & Klepper, 1996).

The interaction between company age and eco-innovation is complex. Some studies suggest a stronger propensity for eco-innovation in younger firms (Horbach, Rammer, & Rennings, 2012), whereas others highlight the role of older, larger firms in adopting sustainable practices due to their abundant resources (Dangelico & Pujari, 2010; Wagner, 2007). However, the specific influence of company age on eco-innovation efforts within the furniture industry in Scandinavia and Finland remains an under-explored area.

1.2.3 COMPANY SIZE

In studies conducted across a variety of sectors, the link between firm size and the drivers and barriers for innovation, eco-innovation, and sustainability efforts has produced conflicting results (Acs & Audretsch, 1987, 1990; Scherer, 1965; Cohen & Klepper, 1996). Company size, which is often measured by the number of employees, can have a variety of implications on innovation and eco-innovation performance, depending on the business sector (Acs & Audretsch, 1990; Coad et al., 2016).

Acs and Audretsch study (1987, 1990) found that, in 156 US sectors, smaller enterprises (those with less than 500 employees) created more innovations per employee than larger ones (those with more than 500 employees), while the opposite was true in 122 industries. This finding suggests that the relationship between company size and innovation performance is context-dependent and may be influenced by variables including industry characteristics, market dynamics, and technological opportunities (Acs & Audretsch, 1990; Coad et al., 2016).

Regarding eco-innovation and sustainability

initiatives, the impact of company size has also been examined in various contexts. Due to their higher financial resources, established market positions, and capacity to adhere to environmental standards, larger businesses are more likely to invest in eco-innovation and sustainable practises, according to certain research (Dangelico & Pujari, 2010; Wagner, 2007). Smaller businesses, on the other hand, could be more agile and flexible, enabling them to more readily adopt new sustainable technology and adjust to shifting market conditions (Gupta and Cawthon, 1996). Nevertheless, in the Scandinavian and Finnish furniture industry the specific role of firm size in influencing eco-innovation efforts remains under-researched.

1.3 THE RESEARCH GAP

A need for an industry-specific (Acs & Audretsch, 1990) understanding of eco-innovation drivers and barriers is crucial (Marin, Marzucchi, & Zoboli, 2015), which brings attention to a research gap in this field. This gap extends to exploring how company age and size impact these eco-innovation innitiatives within specific industries, such as the Scandinavian and Finnish furniture sector—a literature gap this study aims to address (Coad et al., 2016; Gupta and Cawthon, 1996). While important, earlier studies tend to use quantitative methods and frequently disregarded the specifics of different industries (Kammerer, 2009; Triguero, Moreno-Mondéjar, & Davia, 2013). In contrast, this research focuses on a specific sector, adds a qualitative component and adopts a unique mixed-method approach.

1.4 RESEARCH PURPOSE AND QUESTIONS

This research investigates the principal drivers and barriers to eco-innovation within the Scandinavian and Finnish furniture industry, focusing on the potential effects of company age and size (Gupta and Cawthon, 1996; Coad et al., 2016). This investigation on a sector known for its sustainable practices yet less explored in academic literature, is intended to further our understanding of eco-innovation processes and their distinctive dynamics in specific contexts (Acs & Audretsch, 1990). The findings from this study could contribute to the academic discourse on eco-innovation and have practical implications for achieving the SDGs as well as a long-term sustainable economic growth (Kesidou & Demirel, 2012; Doran & Ryan, 2016).

The research questions guiding this study are:

RQ1: What are the major drivers for eco-innovation in furniture companies in Scandinavia and Finland?

RQ2: What are the major obstacles for eco-innovation in furniture companies in Scandinavia and Finland?

RQ3: How does the size and age of the company affect eco-innovation efforts in the Scandinavian and Finnish furniture companies?

To investigate the third research question, after conducting a literature review, 12 hypotheses were developed connected to potential effects of size/age of companies on eco-innovation efforts:

H1. Smaller/younger companies' flexibility promote eco-innovation, while larger/older companies' structures hinder it.

H2. Large companies' comparatively greater financial resources aid product eco-innovation.

H3. Older companies' accumulated resources facilitate eco-innovation.

H4. Large companies' access to skilled staff promotes eco-innovation.

H5. Small companies struggle to attract and retain talent and that hinders eco-innovation.

H6. Older companies' knowledge and experience facilitate eco-innovation.

H7. Older companies' established relationships with customers, suppliers, and other stakeholders help facilitate product eco-innovation activities.

H8. Large companies benefit from economies of scale in eco-innovation.

H9. Large companies establish external cooperation for eco-innovation more easily than small ones.

H10. Older companies find external cooperation for eco-innovation easier compared to younger ones.

H11. Fostering a unified organisational culture for eco-innovation is more challenging for large companies with more employees.

H12. Large companies' in-house R&D and training resources benefit eco-innovation.

1.5 INTENDED CONTRIBUTIONS

The study aims to make several contributions to the existing literature on eco-innovation in the furniture industry:

1. By focusing on the Scandinavian and Finnish furniture sector, the research will contribute to the understanding of eco-innovation drivers and barriers in a specific business area.

2. The study will expand the literature on eco-innovation by examining the effects of company age and size on the eco-innovation pursuits.

3. The research will provide insights for companies, policymakers, industry professionals, investors, and consumers, helping them make informed decisions related to sustainable development and eco-innovation in the Scandinavian and Finnish furniture sector.

1.6 DISPOSITION

The thesis is structured as follows:

- Chapter 1 introduces the research topic, providing the background, problematization, purpose, and intended contributions of the study.

- Chapter 2 presents a systematic literature review, synthesising the state-of-research on innovation and eco-innovation in the furniture industry, identifying relevant concepts and theories as well as investigating the possible effects of company size and age on innovation and eco-innovation efforts.

- Chapter 3 outlines the research methodology, including the research design, data collection, and data analysis methods, as well as considerations for reliability, validity, generalizability and transferability.

- Chapter 4 reports the findings of the study, analysing the empirical and qualitative data in relation to the research questions.

- Chapter 5 discusses the results, connecting the findings to existing literature and extending the theoretical understanding of eco-innovation drivers and barriers in the Scandinavian furniture industry as well as company age and size influence on eco-innovation pursuits.

- Chapter 6 concludes the thesis by defining the answers to the research questions, and discussing the theoretical and practical implications of the study. This chapter also addresses the limitations of the research and provides suggestions for future studies in this area.

2. LITERATURE REVIEW

2.1 DISCUSSION OF INCIDENTS RELATED TO FURNITURE INDUSTRY

Important incidents in the history of the furniture business have drawn attention to the need for greater awareness of the effects that particular materials and practises have on the environment and human health.

The effects of formaldehyde exposure have important ramifications for the furniture business, as shown by numerous scientific research and unfortunate incidents in the past. Formaldehyde was discovered to slowly escape from materials over time, a process known as off-gassing, which happens in such materials as particleboard and plywood (Salthammer, Mentese, & Marutzky, 2010). This has brought attention to the potential threats to health that furniture can pose to people in their everyday surroundings like places of residence and work. Furthermore, in existing research formaldehyde exposure has been linked to adverse health consequences including skin irritation and respiratory issues for employees in the furniture business, much like it has for those in the textile and embalming sectors (Pinkerton, 2004; Zhang et al., 2010). Moreover, the International Agency for Research on Cancer (IARC) recognised formaldehyde as a human carcinogen in 2004 (web.archive.org, 2004). The growing awareness of these risks has urged the furniture industry to seek alternatives to formaldehyde-based materials.

Another important investigation, focused on detecting flame retardants in furniture (Stapleton et al., 2009). 26 pieces of furniture, largely from North Carolina, were examined. The results showed that a mix of flame retardants were widely present. Alarmingly, their quantities at times even exceeded that of flame retardant substances called polybrominated diphenyl ethers that were previously in use, but were being phased out. This raised health and environmental concerns as flame retardant compounds based on organophosphates are considered to be potential carcinogens and to have adverse effects on the environment (Stapleton et al., 2009). The need for transparency and cautiousness in the use of such chemicals for consumer products was highlighted by these findings.

In terms of metals, due to its resistance to corrosion and stylish polished appearance, chromium plating was a common material for furniture maufacturing. However, chrome plating contains chromium (VI), a poisonous and cancer-causing chemical (Costa, 1997). Moreover, the recycling process of chrome, an alloy composed of multiple metals, is particularly complex due to the generation of hazardous byproducts, such as Cr-containing sludge, that necessitate strict disposal rules in order to mitigate contamination of the environment. (Coatings, 2020; Wang et al., 2022). These problems have directed the industry to move towards safer and more sustainable alternatives, such as stainless steel or powder coating (Mart, 2022; Sohoconcept, n.d.; Karia, 2023).

The usage of exotic wood species is an integral sustainability issue in the furniture business. Wood species such as the Brazilian rosewood (Dalbergia nigra), which is prized for its exquisite dark colour and texture, have been subject to substantial overexploitation. It has reached a point where, according to the International Union for Conservation of Nature's 1998 assessment, it is listed as "Vulnerable" under criteria A1cd, due to its declining population (Varty, 1998). Similarly, the use of timber that has been illegally harvested, such as that from the rainforests of Indonesia and the Amazon, also presents a serious sustainability challenge. A report by Greenpeace (2012) highlighted that some companies were sourcing timber by engaging in illegal logging and deforestation. There are also pressing concerns related to illegal activities within the furniture supply chain, that involve species usually not considered exotic, such as a surge of illegal forestry documented in Ukraine, which has been presently exacerbated in the context of an ongoing military conflict (Lemaître, 2022).

This research and events have led to substantial shifts towards more sustainable and health-conscious standards as well as the creation and adoption of eco-labels and certifications in the furniture industry as an essential tool for eco-innovation and sustainable development.

2.2 IMPORTANT LABELS USED FOR ECO-INNOVATIVE FURNITURE

The design and manufacturing of eco-innovative furniture is linked to sustainable supply chains and the use of materials that minimise negative environmental effects. One effective way to evaluate the sustainability of these materials is by the use of eco-labels, which provide guarantee to both manufacturers and consumers that the products fulfil strict environmental and health requirements (European Commission, n.d.).

The Forest Stewardship Council (FSC) certification, which ensures that wood has been acquired from responsibly managed forests, is one such important marker. The FSC's principles and standards cover a comprehensive range of topics, including indigenous rights, labour rights, and environmental impact (FSC, 2021). The use of FSC-certified wood in furniture manufacturing helps ensure the sustainability of forest resources while also reducing the industry's carbon footprint. A similar certification for sustainable forest management is provided by the Programme for the Endorsement of Forest Certification (PEFC). Akin to the FSC, PEFC certification ensures consumers that their purchases do not contribute to deforestation worldwide and that the material procurement complies with the highest ethical, social, and ecological requirements (PEFC, 2021).

Initiatives in the metal sector, such as the Responsible Steel certification, encourage the use of steel that adheres to strict environmental and social standards. This label aims to reduce the environmental impact of steel production and enhance the industry's contribution to a circular economy (Responsible Steel, n.d.). In the furniture industry, replacing harmful and polluting metal compounds such as chrome with less dangerious alternatives to health and the environment, like stainless steel, is a significant step towards eco-innovation.

The use of water-based varnishes and natural oils for finishing furniture is another eco-innovative practice. Low-emitting goods, including paints and coatings, are identified by labels like the GREENGUARD Certification, created by Underwriters Laboratories. This certification, signifies that the product complies with some of the strictest and most thorough criteria in the world for minimal emissions of volatile organic compounds into indoor air (UL Solutions, n.d.).

These eco-labels and certifications not only encourage eco-innovation in furniture production by establishing clear environmental standards, but also provide a way for manufacturers to communicate and showcase their commitment to sustainability. Moreover, they offer consumers the ability to make informed choices, thereby driving demand for eco-innovative furniture and consumer awareness (Testa et al., 2012).

2.3 ECO-INNOVATION: DEFINITIONS

A thorough framework for understanding and evaluating eco-innovation is provided by The Oslo Manual (OECD & Eurostat, 2018). Eco-innovation is explained to be understood as those innovations that create "a significant improvement (either current or potential) in environmental performance across the entire life cycle of a product or process" (OECD & Eurostat, 2018, p. 190). This definition stresses the importance of taking into account a product's whole life cycle, from raw material extraction to end-of-life disposal, when evaluating an eco-innovation's environmental performance.

Eco-innovations can be classified into five main categories:

Product innovations: The creation of brand-new or vastly enhanced products with a lower negative environmental impact compared to existing alternatives. Examples include electric cars, biodegradable packaging materials, and energy-efficient appliances (OECD & Eurostat, 2018).

Process innovations: The adoption of new or considerably better production techniques that lead to a decrease in the consumption of resources or pollution of the environment. Examples include using water-saving technology in industrial operations, systems to recycle waste, and adopting greener manufacturing methods (OECD & Eurostat, 2018).

Organisational innovations: Improvement in

environmental performance by the adoption of innovative management techniques, workplace organisation, or external relationships that lead to ecological improvement. Examples include using environmental management systems, eco-design techniques, and collaborations to share resources or waste management structures (OECD & Eurostat, 2018).

Marketing innovations: the creation of innovative marketing strategies that highlight how goods or services help the environment and thus, the promotion of more sustainable consumption habits. Examples include the use of digital platforms to market the sharing economy, eco-labeling programmes and green advertising campaigns (OECD & Eurostat, 2018).

System innovations: This relates to the use of innovative or considerably improved methods that integrate multiple aspects, such as goods, processes and organisational structures, in order to significantly improve the environment. Smart grids, integrated urban mobility systems, and circular economy business models are a few examples (OECD & Eurostat, 2018).

According to the Oslo Manual (OECD & Eurostat, 2018), an innovation is considered new if it is either new to the firm, new to the market, or new to the world.

New to the firm: It has been developed or adopted by the company for the first time, even if it is already available in the market. Firms may adopt eco-innovative practices through learning, imitation, or technology transfer from other companies or sectors (OECD & Eurostat, 2018).

New to the market: A novel product, process, or practice that is not yet widely available in the market, and the firm is among the first to introduce it. Such eco-innovations can provide competitive advantage, as it allows firms to differentiate themselves from competitors and capture new market opportunities (OECD & Eurostat, 2018).

New to the world: A product, process, or practice that has never been introduced before. This definition highlights the potential of eco-innovation to drive technological advancements, disrupt existing industries, and contribute to the transition towards more sustainable economies (OECD & Eurostat, 2018).

2.4 DIFFERENT PRODUCT ECO-INNOVATION TYPES IN THE FURNITURE INDUSTRY

Innovations in sustainable materials present an excellent opportunity for the furniture industry to reduce its environmental footprint. Utilising sustainable, recyclable, or renewable materials helps to conserve resources and decrease waste by reducing the need for new material assets (Stahel, 2016). IKEA's KUNGSBACKA kitchen fronts, which are constructed from 100% recycled wood and a plastic foil made from PET bottles, are an instance of such an approach (IKEA, n.d.). These innovations align with the guiding principles of the circular economy, encouraging material reuse and recycling in an effort to reduce their negative environmental effects (Bocken et al., 2016).

Another area of product eco-innovations called **design for manufacturing (DfM)** focuses on effective design to minimise material consumption and streamline assembly procedures. With this strategy, waste is decreased and production efficiency is improved (Boothroyd, Dewhurst, & Knight, 2010). Examples of products that embody the aforementioned concepts include Steelcase's Cradle to Cradle (C2C) certified Think Chair, which has fewer parts, that makes it simple to disassemble the item for recycling or refurbishing (Steelcase, n.d.). By prioritising efficiency at the design stage, DfM innovations have the potential to considerably reduce the environmental impact of manufacturing processes.

Modular and adaptable furniture innovations, that can be altered to serve multiple purposes, extends the product's lifespan and represents a further step in eco-innovation. This strategy is demonstrated by Vitra's modular Workbays system, which offers adaptable and adjustable office workstations that are simple to reorganise to meet changing requirements (Vitra, n.d.). These types of innovations contribute to the goal of a circular economy by prolonging products' usage time and reducing waste, thereby extending the value of materials and resources (Lieder & Rashid, 2016).

In the context of product eco-innovation, **energy-efficient solutions** can be integrated directly into furniture design. Built in lightning systems in furniture can use energy-efficient technology, such as LED lights, that have a longer lifespan than traditional lightning solutions (US Department of Energy, n.d.). An example of this is the line of wardrobes and bookshelves from IKEA that have integrated LED lighting systems. By lowering energy use in addition to associated CO2 emissions, these energy-efficient solutions not only provide operational efficiency to the end user, but also advance the larger environmental agenda (Sorrell, 2007; IEA, 2022).

Innovations in durability and quality represent the benefits achieved by enhancing the durability and longevity of furniture. High-quality, durable furniture decreases the need for replacement products, which results in considerable resource savings and waste reduction (Cooper, 2008). Such a strategy is demonstrated by Emeco's Navy Chair, which is marketed as indestructible and comes with a lifetime warranty (sedie.design, n.d.). These innovations promote the use of durable items, which decreases the need for raw materials and waste generation (Cooper, 2008).

Innovations in waste reduction minimise waste throughout the production process. Lean manufacturing techniques as well as the reuse of scraps and waste materials in new products can have a significant positive impact on the environment (King & Lenox, 2009). As example of such approach, in order to reduce waste in the furniture industry, design studio Tableau and Australian designer Ari Prasetya used leftover materials from Danish flooring company Dinesen to craft a variety of distinctive chairs, tables, and benches for the café at the Copenhagen Contemporary art centre (Remodelista, 2022).

2.5 MAIN SCHOOLS OF THOUGHT ON THE MAJOR DRIVERS AND OBSTACLES OF ECO-INNOVATION

Investigation of the major schools of thought on potential eco-innovation drivers is conducted in order to develop the research framework and make it more comprehensive.

2.5.1 TECHNOLOGICAL DETERMINISM

Technological determinism is a school of thought that posits technology as the primary driver of social and environmental change. The notion of technological determinism has its roots in the works of Thorstein Veblen (1921) and has been further refined by other academics, such as Smith and Raven (2012). It is acknowledged in literature that technology plays a key role in fostering innovation (Freeman & Soete, 1997; Stoneman, 1995). In the context of product eco-innovation, technological determinism underlines the crucial role of technological innovations in addressing environmental challenges and promoting eco-innovation (Rennings, 2000; Kemp, 2010; Fussler & James, 1996). Technical developments, such as eco-friendly nanomaterials and improved manufacturing techniques, have been recognised as important drivers of eco-innovation. Moreover, the development and diffusion of green technologies are considered to be an essential aspect of the transition to a more sustainable economy (Foxon, 2011; Unruh, 2002).

However, other scholars contend that a technical determinist perspective on eco-innovation can be overly simplified. While technology is vital, institutions, culture, and human agency also have a big impact on how eco-innovation is shaped (Geels, 2002; Shove & Walker, 2010). Opponents of technological determinism note the potential negative consequences of relying primarily on technology to address environmental issues, as this might result in the social and economic dimensions of sustainability being overlooked (Winner, 2020; Sclove, 1995).

2.5.2 INSTITUTIONAL THEORY

Institutional theory, as discussed by Meyer and Rowan (1977) and DiMaggio and Powell (1983), highlights the role of institutions, such as regulations, norms, and cultural-cognitive aspect of society, in shaping the drivers and barriers for innovation and by extention eco-innovation. The role of institutions in eco-innovation has been examined in the literature, with several studies emphasising the importance of understanding the institutional environment as a driving or inhibiting factor (Horbach et al., 2012; Triguero, Moreno-Mondéjar, & Davia, 2013).

Institutions are argued to influence and form the context in which organisations operate, thus affecting their incentives and capacity for engaging in eco-innovation (North, 1990; Williamson, 2000). By analysing the institutional environment, organisations can discern the elements that either facilitate or impede eco-innovative efforts (Rennings, 2000; Kemp & Pearson, 2008). According to Nidumolu et al. (2009), businesses may use institutional factors to their advantage in order to adopt eco-innovation and gain a competitive edge. They contend that institutions can offer organisations, involved in sustainable developemnt, access to resources, expertise, and legitimacy (Porter & van der Linde, 1995; Ambec, Cohen, Elgie, & Lanoie, 2013). Environmental regulations could also promote businesses to create innovative technologies and procedures that not only adhere to legal standards, but also result in cost savings, improved reputation, and business prospects (Del Ro, 2015).

Conversely, some studies have shown potential challenges to eco-innovation created by institutional involvement (Darnall et al., 2007; Ghisetti & Quatraro, 2013). Due to the complexity and variation across different countries, regulatory frameworks can at times discourage innovation, potentially causing confusion and uncertainty for enterprises (OECD Report, n.d.). This is particularly apparent with labour regulation, where enterprises are deterred from innovating by specific thresholds, like those in France, due to the possibility of rising regulatory costs (Bergeaud et al., 2019). This condition can limit investment in research and developement and may make it more cost-effective for businesses to adhere to the bare minimum of regulations rather than aiming for radical eco-innovative solutions.

Furthermore, institutional theory has also been challenged for its deterministic interpretation of the relationship between institutions and organisations. A counterargument perspective is that the theory underestimates the role of agency and strategic action in shaping institutional change, as it tends to downplay the influence of individual actors and their decisions within organisations (Oliver, 1991; Giddens, 1984). Giddens (1984) makes the argument that people may use their knowledge and resources to influence and change institutional structures, suggesting that institutions are not just subject to determinism but also to human agency and influence.

2.5.3 RESOURCE-BASED VIEW

Another prominent theoretical framework for comprehending the drivers and barriers of eco-innovation is the resource-based view (RBV). According to the RBV, a firm's performance and competitive advantage are defined by the distinctive resources and capabilities it possesses (Penrose, 2009; Wernerfelt, 1984). These resources are frequently regarded as valuable, rare, unique and non-substitutable (Barney, 1991). According to the RBV, firms that possess and effectively exploit their resources and capabilities can achieve superior performance in terms of innovation, sustainability, and overall competitiveness (Grant, 1991; Mahoney & Pandian, 1992).

However, the RBV has received a number of critiques that call for a discussion in order to fully grasp the advantages and disadvantages of this school of thought. One of the main critiques of the RBV is that it is static. According to some academics, this is due to the RBV's predominate focus on internal resources and capabilities of enterprises without comprehensively considering how the external environment factors influence them (Priem & Butler, 2001; Newbert, 2007). There is support in the argument that the RBV falls short in capturing the dynamic interaction between enterprises and their external environment, which includes phenomena like market volatility, industry trends, and technical advancements (Porter, 1991; Teece, 2007). Another critique of the RBV pertains to its perceived underestimation of the importance of path dependence and historical processes in shaping firms' resources and capabilities (Dosi, Nelson, & Winter, 2000; Teece, 2007). Path dependence refers to the notion that past decisions and events significantly influence a firm's present resources and capabilities (Arthur, 1989; David, 1985). Critics argue that the RBV's narrow focus on current resources and capabilities may overlook the historical context that has shaped them, resulting in an incomplete understanding of the basis for a firm's competitive advantage (Lippman & Rumelt, 2003; Teece, 2007). Despite these criticisms, the RBV remains a valuable school of thought for investigating the drivers and barriers to eco-innovation, as it offers insights into the resources and capabilities that are essential for

eco-innovative activities (López-Gamero, Molina-Azorín, & Claver-Cortés, 2009; Triguero, Moreno-Mondéjar, & Davia, 2013).

2.5.4 DIFFUSION OF INNOVATIONS THEORY

This school of thought, which Rogers (1962) developed, places a strong focus on the role that social networks and the spread of ideas play in fostering eco-innovation. The perspective holds that the adoption of innovation and eco-innovation can be facilitated by the dissemination of information, ideas, and best practises via social networks (Valente, 1995; Granovetter, 1973). The perceived properties of the invention, the characteristics of the adopter, and the structure of the social system all have an impact on how quickly the innovation is diffused (Westphal, Gulati, & Shortell, 1997).

In several fields of research, the diffusion of innovations theory has been used to analyse the factors that promote and obstruct product and environmental innovation (Ghisetti & Rennings, 2014; Mazzanti & Zoboli, 2006). Horbach (2008) used the idea to investigate how quickly cleaner technologies are being adopted in the manufacturing sector. Additionally, research by Carrillo-Hermosilla, del Rio, and Könnölä (2010) as well as Bossle, Barcellos, and de O. Vieira (2016) examined how environmentally friendly products were adopted in the food and automobile industries.

However, the diffusion of innovations theory has faced several criticisms. Its deterministic character is one criticism, since it makes the assumption that innovations are always advantageous and will eventually be embraced by all members of a social system (Greenhalgh et al., 2004). An argument is made that as a result of perceived risks related to the innovation's performance, compatibility with or potential perceived negative effects on current systems, people or organisations may oppose or reject innovations (Laforet & Tann, 2006). Similarly, organisational inertia, which is the persistence of current routines, structures, and cultural norms (Hannan & Freeman, 1984; Tripsas & Gavetti, 2000), can make organisations difficult to change and less likely to adopt new advancements. Furthermore, widespread diffusion of innovative solutions excessively quickly can result in making environmental issues worse. This is known as the rebound effect (Turner, 2013; Druckman et al., 2011), which occurs when, for example, cost-saving efficiency improvements lead to higher consumption, negating the eco-benefits of the innovation. These findings challenge the deterministic assumptions of the diffusion of innovations theory and suggest that the adoption and diffusion process of eco-innovations can be complex and context-dependent.

2.5.5 TRIPLE BOTTOM LINE

The Triple Bottom Line (TBL) paradigm emphasises the necessity of balancing economic, social, and environmental factors in fostering eco-innovation (Elkington, 1997; Slaper & Hall, 2011). This viewpoint contends that innovation need to be driven not just by financial incentives but also by social and environmental factors, enabling a comprehensive view of sustainability (Elkington, 1997; Savitz & Weber, 2013). According to a this broad approach to sustainability, businesses should aim to strike a balance between economic, social, and environmental performance—often referred to as the "three pillars" (Elkington, 1997; Henriques & Richardson, 2004). TBL's implications for innovation, particularly product eco-innovation, have been explored by previous studies (Dyllick & Hockerts, 2002; Pan, Sinha, and Chen, 2020). Schaltegger and Burritt (2005) contend that the TBL framework can aid organisations in recognising and assessing the potential economic, social, and environmental effects of eco-innovations, while Adams et al. (2016) suggest that the TBL framework can direct the creation of sustainable business models that take into account the interdependencies between product eco-innovation and the larger social, economic, and environmental context.

On the other hand, the TBL paradigm has been criticised in the context of eco-innovation and sustainable growth due to the lack of metrics and indicators that are recognised worldwide for evaluating the performance and sustainable development (Parris & Kates, 2003). As a result, it may be challenging to compare and measure the performance of various innitiatives, which might impede the creation of generally accepted best practises and standards for eco-innovation (Székely & Knirsch, 2005). Moreover, assessing environmental and social impacts might be more difficult than quantifying profits (Kenton, 2022). Despite this, the TBL school of thought continues

to be a useful resource for guiding and evaluating product eco-innovation, since it promotes a thorough and balanced consideration of economic, social, and environmental factors.

2.5.6 SCHOOLS OF THOUGHT AND THE DEVELOPMENT OF THE RESEARCH

In the present research, the objective is not to advocate for or align with any specific school of thought. Instead, it is intended to view them all as potentially relevant and instructive in understanding the forces influencing and impeding product eco-innovation in the furniture sector, recognizing that each school can provide insightful analysis into various facets of the eco-innovation process. This strategy is consistent with Adams, Jeanrenaud, Bessant, Denyer, and Overy's (2016) pluralistic technique, which promotes a multiple perspective approach in the research design. Incorporating various perspectives and different ideas about innovation can offer a more holistic understanding of the complex interplay of factors that shape eco-innovation within a specific industry (Rennings, 2000; Fagerberg, Mowery and Nelson, 2006). This inclusive design aligns with best practices in both survey and interview research, as it reduces the likelihood of leading participants towards a single school of thought, thereby enhancing the validity and reliability of the findings (Denzin & Lincoln, 2011; Zahle, 2020).

2.6. COMPANY SIZE AND ITS EFFECT ON INNOVATION

2.6.1. SCHUMPETERIAN HYPOTHESIS

The Schumpeterian Hypothesis postulates that larger firms are more innovative due to their greater financial resources, established market positions, and economies of scale (Schumpeter, 1942). This viewpoint contends that larger businesses have more funds available to support R&D initiatives and manage the risks involved with innovation. Various research studies advanced the exploration of the link between business size and innovation inspired by Schumpeter's work on the subject (Scherer, 1965; Cohen & Klepper, 1996). For instance, Scherer (1965) and Cohen and Klepper (1996) discovered that bigger businesses tend to spend more on R&D and are more likely to obtain patents, thus supporting the Schumpeterian Hypothesis.

Despite its substantial contributions, there have been a number of arguments against the Schumpeterian Hypothesis. Some academics contend that it overemphasises the relevance of business size while underestimating the significance of other elements (Goodwin, 1998), such as organisational culture (Schein, 2004) and external networks (Powell, Koput, and SmithDoerr, 1996), in fostering innovation. The Entrepreneurial/Young businesses perspective, which provides the viewpoint that smaller and younger businesses are more innovative due to their agility and adaptability (Acs & Audretsch, 1990; Srensen & Stuart, 2000), can also cast doubt on the Schumpeterian Hypothesis. According to this alternate perspecitve, there may be more nuance and context-dependence in the link between business size and innovation than the Schumpeterian Hypothesis implies.

2.6.2 ENTREPRENEURIAL FIRMS PERSPECTIVE

Due to their agility, flexibility, and willingness to take risks, the entrepreneurial firms position suggests that smaller, often younger, organisations can be more innovative than bigger and older firms (Acs & Audretsch, 1990; Srensen & Stuart, 2000). The Schumpeterian Hypothesis, which underlines the importance of big business size in fostering innovation (Schumpeter, 1942), conflicts with this viewpoint. Several empirical investigations conducted in multiple sectors have backed the entrepreneurial young firms approach. Acs and Audretsch (1990) present notable empirical data in their work "Innovation and Small Firms" to highlight the growing significance of small enterprises in producing technical discoveries and fostering economic growth. They contend that despite being small, these businesses are successfully utilising adaptable technology and making major advances into an array of industries, including manufacturing. According to Acs and Audretsch, the adaptibility of these enterprises is catalysing changes in market structures. Furthermore, the importance of Small and Medium-sized Enterprises (SMEs) in fostering job development and technical innovation is highlighted in a later Audretsch's 2002 study as

well, which reveals high patenting rate per employee and a significant net employment gain in SMEs (Audretsch, 2002). Some researchers have explored the specific conditions and factors that facilitate innovation in smaller companies. Welbourne and Pardo-del Val (2008), for instance, emphasised the significance of external networks, partnerships, and strategic alliances as in "relational capital" for fostering innovation among small businesses. Nooteboom (1994) also stressed the importance of organisational learning and adaptability in enabling smaller businesses to innovate and compete with more established companies.

The representation of entrepreneurial firms is not exhaustive, however. This viewpoint accentuates the importance of business size while ignoring the impact of other possible determinants on inventive performance, such as management skills (Helfat and Peteraf, 2009) and organisational culture (Tellis, Prabhu, and Chandy, 2009). Research, suggesting that the link between company age and innovation may vary depending on industries and contexts, has also cast doubt on the idea of entrepreneurial young firms importance in innovation capabilities (Acs & Audretsch, 1990; Malerba & Orsenigo, 1996). Malerba and Orsenigo (1996) discovered that innovation does not directly correlate with firm size across all industries, instead, they demonstrated that the nature of innovative activities varies substantially across technological classification groups of companies.

2.6.3 THE CONTINGENT/ CONTEXTUAL PERSPECTIVE

According to the contingent/contextual approach (Nooteboom, 1994; Cohen & Klepper, 1996), the link between company size and innovation is not always relevant and is instead dependent on a number of variables and the unique environment in which the firm operates. According to this understanding, the link between company size and innovation performance can be affected by factors such as technology regimes, the external environment, and industry-specific features (Malerba & Orsenigo, 1995; Pavitt, 1984). The variable effects of business size on innovation across various industries and environments have been shown in a number of studies to support the contingent/contextual viewpoint (Malerba & Orsenigo, 1996). Laursen and Salter (2006) provided evidence that a firm's search strategies for novel ideas, particularly those that include substantial external partnerships, are more closely related to innovation success than solely the firm's size. According to Rothaermel and Hess (2007), rather than being primarily impacted by business size, the requirements for innovation exist at the person, firm, and network levels, with various degrees of interplay between all three impacting a firm's inventive output.

Given its context-specific character, the contingent/ contextual perspective may be criticised for lacking generalizability (Cheng, Dimoka and Pavlou, 2016). However, proponents of this viewpoint assert that in order to create more accurate and effective innovation policies and strategies, it is crucial to grasp the nuances and particular variables that affect the link between business size and innovation (Malerba, 2004; Tushman & Anderson, 1986).

2.7 COMPANY AGE AND ITS EFFECT ON INNOVATION

2.7.1 THE AGE-DEPENDENT INNOVATION PERSPECTIVE

The age of a corporation has a big impact on its innovation performance, according to the age-dependent innovation viewpoint (Sorensen & Stuart, 2000). Sorensen and Stuart (2000) highlighted the inherent trade-offs in organisational learning and innovation processes across the firm age spectrum, drawing on their investigation of the relationship between organisational ageing and innovation in high-technology industries like biotechnology and semiconductors. Their research showed that since they are less constrained by established practises and organisational inertia, younger enterprises may develop more creative solutions. According to Tushman and Anderson's 1986 study, radical innovation was more commonly pioneered by new enterprises. Younger often smaller companies, according to Acs & Audretsch (1990), tend to be more innovative because of their flexibility, agility, and capacity to adjust to shifting market conditions. The potential liability of adolescence is shown by the evidence of an inverted U-shaped correlation between failure risk and age, demonstrated to Bruderl and Schussler (1990). This is because the possibility of failure for a firm when it first launches is quite low; it only increases later in the firm's

lifetime. New organisations are given starting time known as the "waiting for success" period where they can experiment and rapidly innovate (Bruderl and Schussler, 1990).

In contrast, other academics contend that more established companies may benefit from advantages that can enhance their capacity for innovation, such as accumulated expertise, experience, and resources (Hannan & Freeman, 1984; Cohen & Levinthal, 1990; Zahra and George, 2002). Additionally, more established networks and reputation may be advantageous to older businesses, which may help with the diffusion of novel eco-innovative products (Rogers, 2010).

2.7.2 NON AGE CENTRED INNOVATION PERSPECTIVE

According to this perspective, firm age may not significantly affect an organization's capacity for or performance in innovation; rather, innovation is primarily influenced by factors like the firm's resources, capabilities, and strategic orientation, all of which may be independent of company age (Zhou, Yim, and Tse, 2005). A thorough investigation of the relationship between a manufacturing firm's age and its propensity to introduce innovations was done by Huergo and Jaumandreu in 2004. While accounting for variations among industries and business sizes, the researchers attempted to understand how this likelihood changes as organisations develop. Their study's finding was that, regardless of the age of a business, the chance of innovation looked to be rather stable throughout time. This perspective underscores the possibility that firm age may not have a substantial impact on innovation efforts, a consideration that should be taken into account in the current research.

2.7.3 THE CONTINGENT/ CONTEXTUAL PERSPECTIVE ON FIRM AGE AND INNOVATION

According to the contingent/contextual viewpoint (Huergo and Jaumandreu, 2004; Garca-Quevedo, Pellegrino, and Vivarelli, 2014), the link between company age and innovation is dependent on a number of variables, including industry features and market dynamics. Huergo and Jaumandreu (2004) notes that some industries may have quicker innovation cycles, pushing younger businesses to innovate to remain competitive, whereas in others, older organisations may have the advantage in terms of innovation due to their access to resources, expertise, or established networks.

Such a contextual approach, however, may not have a solid theoretical foundation and may be overly reliant on the particulars of each unique case (Cheng, Dimoka, and Pavlou, 2016). The flexibility it provides is nonetheless helpful for comprehending the intricate and multidimensional nature of innovation processes and its drivers (Huergo and Jaumandreu, 2004).

2.8 THEORETICAL FRAMEWORK

2.8.1 THEORETICAL BACKGROUND

The prior literature study was carried out to explore the main schools of thought on drivers and barriers to eco-innovation in order to develop a comprehensive research framework. One of the key findings from this review was the importance of considering both internal and external factors that influence a company's eco-innovation efforts (Río et al., 2015; Dias and Braga, 2022; OECD, 2021; Arnold & Hockerts, 2010; Bossle et al., 2016; Carrillo-Hermosilla et al., 2010; Del Rio et al., 2017; Galliano & Nadel, 2013; Horbach, 2008). This strategy is especially pertinent to the furniture industry's creative sector, because it enables a more comprehensive understanding of the different impacts on product eco-innovation by taking into account both: industry-specific characteristics and the larger environment in which these businesses operate.

In order to develop a robust research framework that encompasses these internal and external factors, the study initially assessed two well-established frameworks: PESTEL for external analysis and McKinsey's 7S for internal analysis (Oxford Learning Lab, 2018; Johnson et al., 2005; Waterman et al., 1980). These frameworks were taken into consideration because they could provide an extensive understanding of the business environment and because they were consistent with the main schools of thought mentioned in the literature research.

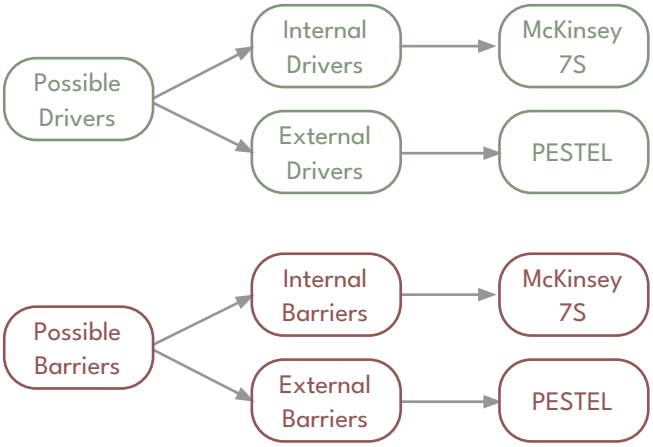

Fig. 1: Author's illustration of innitial research framework.

2.8.2 EXTERNAL FACTORS: PESTEL ANALYSIS CONSIDERATIONS

For its capacity to offer a thorough knowledge of the external variables impacting businesses in the furniture sector, the PESTEL framework was taken into consideration (Johnson et al., 2005). PESTEL, which stands for Political, Economic, Sociocultural, Technological, Environmental, and Legal factors, has been used in the literature to analyse the external environment of organisations across various industries (Yüksel, 2012; Song, Sun and Jin, 2017; Pan, Chen and Zhan, 2019). The application of the PESTEL framework in the context of eco-innovation was considered as relevant, since it enables the identification of potential drivers and barriers in the broader context, which may influence a company's eco-innovation efforts.

However, it was discovered throughout the evaluation of the literature, that the PESTEL framework had not been specifically employed in earlier research concentrating on factors promoting and impeding innovation or eco-innovation. As a result, the decision was made to keep the PESTEL framework in mind while examining other approaches used in similar types of studies. The intention was to combine elements of the PESTEL framework with those identified in previous research, in order to develop a more suited and relevant framework for understanding the drivers and barriers of product eco-innovation within the Scandinavian and Finnish furniture industry.

2.8.3 INTERNAL FACTORS: MCKINSEY'S 7S FRAMEWORK

For the internal analysis of the companies, the McKinsey 7S framework was considered. This model (Waterman et al., 1980) focuses on seven linked organisational components: strategy, structure, systems, shared values, skills, style, and staff. Studies (Waterman et al., 1980; Chmielewska et al., 2022) have used the 7S framework to examine the internal dynamics of organisations and how these aspects affect their performance.

However, again, while offering an extensive overview of internal organisational dynamics, the McKinsey 7S framework has not been extensively discussed in prior research concentrating on the forces driving and impeding innovation or eco-innovation. This observation emerged during the literature review. Nonetheless, the 7S framework can provide valuable insights into the internal aspects affecting an organisation's ability to innovate (Lazarenko et al., 2018; Pavlidis, 2020). As a result, it was decided to use a methodology similar to that of the PESTEL framework, in which the 7S framework would be taken into consideration and combined with the elements identified in previous studies examining drivers and barriers of eco-innovation or innovation. This approach allows for a more comprehensive understanding of the internal factors that drive or hinder eco-innovation, while also leveraging the insights provided by the 7S framework in examining organisational dynamics.

2.9 FORMULATING THE RESEARCH FRAMEWORK FOR THE POSSIBLE EXTERNAL DRIVERS AND BARRIERS

Porter and van der Linde (1995) emphasise four primary external factors in their work on "Green and Competitive" businesses, which have a significant impact on a company's ability to innovate in the context of environmental sustainability. The categories proposed by Porter and van der Linde (1995) have been used in studies in various sectors and contexts in the examination of eco-innovation drivers and obstacles, including Rennings (2000), Kemp and Pearson (2008), Horbach (2008), Arundel and Kemp (2009), Helble and Majoe (2020), and Del Río (2009).

2.9.1 ENVIRONMENTAL FACTORS

The management of natural resources, pollution, and waste is a crucial aspect for companies looking to develop in an ecologically responsible way (Porter and van der Linde, 1995). This viewpoint is supported by various authors, who argue that the increasing awareness of environmental issues and the need for sustainable development drives companies to innovate (Hart & Milstein, 2003; Shrivastava, 1995; Cohen & Winn, 2007).

2.9.2 MARKET FACTORS

Porter and van der Linde (1995) emphasise the role of consumer demand, market opportunities, and competition in shaping eco-innovation. Other research has added to this by discussing how **supply side** (OECD, 2021, Gebler et al., 2014; Petrick and Simpson, 2013; Rennings and Rammer, 2009, Chin et al., 2012), **demand side** (Gebler et al., 2014; Petrick and Simpson, 2013; Rennings and Rammer, 2009, Ginsberg & Bloom, 2004) or **competition in the market** can each have an influence on innovation and eco-innovation efforts (Porter, 1990, Orsato, 2006).

Supply-side factors, such as resource availability and supply chain relationships, for example, can have a big impact on eco-innovation efforts, assisting or hindering the development and distribution of sustainable goods (Roh et al., 2022). Moreover, a company's innovation efforts may be considerably impacted by the increasing **customer demand** for environmentally friendly goods and services (Orsato, 2006; Huang et al., 2022). Similarly, **competitive pressures** can also drive innovation as companies seek to differentiate themselves in the market or, the opposite, the development of new standards within the market can drive competitor companies to adopt new inventions or ideas (Porter, 1990).

2.9.3 POLICY FACTORS

According to Porter and van der Linde (1995), government incentives, environmental standards, and laws may either encourage or impede eco-innovation. While stringent regulations can stimulate innovation by setting higher environmental performance standards, lenient policies may hinder innovation by allowing companies to maintain the status quo (Ambec et al., 2013; Hojnik and Ruzzier, 2016). By offering financial assistance, tax exemptions, or other benefits to businesses engaging in sustainable development, the government can also have an important part in promoting eco-innovation (Kemp, 1998).

2.9.4 TECHNOLOGICAL FACTORS

Porter and van der Linde (1995) recognise how technological advancements and adoption are important external influences. They contend that technological developments can promote sustainable growth and open up new avenues for eco-innovation. This perspective is supported by research highlighting the role of technological change in fostering innovation, particularly in sectors characterised by rapid technological advancements (Horbach et al., 2012; Rennings, 2000).

2.9.5 COOPERATION

During the literature review, another crucial external factor was identified that influences innovation and eco-innovation efforts – cooperation (Dias and Braga, 2022; Tether, 2002; Laursen & Salter, 2006). Access to knowledge sharing with business enterprises outside of the group, universities, government, and non-profit organisations has been recognized as a significant driver of innovation and eco-innovation (Chesbrough, 2003; Miotti & Sachwald, 2003; Tsai & Ghoshal, 1998). In this context, collaborative networks and partnerships can facilitate the transfer of critical information and resources, thus fostering innovation and sustainable practices (Hagedoorn, 2002; Inkpen & Tsang, 2005). Therefore, to construct a more thorough analytical framework in this study, Porter's categories are combined with the collaboration aspect (Porter & van der Linde, 1995).

2.9.6 THE RESEARCH FRAMEWORK FOR EXTERNAL FACTORS

The developed framework, which consists of environmental, market, policy, technological factors, and cooperation, relates to the PESTEL model, encompassing political, economic, sociocultural, technological, environmental, and legal aspects

(Johnson et al., 2005).

Environmental factors align with PESTEL's environmental dimention, addressing natural resources (Porter & van der Linde, 1995). Market factors connect to PESTEL's economic and sociocultural aspects, covering consumer demand, market supply and competition. Policy factors correspond to PESTEL's political and legal aspects, focusing on environmental regulations and norms. Technological factors directly link to PESTEL's technological component, emphasising technological advancements and their adoption (Porter & van der Linde, 1995).

By emphasising the need of information exchange and collaboration with other institutions, the cooperation factor provides an additional dimension (Dias and Braga, 2022). This aspect broadens the framework's scope by integrating factors that PESTEL does not specifically address.

The framework was also developed by considering the main schools of thought discussed in the literature review about the drivers and barriers of innovation. Technological determinism (Veblen, 1921) is covered by the framework's technological factors (Porter & van der Linde, 1995), which emphasise the role of technological advancements and adoption in driving eco-innovation. Institutional theory (Meyer and Rowan, 1977) is reflected in the policy factors (Porter & van der Linde, 1995), as it considers the influence of environmental regulations, standards, and government incentives on eco-innovation efforts. The environmental considerations (Porter & van der Linde, 1995) and the resource-based approach (Barney, 1991) both emphasise the value of scarce natural resources in fostering eco-innovation. Rogers' (1962) theory on the diffusion of innovations emphasises the importance of consumer demand, market possibilities, and information exchange in advancing eco-innovative practises. Finally, the triple bottom line (Elkington, 1997) is embodied in the framework as a whole, as it integrates economic, social, and environmental dimensions, emphasising the importance of a balanced approach to eco-innovation.

2.10 FORMULATING THE RESEARCH FRAMEWORK FOR THE POSSIBLE INTERNAL DRIVERS AND BARRIERS

Leo & Tello-Gamarra (2020) offer a comprehensive framework for internal factors that could serve as drivers or obstacles for eco-innovation by focusing on four main categories: organisational culture, strategy, research & development (R&D), and human capital. These categories have also been used in other studies:

2.10.1 ORGANISATIONAL CULTURE

A company's organisational culture plays an important role in promoting eco-innovation. Shared values are essential for coordinating organisational aims related to innovation and sustainability, as emphasised by Xu, Wang, and Suntrayuth (2022). A strong emphasis on culture, **shared beliefs and values** can create a conducive environment for eco-innovation (Schein, 2010; Lozano, 2015). In order to create a climate that fosters eco-innovation initiatives, Schein (2010) and Lozano (2015) underline the importance of organisational values and beliefs being in line with sustainability aims. Another component of corporate culture is the **leadership style**. According to Li et al. (2018) and Leo & Tello-Gamarra (2020), leaders may foster an environment that is advantageous to eco-innovation initiatives by supporting and encouraging innovation as well as offering the required rewards and recognition. Other studies, such as those conducted by Linnenluecke and Griffiths (2010) and Afsar, Badir, and Kiani (2016), also emphasise the importance of leadership and organisational culture in promoting innovation and eco-innovation within companies.

2.10.2 STRATEGY

Ceptureanu, Popescu, and Orzan (2020) assert that promoting the creation of sustainable products requires a clear, well-defined strategy that prioritises sustainable product development. The authors stress the need of establishing specific goals and targets related to eco-innovation, as they can significantly impact a company's ability to develop and implement environmentally friendly products and solutions. This perspective is further supported by other researchers, such as Hart (1995) who notes the importance of incorporating sustainability into a company's strategic planning process to foster eco-

innovation. Additionally, Schaltegger and Wagner (2011) and Nidumolu, Prahalad, and Rangaswami (2009) emphasise the necessity for organisations to acknowledge the strategic opportunities presented by environmental challenges and develop plans to use that strategically, ultimately fostering eco-innovation and long-term competitive advantage.

2.10.3 RESEARCH & DEVELOPMENT CAPABILITIES

Research and development (R&D) is an essential part of innovation, according to Tidd and Bessant (2018). It can be conducted in specialised departments or throughout the entire firm. The **systems and structures** within a company play a significant role in shaping R&D capabilities (Chesbrough, 2003). Efficient systems and flexible structures can facilitate a more effective allocation of resources and improve the overall R&D process (Tidd & Bessant, 2018). According to Freeman and Soete (1997), **financial resources** are also a crucial part of R&D capabilities. A company's ability to invest in R&D is directly related to the availability of financial resources, which can either enable or hinder the pursuit of innovative projects and sustainable product development (Hottenrott & Lopes-Bento, 2014). Therefore, taking into account R&D and related systems, structures, and financial resources is crucial for examining the drivers and berriers of eco-innovation.

2.10.4 HUMAN CAPITAL

According to Sun, Li, and Liu (2020) and Laursen and Foss (2003), human capital is a critical element in the innovation process, since it directly affects a company's ability to generate product-eco innovation. Possessing a skilled workforce with diverse expertise is of great importance for supporting eco-innovation efforts. Additionally, opportunities for training and development can further enhance employees' abilities to contribute to sustainable product development (Demirkan, Srinivasan and Nand, 2021). According to Beynon et al. (2019) not only staff training and development opportunities , but also sufficient level of staff allocation is important for innovation. Amabile (1998) points out that it is necessary for employees to feel empowered to take risks and experiment with new ideas, as this fosters a culture creativity within the company. Consequently investing in human capital, including skills development and adequate staffing, is pertinant for overcoming internal barriers and driving eco-innovation.

2.10.5 THE RESEARCH FRAMEWORK FOR INTERNAL FACTORS

The McKinsey 7S framework, which emphasises the interconnectedness of strategy, structure, systems, shared values, skills, staff, and style in organisational effectiveness, is aligned with the developed internal factors framework, which consists of **organisational culture, strategy, research and development capabilities, and human capital** (Waterman, Peters, & Phillips, 1980). Organisational culture incorporates shared values and leadership style (Xu, Wang, & Suntrayuth, 2022; Leo & Tello-Gamarra, 2020), while strategy focuses on prioritising product-eco innovation (Ceptureanu et al., 2020). Research and development capabilities reflect the systems and structure aspects, as they are influenced by the organisation's processes, procedures, and resource allocation (Teece, Pisano and Shuen, 1997). Human capital encompasses the skills and staff dimensions of the McKinsey 7S framework, emphasising the importance of technical expertise, creative skills, and adequate staffing (Demirkan, Srinivasan and Nand, 2021).

As described in the literature review, this framework also takes into account the discussed schools of thought on eco-innovation drivers. Technological determinism (Veblen, 1921) is represented by the research and development capabilities category (Teece, Pisano and Shuen, 1997), as it underscores the role of technology in driving eco-innovation. Institutional theory (Scott, 2008) is reflected in the organisational culture and strategy factors (Leo & Tello-Gamarra, 2020), which consider the influence of internal values, norms, and strategic goals on eco-innovation efforts. The resource-based view (Barney, 1991) aligns with the human capital and R&D capabilities factors(Sun et al., 2020), emphasising the importance of organisational resources, including personnel and their skills, in promoting eco-innovation. Diffusion of innovations theory (Rogers, 1962) connects to the organisational culture, strategy, and human capital factors, as it highlights the role of internal values, strategic priorities, and staff expertise in

driving eco-innovative practices. Finally, the triple bottom line (Elkington, 1997) is embodied in the framework as a whole, as it integrates economic, social, and environmental dimensions, emphasising the importance of a balanced approach to eco-innovation.

2.11 COMPANY AGE IMPACT

Research suggests that the relationship between company age and innovation, including eco-innovation and sustainability efforts, varies across industries (Sørensen & Stuart, 2000; Acs & Audretsch, 1990; Cohen & Klepper, 1996).

Younger companies are often **more agile and adaptable (H1)**, allowing them to respond quickly to changing market conditions and adopt new technologies (Sørensen & Stuart, 2000; Schooley, 2022). They may have **less bureaucratic structures** and a more risk-taking culture (Hannan & Freeman, 1984, Mintzberg, 1979; Bendickson et al., 2017), fostering innovation. However, research suggests that younger companies may face **challenges related to limited resources, experience, and established relationships with stakeholders** (Cassar, 2004; Davidsson & Honig, 2003).

On the other hand, older companies tend to have **greater accumulated knowledge, experience (H6), and resources (H3)**, which can facilitate innovation and eco-innovation efforts (Sørensen & Stuart, 2000). They often have **established relationships with customers, suppliers, and other stakeholders (H7)**, enabling them to leverage these connections for innovation activities (Gulati, 1998). However, research indicates that older companies may face **challenges related to inertia and resistance to change (H1)**, which can hinder their ability to adopt new technologies and practices (Hannan & Freeman, 1984; Sørensen & Stuart, 2000).

When it comes to external cooperation, due to the established relationships and the longevity of business operations in older companies (Gulati, 1998) a hypothesis is formulated that older companies would find external cooperation easier **(H10)**.

2.12 COMPANY SIZE IMPACT

The impact of company size on innovation, eco-innovation, and sustainability efforts has been widely studied across different industries, yielding mixed results (Acs & Audretsch, 1990; Scherer, 1965; Cohen & Klepper, 1996). Company size, often measured by the number of employees or annual revenue (Shepherd and Wiklund, 2009; Hasan et al., 2015), can result in varying effects on innovation and eco-innovation performance depending on the industry sector (Acs & Audretsch, 1990).

Smaller companies tend to be **more agile and flexible (H1)**, allowing them to adapt more easily to changing market conditions and embrace new technologies (Hannan & Freeman, 1984; Nooteboom, 1994; Rothwell, 1989). They are also more likely to have flatter, more flexible organisational structures that foster an entrepreneurial mindset and facilitate innovation (Nooteboom, 1994; Rothwell, 1989; Mintzberg, 1979). However, research suggests that smaller companies may face challenges related to **limited financial resources, difficulty in attracting and retaining skilled personnel (H5), and lower economies of scale (H8)** (Acs & Audretsch, 1990; Storey, 2016; Rodrigues et al., 2022).

On the other hand, larger companies tend to have **greater financial resources (H2) and better access to skilled personnel (H4)**, which can facilitate innovation and eco-innovation efforts (Acs & Audretsch, 1990; Cohen & Klepper, 1996; Du Boff and Chandler, 1990; Kotler and Keller, 2006; Leiponen, 2005). They may also benefit from **economies of scale (H8)**, which can enable them to invest in **R&D and employee training (H12)** and skill development (Cohen & Klepper, 1996; Du Boff and Chandler, 1990; Kesen, 2016). However, large companies may face **challenges related to bureaucracy, slow decision-making processes, difficulty in adopting new technologies, practices (H1), and fostering a unified organisational culture (H11)** (Rothwell, 1989; Hannan & Freeman, 1984; Schein, 2017). Tether (2002) notes that company size and the likelihood of external cooperation correlate positively therefore a hypothesis is formulated that large companies would find external cooperation easier **(H9)**.

2.13 HYPOTHESES DEVELOPED FROM THE LITERATURE REVIEW FOR THE THIRD RESEARCH QUESTION

H1. Smaller/younger companies' flexibility promote eco-innovation, while larger/older companies' structures hinder it.

H2. Large companies' comparatively greater financial resources aid product eco-innovation.

H3. Older companies' accumulated resources facilitate eco-innovation.

H4. Large companies' access to skilled staff promotes eco-innovation.

H5. Small companies struggle to attract and retain talent and that hinders eco-innovation.

H6. Older companies' knowledge and experience facilitate eco-innovation.

H7. Older companies' established relationships with customers, suppliers, and other stakeholders help facilitate product eco-innovation activities.

H8. Large companies benefit from economies of scale in eco-innovation.

H9. Large companies establish external cooperation for eco-innovation more easily than small ones.

H10. Older companies find external cooperation for eco-innovation easier compared to younger ones.

H11. Fostering a unified organisational culture for eco-innovation is more challenging for large companies with more employees.

H12. Large companies' in-house R&D and training resources benefit eco-innovation.

2.14 CONNECTION BETWEEN COMPANY AGE AND SIZE

The relationship between a company's age and size has been documented in the organisational literature, with many studies pointing to the existence of a correlation. Theoretically, young firms tend to be smaller due to various factors such as the scope of their operations, resource constraints, and limited market penetration (Coad, Segarra and Teruel, 2013; Evans, 1987; Fort et al., 2013). As these firms grow older, they typically expand in size due to accumulated market experience (March, 1991), an established reputation (Roberts and Dowling, 2002), an expanded client base (Hitt et al., 2001), and increased resource acquisition (Fort et al., 2013; Penrose, 2009). These ideas have been supported by empirical research. For instance, Mata, Portugal, and Guimaraes (1995) discovered that firm age and size had a positive correlation, particularly early in the business's history. Additionally, research from 2013 by Coad, Segarra, and Teruel confirmed the same results, highlighting how the size-age association is particularly strong for new enterprises.

According to Evans (1987), this trend appears to continue until businesses reach a particular age and size, at which point the association between age and size starts to weaken. Older firms display a higher degree of heterogeneity in their size. It is not uncommon to find old companies that are small in size due to various factors, such as specific industry conditions, strategic choices, or historical trajectories (Porter, 1980; Robinson and Pearce, 1984). This understanding of age-size correlation ,especially noticeable in young companies, was used in developing the first hypothesis **(H1)**, which combines both young and small companies in comparison to larger and older enterprises and compares their respective agility and flexibility capabilities in aiding eco-innovation efforts.

2.15 CONCEPTUAL FRAMEWORK

The research framework consists of internal and external factors that can potentially serve as drivers or barriers to eco-innovation as well as 12 developed hypotheses to investigate the effects of company age and size for eco-innovation efforts. Each factor in the developed framework as well as each hypothesis related to the company age and size effects was turned into a direct question in the survey used for this study in order to investigate the research questions.

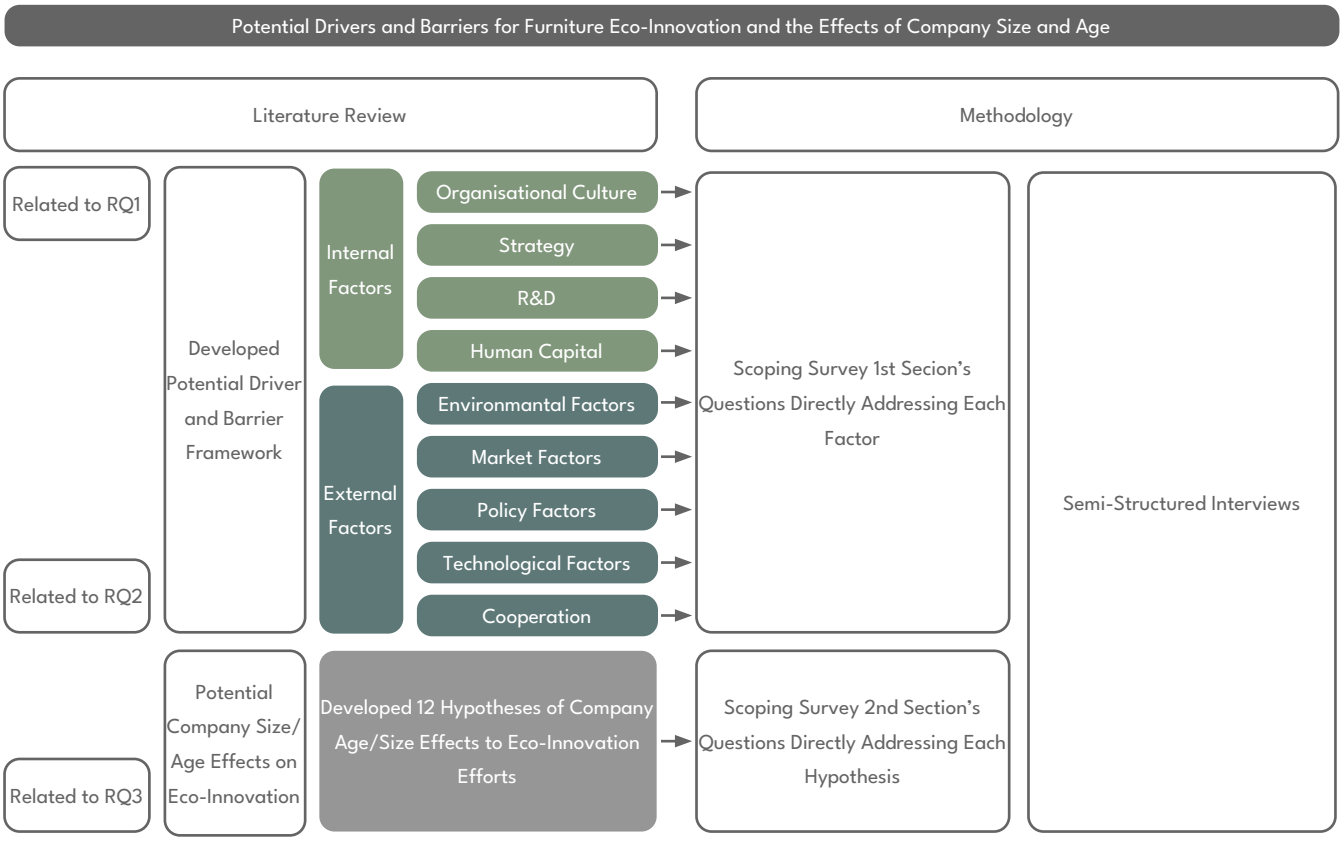

Fig. 2: Author's illustration of the research framework developed during the literature review, that is guiding the research.

3 METHODOLOGY

3.1 RESEARCH DESIGN

3.1.1 LITERATURE REVIEW OUTLINE

The Oslo Manual, which is internationally recognised for its thorough instructions on gathering and analysing innovation data, served as the study's primary foundation. After familiarising with the concept of eco-innovation, the literature review proceeded with a broad investigation into the potential drivers and barriers of eco-innovation and innovation in different sectors, laying the groundwork for a more focused investigation into the furniture industry. To assess the various schools of thought on innovation and eco-innovation, databases such as Google Scholar and Scopus were used. Relevant scholarly publications and resources were filtered and chosen using keywords like "innovation theory", "eco-innovation drivers and barriers", "technological determinism", "institutional theory", "resource-based view", "diffusion of innovations theory", and "triple bottom line". After a thorough examination of the existing research on the subject, the study moved on to examine the potential impacts of firm age and size on innovation. To discover relevant literature, terms such as "Schumpeterian hypothesis," "company size and innovation," and "company age and innovation" were input into the search engine. The methodology involved an initial overview of the abstracts. Those identified as relevant to the research topic underwent a discussion and conclusion review, noting the main points in a summary form to be able to reference and use the knowledge gained from the articles and synthesise them into a framework for this research.

3.1.2 RESEARCH APPROACH: INDUCTIVE AND DEDUCTIVE

The study follows Creswell's (2009) guidelines, using both inductive and deductive methods to extensively examine eco-innovation in the Scandinavian furniture industry. The first section of the study, which is connected to research questions 1 and 2, is predominantly inductive. A framework for the possible drivers and constraints to eco-innovation is developed as a result of this literature review. No particular emphasis is placed on predefined hypotheses or any specific drivers or barriers. Instead, the objective is to understand how the research participants themselves assess the influence of each factor on eco-innovation.

The second section of the study, which deals with research question three, employs a deductive approach. Here, the study generates hypotheses from existing literature and theories, and these hypotheses are then tested for their validity based on the responses of industry professionals. This strategy follows the conventional paradigm of scientific inquiry and is consistent with hypothetico-deductive reasoning, where hypotheses are methodically created and examined (Popper, 1959).

3.1.3 MIXED METHODS RESEARCH DESIGN

The research uses a mixed methods strategy to get a more comprehensive understanding of the industry. By combining generalizable, broad data from the scoping survey with nuanced insights from subsequent interviews, the use of a mixed methods methodology offers a potential to investigate and gain a more thorough perception of the industry (Creswell, 2009). This approach combines the strengths of quantitative and qualitative methodologies, counterbalancing their respective weaknesses (Creswell & Plano Clark, 2019).

3.1.4 COMPANY SIZE UNDERSTANDING

In this study company size was chosen to be determined by the number of full time employees for several reasons:

- **Prevalence in the literature:** It is a common practice in organisational and innovation studies (Acs & Audretsch, 1987; Symeonidis, 1996; Cohen & Klepper, 1996; Hart and Oulton, 1996; Nooteboom, 1994; Dangelico & Pujari, 2010). This allows for comparability with previous research and facilitates the integration of findings into the existing body of knowledge.
- **Comparability across firms:** Ability to consistently compare different organisations within the Scandinavian furniture industry. This measure is easily accessible and provides a

clear, objective basis for comparisons.

- **Organisational features:** It enables the exploration of organisational features such as shared values, organisational culture, and decision-making processes (Cameron and Quinn, 2011). These features may influence the companies' ability to pursue eco-innovation and respond to drivers and barriers in the industry.
- **Resource availability and capabilities:** It can also serve as a proxy for the availability of resources and capabilities that may impact a firm's capacity for eco-innovation.

3.1.5 COMPANY SIZE CATEGORIZATION

For the purpose of this research, the classification of companies into large or small is based on the European Union's definitions of small and medium-sized enterprises (SMEs). According to these definitions, a micro-enterprise employs between 1 and 9 employees, a small enterprise employs between 10 and 49 employees, a medium-sized enterprise employs between 50 and 249 employees, and a large enterprise employs 250 employees or more (European Commission, 2003). This classification provides a comprehensive and widely accepted framework for assessing company size as well as allows for clear differentiation between small and large companies.

3.1.6 COMPANY AGE CATEGORIZATION

Company age interpretations differ across research. Certain studies, like Ayyagari, Demirguc-Kunt, & Maksimovic (2011), indicate a firm is considered 'young' if it's been operational for 0-5 years, and 'mature' if it's 11 years or older. Conversely, research by Coad, Segarra, & Teruel (2016) categorises firms younger than 10 years as 'young'. Given these varied perspectives, this study adopts a modified approach from the OECD (2021), taking into account the specific nature of the furniture industry, characterised by high capital requirements and lengthy product cycles. As a result, for the purposes of this study, companies operating for 0-10 years are classified as 'young', those from 11-20 years are 'mature', and firms in operation for over 20 years are considered 'old'.

3.1.7 EMPLOYEE NUMBER AND COMPANY AGE SOURCES

Open to the public online databases as well as corporate websites, including annual reports, were used to compile information on the number of full-time employees and the age of the businesses. The AllaBolag database was utilised for Sweden, Proff.no for Norway, Virk.dk for Denmark, and Finder.fi for Finland. To avoid overwhelming the company representatives with administrative inquiries and to keep the survey and interviews' focus centred on the study objectives, the method of employing sources for gathering this secondary data was adopted (Hox & Boeije, 2005).

3.2 QUANTITATIVE RESEARCH DESIGN

3.2.1 INTRODUCTION TO QUANTITATIVE RESEARCH

Quantitative research, which uses statistical analysis of numerical data, is essential to this study. The method can effectively collect information that will assist in an extensive analysis of eco-innovation in the Scandinavian and Finnish furniture industries (Creswell, 2009). Notable for the method's numerical basis and objectivity, it facilitates result generalisation and has proven validity in prior similar studies (Biscione et al., 2021; Pacheco Dias and Souza Braga, 2021). In the present study, quantitative research method is used in the form of a survey, an effective and efficient tool, enabling rapid data collection from a large audience, especially appealing to time-restricted industry professionals (Dillman, Smyth & Christian, 2014).

3.2.2 PRE-TESTING OF THE QUESTIONNAIRE

Following advice from Fowler (2013), Van Teijlingen and Hundley (2001), and Creswell & Creswell (2017), the survey was improved via several iterations. Industry experts outside of Scandinavia, namely those in the Lithuanian architectural and interior design sectors, who have prior experience working with furniture manufacturing enterprises, provided feedback. The pre-testing input indicated that factors from the driver-barrier framework could

operate dually as a driver and a barrier at the same time for a company. This insight led to a modification in the questionnaire design, allowing respondents to evaluate each factor from both perspectives to collect more nuance in the answers. Another suggestion was to include open-ended questions. Such sections give respondents the opportunity to offer additional insights, enhancing the data's depth and accounting for any potential drivers or obstacles that the preset framework could not address. Finally, the need of conciseness and time economy was emphasised. The final questionnaire was created to be as brief as possible, with simple and direct questions, in accordance with studies demonstrating that shorter surveys boost response rates (Galesic & Bosnjak, 2009). The pre-testing phase significantly improved the survey's reliability, validity, and overall effectiveness by incorporating these insightful observations and grounding the survey development process in scholarly recommendations (Fowler, 2013; Van Teijlingen & Hundley, 2001; Creswell & Creswell, 2017; Galesic & Bosnjak, 2009).

3.2.3 OVERVIEW OF THE SURVEY DESIGN

The survey's introduction provides a concise summary of the research aim: to explore the drivers and obstacles for product eco-innovation in the Scandinavian and Finnish furniture industry, and the influence of company size and age on these factors (see Appendix for the survey questionnaire). Important concepts like "product eco-innovation," "company age," and "company size" were defined to avoid any misunderstandings or misinterpretations. Transparency and trust were promoted by including the researcher's contact details and the official letter from the university course coordinator (Easterby-Smith, Thorpe & Jackson, 2015; Fowler, 2013). The questionnaire design ensured the data collected was capable of addressing the research objectives, and complied with clear question construction and an appropriate response scale criteria (Fowler, 2013).

There were two primary components to the survey. The first was focused on identifying eco-innovation's drivers and obstacles using the developed framework. Each of the questions in this section related to a specific factor of the framework. The second section's objective was to investigate the effects of firm age and size on eco-innovation. Each inquiry in that section was connected directly to a particular hypothesis for methodical testing. The survey used a five-point Likert scale (Joshi et al., 2015), adapted to the context of each section, a practice commonly found in social science research due to its reliability and straightforward interpretation. The first section ranged from "1 - Major Obstacle" to "5 - Major Driver," reflecting perceived eco-innovation drivers or obstacles. In the second section, the scale ranged from "1 - Strongly Disagree" to "5 - Strongly Agree," to assess agreement with hypotheses related to the effects of company size and age on eco-innovation efforts.

3.2.4 ETHICAL CONSIDERATIONS

This study adhered to the ethical research standards (American Psychological Association, 2017) by ensuring participant rights and welfare through informed consent, voluntary participation, clear communication of the study's objectives, and the use of the data acquired. No obligatory measures were used to gather any personal information. The final survey question asked if respondents would be open to further discussion on this subject, and if so, respondents could share their personal contact information. However, this question was marked as non-mandatory, and participants were assured that even after the contact information was collected, it would not be shared and that their identity as well as the confidentiality of the company they represent would be maintained. The first question regarding the company's name was intended purely for the analysis of company age and size, contributing to data reliability as well as preventing repeated contact with the same company, thereby maintaining professional conduct. For this study to succeed, developing trust with participants was essential (Easterby-Smith, Thorpe, & Jackson, 2015). Following ethical standards and GDPR requirements ensured confidentiality and anonymity, which enhanced trust, raised response rates, and improved the accuracy of the results.

3.2.5 TARGET AUDIENCE AND SAMPLING STRATEGY FOR THE SURVEY

The study investigates furniture companies in Sweden, Norway, Denmark and Finland. Despite

initial plans not including Finland, it was added due to its similar design ethos, sustainability practices, international acclaim, and to bolster the potential for response rates (Scandinavia Design, n.d.; McCrory, 2020; Active Sustainability, n.d.). These nations share common values, work methodologies and design styles such as minimalism and woodwork traditions, facilitating a collective analysis (Bjerregaard, 2017; Pakarinen & Asikainen, 2018). Their joint commitment to sustainability is evident in their adoption of the Nordic Swan Ecolabel (Nordic Ecolabelling, n.d.).

The target audience for this survey consisted of professionals working in furniture companies that operate in the countries of interest with an emphasis on reaching managers responsible for sustainability, R&D, product design and generally higher management with an otherview of broad activities of the company within the furniture industry. The sampling strategy employed was non-probability purposive sampling, where specific groups or individuals are selected based on their knowledge or experience within the subject area (Teddlie & Yu, 2007). This strategy guarantees that participants have the prior knowledge and contextual awareness needed to contribute insightful responses to the study questions. Additionally, the use of direct contact via email and LinkedIn allowed for a greater level of control in participant selection.

3.2.6 QUESTIONNAIRE DISTRIBUTION

Lund University's Sunet Survey, a reliable and secure platform, was used to distribute the developed scoping survey questionnaire (Lund University, n.d.). The survey was distributed to reach geographically diverse respondents through direct email and LinkedIn. Companies were approached via open emails asking them to participate in a 10-minute online survey or a 20-minute anonymous interview. An official letter from the university was attached to build trust and validate the research. Simultaneously, LinkedIn was used to broaden the survey's reach. A similar invitation to take part in an interview or survey was sent to professionals in the Finnish or Scandinavian furniture sectors on the Linkedin online platform. Alternatively, if their own participation was not possible, contacted industry representatives were asked to recommend colleagues for participation. A screenshot of the sent message can be found in the Appendix.

The survey distribution was adapted to a sequential approach due to initial low response rates. After the first hundred companies yielded inadequate responses, more companies were contacted in waves. According to the fact that businesses often require a few business days to look over and respond to messages they receive, a moving list was created where new businesses were contacted while reminder messages were sent to those who had already been reached. The sequential method of contacting companies, although not initially planned, yielded several unexpected benefits. This approach allowed for a more manageable processing of the responses received, which varied from expressions of interest in interviews to polite declines. It was crucial to maintain a high level of professionalism in managing these responses, as it occasionally led to persuading hesitant companies to participate. Some companies expressed doubt about their ability to contribute to the discourse on eco-innovation, yet their perspectives, particularly regarding the barriers they faced, were important to the study. The sequential approach also facilitated a dynamic adjustment of the sampling strategy. As the response rates remained low after the initial contact with the first set of companies, the sequential method enabled the broadening of the company contact list for subsequent waves of outreach as necessary. The study reached out to 625 companies through email and an additional 200 industry professionals via LinkedIn.

3.2.7 NUMBER OF RESPONDENTS

The Central Limit Theorem (CLT), which states that with sample sizes of 30 or more, the distribution of sample means approaches normality, regardless of the distribution of the population, served as a guidance for this research (Ganti, 2023) as this study is of exploratory nature, which targets broad patterns and trends within the Scandinavian and Finnish furniture industry related to eco-innovation drivers and barriers, as well as the impact of firm size and age. Additionally, practical considerations such as time and resource limitations made aiming for this sample size manageable. Furthermore, 30 or more respondents have the potential to represent the diversity needed in terms of geography, company age, and size and this further enhanced the validity of the study's findings.

A total of 34 businesses from the Scandinavian nations and Finland responded to the questionnaire. The companies represented in the survey were diversified across countries, company ages, and sizes. The geographical distribution of the respondents was as follows: Finland (2), Denmark (14), Norway (2), and Sweden (16). These numbers indicate a complete distribution of responses across the countries, with a slight underrepresentation of Finland and Norway. In terms of company age, responses covered the full spectrum. Four of the companies were young (0-10 years), nine were mature (11-20 years), and twenty-one were categorised as old companies (21 years and above). While this distribution could lead to less young company representation, the overall distribution ensures insights across all company ages. The size of the responding companies was also diverse. Nine were micro-sized companies with 1 to 9 full-time employees, eight were small companies with 10-49 employees, ten were medium-sized companies with 50-249 employees, and seven were large companies with 250 or more employees.

Company	Size	Age	Country of Operations/Origin
1	1-9 (micro)	11-20 (mature)	Sweden
2	1-9 (micro)	0-10 (young)	Sweden
3	1-9 (micro)	11-20 (mature)	Denmark
4	50-249 (medium)	21-inf (old)	Denmark
5	1-9 (micro)	0-10 (young)	Sweden
6	10-49 (small)	21-inf (old)	Sweden
7	50-249 (medium)	21-inf (old)	Sweden
8	1-9 (micro)	21-inf (old)	Norway
9	10-49 (small)	21-inf (old)	Sweden
10	1-9 (micro)	0-10 (young)	Sweden
11	50-249 (medium)	21-inf (old)	Denmark
12	50-249 (medium)	21-inf (old)	Sweden
13	50-249 (medium)	21-inf (old)	Finland
14	250-Inf	21-inf (old)	Sweden
15	250-Inf	21-inf (old)	Denmark
16	50-249 (medium)	0-10 (young)	Denmark
17	50-249 (medium)	21-inf (old)	Denmark
18	50-249 (medium)	21-inf (old)	Sweden
19	1-9 (micro)	21-inf (old)	Denmark
20	10-49 (small)	21-inf (old)	Denmark
21	10-49 (small)	11-20 (mature)	Denmark
22	10-49 (small)	11-20 (mature)	Denmark
23	1-9 (micro)	21-inf (old)	Sweden
24	10-49 (small)	11-20 (mature)	Norway
25	250-Inf	11-20 (mature)	Finland
26	250-Inf	21-inf (old)	Denmark
27	50-249 (medium)	21-inf (old)	Denmark
28	250-Inf	11-20 (mature)	Sweden
29	10-49 (small)	11-20 (mature)	Sweden
30	250-Inf	21-inf (old)	Denmark
31	10-49 (small)	11-20 (mature)	Sweden
32	1-9 (micro)	21-inf (old)	Sweden
33	50-249 (medium)	21-inf (old)	Denmark
34	250-Inf	21-inf (old)	Sweden

Table 1. Secondary data of the survey participant's represented companies.

3.2.8 DATA ANALYSIS FOR THE QUANTITATIVE RESEARCH

Descriptive and comparative statistical analysis, well-known techniques for showing patterns and trends in quantitative data, were used to evaluate the survey results (Field, 2017). Descriptive statistical analysis, a standard in social science research, was used to summarise the central tendency in the survey data (Lee, 2020). The responses, collected via a modified Likert scale, were quantified to assess attitudes towards eco-innovation drivers and barriers, and the degree of consensus or disagreement with hypothesis-related statements. Google Sheets was used to calculate the means from the Likert scales, revealing the central tendency of responses for each factor or statement. Afterward the different mean scores were compared to determine the perceived major drivers and barriers as well as the average agreement or disagreement with the hypotheses statements by the industry representatives.

3.2.9 LIMITATIONS

Quantitative approach in this study has its limitations. Recognising and addressing these limitations is key to preserving the authenticity of the research. A limitation of the survey is its inherent subjectivity. Since it relies on perceptions, the data might not fully reflect the actual drivers or barriers to eco-innovation in the Scandinavian and Finnish furniture industry. These impressions could not accurately reflect objective reality because of personal beliefs or experiences (Bryman, 2012). By focusing on skilled industry specialists and combining survey data with in-depth interviews, this risk is being mitigated (Jick, 1979). Another limitation arises from evaluating challenges or advantages across different company sizes or ages. Smaller or younger firms may lack the experience to accurately assess conditions of larger or older companies, and vice versa. Again, this risk is partially mitigated by the selection of industry professionals who have a broad understanding of the industry dynamics and the triangulation with qualitative interviews (Jick, 1979). Moreover, the study encountered a selection bias during the survey distribution, as companies less engaged in eco-innovation were less likely to participate. This could exclude crucial insights about barriers faced by these companies (Bethlehem, 2010). However, respecting the principles of voluntary participation and ethical research conduct, the study did not press for participation of the unwilling parties, often citing resource shortages as the reason for non-engagement with the study. Although this would have provided valuable data, the ethical commitment to voluntary participation was paramount. It is also important to recognise that despite the survey's wide scope, the results might not be fully generalizable to all furniture enterprises in Finland and the Scandinavia. Regional variations in business environments, societal attitudes and policy landscapes can impact eco-innovation practices and perceptions, introducing potential variability in responses. Lastly, there could be a tendency for companies to downplay the severity of obstacles and overemphasise positive aspects such as their eco-innovation drivers. This could be a consequence of social desirability bias, which refers to the tendency for respondents to give responses that would be well-received by others (Krumpal, 2013).

Overall, although these limitations might lead to biases or inaccuracies in the study, precautions have been made to minimise their impact. The focus of industry specialists and the triangulation with qualitative interviews are deliberate measures to increase the validity and reliability of the study's findings (Bryman, 2012; Jick, 1979).

3.3 QUALITATIVE RESEARCH DESIGN

3.3.1 INTRODUCTION TO THE QUANTITATIVE RESEARCH

Focusing on participant perspectives and experiences, qualitative research enables thorough exploration of complex phenomena (Creswell, 2009). It contributes to this study's quantitative survey data by providing in-depth insight into the nuances of eco-innovation within the Scandinavian and Finnish furniture industry. The qualitative approach, specifically through the use of interviews, facilitates access to industry professionals' knowledge, perceptions, and experiences. This access is invaluable, given that these professionals are immersed in the dynamics of eco-innovation within their industry.

The application of qualitative research to explore the complex interplay between the drivers and barriers as well as the company size and age effects on eco-innovation is a novel approach in the field, adding a new dimension to existing literature which most often relies on quantitative methodology (Biscione et al., 2021; Pacheco Dias and Souza Braga, 2021; Horbach, Rammer, & Rennings, 2012). Although quantitative studies have offered insightful information, the nuanced understanding that qualitative research brings is integral for a comprehensive exploration of the research questions.

3.3.2 OVERVIEW OF THE INTERVIEW APPROACH AND PROTOCOL

Semi-structured interviewing is the approach used in this study, and it is well-known for its adaptability and flexibility in qualitative research (DiCicco-Bloom & Crabtree, 2006). Open-ended questions and follow-up inquiries are permitted by the semi-structured method, which encourages a thorough investigation of the participants' experiences and viewpoints. This flexible approach ensures consistency across interviews while facilitating the emergence of unique themes and insights, thus enriching the study's findings. The interview protocol consists of four primary questions:

1. What are the major drivers for furniture eco-innovation in your company?
2. What are the major barriers for furniture eco-innovation in your company?
3. How does company size affect this?
4. How does company age affect this?

These four guiding inquiries directly correspond to the study's research questions. All four questions of interest for the interview and the research framework with the potential driver and barrier factors to eco-innovation as well as possible company age and size effects are shared with the interview participants in advance, allowing them to contemplate the answers and provide more informative responses during the online meeting. Due to the open-ended nature of the questions, respondents are encouraged to elaborate on their experiences, give specific instances, and mention any other pertinent details that were not initially covered by the interview process. Additional questions concerning the company representatives' knowledge of how, generally, firm size and age impact eco-innovation initiatives outside of their organisation are asked if they are willing to further discuss this and elaborate on the topic. The interviews are set up to last 20 to 30 minutes in order to accommodate the time restrictions of busy industry professionals. This time limit can be increased, though, if the participants show a desire to continue the conversation for longer, as happened in one case where the interview lasted over an hour.

3.3.3 TARGET AUDIENCE AND SAMPLING STRATEGY FOR INTERVIEWS

The interviewees, like the survey participants, are industry professionals from Scandinavian and Finnish furniture companies, preferably occupying high-level positions related to sustainability, product development, or research. Their comprehensive knowledge of company operations and eco-innovation drivers or barriers provides invaluable insights. Non-probability purposive sampling was the method used in this part of the research as well, as this sampling strategy is frequently used when the research needs insights from certain groups or individuals (Teddlie & Yu, 2007). This targeted approach ensures the collected data is relevant to the research questions. Furthermore, the study adopted an inclusive approach towards the involvement of representatives from non-production organisations, such as manufacturing unions. This choice was made with the knowledge that these representatives may offer helpful industry-wide insights on the research topic because of their interactions with numerous member firms, including furniture manufacturers.

3.3.4 DATA COLLECTION METHODS FOR QUALITATIVE RESEARCH

Online interviews were used in this study, which was a convenient and effective strategy considering the geographical spread of participants across four nations. This method allows for flexible scheduling and interaction with participants without requiring them to physically travel (Lo Iacono, Symonds, & Brown, 2016). Furthermore, OBS Studio, a reliable programme for recording computer audio sound,

was used to record the online interviews. This ensured accurate documentation of interviews and facilitated in-depth analysis. Post data collection, interview audio was transcribed into text. This crucial step in qualitative research allowed to revisit the interview data, take note of all the expressed details and systematically analyse it, identifying key themes related to eco-innovation drivers, barriers, and the influence of company age and size.

Data was collected from representatives of eight Scandinavian furniture companies, providing deeper insight into survey results. Four of these businesses were from Denmark, two each from Sweden and Norway, but none of the Finnish businesses indicated interest in taking part in an interview. This has to be noted as geographical non representation could impact the conclusions made, given potential national variations in business practices, regulatory environments, and cultural attitudes towards eco-innovation. The organisations involved in the study varied in size, including three medium-sized companies, two micro, one small and one large enterprise. In addition, one interviewee represented a large Danish Union that incorporates various companies, including furniture manufacturers. Although it doesn't reflect the perspective of a single firm, its inclusion expands the study's scope by bringing in a multi-company perspective. Six of the firms had been in business for a long period (old), one was relatively new (young), and one was intermediate (mature) in terms of organisational age. This distribution covered the whole spectrum of interest for the study, even though the distribution wasn't entirely balanced.

3.3.5 DATA ANALYSIS FOR QUALITATIVE RESEARCH

Each interview's transcript was entered into NVivo, a tool used to code text based on emerging themes. The data was classified into groups based on recurrent patterns under the guidance of theme analysis principles (Braun & Clarke, 2012). As the study progressed, concepts common to several interviews were categorised under one code. This process facilitated the identification of common trends across the dataset and aided in understanding the interview responses. Though the analytic approach emphasised frequently occurring themes, less prevalent, but relevant themes were also retained for analysis, aligning with the interpretivist paradigm of qualitative research, which prioritises depth and context (Nickerson, 2022). Unlike quantitative research, which often places a focus on repetition and frequency of answers, this approach values unique observations as well.

The analysis findings were synthesised and interpreted within the context of the research questions, the developed framework for drivers and barriers to eco-innovation, and the hypotheses related to the impact of company size and age on eco-innovation efforts. This process of interpretive analysis involves a careful comparison between the emergent themes from the interviews and the established theoretical constructs within the study's conceptual framework. This triangulation, the process of cross-verifying findings with multiple data sources or theoretical perspectives, serves to

Interview Nr.	Representative's Position	Size	Age	Country of Operations/ Origin	Time of the Interview
1	Factory Manager	50-249 (medium)	21-inf (old)	Sweden	1h 18min
2	Manager	1-9 (micro)	21-inf (old)	Norway	19 min
3	Union Representative, Seniorconsultant	250-Inf	21-inf (old)	Denmark	26 min
4	Product Manager	50-249 (medium)	0-5 (young)	Denmark	28 min
5	Sustainability Manager	10-49 (small)	11-20 (mature)	Norway	24 min
6	Sustainability Manager	1-9 (micro)	21-inf (old)	Sweden	30 min
7	CEO	50-249 (medium)	21-inf (old)	Denmark	23 min
8	Human Resources Manager	250-Inf	21-inf (old)	Denmark	25 min

Table 2. Data on the conducted interviews.

increase the reliability and validity of the research (Bryman, 2012; Jick, 1979).

3.3.6 LIMITATIONS

While semi-structured interviews give depth and flexibility in terms of interview design, they can also result in a certain degree of emphasis on the factors that the participants think are most crucial. As a result, it's possible that some aspects of the research framework or hypotheses relating to the age and size of the firm might not be covered in detail. This limitation is addressed by encouraging participants to take part in the survey as well. The deeper, but possibly narrower and focused insights received from the interviews can be supplemented by the broader scope, but less depth results of the survey (Fowler, 2013).

Another limitation is linked to participant attraction. The ethical considerations of this study prevent the enforcement of participation from representatives, even if their specific company types, such as small, large, young, or old could be highly valuable for the study. There is a potential for a selection bias (Bethlehem, 2010) as some companies that engage less in eco-innovation declined to participate, leaving their perspectives on possible barriers underrepresented. This limitation is adressed to some extent by the fact that interviewed managers have experience working in or interacting with a variety of company types, allowing them to share their diverse experiences. However, it is important to acknowledge the potential gap in understanding the unique barriers faced by companies that chose not to engage in the research, often citing lack of resources, time or insubstantial current engagement in this topic. Despite these limitations, the study makes an effort to offer an insightful exploration of the drivers and barriers to eco-innovation in the Scandinavian and Finnish furniture industry.

3.4 RESEARCH QUALITY CRITERIA

3.4.1 VALIDITY

The degree to which the research design and techniques adequately address the research questions is referred to as a study's validity. The validity of this study, which focuses on eco-innovation in Scandinavian and Finnish furniture companies, is ensured through four key aspects: content validity, face validity, criterion-related validity, and construct validity (Middleton, 2019; Barber et al., 2000). The study's content validity is reflected in its survey and interview protocols, with questions directly corresponding to the research queries. This design enhances the content validity, ensuring the study measures what it's intended to measure and also adresses the face validity by being transparent and clear about the research aims. Criterion-related validity in this study is reached through the alignment of the research design with existing theories and findings in the field of innovation and eco-innovation. The research methodology enables the study's findings to be contextualised within the larger academic discourse, hence strengthening its criterion-related validity. Lastly, construct validity assesses the accuracy with which a study measures the theoretical constructs it intends to measure. These constructs—drivers and barriers to eco-innovation, as well as the effects of firm size and age—are explored in this study's survey and interview protocols at the very top of the survey or at the beginning of the interview. They are also briefly addressed in the introduction message inviting to participate in the study. This explains terms in order to make sure that important concepts are not left to interpretation, thereby enhancing the construct validity of the findings (Middleton, 2019).

3.4.2 RELIABILITY

Reliability in research refers to the consistency and replicability of findings derived from a specific instrument or tool (Barber et al., 2000). In the current study, the reliability of findings is enhanced through the careful design and execution of both quantitative surveys and qualitative interviews. The questions in the quantitative survey were specifically designed to collect information on eco-innovation drivers and barriers, as well as the impact of firm size and age, based on a thorough literature review. The use of the Likert scale for responses provides a uniform measurement scale, enhancing the survey's reliability (Joshi et al., 2015). Prior to the main survey, a pilot study was carried out to identify and correct any potential ambiguities and ensure consistent clarity and comprehension for the respondents (Van Teijlingen & Hundley, 2001). A semi-structured interview methodology is used

while conducting qualitative interviews in order to achieve a balance between consistency and the opportunities for participants to offer original inputs (DiCicco-Bloom & Crabtree, 2006). The protocol addresses the research questions directly. The same researcher conducts all interviews, minimising the potential variation that different interviewers could introduce, thus strengthening the study's reliability. Lastly, the interviews are recorded on audio and then transcribed to guarantee a precise documentation of the subject matter.

3.4.3 GENERALIZABILITY

The degree to which research findings from a specific study may be transferred to other comparable populations or circumstances is referred to as generalizability (Polit & Beck, 2010). The mixed-methods approach of this study, combining quantitative surveys for a broad industry overview and qualitative interviews for in-depth insights, builds a potential for comprehensive image of the furniture industry's eco-innovation landscape, thereby enhancing generalizability (Gibson, 2016). The sample for this study, which consisted of 34 diverse companies from Scandinavia and Finland, gives a broad industrial representation. As guided by the Central Limit Theorem (CLT), with a sample size of 30 or more, the distribution of sample means approaches normality, irrespective of the population's distribution (Ganti, 2023). Therefore, the 34 survey responses representing companies in Scandinavian and Finland are adequate to investigate broad trends and patterns, which this study is exploring, and therefore strengthens generalizability to similar firms within the industry. However, there might be limits, when it comes to transferring the findings of this study to other regions.

3.4.4 TRANSFERABILITY

In qualitative research, the principle of transferability is applied. It relates to how much research findings may be generalised to other situations (Coghlan and Brydon-Miller, 2014). Given the Nordic countries' international reputation for sustainability and eco-innovation (Nordregio, 2022), the uncovered eco-innovation practices and challenges may serve as reference points for other industries and regions.

However, due to the uniqueness of the Nordic setting, which includes cultural, historical, and environmental variables as well as a strong sustainability focus, the transferability of findings must be cautiously evaluated (Hjorth & Bagheri, 2006; Nordregio, 2022). The furniture sector also has specialised materials requirements, production procedures, and market dynamics. As a result, even if the findings from this study's patterns and insights may provide broad direction, their direct application to other situations may necessitate more context-specific analysis and adaption. Future research could explore the transferability of these findings by investigating similar dynamics in different industrial sectors or geographical regions.

4. RESULTS AND ANALYSIS

4.1 DRIVERS AND OBSTACLES

The survey's first section asked respondents from the Finnish and Scandinavian furniture sector to rate potential eco-innovation influencing factors as drivers, barriers, or both on a 1-5 Likert scale (1: major obstacle, 3: neutral, 5: major driver). The mean value of all 34 responses represented the industry's collective perception of each factor's influence:

All factors were generally seen as stronger drivers than barriers for eco-innovation, except for "Resource Capabilities". Its total driver/barrier ratio score was 2.88, indicating it's perceived more as a barrier, given it's below the neutral point of 3. The data suggests that companies generally view various factors as eco-innovation drivers more than obstacles. The 3.35 total average of all factor evaluations indicates a stronger positive push for eco-innovation in the Scandinavian and Finnish furniture industry. Further triangulation with interview data is needed for more concrete conclusions about the strength of these drivers relative to obstacles and to better understand the dynamics of eco-innovation in the Scandinavian and Finnish furniture industry.

Nr.	Factor	References	Average Obstacle	Average Driver	Average Total	All Factors Average
1	Environmental Factors (Climate Change, Natural Resource Scarcity)	Porter & van der Linde (1995); Hart & Milstein, (2003)	2.91	4.24	3.57	3.35
2	Legal Factors (Regulations, Standards)	Porter & van der Linde (1995); Ambec et al., (2013)	2.88	3.97	3.43	
3	Technology Availability and Accessibility	Porter & van der Linde (1995); Horbach et al., (2012)	2.82	3.71	3.26	
4	Cooperation with External Entities	Dias & Braga, 2022; Chesbrough, 2003;	2.88	3.65	3.26	
5	Market Supply	Porter & van der Linde (1995); Chin et al., (2012)	2.71	3.65	3.18	
6	Market Demand	Porter & van der Linde (1995); Rennings and Rammer, (2009)	2.91	4.32	3.62	
7	Competitive Pressures	Porter and van der Linde (1995); Orsato, (2006)	2.94	3.94	3.44	
8	Shared Values and Leadership	Xu, Wang & Suntrayuth (2022); Li et al., (2018)	2.97	3.94	3.46	
9	Company's Strategy	Ceptureanu, Popescu & Orzan (2020); Hart ,(1995)	2.97	4.12	3.54	
10	R&D Systems and Structures	Tidd & Bessant (2018)	2.82	3.94	3.38	
11	Resource Capabilities	Freeman & Soete, (1997)	2.35	3.41	2.88	
12	Skilled Staff Availability	Sun, Li, & Liu, (2020); Laursen & Foss, (2003)	2.68	3.56	3.12	

Table 3. Survey results for the first section asking about the major drivers and barriers.

4.2 DRIVERS

4.2.1 MARKET DEMAND (HIGHEST SURVEY AVERAGE SCORE OF 4.32)

The information gathered during the interviews underscores the importance of market demand as a major driver for eco-innovation in the Scandinavian and Finnish furniture industry. Acknowledged universally in all interviews, it was shown to have a central role in shaping business practices towards sustainable objectives. The mechanisms through which market demand impacts eco-innovation were identified in two primary ways.

Firstly, market demand motivates businesses to acquire specific eco-labels and adherence to eco-standards. This is an example of consumer demand for tangible proof of a company's commitment to sustainability, encouraging more transparent and accountable business operations.

Interview 7:

"Definitely our client and customer requests. A few years ago our company realised that the customers ask for one: information and two: result. So, definitely our customers push us forward."

Secondly, the market's influence is felt through enhanced and broadened marketing opportunities, driven by the region's environmentally conscious customer base. Consumers in Scandinavia and Finland, have been characterised in the interviews by their socio-cultural awareness and therefore having a preference for sustainable practices where they gravitate towards companies demonstrating environmental responsibility even if this is done through marketing means and not necessarily through the acquisition of sustainability labels.

Interview 1:

"Customers who are asking for an eco-friendly product. And create that, we market it by saying that we are doing it and basically the marketing benefit is there."

This dynamic that the customer demand creates, allows businesses to leverage their eco-innovative efforts as unique selling points, further accelerating the adoption of eco-innovation in the industry.

However, during the interviews more nuanced insight was shared about this factor explaining that market demand also serves as a barrier to an extent, as some customers seek cheaper options and eco-innovative products are often more expensive resulting in an obstacle for eco-innovation efforts in the industry.

Company 1:

"The customer needs. Which actually also sometimes is a barrier, because we, of course, have competitors in the market. And we also see that customers sometimes just go for the cheapest option. And then they rule out eco-friendly products just to get the price down."

Nevertheless, even if to an extent this factor is a barrier it was recognised by all the interview company representatives as a major driver signifying that while the aspect has a dual effect it is predominantly positive and driving eco-innovation in the Scandinavian and Finnish furniture industry. This is also conveyed by the survey answers where market demand is evaluated as a driver with the score 4.32 out of 5 and the same factor evaluated as an obstacle has a score of 2.91 signifying a smaller obstacle effect than the driving effect as the neutral point in the Likert scale is 3.

4.2.2 ENVIRONMENTAL FACTORS SUCH AS CLIMATE CHANGE AND RESOURCE SCARCITY (SURVEY AVERAGE SCORE OF 4.24)

The findings from the interviews reveal that environmental factors and challenges such as climate change and resource scarcity was a prominent driver towards eco-innovation. This is reflected in the frequency of mentioning it in six out of eight interviews, emphasising the necessity to adapt business operations in response to environmental degradation and the dwindling availability of natural resources. The interview participants recognized the importance of making conscious decisions to uphold ethical business practices, such as opting for sustainable alternatives instead of materials such as expensive rainforest wood that is rare, exotic and on the brink of extinction. There was also the expressed concern over indiscriminate deforestation in Europe. A special attention was placed on the sources for wood which is used in

European furniture companies, estimating that it comes to a large extent from Eastern Europe, where there is a lot of illegal forestry happening according to the interview participant.

Interview 6:

"They are talking a lot about illegal forestry in Eastern Europe."

There was also a discussion about the importance of resource scarcity and how eco-innovation promotes controlled usage and sourcing of timber. An example of this was discussed in the form of ebony wood, that is scarce material, which use in furniture is an environmentally degrading practice these days.

Interview 1:

"20 or 30 years ago, you could buy a product like Ebony wood, I'm not sure if you're familiar with it, it's a very black type of wood. It's rainforest wood. We should not be working with it. Today you can't buy it anymore. And in this case, I would say that's a good thing. We cannot keep cutting down rainforest and we cannot just cut down forests everywhere. So you have to do it in a controlled way."

Additionally, the notion of 'degrowth' - intentionally reducing production to minimise environmental impact - was viewed as a commendable strategy towards sustainability.

Interview 6:

"And what happened was that I reduced my amount of products from 800 to 200, 75% reduction on my collection. And then someone told me, that's the best you have ever done regarding the environment. I started to focus on a small number of products and I also reduced the amount of material used within the products. Before I produced sofas, metal chairs from different factories, a lot of transport, a few units, a lot of bad transport. But now I have more or less only oak, some ash, and 70 products to use less varied material in the production processes. And I also think it goes a little bit hand in hand with Timothée Parrique. It's a professor in Lund who's talking about degrowth. I agree with what he's saying."

The discussion of this theme highlights the consensus among these companies on the urgent need to adapt to environmental challenges and resource scarcity. Thus, supporting the driving force that environmental factors create in regards to eco-innovation in the industry.

4.2.3 THE COMPANY'S STRATEGY (SURVEY AVERAGE SCORE OF 4.12)

6 out of 8 interviewees mentioned the strategic direction as a driver for eco-innovation for their companies. Firms' representatives articulated a clear understanding of the evolving business landscape in the Scandinavian and Finnish furniture industry, underpinned by the shift from linear to circular economy models. Notably, this transition is recognized as a strategic necessity by some interviewees and a direction that will ensure the companies' survival and competitiveness in the long term.

Interview 7:

"And we see now that more and more circular businesses or models are coming, I mean, reuse, recycling, products as a service, for example. So we realise that in order to stay alive as a company, we need to be there also in the circular world."

One company declared ambitious sustainability goals, aspiring to become a leading figure in sustainable furniture manufacturing, showcasing not that they will for sure reach it, but how this goal aligns their company's decisions and eco-innovation efforts, creating a strategic direction for the organisation.

Interview 7:

"And we are very ambitious. And our goal is to be the most sustainable furniture company in Europe or in the world."

Furthermore, the importance of resource allocation in driving eco-innovation was underscored, implying that effective management and prioritisation are crucial elements in implementing eco-innovative strategies.

Interview 4:

"It's all about where we put the resources. Is it a priority? Strategy of the company? Then the

resources will be found. I'm sure."

Interestingly, the influence of ownership on a company's commitment to eco-innovation was highlighted, with one participant noting the direct involvement of their owners in innovation processes. This suggests that a company's eco-innovation endeavours can be significantly shaped by the strategic decisions and perspectives of their owners or stakeholders.

Interview 1:

"This company, we are "X" (stand in for the real company name), we are owned by "Y". And "Y" is innovative. They are actually sometimes themselves coming into this factory and doing their own little innovation in house, which I think is a good thing... You do not see that in every company. But here, it is a conscious effort."

With the frequent mention of this theme, the company's strategy was deemed to be an important driving factor in the Scandinavian and Finnish furniture industry.

4.3 OBSTACLES

When it comes to the obstacles for eco-innovation, respondents identified the following as the most important ones:

4.3.1 RESOURCE CAPABILITIES (SURVEY AVERAGE SCORE OF 2.35)

The discussion of resource capabilities as a significant barrier to eco-innovation surfaced in all eight interviews, highlighting its universal importance across the Scandinavian and Finnish furniture industry. Innovating within a given budget was portrayed as a persistent challenge.

Interview 1:

"We get a certain budget. And within the budget, we also have to do our innovation. And sometimes we can ask for the additional budget, to see if we can do more innovation. So the company is giving us a budget. But that's not always as high as you want it to be. So it is a barrier."

Financial constraints can not only delay or hinder innovation, but also affect a firm's ability to overhaul its production processes for enhanced eco-friendliness. Consequently, companies may be unable to invest in new, more sustainable machinery, or lack funds to adjust their purchasing, production, and handling procedures. The issue of budget limitation was connected to the high costs involved in sustainable design and product reconfiguration for recyclability. Notably, the complexity of rethinking product design and adjusting to new materials could intensify the strain on resources.

Interview 7:

"It is difficult, because you need to rethink your entire business model. You need to rethink product design, which is what we are doing at the moment. So we work with laminated products. We laminate different materials together, like ceramic steel and particle board, for example. And this is obviously hard to demount. So our products are high quality, and they have a long lifespan. But the way that we have constructed them so far, it is not easy to separate the materials and recycle them at the end of life. I would say sustainable design and all the time and resources needed to redo it is one of our major barriers."

Given both: the interview and survey data the issue of resource capabilities appears as a major hindrance to eco-innovation in the Scandinavian and Finnish furniture industry, indicating its prominence as a factor to be carefully considered in further studies and strategic planning within the industry.

4.3.2 AVAILABILITY OF SKILLED STAFF (SURVEY AVERAGE SCORE OF 2.68)

Across the conducted interviews, it was shared that the availability of skilled staff stands as an important barrier towards eco-innovation, being recognized by 4 out of 8 company representatives. This issue is closely related to the previously discussed challenge of resource capabilities. In the interviews, Small to Medium-sized Enterprises (SMEs) were discussed to especially experience this obstacle more profoundly, as depicted by the case of companies grappling with the extensive requirements of regulatory documentation such as the Green Deal, which was disclosed in the interview

with the manufacturing union representative. According to the interviewee, SMEs find themselves understaffed, often relying on a single individual to shoulder various responsibilities ranging from finance to administration.

Interview 3:

"In the industry there are many Small to Medium size enterprises, SMEs and the demands for documenting that follows the Green Deal and all the different demands needed is a very big task for them, because maybe they are self employed at the company and they don't have ESG (environmental, social and governance) or CSR (corporate social responsibility) departments."

Hiring external consultants to aid in such tasks is a potential solution, however, the high cost of such services often deters these companies due to their constrained resources. Similarly, the financial and time constraints that come with small staff numbers and the limited possibility of investing in skilled professionals is explained to be a struggle exacerbated during periods of economic recession.

Interview 6:

"As a small company, I don't have the time or the effort to, like I say, I need to find a student, but invest 5000-10,000 Euro, perhaps I can find a consultant. And we can do this very fast. But right now, especially with the times today, where no one buys furniture... and it's the same all over Europe. So there is a huge recession regarding furniture. Okay, of course, large companies can employ two people, four people, it doesn't matter for them."

Furthermore, even with a small team, the breadth of tasks can be overwhelming.

Interview 2:

"We only have two employees in this team. So you can imagine how many different tasks we have."

Gathering insight from the survey responses and the interviews, the availability of skilled staff is an important barrier in the Scandinavian and Finnish furniture industry. Additionally, it is not just a standalone challenge, but also a facet intertwined with the broader issue of resource availability.

4.3.3 SUPPLY-SIDE MARKET FACTORS (SURVEY AVERAGE SCORE OF 2.71)

From the gathered interviews, it was found that the supply side of the market poses additional challenges to eco-innovation, a notion discussed by 4 out of the 8 company representatives in the interviews. One interviewee raised concerns about illegal forestry activities happening in Eastern Europe, from where according to the company representative, approximately 80% of European furniture wood originates. This lack of transparency and unethical practices in the sourcing of raw materials contribute to an unsustainable supply chain, a topic the industry often sidesteps as discussed in the interview.

Interview 6:

"They are talking a lot about illegal forestry in Eastern Europe. And I would say 80% of European furniture wood is coming from this area. So there is also something that the industry, they don't talk about, they are saying we have European oak, but is it Russian? Is it White Russian? Is it Croatia? Is it Germany? Everyone says Europe? So there is so much illegal activity, especially now after Ukraine. problem."

Another problem of the supply side associated with certain materials, such as melamine, was discussed as well. Given the plastic content of such materials, their disposal through recycling process or incineration poses environmental concerns due to the release of harmful chemicals therefore illustrating how the supply of various materials limits the company's efforts to create eco-innovations.

Interview 1:

"And that means that the supplier just needs to supply the right product."

"What they do is put a white layer on the outside on both sides. If you have a kitchen from *a large furniture company*, for example, that is melamine. The white part of the kitchen, the inside of the cabinets, that is melamine. Now, that has a certain level of plastic in it. The moment that you throw your kitchen away after so many years, that kitchen can be recycled in theory. So there are two ways they recycle it, which would be a good thing. But then you have plastic inside your product.

Alternatively, they burn it."

The company representative personally advocated for the Cradle to Cradle approach, highlighting the benefits of using more sustainable materials like oiled wood, which are not only eco-friendly, but also offer longevity.

Interview 1:

"Because if you really go Cradle to Cradle you can make a wooden panel with a wooden surface. And instead of putting on a lacquer, you put on an oil. So if you oil wooden products we already know from the 1600s that an oiled wood product has a very long lifespan. And once you want to reuse it, you have a clean product. Doesn't matter if you burn it or if you make it into something else. Because it's a clean product. It doesn't create chemicals, it does not create too much co2 that is not handleable. So there's no real negative sides apart from the first time you pay more to get that product."

Company 7 underlined the significant role of suppliers in facilitating the creation of eco-innovative products. The company emphasised the importance of maintaining a strong relationship with suppliers and how that can create a real challenge when working towards creating more sustainable supply chains and networks.

Interview 7:

"The suppliers also play a major part in our ability to produce eco-innovative products."

"We have around 30 suppliers. That's something that you can manage. But a larger company that has like 300,000 products, and I don't know, 50,000 suppliers, and I'm, I don't know how many they have, but let's say a couple of thousands of players. Then it's going to be really difficult, and I'm not sure that they ever will be able to work strategically and prioritise for sustainable production."

Interviewee 3 pointed out the increasing demand for more comprehensive documentation, like Environmental Product Declarations (EPDs) or lifecycle assessments, both in the private and public sectors. This requirement in order to be fulfilled for the furniture companies depends heavily on suppliers to provide additional data and documentation.

Interview 3:

"Especially in the big private companies, when they are supplying new office equipment, new office furniture, there are demands that you have an EPD (Environmental Product Declarations) or some kind of life cycle assessment with the furniture you deliver. And the same thing is also starting now in the public contract market that they also are starting to tighten the screw and want more documentation and some kind of life cycle assessment on the products they buy. Therefore creating the need for suppliers to provide additional information and transparency."

On the other hand, in the interviews it was also acknowledged that the supply side of the market can serve as a driver for eco-innovation within companies as it is mutually beneficial for the suppliers as well as the companies that focus on eco-innovation to create better materials and therefore better products.

Interview 1:

"But the glue companies themselves started to look for alternatives."

Through collaboration with the furniture companies, suppliers can bring newly developed eco-innovations such as adhesives or paints to a broader market. This not only creates profitable opportunities for the suppliers, but also sets new standards for eco-innovations in the industry and enables furniture companies to innovate in accordance to the new supply possibilities.

Interview 1:

"The positive side is we do not develop just by ourselves, we have our suppliers helping us. So let's say if I have a spray paint line that needs to be innovated, then the supplier of the paint, and the factory that delivers the spray paint line, they all work together on this, together with us, and then we make tests together. So we get people coming in from Denmark, who are specialists in water paint, and the spreading machines. We got people from Sweden, who are basically in this case more to chemists, who provide us with the right type of paint, maybe the viscosity needs to be changed to make it work better or whatever.

So it's a group effort. It's not only us."

"You also get a kind of cooperation between those companies where these sales are also benefiting them. So once the product is developed, they also can market it towards another customer."

Drawing on the insights provided by the interviews and the survey responses, it becomes apparent that the supply side of the market has dual, complex effects on eco-innovation efforts within the furniture industry, acting both as a barrier and a driver. As a barrier, the supply side issues are rooted in transparency concerns, environmental challenges associated with specific materials, and the increasing demand for detailed documentation. These obstacles were underscored by 4 out of the 8 interviewees, whose accounts echoed the third strongest barrier reflected in the survey data with an average score of 2.71.

On the other hand, the supply side also serves as a driver. The interviews indicated how closer collaborations with suppliers and adherence to eco-friendly practices could foster eco-innovation. Despite ranking as the 9th-10th strongest driver in the survey results with a score of 3.65, the potential of the supply side as a driving force for eco-innovation should not be underestimated. Therefore, while the supply side of the market can pose significant challenges to the pursuit of eco-innovation, it also presents opportunities for progress.

4.4 ADDITIONAL DRIVERS AND OBSTACLES

The survey included two open-ended questions asking respondents to identify any additional major drivers or obstacles to eco-innovation not covered in the existing research framework. While many of the responses could be assimilated into the existing categories within the research framework used, there were some novel or more in depth insights that expanded the understanding of the factors influencing eco-innovation. Additional information from the interviews, where applicable, is important for better interpretation of these survey open ended answers.

Nr.	Size	Age	Country of	Other Major Drivers?	Other Major Obstacles?
6	10-49 (small)	21-inf (old)	Sweden		Knowledge at the suppliers end
7	50-249 (medium)	21-inf (old)	Sweden	Work environment (new products are not as bad for health)	Budget calculation span (4 years in most organisations)
9	10-49 (small)	21-inf (old)	Sweden	Environment, The will to do better, competitiveness, legislations	Financial, knowledge
16	50-249 (medium)	0-10 (young)	Denmark		Economics. Price. It's more expensive to produce
17	50-249 (medium)	21-inf (old)	Denmark		Cost
24	10-49 (small)	11-20 (mature)	Norway	Personal ambitions about eco-innovation	Staff attitude
25	250-Inf	11-20 (mature)	Finland	Competitive advantage (financials wise)	
26	250-Inf	21-inf (old)	Denmark	Sustainability is a branding possibility	Certifications and documentation on a true full life cycle sustainable journey is extremely complex.
27	50-249 (medium)	21-inf (old)	Denmark	It is our customers that decide how much to focus on eco-innovation. The large retailers in Europe and laws/regulations decide what we do.	Lack of enforcement from authorities with regards to compliance with ECO regulations. A company will not always benefit from following EU laws, because many companies do not follow EU regulations such as EUTR.
32	1-9 (micro)	21-inf (old)	Sweden	The Greta Thunberg mentality is very obvious among furniture consumers	How to promote eco driven furniture production far away since most consumers only think about local production

Table 4. Survey results for the open ended questions asking for any additional major drivers and barriers.

4.4.1 AS OTHER MAJOR DRIVERS THE RESPONDENTS MENTIONED

"Work environment (new products are not as bad for health)": This illustrates the importance of creating a healthier work environment in motivating companies to adopt eco-innovation. The transition to eco-innovation often includes the use of less toxic materials or safer processes, which can improve the working conditions and health outcomes for employees.

Interview 1:

"As a driver, it also has to do with the people who work with it. Because if you're working inside a factory and you're working with a chemical product, then it's not only the customer, but it's also inside your own factory, where you're working with the product, you need additional ventilation, you need to protect people so they don't get chemicals on their hands or breathe it in. So that is very, very important."

In turn, it can enhance productivity, boost employee morale, and reduce health-related costs, thereby serving as a compelling driver for eco-innovation. This open ended response could be integrated in the existing research framework as a part of the "Company Strategy" factor.

"Environment, the will to do better, competitiveness, legislations": This multi-faceted answer demonstrates the synergistic impact of environmental concerns, an internal drive for improvement, competitive pressures, and legal factors on eco-innovation. Three of the mentioned aspects are included in the research framework with one "the will to do better" that might be considered as an addition to the framework if interpreted as individual will to improve. However, if this is considered as the whole organisation striving to do better, it can be interpreted as part of the "Shared Values/Organisational Culture" factor in the research framework.

"Personal ambitions about eco-innovation": This highlights the role of individual motivation and ambition in driving eco-innovation, which has not been as emphasised in the research framework as it considered more "Shared Values" or "Leadership". Therefore this answer, if it refers not to leadership, but to the individual desire to be a part of a more sustainable change in the world, can add new insights into the drivers of eco-innovations through the perspective of individual ambitions.

Interview 1:

"It's my personal stand. And at the same time, the company is supporting that."

"Competitive advantage (financials wise)" and **"Sustainability as a branding possibility":** These drivers underscore the potential economic and marketing benefits of eco-innovation, which can be entailed in the "Company Strategy " of the research framework. Firms can gain a competitive edge by adopting eco-innovative practices that enhance their reputation among environmentally conscious consumers.

"It is our customers that decide how much to focus on eco-innovation. The large retailers in Europe and laws/regulations decide what we do.": This driver emphasises how influential stakeholders, such as consumers and regulators, may affect how an organisation approaches eco-innovation. This underlines once more the factor that has received the greatest attention in this data gathering study, namely that customers and market demand as the most powerful force enabling companies to seek eco-innovative solutions in the Scandinavian and Finnish furniture industry. The large retailers in Europe and laws/regulations mentioned as deciding factors on what the furniture manufacturers do, can imply a driving potential.

Interview 3:

"One important driver for furniture eco-innovation is probably the forecasts from the EU."

But also a possibility to limit eco-innovation efforts and its distribution.

"The Greta Thunberg mentality is very obvious among furniture consumers": This driver reflects the influence of socio-cultural movements and public sentiment in promoting eco-innovation. The 'Greta Thunberg effect' refers to the increased environmental awareness and demand for sustainable products inspired by the young activist, which has been widely noted in recent literature (Bocken et al., 2019). This factor could be encapsulated in the "Market Demand", however it is an interesting detail highlighting the

market socio-cultural nuances especially prominent in the Scandinavian and Finnish region.

4.4.2 AS OTHER MAJOR BARRIERS THE RESPONDENTS MENTIONED

"Knowledge at the suppliers' end": This reflects that suppliers' lack of understanding or knowledge about eco-innovation can be a significant obstacle. It aligns with the framework factor of "Market Supply" and highlights the critical role of the supply chain in eco-innovation. This emphasises and supports the evaluation of "Market Supply" as a third major obstacle identified in the survey mean score evaluations.

"Budget calculation span (4 years in most organisations)": This suggests that the short-term financial planning horizon in many organisations might limit their ability to invest in long-term eco-innovative initiatives.

Interview 1:

"The durability of a manager or manager on a higher level is four years. So a manager, let's say that is hired in a big company. He works there for four years, and then he starts another job and somebody else takes his place. During that time he looks first at profit and bonus. If he starts to innovate and invest a lot of money in long term solutions that is not going to benefit him. That's not going to benefit the company over a calculation span of four years"

"It's the killer on a lot of projects. And I've seen it on different things. I've seen this so many times in different budgets and different investments in all kinds of things. So whenever a manager gets something in front of him with a break-even point that is too far away, the answer is no."

This open ended response to the survey that was supplemented by interview explanation revealed how budget calculations are related to management practices and how emphasis on short term projects and short term budget calculations creates less resources and therefore difficulties for eco-innovation initiatives to take place. As they often can take longer time periods to implement and pay off. This aspect could be related to the "Resource Capabilities" factor in the initial framework, emphasising financial constraints even if they are created consciously through resource allocation and planning.

"Staff attitude": This highlights the potential challenge posed by employees' attitudes and perceptions towards eco-innovation. This aspect could be considered as a part of "Shared Values","Leadership", where difficulties of aligning organisational direction and motivating employees can become a challenge.

"Certifications and documentation on a true full life cycle sustainable journey is extremely complex": This underlines the difficulties associated with achieving and documenting comprehensive sustainability assessment. It relates to the "Legal Factors" in the research framework, expanding it to include certifications and standards and considering the factor to be not solely external, but also possibly internal, where great effort is necessary from within the company in order to comply with the required documentation. This can also connect with "Market Supply" illustrating how complex of a process it is from acquiring materials with necessary certifications and documentation.

Interview 3:

"There is a lot of documentation involved in complying with all the regulations from the EU. We can see now that starting from the EU and now Denmark, we have the new regulation for buildings in Denmark (*Buildings' Life Cycle Assessment*). When you build a building above 1000 square metres, then you need to make a climate assessment. The building itself and the building process of the project are not allowed to emit more than 12 kilos of CO2 per square metre in the building place. And that means that every producer that is supplying this building with floors, windows, you name it, needs to come with an EPD for their products. So they need to make this life cycle assessment of their products and that way starts a lot more demanding. Each product needs to have a lot of data at the same time. Not the furniture. But windows, floors, everything that stays in the house if you lift the house and shake it. For furniture this is not strictly required... yet. But the industry is moving towards that direction."

"Lack of enforcement from authorities with regards to compliance with ECO regulations. A company will not always benefit from following

EU laws, because many companies do not follow EU regulations such as EUTR.": This highlights a deficiency in regulatory enforcement as a major obstacle. This relates directly to the "Legal Factors" aspect of the framework as the respondent provided an example of EU Timber Regulation being subject to evasion by companies and this obstacle reinforces the importance of government involvement in eco-innovation, however, now from a different perspective. Not from the point of view of demanding detailed data and assessment, but from not monitoring enough if companies actually comply with the requirements of the documentation standards.

"How to promote eco driven furniture production far away since most consumers only think about local production": This obstacle points to the challenges of promoting sustainable products in markets that are more focused on local production. This could be related to "Market Demand" in the framework. The statement reflects the challenge of marketing eco-innovative furniture in distant markets, where consumers prefer locally produced goods, associating them with lower carbon footprints. This adds a geographic dimension to the "Market Demand" category in the framework, highlighting the need to consider geographical proximity between production and consumer markets.

Interview 6:

"And for a New Zealand customer, they would never buy furniture in Poland, or from me here, because then it's too expensive in comparison to China. So for us, having a factory in China could even be better. From a total environmental point of view, depending on where we are selling the most."

The interviewee represented a unique perspective. His shared insights discuss the necessity for strategies communicating the ecological benefits of products to distant markets, as a sustainable eco-innovative product created in an efficient factory that is further away might still be not contributing to pollution as much and a viable option even considering transportation, compared to potentially many smaller local factories.

Interview 6:

"To be the perfect furniture company, you need to have a factory, one in Hamburg, Germany, one in Munich, Germany, one in Frankfurt, one in Stockholm, one in Oslo, one in Helsinki, one in Lithuania, then you have really local production, but then you have a lot of factories, which might not be the best solution."

This underscores the complexity of eco-innovation, integrating technological, organisational, and market factors such as consumer perceptions and geographical considerations.

"Economics, price, it's more expensive to produce": As mentioned by a few respondents this further supports the importance of "Resource Capabilities" as the strongest barrier to eco-innovation identified in the survey evaluations.

"Knowledge": This can be related to the "Skilled Staff" factor as the collective knowledge of the employees could be considered as the collective knowledge of the company.

4.5 EVALUATION OF HYPOTHESES: COMPANY AGE AND SIZE EFFECTS

The second section of the survey aimed to assess the respondents' agreement or disagreement with a set of hypotheses pertaining to the effects of company age and size on eco-innovation in the Scandinavian and Finnish furniture industries. Each hypothesis was evaluated on a Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). In total the company representatives agreed with 8 out of the 12 hypotheses which indicates that these hypotheses are true in the context of Scandinavian and Finnish furniture industry and disagreed with 4 of out of 12 hypotheses suggesting that the four hypotheses are not applicable to the Scandinavian and Finnish furniture industry (above 3 average score indicated industry agreement, below 3 indicates industry disagreement).

The industry average scores for each hypothesis in order of agreement highest to lowest: (the green text hypothesis are the ones the respondent companies have on average agreed with and the red coloured hypothesis statements are the ones on average disagreed with):

Where applicable further insights are gathered from the interviews for more in-depth interpretation of the survey answers.

Based on the industry average scores, the hypothesis with the highest level of agreement was **"Large companies benefit from economies of scale in eco-innovation"** with an average score of 3.97. No respondent company representative disagreed with the statement, there were only positive or a few neutral responses, but none negative, suggesting that the industry perceives that larger companies have advantages in terms of scale that support their eco-innovation efforts. Economies of scale is an important aspect related to the diffusion stage of an innovation facilitating the ability of the company to spread the innovation and make it available to many customers quickly.

Second to most agreed with hypothesis was: **"Large companies' comparatively greater financial resources aid product eco-innovation"** with an average score of 3.94.

Interview 1:

"But once a larger company makes a decision, they have more money. So they can push much more money into that department to make a quick innovation."

Hypothesis	Statement	Mean Value
H8	Large companies benefit from economies of scale in eco-innovation	3.97
H2	Large companies' comparatively greater financial resources aid product eco-innovation	3.94
H12	Large companies' in-house R&D and training resources benefit eco-innovation	3.71
H7	Older companies' established relationships with customers, suppliers, and other stakeholders help facilitate product	3.68
H4	Large companies' access to skilled staff promotes eco-innovation	3.50
H11	Fostering a unified organisational culture for eco-innovation is more challenging for large companies with more	3.47
H9	Large companies establish external cooperation for eco-innovation more easily than small ones	3.44
H1	Smaller/younger companies' flexibility promotes eco-innovation, while larger/older companies' structures hinder it	3.32
H10	Older companies find external cooperation for eco-innovation easier compared to younger ones	2.94
H5	Small companies struggle to attract and retain talent, hindering eco-innovation	2.91
H3	Older companies' accumulated resources facilitate eco-innovation	2.85
H6	Older companies' knowledge and experience facilitate eco-innovation	2.82

Table 5. Survey results expressed in mean value for agreement/disagreement with each hypothesis.

This aligns with the perception that larger companies have the financial means to invest in product eco-innovation activities and as "Resource Capabilities" were found to be the biggest barrier to eco-innovation, having more financial resources poses an important advantage.

Greater financial resources are also directly related to the third most agreed with hypothesis statement saying **"Large companies' in-house R&D and training resources benefit eco-innovation"** with an average score of 3.71. This highlights that industry professionals acknowledge the importance of dedicated R&D activities to eco-innovation efforts.

Interview 1:

"If you have a large company, and you have a large factory, you can keep your machines running while you do parallel innovation. So at the same time you create some new innovation, you have a team of people doing that, but your production continues. That is much easier in a large company to decide, okay, we go for it, maybe even build a little factory at the side or use an empty room to do the innovation and R&D."

Judging by these three most agreed with statements from the hypotheses list there is a perception of large companies in particular having an advantage in creating and distributing eco-innovative furniture solutions in the Scandinavian and Finnish furniture industry.

The hypothesis **"Older companies' established relationships with customers, suppliers, and other stakeholders help facilitate product eco-innovation activities"** received an average score of 3.68. This reveals a perception within the industry that the network and relationships built over time by older companies are an important facilitator of eco-innovation activities. These relationships can provide access to resources, knowledge, and opportunities that are conducive to eco-innovation.

The hypothesis **"Large companies' access to skilled staff promotes eco-innovation"** earned an average score of 3.50. This indicates the industry's agreement with the idea that large companies, due to their resources and reputation, may use their larger skilled employee numbers to dedicate a certain amount of specialists specifically for eco-innovation purposes.

Interview 7:

"If you are a large company, then you might have lots of people, you can hire many people with good knowledge, and then you can have a large impact also on your suppliers. Talking about innovation connected to products, it might be easier to be a large company, because you can have dedicated innovation teams."

The hypothesis **"Fostering a unified organisational culture for eco-innovation is more challenging for large companies with more employees"** received an average score of 3.47, indicating average agreement among the respondents. This suggests that while large companies have advantages in terms of resources, they may face challenges in promoting a unified culture for eco-innovation due to their size and complexity.

Interview 1:

"At the same time, the benefit of a smaller company is that you have less people around the table to make a decision. So it's easier to get five people in the same direction than 50."

The statement **"Large companies establish external cooperation for eco-innovation more easily than small ones"** yielded an average agreement with a score of 3.44. This highlights the perception that large companies in the Scandinavian and Finnish furniture industry, possibly due to their resources and, potentially, brand, may have an advantage in securing external partnerships for eco-innovation.

The last agreed hypothesis statement **"Smaller/ younger companies' flexibility promotes eco-innovation, while larger/older companies' structures hinder it"** obtained an average score of 3.32. This suggests an understanding within the industry that smaller, younger companies, due to their flexibility and agility, can have an edge in pursuing eco-innovation, while the established structures of larger or older companies might serve as a barrier.

Interview 6:

"In general, the smaller company is much more

flexible."

Interview 7:

"If you start up a company with a circular business model, of course, that is easier to become sustainable than if you need to change your linear existing business model."

The hypothesis statement that garnered the most disagreement was **"Older companies' knowledge and experience facilitate eco-innovation"** with an average score of 2.82. This may suggest that within the Scandinavian and Finnish furniture industry, there is a perception that age, and the associated accumulation of knowledge and experience, do not necessarily enhance a company's capacity for eco-innovation. This runs counter to the notion that organisational longevity and the experiences garnered over time would naturally incline a company towards eco-innovation. However, it may also be reflective of the fact that many older companies are encumbered by established routines and processes that make them less agile and responsive to change their working methods and pursue eco-innovation.

Interview 5:

"An older company is probably negative since one tends to stick with the well-known procedures and might be resistant to change. For younger companies, there can be more openness and agility."

Another disagreed statement was **"Older companies' accumulated resources facilitate eco-innovation"** with an average of 2.85. This disagreement could indicate that, while older companies might indeed have accumulated resources, they do not necessarily translate into facilitating eco-innovation. It may point to a need for resources specifically dedicated to or configured for eco-innovation, where accumulated resources in older companies might be precisely adapted to the older methods of manufacturing and thereby not necessarily useful for innovation efforts.

Interview 3:

"Newly started companies, they can start from scratch, and they can start to design, and they can start to adapt their products and their production in compliance with the new demands."

"Here in Denmark, we have a lot of what we call design classics. We have a lot of producers who are known worldwide for their product design, and the products were designed in the 40s and 50s. And they have been making those designs ever since. At that time, you didn't think about design like now, you didn't think about repairability and that you should be able to replace different parts and so on. But they have built a very old tradition and they have a very long lifetime. The durability is very high, but they are not exactly complying with all the new demands and likewise the production is not designed for new demands."

The hypothesis, **"Small companies struggle to attract and retain talent, hindering eco-innovation"** also met with disagreement, receiving an average score of 2.91. This suggests that the industry does not perceive the size of a company as a significant distinctive barrier in small companies to attracting and retaining talent.

Interview 4:

"I don't think it's a challenge if the company is small. In our company for example, we don't have so many people, but we are still proud in terms of developing new, sustainable products. Being a market leader for such products. So I don't think it's a problem."

This could be indicative of the increasingly important role that mission-driven work and the role that impactful innovation plays in attracting talent, irrespective of company size. Furthermore, a different explanation was provided in another interview highlighting that essentially finding skilled employees is a challenge for both large and small companies, therefore negating the emphasis on small companies in this hypothesis statement.

Interview 1:

"It does not seem to be harder for smaller companies than for larger ones. It is very hard in general, for both: small and large companies to find skilled staff."

Furthermore, a practical insight was shared by a company representative in the interview saying that:

Interview 1:

"The problem is, where do I find somebody who is able to operate this machine? Or where do I find somebody who is skilled to make an innovation. And therefore, I think most of the time, the solution is that you have some people who have already been working with it. But you will also probably need some younger people, or at least innovative people who are thinkers, who are willing to take a test and try. And the benefit of the older people, and that also comes back in point four, of course. The benefit of older people is they have a lot of experience. And younger people, they still want to push towards new things development, because that drives them. So if you find a good combination there, inside either a large array or a small company, then you have a lot of options. You create a lot of options."

The interviewee's statement emphasises the difficult task of balancing experience and inventiveness within a company's workforce without emphasis on smaller or larger companies having an upper hand in this regard.

Lastly, the statement **"Older companies find external cooperation for eco-innovation easier compared to younger ones"** saw a relative disagreement with an average score of 2.94. This may imply that the industry perceives no substantial advantage for older companies in establishing external collaborations for eco-innovation. In fact, the agility of younger, smaller companies might make them more appealing partners for such cooperation.

These hypothesis statements answered with the help of quantitative survey data and the qualitative interviews provides an indication into what the Scandinavian and Finnish furniture industry perceives as the effects of company age and size to product eco-innovation efforts.

5 DISCUSSION

5.1 MAJOR DRIVERS AND BARRIERS IN RELATION TO THE DISCUSSED MAIN SCHOOLS OF THOUGHT

Addressing the first two research questions, the major drivers and barriers of eco-innovation in the Scandinavian and Finnish furniture industry, were identified as:

5.2 THE MAJOR DRIVERS

1. Market Demand,
2. Environmental Factors such as Climate Change and Resource Scarcity,
3. The Company's Strategy

The study's findings, which point to the importance of **market demand** as a primary driver of eco-innovation in the Scandinavian and Finnish furniture industries, provide compelling evidence of the growing consumer awareness of environmental effect and sustainable goods. This aligns with the Diffusion of Innovations theory (Rogers, 1962), which notes that market forces, the perceptions and the willingness of innovation adopters, which is directly related to consumer demand, can stimulate the spread of innovations. The rising environmental consciousness amongst consumers serves as an external societal pressure driving eco-innovation, thereby aligning to an extent with the Institutional Theory (DiMaggio & Powell, 1983). Despite the fact that this pressure does not come directly from governmental or regulatory authorities, it is nonetheless a component of the larger institutional structure in which businesses function. Furthermore, this observed shift towards sustainable consumption corresponds with Porter and van der Linde's (1995) assertion of consumer demand, market opportunities, and competition playing a critical role in shaping eco-innovation. It upholds the idea that businesses should innovate to be competitive as customer demand shifts towards sustainable products. Demand-side factors have been noted to influence a company's innovation drive in other literature as well which corresponds with the present research findings (Gebler et al., 2014; Petrick and Simpson, 2013; Rennings and Rammer, 2009, Ginsberg & Bloom, 2004).

This research highlighted **environmental factors**, such as climate change and resource scarcity, as the second most influential driver in industry decision-making on eco-innovation. This finding is consistent with the established scholarly discourse that emphasises environmental factors as crucial drivers for sustainable innovation (Porter & van der Linde, 1995; Hart & Milstein, 2003) and reflects the increased awareness of the need for sustainable practises to manage finite resources and mitigate environmental impacts. Porter and van der Linde (1995) underscore that companies must address pressing environmental challenges, including resource management, pollution control, and waste reduction. Other scholars support this argument, attributing the escalating awareness of environmental issues and the ensuing demand for sustainable development as catalysts for corporate innovation (Hart & Milstein, 2003; Shrivastava, 1995; Cohen & Winn, 2007).

The research confirmed the findings of Ceptureanu, Popescu, and Orzan (2020), who emphasise the need of a defined strategy in supporting the creation of sustainable products, by identifying a **company's strategic direction** as the third significant driver for eco-innovation. This strategic perspective involves, as underlined by Hart (1995), incorporating sustainability into strategic planning and, as suggested by Schaltegger and Wagner (2011) and Nidumolu, Prahalad, and Rangaswami (2009), exploiting environmental challenges as strategic opportunities.

External drivers, such as market demand and environmental considerations, exert pressure and influence on the firm and urge it to adopt eco-innovation. They reflect elements of the greater business environment outside the control of specific businesses, but to which those businesses must adapt if they want to survive and compete. Contrastingly, an internal driver is the company's strategic orientation towards sustainability. This represents how a company chooses to organise and apply its resources in response to external pressures. Essentially, it's about how a company aligns its internal environment with the dynamics of the external business landscape to derive the most

value. This alignment process is a critical element of strategic management, as highlighted by, for example, Andrews (1987), who suggested that effective strategies match the company's internal situation with its external environment and present opportunities to fulfil its mission. Hence, all three major drivers found in this study are interconnected and should be understood together to drive strategic sustainable development in companies.

The findings are interestingly consistent with the idea of the triple bottom line (Elkington, 1997), which promotes a balance between social, environmental, and economic aspects of sustainability. These three components are represented by the identified drivers as in the corporate (strategy), economic (market demand), and environmental (environmental factor) dimensions.

In contrast to the idea of technological determinism, which holds that technology is the main force behind social and environmental change (Veblen, 1921; Smith & Raven, 2012), this study observed that technological factors had a limited impact on promoting eco-innovation in the Scandinavian and Finnish furniture industry. Despite being acknowledged as an important factor in eco-innovation (Freeman & Soete, 1997; Stoneman, 1995), technical developments did not emerge as the main forces in this specific industry setting. These conclusions are in line with those of critics who warn against an exclusively technological perspective on eco-innovation and stress the significance of other variables such as institutions, culture, and human agency (Geels, 2002; Shove & Walker, 2010). Therefore, in the Scandinavian and Finnish furniture industry, a shift towards a holistic view that includes strategic, organisational, and market factors might be more beneficial in promoting eco-innovation.

5.3 THE MAJOR BARRIERS

1. Resource Capabilities,
2. Availability of Skilled Staff,
3. Supply-side Market Challenges

The research highlighted **resource capabilities** as the principal obstacle impeding eco-innovation efforts, underscoring the internal constraints within companies. This finding aligns with Barney's (1991) Resource-Based View, which claims that a firm's resources and capabilities are integral to determining its strategic direction and success. The ability of a firm to invest in R&D is directly related to the availability of funding, which can either support or prevent the creation of new initiatives and sustainable products (Hottenrott & Lopes-Bento, 2014).

The study found that the **lack of skilled workers** is an important obstacle for product eco-innovation in the Scandinavian and Finnish furniture industry. This confirms prior studies (Sun, Li, and Liu, 2020; Laursen and Foss, 2003) that indicated skilled workers to be essential for innovation. Furthermore, the level of staff allocation is a vital aspect of human capital influencing innovation: the presence of a workforce with diverse expertise could support eco-innovation efforts, whilst insufficient staffing levels can pose significant obstacles (Beynon et al., 2019). This underlines the importance of investing in training and professional development for employees (Demirkan, Srinivasan and Nand, 2021; Beynon et al., 2019).

The **supply side of the market** was identified in this study as the third significant barrier to eco-innovation. The difficulty of sourcing sustainable materials and finding suppliers dedicated to sustainability significantly impacts a company's ability to innovate sustainably (Seuring and Müller, 2008). According to studies (OECD, 2021; Gebler et al., 2014; Petrick and Simpson, 2013; Rennings and Rammer, 2009; Chin et al., 2012; Roh et al., 2022), supply-side factors like resource availability and supply chain dynamics can either facilitate or hinder the development of sustainable products, affirming Porter and van der Linde's (1995) assertion about the importance of market elements in shaping eco-innovation. In the present research the hindering aspect of it is more strongly revealed in the Scandinavian and Finnish furniture industry.

The major obstacles, consisting of two internal barriers and one external barrier that nevertheless strongly relates to the company's internal capabilities as well as those of its suppliers, contrast with the main drivers, which included two external factors and one internal factor that connected the internal capabilities to the company's external environment. Resource capabilities and the availability of skilled staff stand as the internal hurdles, while the supply

side of the market poses an external challenge. Yet, this latter obstacle also signals an interdependence between internal and external factors. To overcome these barriers, the company's internal capabilities must align with the capabilities of their suppliers, indicating a need for collaborative solutions to achieve shared sustainability goals.

This contrast between the drivers and barriers of eco-innovation suggests that while the external environment can act as a catalyst for change, ultimately the company's internal resources and capabilities play a critical role in shaping the successful implementation of eco-innovative practices and sustainable growth. The pivotal role of strategic alignment, observed in the drivers of eco-innovation, is echoed in the barriers, further reinforcing the importance of an integrative approach that aligns the company's internal operations with external demands and opportunities (Barney, 1991; Andrews, 1987). Therefore, efforts to foster eco-innovation should focus not only on responding to external pressures but also on enhancing internal capabilities and cultivating partnerships that can enable a holistic and effective response to these challenges.

5.4 UNEXPECTED FINDINGS

Several unexpected outcomes arose during the study. Firstly, it was surprising from the individual researcher's point of view to observe that government regulations were not rated higher as drivers for eco-innovation. While they certainly exist as motivators, they do not appear to be acknowledged as primary drivers for furniture industry firms.

A second unexpected observation was the immense influence that consumers and society's attitudes have on eco-innovation. Contrary to personal researcher's expectations of significant governmental influence that were based on the potential power of regulatory capacity, consumers emerged as the leading driver of eco-innovation. This demonstrates the significant influence customers have on the market and the introduction of eco-innovations. Despite feeling small, individual consumer choices can serve as leverage points and effectively drive systemic change (Hjorth & Bagheri, 2006), indicating their vital role in transforming the broader Scandinavian and Finnish furniture industry.

Unexpectedly, the study found that furniture, which is often thought to be safe in daily living, might actually pose serious health hazards. This discovery resulted from learning about historical and ongoing industry practices involving the use of materials and processes that created not only environmentally unsustainable, but also harmful to human health furniture. The severity of these practices sometimes resulted in disease due to prolonged exposure, emphasising the urgency of eco-innovation for environmental and human health well-being (Stapleton et al., 2009; Pinkerton, 2004; Zhang et al., 2010).

Another unexpected insight surfaced during an interview about the ideal sustainable production model: Is it more eco-friendly to maintain various local production sites or centralise production in a highly efficient factory for a global company? While localised production may lower transport emissions and boost local economies, a centralised approach might optimise resource usage and control over production standards. Although this question extends beyond this study's scope, it introduces a valuable consideration for future eco-innovation research and could significantly influence manufacturing strategies and sustainability practices.

The study also discovered that some administrative procedures unintentionally generate obstacles to eco-innovation. Specifically, the budgeting and planning in some companies are not supportive of long-term eco-innovation initiatives, as they usually project only four years ahead, while eco-innovation often requires a longer timeframe to provide beneficial outcomes. This finding ephasises management's critical role in eco-innovation and the importance of strategic long-term planning.

5.5 COMPANY SIZE AND AGE EFFECTS

In response to the third research question, twelve hypotheses were proposed. The eight hypotheses, that were broadly agreed upon by the average Scandinavian and Finnish furniture company representatives' responses, suggesting the applicability of them to the industry, were as follows:

Hypothesis	Statement	References
H8	Large companies benefit from economies of scale in eco-innovation	Acs & Audretsch, 1990; Rothwell, 1989
H2	Large companies' comparatively greater financial resources aid product eco-innovation	Acs & Audretsch, 1990; Rothwell, 1989
H12	Large companies' in-house R&D and training resources benefit eco-innovation	Kesen, 2016; Boff and Chandler, 1990
H7	Older companies' established relationships with customers, suppliers, and other stakeholders help facilitate product eco-innovation activities	Gulati, 1998
H4	Large companies' access to skilled staff promotes eco-innovation	Du Boff and Chandler, 1990; Leiponen, 2005; Cohen & Klepper, 1996; Rothwell, 1989
H11	Fostering a unified organisational culture for eco-innovation is more challenging for large companies with more employees	Schein, 2017
H9	Large companies establish external cooperation for eco-innovation more easily than small ones	Not direct reference, but the hypothesis was derived from Tether (2002)
H1	Smaller/younger companies' flexibility promotes eco-innovation, while larger/older companies' structures hinder it	Hannan & Freeman, 1984; Nooteboom, 1994; Rothwell, 1989; Nooteboom, 1994; Rothwell, 1989; Mintzberg, 1979; Sørensen & Stuart, 2000; Schooley, 2022

Table 6. Company age/size effect hypotheses that were agreed with.

5.6 AGREED WITH HYPOTHESES

The consensus on the hypotheses signals to the unique advantages and challenges that both larger and smaller, as well as older and younger companies, grapple with in eco-innovation. The hypothesis that larger firms benefit from economies of scale, greater financial resources, and access to skilled staff and R&D capabilities **(H2, H8, H12)**, aligns with the work of multiple researchers (Acs & Audretsch, 1990; Cohen & Klepper, 1996; Du Boff and Chandler, 1990; Leiponen, 2005). Yet, **H11** draws attention to the difficulties larger companies may face in cultivating a unified culture for eco-innovation (Rothwell, 1989; Hannan & Freeman, 1984; Schein, 2017). **H1** points towards the potential of smaller or younger companies' flexibility in promoting eco-innovation, while also highlighting their structural and resource-related limitations (Hannan & Freeman, 1984; Mintzberg, 1979; Bendickson et al., 2017). In the case of older firms, **H7** discusses the helpful role of their established relationships for eco-innovation, while **H1** illustrates the innovation resistance they might face due to entrenched structures (Gulati, 1998; Sørensen & Stuart, 2000). These hypotheses offer a rounded perspective on how different firm characteristics can influence their eco-innovation efforts in the Scandinavian and Finnish furniture industry.

5.6.1 LARGE COMPANIES AND ECO-INNOVATION

The hypotheses suggesting larger companies have an advantage in driving eco-innovation **(H2, H8, H12, H4)** point towards the strength of these firms. These organisations, bolstered by economies of scale, substantial financial resources, skilled personnel, and in-house R&D facilities, are well-positioned to take the lead in eco-innovation initiatives. These

findings align with the Schumpeterian hypothesis (Schumpeter, 1942), Cohen & Klepper (1996), Dangelico & Pujari (2010), and Wagner (2007), all of whom argue that larger firms can significantly contribute to innovation efforts due to their resource availability and economies of scale. The alignment of the findings with the Schumpeterian hypothesis could be attributed to the specificities of the Scandinavian and Finnish furniture industry. Similar to traditional manufacturing sectors such as automotive and pharmaceuticals, the furniture industry requires substantial initial capital investments and has extended establishment times. However, the hypothesis regarding the challenges of fostering a unified organisational culture in larger companies **(H11)** suggests a potential hurdle for these firms in achieving their eco-innovation objectives (Rothwell, 1989; Hannan & Freeman, 1984; Schein, 2017).

5.6.2 SMALL COMPANIES AND ECO-INNOVATION

H1 underscores the role of small companies' flexibility in promoting eco-innovation. This is relevant in the Scandinavian and Finnish furniture industry, where adaptation to changing market trends and emerging sustainability standards is crucial and where small companies have the potential to experiment and find diverse and unique strategies (Storey, 2016; Rodrigues et al., 2022). This aligns with the Entrepreneurial firm perspective (Acs & Audretsch, 1990; Sørensen & Stuart, 2000).

5.6.3 OLD COMPANIES AND ECO-INNOVATION

The agreed with hypothesis pointing towards the beneficial role of older companies' established relationships in facilitating eco-innovation **(H7)** aligns with existing literature (Gulati, 1998; Sørensen & Stuart, 2000). Yet, another agreed with hypothesis **(H1)** suggests that the more bureaucratic structures of older companies could serve as a barrier to innovation (Hannan & Freeman, 1984; Sørensen & Stuart, 2000). Instead of promoting eco-innovation, the historical patterns, established practices, and entrenched ways of thinking linked to their accumulated experience seem to inhibit new idea developement, therefore the age-dependent innovation understanding holds only partially true. This finding is consistent with the insights from scholars who warn about the 'competency trap' (Liu, 2006) and 'core rigidities' (Leonard-Barton, 1992), where past achievements and ingrained habits may make it difficult for organisations to adopt new, innovative paths, including those involving eco-innovation. There is an observation of a dualistic nature in older companies. Their accumulated experience and knowledge, according to the research results, tends to inhibit innovation, but on the other hand, the established relationships with suppliers and other stakeholders, creates opportunities for trusting and innovative collaborative endeavours. As such, this reflects the complexity of how a company's age can influence eco-innovation. Therefore, older firms in the Scandinavian and Finnish furniture industry must carefully manage their historical assets and potential rigidity to foster eco-innovation effectively.

5.6.4 YOUNG COMPANIES AND ECO-INNOVATION

H1 underlines the argument that younger companies' flexibility promotes eco-innovation, highlighting their adaptive capacity and openness to take risks and experiment as potential drivers of innovation. This finding supports the entrepreneurial firms perspective (Acs & Audretsch, 1990; Sørensen & Stuart, 2000), suggesting that young fims have a great capacity for taking risks and designing their business model without pre-existing constraints. For young companies in the Scandinavian and Finnish furniture industry, their innovative edge lies in leveraging their flexibility, despite the potential challenges associated with their size and resource constraints.

The contingent/contextual perspective that argues both firm size and age affect innovation, but this impact is contingent on other internal and external factors seems to capture the complexity of the Scandinavian and Finnish furniture industry most accurately (Huergo and Jaumandreu, 2004; García-Quevedo, Pellegrino, & Vivarelli, 2014; Nooteboom, 1994; Cohen & Klepper, 1996). It underscores the importance of context and situational factors in determining how company size and age influence eco-innovation. These factors include, but are not limited to, market dynamics, government policies, company strategy, and availability of resources. Overall, the agreement with many of the hypotheses, that were informed by the literature

review, indicates that the effects of company size and age on eco-innovation, as observed in the Scandinavian and Finnish furniture industry, to a large extent align well with previous research and theoretical perspectives, adding further validation to these studies and theories.

5.7 DISAGREED WITH HYPOTHESES

The participants on average disagreed with the following four hypotheses:

Hypothesis	Statement	References
H10	Older companies find external cooperation for eco-innovation easier compared to younger ones	Not direct reference, but the hypothesis was derived from Gulati, (1998)
H5	Small companies struggle to attract and retain talent, hindering eco-innovation	Rodrigues et al., 2022;Storey, 2016
H3	Older companies' accumulated resources facilitate eco-innovation	Sørensen & Stuart, 2000
H6	Older companies' knowledge and experience facilitate eco-innovation	Sørensen & Stuart, 2000

Table 7. Company age/size effect hypotheses that were disagreed with.

The disagreement with certain hypotheses in the survey underscores the complexity and nuances of eco-innovation within the furniture industry, specifically in Scandinavia and Finland.

5.7.1 OLD COMPANIES AND DISAGREED HYPOTHESES

Disagreements regarding hypotheses about older companies provide a more nuanced understanding of their role in eco-innovation. Disagreement with the **H3**, which states that accumulated resources facilitate innovation, and **H6**, which notes that knowledge and expertise of older companies encourages eco-innovation, can be seen as a departure from the age-dependent innovation view and a support for the entrepreneurial young firms perspective (Acs & Audretsch, 1990; Sørensen & Stuart, 2000). This contradiction might suggest that the specific context of eco-innovation, with its emphasis on novel, sustainable practices, may demand more flexibility, adaptability, and openness to new ideas, making accumulated resources less critical as well as often a barrier that has to be redesigned and transformed to comply with modern demands. Disagreement with **H10** (older companies find external cooperation for eco-innovation easier compared to younger ones) provides an interesting counterpoint to the notion that established relationships and firm longevity necessarily lead to ease of cooperation for older firms. This view aligns with Gulati's (1998) research, which suggests that the existing relationships of older companies may not automatically translate into successful cooperation for innovation. It can suggest that in the context of eco-innovation, other factors, perhaps related to the industry-specific characteristics or the dynamic nature of eco-innovation, might be at play in facilitating external cooperation.

5.7.2 SMALL COMPANIES AND DISAGREED HYPOTHESES

Hypotheses disagreements concerning small companies shed light on the complexities related

to size and eco-innovation. For instance, **H5** (small companies struggle to attract and retain talent, hindering eco-innovation) generated disagreement, indicating a more complex relationship between company size, talent retention, and eco-innovation than previously assumed. This diverges from the works of Acs & Audretsch (1990) and Storey (2016), suggesting that the financial and economic challenges of smaller firms could impact their ability to attract and maintain skilled personnel. The discrepancy might be due to the specific characteristics of the eco-innovation landscape, where the dynamism, growth potential, and societal relevance of eco-innovation might be particularly attractive to talent, potentially counterbalancing the traditional resource limitations of smaller companies. Or as an interview participant disclosed, large and small companies face similar challenges in regards to attracting and retaining talent without having this challenge more distinctly present in one or the other category of companies.

5.8 MANAGERIAL IMPLICATIONS

This research has uncovered a variety of implications regarding strategic approaches for promoting eco-innovation, each of which is contingent upon the size and age of a company. Different strategies are recommended for different kinds of enterprises, namely large enterprises, small and medium-sized enterprises (SMEs), and younger as well as older companies.

5.8.1 FOR LARGE ENTERPRISES

Large enterprises, according to the study's findings, may be better equipped to drive and distribute eco-innovation due to their inherent resources, scale, larger employee numbers and established networks, which helps counteract the major barriers to eco-innovation, which have been found to be resource capabilities, environmental factors such as resource scarcity and the availability of skilled staff. Large companies can potentially use closed innovation strategies, leveraging their extensive resources and dedicated innovation departments to foster eco-innovation internally (Chesbrough, 2003), which provides them with a big advantage at developing innovations and bringing them to the market as their employees can be dedicated to precisely this task as opposed to smaller companies' employees juggling many other responsibilities.

Interview 7:

"If you are a large company, then you might have lots of people, you can hire many people with good knowledge, and then you can have a large impact also on your suppliers. Talking about innovation connected to products, then it might be easier to be a large company because you can have dedicated innovation teams."

Another possibility for eco-innovation is to leverage their networks for cooperation purposes, where teams could be formed together with suppliers or other stakeholders for innovation efforts as was mentioned in the interview about successful innovation work being done together with supplier cooperation, thatcreates mutual benefit.

However, the challenges these companies face in fostering a unified organisational culture for eco-innovation should not be overlooked, necessitating continuous efforts towards fostering a supportive, innovation-friendly organisational culture, so that the advantages can be leveraged in the best possible manner.

5.8.2 FOR SMES

On the other hand, SMEs, which often include younger firms, could adopt open innovation strategies. Open innovation is a paradigm where firms leverage both internal and external ideas to advance their innovation processes (Chesbrough, 2003). It promotes practices like crowdsourcing, collaborations, and integrating users into the innovation process, thus reducing costs, accelerating idea generation and development time. One approach could be to cooperate with their suppliers or other external partners to create diverse innovation teams, thereby leveraging external knowledge for mutual benefit (Chesbrough & Bogers, 2014). This cooperative approach towards innovation can serve as a significant asset for these smaller and often younger companies, helping them overcome potential resource limitations and foster eco-innovation. Furthermore, despite their limited resources, SMEs' inherent flexibility can be harnessed to drive eco-innovation. An advantage they possess is the inherent ability to transform their business practices in an easier manner than

old or large businesses.

While large businesses were found to have a harder process of aligning their employees to new directions and old enterprises' established resources were discussed as a barrier, SME businesses have an upper hand in both of these regards with less effort needed to rethink and change their workflow.

Alternatively, an interview revealed that small enterprises might consider exploring traditional furniture-making methods that were inherently eco-friendly.

Interview 1:

"Because if you really go Cradle to Cradle you can make a wooden panel with a wooden surface. And instead of putting on a lacquer, you put on an oil. So if you oil wooden products we already know from the 1600s that an oiled wood product has a very long lifespan. And once you want to reuse it, you have a clean product. Doesn't matter if you burn it or if you make it into something else. Because it's a clean product. It doesn't create chemicals, it does not create too much co2 that is not handleable. So there's no real negative sides apart from the first time you pay more to get that product."

These practices used locally sourced, natural materials and minimal waste production. While these traditional methods might not cater to mass production in the current market dynamics, they offer an alternative approach to eco-innovation, tailored to the capacities of smaller local enterprises. However, these adaptations should balance the need for mass-market affordability with sustainable practices to ensure both business viability and eco-friendly progress.

5.8.3 FOR OLD ENTERPRISES

Regarding older companies, a strategy of continuous readjustment of business practices, products, and processes seems to be the way forward. This was emphasised in one of the interviews, where an older company was in the process of transforming its product design and shifting from a linear to a circular business model.

As such, even with the disadvantage of having existing processes that need to be altered instead of starting from scratch (Hannan & Freeman, 1984), older enterprises have the potential to transform with the right management and business strategy that is aligned with long-term goals.

5.8.4 FOR YOUNG ENTERPRISES

Younger enterprises, meanwhile, can capitalise on their agility to meet current-day demands and rapidly innovate. They can also use their initial capital for establishing an innovative production model. As opposed to older companies, young enterprises are not burdened with established practices and do not need as much effort in transforming the way they work as they can plan strategically best approach of the business model in the very beginning stages of establishment.

Interview 7:

"If you start up a company with a circular business model, of course, that is easier to become sustainable than if you need to change your linear existing business model."

In the dynamic eco-innovation landscape, these companies could be better placed to adapt and innovate, meeting modern-day sustainability expectations and demands (Tushman & O'Reilly, 1997).

5.8.5 FOR THE SCANDINAVIAN AND FINNISH FURNITURE INDUSTRY

A overarching practical insight was shared by a company representative in the interview saying that:

Interview 1:

"The problem is, where do I find somebody who is able to operate this machine? Or where do I find somebody who is skilled to make an innovation. And therefore, I think most of the time, the solution is that you have some people who have already been working with it. But you will also probably need some younger people, or at least innovative people who are thinkers, who are willing to take a test and try. And the benefit of the older people, and that also comes back in point four, of course. The benefit of older people is they have a lot of experience. And younger people, they still

want to push towards new things development, because that drives them. So if you find a good combination there, inside either a large array or a small company, then you have a lot of options. You create a lot of options."

The interviewee's statement highlights the critical role of workforce diversity in blending operational expertise and innovative perspectives for successful eco-innovation. It suggests that eco-innovation is not strictly contingent on company age or size but relies on a synergy between established knowledge and forward-thinking. This notion aligns with the research indicating that diverse teams can yield novel solutions (Mothe & Nguyen-Thi, 2021).

These strategic considerations must be viewed in light of the increasing regulatory requirements, transparency demands, and a rising need for sustainable practices in the industry (Porter & Kramer, 2006) even though this was not found to be one of the most important drivers, but it continues to raise the bar for the companies who are not at the forefront of sustainable development practices. Both the European Union and various national governments have been increasing the sustainability requirements in the manufacturing sector, with ambitious goals set out under initiatives such as the Green Deal and the 2030 Agenda. Considering the identified major driver "Market Demand" and the in an interview discussed Greta Thumberg socio-cultural influence on the relevant study region it seems that irrespective of size and age, the trend suggests that companies in the Scandinavian and Finnish furniture industry will increasingly need to integrate sustainability considerations into their practices, employing appropriate strategies to foster eco-innovation.

6 CONCLUSION

6.1 MAIN FINDINGS

This research was centred around investigating the main drivers and barriers as well as exploring the influence of company size and age on eco-innovation in the Scandinavian and Finnish furniture industry. Through an integration of survey responses and qualitative interviews, the study aimed to answer three main research questions and test twelve hypotheses regarding the relationship between company size, age and eco-innovation.

6.2 RQ1: WHAT ARE THE MAJOR DRIVERS FOR ECO-INNOVATION IN FURNITURE COMPANIES IN SCANDINAVIA AND FINLAND?

The study identified three primary drivers:

1. Market demand
2. Environmental factors such as climate change and resource scarcity
3. The company's strategy

Market demand, environmental factors, and a company's strategic orientation emerged as major drivers of eco-innovation in the Scandinavian and Finnish furniture industry. The increasing consumer consciousness towards environmental impact is shaping purchasing decisions, making eco-innovation commercially viable and competitively advantageous. The pressing environmental realities of climate change and resource scarcity underscore the urgent need for sustainable practices to preserve our environment and resources. These external drivers, consisting of market demand and environmental challenges, represent larger business landscape pressures that companies need to respond to for competitiveness and viability. Conversely, the company's strategic orientation towards sustainability represents an internal driver and demonstrates how a company strategically organises its resources to address these external pressures. Drawing on Andrews (1987), this involves aligning a company's internal resources and capabilities with external opportunities and pressures.

6.3 RQ2: WHAT ARE THE MAJOR OBSTACLES FOR ECO-INNOVATION IN FURNITURE COMPANIES IN SCANDINAVIA AND FINLAND?

Three significant barriers were identified in this research:

1. Resource capabilities
2. Availability of skilled staff
3. Supply side of the market

In the Scandinavian and Finnish furniture industry, research identified barriers to eco-innovation to include two internal and one external factors. Internally, resource limitations and a scarcity of skilled staff present significant challenges (Barney, 1991). Externally, the supply side, with issues related to sustainable material sourcing and the alignment with eco-conscious suppliers, emerges as a substantial hurdle (Seuring and Müller, 2008). As such, enhancing resource capabilities, developing skilled staff, and adapting supply chains for sustainability are integral to fostering eco-innovation. The key drivers of eco-innovation, including two external elements and an internal one, are counterbalanced by two internal barriers - resource capabilities and skilled staff availability - and an external one tied to the supply side of the market (Barney, 1991; Andrews, 1987). This signals an interplay between internal and external factors. It highlights the significant role of the company's internal resources and strategic alignment in successfully implementing eco-innovation. Thus, fostering eco-innovation should concentrate on enhancing internal capabilities, building productive partnerships, and creating a robust response to external pressures, effectively aligning internal operations with external demands and opportunities.

6.4 RQ3: HOW DOES THE

Hypothesis	Statement	Mean Value
H8	Large companies benefit from economies of scale in eco-innovation	3.97
H2	Large companies' comparatively greater financial resources aid product eco-innovation	3.94
H12	Large companies' in-house R&D and training resources benefit eco-innovation	3.71
H7	Older companies' established relationships with customers, suppliers, and other stakeholders help facilitate product	3.68
H4	Large companies' access to skilled staff promotes eco-innovation	3.50
H11	Fostering a unified organisational culture for eco-innovation is more challenging for large companies with more	3.47
H9	Large companies establish external cooperation for eco-innovation more easily than small ones	3.44
H1	Smaller/younger companies' flexibility promotes eco-innovation, while larger/older companies' structures hinder it	3.32

Table 8. Survey results expressed in mean value for agreement for the hypotheses.

SIZE AND AGE OF THE COMPANY AFFECT ECO-INNOVATION EFFORTS IN THE SCANDINAVIAN AND FINNISH FURNITURE COMPANIES?

In addressing the third research question, this study tested 12 hypothese. The eight on average agreed with hypothesis marked in green can be seen in top table.

The agreement on the hypotheses underscores the diverse advantages and hurdles that both large and small, as well as old and new companies, encounter in eco-innovation. The agreement on hypotheses **H2, H8,** and **H12** reaffirms the benefits that larger firms derive from economies of scale, financial resources, and skilled R&D capabilities, as identified in past research (Acs & Audretsch, 1990; Cohen & Klepper, 1996; Du Boff and Chandler, 1990; Leiponen, 2005). However, **H11** brings to light the challenges large firms can face in nurturing a coherent eco-innovation culture (Rothwell, 1989). The agreement on **H1** emphasises the potential of smaller or newer firms to leverage their flexibility for eco-innovation, but also their resource constraints (Hannan & Freeman, 1984; Mintzberg, 1979). In terms of older firms, **H7** suggests their established networks can support eco-innovation, whereas **H1** indicates possible resistance due to ingrained structures (Gulati, 1998; Sørensen & Stuart, 2000). Overall, these hypotheses provide a nuanced understanding of how diverse company attributes can shape their eco-innovation approaches within the furniture industry in Scandinavia and Finland.

Participants disagreed with the following four hypotheses:

The results showed a level of divergence with four hypotheses, indicating the multifaceted dynamics

Hypothesis	Statement	Mean Value
H10	Older companies find external cooperation for eco-innovation easier compared to younger ones	2.94
H5	Small companies struggle to attract and retain talent, hindering eco-innovation	2.91
H3	Older companies' accumulated resources facilitate eco-innovation	2.85
H6	Older companies' knowledge and experience facilitate eco-innovation	2.82

Table 9. Survey results expressed in mean value for disagreement for the hypotheses.

of eco-innovation in the Scandinavian and Finnish furniture industry. These disagreements involve hypotheses **H10** (Gulati, 1998), which posits that older companies find external cooperation for eco-innovation easier; **H5** (Acs & Audretsch, 1990; Storey, 2016), which suggests that small companies' challenges in attracting and retaining talent impede eco-innovation; **H3** (Sørensen & Stuart, 2000), that proposed accumulated resources of older companies facilitate eco-innovation; and H6 (Cohen & Klepper, 1996), which states older companies' experience and knowledge foster eco-innovation. These findings underscore the nuanced interplay between a firm's age and size and its eco-innovation efforts, emphasising the need for tailored strategies that consider these attributes and the firm's unique context.

6.5 IMPLICATIONS FOR THEORY

This research enriches the existing eco-innovation theoretical framework by providing deeper insights into the dynamics between company size, age, and eco-innovation within a specific industry context, namely, the Scandinavian and Finnish furniture industry. The findings suggest that both company size and age play a multifaceted role in the eco-innovation process, with certain advantages and disadvantages tied to each. Contrary to the age-dependent innovation perspective, which suggests that older firms, due to their accumulated resources and experience, are more conducive to innovation (Sorensen & Stuart, 2000), the study indicates that this may not be universally applicable. In fact, age might pose certain barriers to eco-innovation, particularly if older firms find it difficult to shift away from established routines and practices towards more sustainable ones as supported by the disagreed with hypotheses **(H3, H6)**. Furthermore, the research emphasises the importance of the contingent/contextual perspective in understanding eco-innovation (Huergo and Jaumandreu, 2004; García-Quevedo, Pellegrino, & Vivarelli, 2014; Nooteboom, 1994; Cohen & Klepper, 1996). The implications of company size and age on eco-innovation can be heavily influenced by the specific industry context and broader external environment in which a company operates. Therefore, the findings of this study further advocate for a contextualised understanding of the drivers and barriers to eco-innovation, where the effects of firm-specific factors such as size and age are examined in relation to the specific industry and market dynamics.

6.6 IMPLICATIONS FOR PRACTICE

This study offers valuable implications for fostering eco-innovation in the Scandinavian and Finnish furniture industry. For large companies, while resources and scale are advantageous, they must strive for a unified eco-innovation culture to harness these advantages fully. Small to medium enterprises (SMEs), often younger, can adopt open innovation strategies, leveraging their flexibility and external collaborations to drive eco-innovation. Older companies, on the other hand, should focus on continuously transforming their practices towards sustainable models. This requires strategic evolution aligned with long-term sustainability goals. Younger firms, unencumbered by established practices, can use their agility to innovate rapidly, capitalising on their potential to shape sustainable business models from inception.

A crucial insight is the necessity of balanced teams, blending operational experience with innovative drive, fostering eco-innovation irrespective of a company's size or age. Lastly, in light of rising regulatory and market demands for sustainability, all companies, regardless of their size and age, must integrate sustainability into their practices, strategically driving eco-innovation to meet these evolving expectations.

6.7 POLICY RECOMMENDATIONS

In light of the findings of this study, there are several policy recommendations that can be put forward to further stimulate eco-innovation within enterprises of different sizes and development stages.

Promotion of open innovation frameworks stands out as a key suggestion (Chesbrough, 2003). The study shows that younger, smaller firms might be open to such approaches, which implies fostering partnerships and encouraging knowledge exchange with universities and research bodies. To incentivize this, policy initiatives could be designed by governments and the European Union, offering tax benefits, grants, or subsidies. The EU Horizon

program (European Commission, 2021), which funds collaborative research, including eco-innovation, presents a model that could be expanded within the furniture industry in Scandinavia and Finland.

Secondly, policies should aid larger, established companies in shifting towards sustainable business models. This could include providing technical aid and financial incentives for companies aiming to adopt circular business models and sustainable processes. Nordic governmental agencies, such as Business Finland (Business Finland, 2023), Vinnova in Sweden (Vinnova, 2023), Innovation Norway (Innovation Norway, 2023), and the Danish Business Authority (Danish Business Authority, 2023), can enhance their current sustainability programs to support this shift. Existing initiatives like Denmark's Green Investment Fund (Green Investment Fund, n.d.) and Business Finland's sustainable business programs (Business Finland, 2023) could be expanded to help larger firms integrate eco-innovation.

The third recommendation suggests enforcing stricter regulatory standards. Although not a main driver in this study, their role in spurring sustainable practices is significant. Thus, policies increasing sustainability demands in manufacturing, from the government and the EU, could effect substantial changes. Regulations, akin to Möbelfakta in furniture (Mobelfakta, n.d.), can stimulate products to meet these standards and therefore eco-innovate. Promoting transparency in businesses is advisable. Regulatory bodies like the European Chemicals Agency (European Chemicals Agency, 2023), national environment agencies, or consumer protection bodies could enforce stricter disclosure requirements on environmental and social business impacts from suppliers and producers. This transparency can enhance consumer trust and encourage sustainable practices, while also aiding suppliers to align with modern market demands and ensure responsible sourcing of materials.

Lastly, promoting education and training in sustainability and eco-innovation is essential. It's vital to equip the workforce with necessary skills, hence the need for policies promoting related educational programs (Kesen, 2016). This education can also be translated not only to the workforce, but in raising concern in the society at large, meaning in making the customers more aware of what they are purchasing and what different labels mean as well as the potential health concerns related to various chemicals used in furniture. Increasing customer awareness can significantly impact the industry's eco-innovation pursuits, given the influential role of market demand. More informed customers not only promote sustainable development but also help alleviate the market-demand related barriers to eco-innovation. Due to making more sustainable purchasing decisions, customers can reduce the tendency for companies to default to non-sustainable practices. By adopting these policy recommendations, decision-makers can contribute to creating an environment conducive to eco-innovation, benefiting businesses of all sizes and maturity stages.

6.8 LIMITATIONS OF THE RESEARCH

This study, like all research, has its limitations. Firstly, the reliance on survey data introduces subjectivity, potentially reflecting personal biases rather than the true state of eco-innovation in the Scandinavian and Finnish furniture industry (Bryman, 2012). To mitigate this, industry professionals are invited to participate and supplement the survey with qualitative interviews (Jick, 1979). Second, the study may not fully represent the challenges or advantages experienced by companies of varying sizes or ages. The perspectives of smaller or younger companies may not align with the realities faced by their larger or older counterparts and vice versa. Selection of knowledgeable industry professionals and data triangulation minimises this risk (Jick, 1979). Third, the study exhibits a selection bias: companies less engaged in eco-innovation were less likely to participate, possibly omitting essential insights about the barriers they face (Bethlehem, 2010). Yet, respecting voluntary participation principles and ethical research conduct, the study did not coerce unwilling parties. An additional limitation of this study lies in the absence of Finnish companies from the interview data. This could misrepresent findings and limit the generalizability of the results to the Finnish context. Efforts were made to mitigate this bias through the survey methodology, yet the impact of this limitation should be considered when interpreting the results. Lastly, to an extent the survey's findings may not be universally applicable to all Scandinavian and Finnish furniture companies as regional variations in business environments,

societal attitudes, and policy landscapes could introduce variability in responses (Ghisetti & Rennings, 2014). Despite these limitations, the study utilised strategic mitigation strategies such as qualitative interviews and a focus on industry professionals to enhance its reliability and validity.

6.9 DIRECTIONS FOR FUTURE RESEARCH

Future research could delve deeper into these areas to further the understanding of eco-innovation dynamics and inform sustainable development strategies:

- **Expanding Geographical Reach:** To verify and compare the applicability of findings, similar research could be conducted in other regions or sectors.
- **Exploring Additional Company Characteristics:** Influences of corporate culture, leadership, and social responsibility policies on eco-innovation could be explored.
- **Conducting Larger-Scale Studies:** Studies including a larger scale of participants could test the relevance and of the current research findings.
- **Investigating Consumer Role:** The role of consumers in driving eco-innovation and understanding consumer attitudes towards eco-innovation and their willingness to pay could help companies better align their strategies with market demand.
- **Evaluating Policy Interventions:** Evaluating different policy interventions' efficacy in stimulating eco-innovation could guide policymakers.

6.10 FINAL REMARKS

This study provides a contribution to understanding the drivers and barriers of eco-innovation within the Scandinavian and Finnish furniture industry. It challenges existing theoretical constructs, offering new perspectives that could refine our comprehension of eco-innovation dynamics. The practical and policy recommendations resulting from this research have the potential to guide firms, industry stakeholders, and policymakers in their efforts to foster eco-innovation, thereby promoting sustainable development within the industry. Given the urgency for sustainable business practices in light of pressing environmental challenges, the continued investigation of factors influencing eco-innovation is paramount. This study, thus, hopes to serve as a stepping stone for future research endeavours in this significant field and help refine our approaches, strategies, and policies to further the cause of sustainability.

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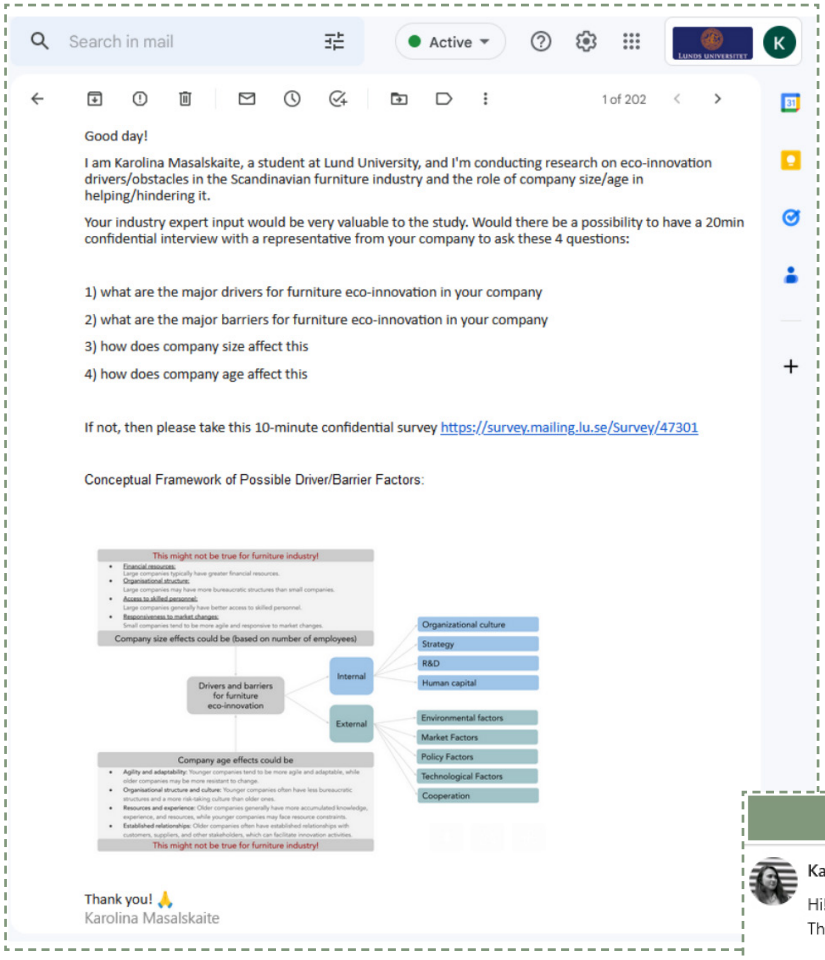
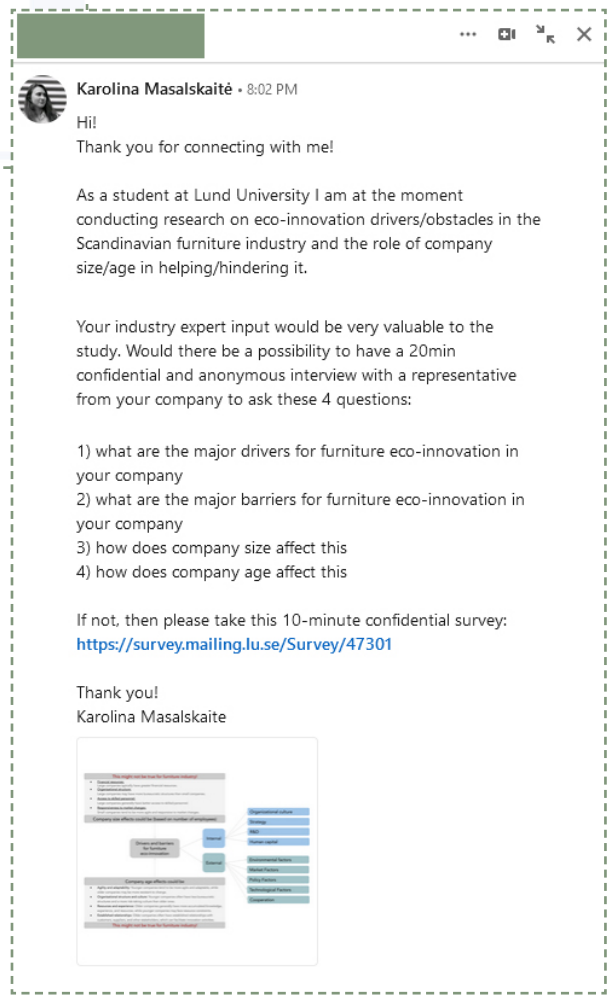
8. APPENDIX

The sent out message:





THE SURVEY

Research Survey on the Drivers and Obstacles for Product Eco-Innovation in the Scandinavian and Finnish Furniture Industry and the Role of Company Size and Age

Dear Participant,

I am Karolina Masalskaite, a student at Lund University, and I appreciate your participation in this 10 minute survey for my thesis. This research aims to explore the drivers and obstacles for product eco-innovation in the Scandinavian and Finnish furniture industry, and the influence of company size and age on these factors.

For this study, product eco-innovation refers to the development and implementation of improved or new products with environmental benefits, such as reduced energy consumption, waste, or pollution. Company age is defined as 0-10 years for young companies and 20+ years for old companies. Company size is based on the number of employees, with large enterprises having over 250 employees and small ones having under 50.

Your anonymous input will significantly contribute to our understanding of eco-innovation. If you have any questions, feel free to reach me at **ka8478ma-s@student.lu.se.**

Thank you for your valuable contribution.

Best regards, Karolina Masalskaite, Lund University School of Economics and Management

How to fill in the paper survey

Below you can see how you mark an answer option in the check boxes, and how you change a selection.

- ☒ The answer option has been marked correctly
- ☒ The answer option has been marked incorrectly, the cross must be in the middle of the box
- ☒ The answer option has been marked incorrectly, the cross is too strong
- ☒ Changed selection, the answer option will not be counted as being marked

Name of your company This information will be used only for analyzing responses in relation to company age and size, measured by full-time employees.

Questions:

If a factor acts as both a driver and obstacle, please mark two corresponding answers. Thank you for your insightful input on product eco-innovation factors.

1. How do environmental factors, such as climate change and natural resource scarcity, motivate your company to pursue eco-innovation?

- ☐ 1 - Major obstacle
- ☐ 2 - Obstacle
- ☐ 3 - Null level of effect
- ☐ 4 - Driver
- ☐ 5 - Major driver

2. To what extent do legal factors, such as regulations and standards, drive eco-innovation in your company?

- ☐ 1 - Major obstacle
- ☐ 2 - Obstacle
- ☐ 3 - Null level of effect
- ☐ 4 - Driver
- ☐ 5 - Major driver

3. How does technology availability and accessibility support your company's eco-innovation?

- ☐ 1 - Major obstacle
- ☐ 2 - Obstacle
- ☐ 3 - Null level of effect
- ☐ 4 - Driver
- ☐ 5 - Major driver

4. How much does cooperation with external entities (e.g. universities, business partnerships) contribute to your company's eco-innovation efforts?

- ☐ 1 - Major obstacle
- ☐ 2 - Obstacle
- ☐ 3 - Null level of effect
- ☐ 4 - Driver
- ☐ 5 - Major driver

5. How much does market supply impact your company's eco-innovation?

- ☐ 1 - Major obstacle
- ☐ 2 - Obstacle
- ☐ 3 - Null level of effect
- ☐ 4 - Driver
- ☐ 5 - Major driver

6. How does market demand affect your company's eco-innovation efforts?

- ☐ 1 - Major obstacle
- ☐ 2 - Obstacle
- ☐ 3 - Null level of effect
- ☐ 4 - Driver
- ☐ 5 - Major driver

7. How do competitive pressures impact your company's eco-innovation?

- ☐ 1 - Major obstacle
- ☐ 2 - Obstacle
- ☐ 3 - Null level of effect
- ☐ 4 - Driver
- ☐ 5 - Major driver

8. How do shared values and leadership promote eco-innovation in your company?

- ☐ Major obstacle
- ☐ Obstacle
- ☐ Null level of effect
- ☐ Driver
- ☐ Major driver

9. How strongly does your company's strategy encourage eco-innovation?

- ☐ 1 - Major obstacle
- ☐ 2 - Obstacle
- ☐ 3 - Null level of effect
- ☐ 4 - Driver
- ☐ 5 - Major driver

10. How supportive are your company's R&D systems and structures for eco-innovation?

- ☐ 1 - Major obstacle
- ☐ 2 - Obstacle
- ☐ 3 - Null level of effect
- ☐ 4 - Driver
- ☐ 5 - Major driver

11. How do resource capabilities enable eco-innovative initiatives in your company?

- ☐ 1 - Major obstacle
- ☐ 2 - Obstacle
- ☐ 3 - Null level of effect
- ☐ 4 - Driver
- ☐ 5 - Major driver

12. How does skilled staff availability impact eco-innovation in your company?

- ☐ 1 - Major obstacle
- ☐ 2 - Obstacle
- ☐ 3 - Null level of effect
- ☐ 4 - Driver
- ☐ 5 - Major driver

13. Other major drivers?

14. Other major barriers?

Please indicate your level of agreement with the following statements in regards to your industry:

15. Smaller/younger companies' flexibility promote eco-innovation, while larger/older companies' structures hinder it.

- ☐ 1 - Strongly disagree
- ☐ 2 - Disagree
- ☐ 3 - Neutral
- ☐ 4 - Agree
- ☐ 5 - Strongly agree

16. Large companies' comparatively greater financial resources aid product eco-innovation.

- ☐ 1 - Strongly disagree
- ☐ 2 - Disagree
- ☐ 3 - Neutral
- ☐ 4 - Agree
- ☐ 5 - Strongly agree

17. Older companies' accumulated resources facilitate eco-innovation.

- [ ] 1 - Strongly disagree
- [ ] 2 - Disagree
- [ ] 3 - Neutral
- [ ] 4 - Agree
- [ ] 5 - Strongly agree

18. Large companies' access to skilled staff promotes eco-innovation.

- [ ] 1 - Strongly disagree
- [ ] 2 - Disagree
- [ ] 3 - Neutral
- [ ] 4 - Agree
- [ ] 5 - Strongly agree

19. Small companies struggle to attract and retain talent and that hinders eco-innovation.

- [ ] 1 - Strongly disagree
- [ ] 2 - Disagree
- [ ] 3 - Neutral
- [ ] 4 - Agree
- [ ] 5 - Strongly agree

20. Older companies' knowledge and experience facilitate eco-innovation.

- [ ] 1 - Strongly disagree
- [ ] 2 - Disagree
- [ ] 3 - Neutral
- [ ] 4 - Agree
- [ ] 5 - Strongly agree

21. Older companies' established relationships with customers, suppliers, and other stakeholders help facilitate product eco-innovation activities.

- [ ] 1 - Strongly disagree
- [ ] 2 - Disagree
- [ ] 3 - Neutral
- [ ] 4 - Agree
- [ ] 5 - Strongly agree

22. Large companies benefit from economies of scale in eco-innovation.

- ☐ 1 - Strongly disagree
- ☐ 2 - Disagree
- ☐ 3 - Neutral
- ☐ 4 - Agree
- ☐ 5 - Strongly agree

23. Large companies establish external cooperation for eco-innovation more easily than small ones.

- ☐ 1 - Strongly disagree
- ☐ 2 - Disagree
- ☐ 3 - Neutral
- ☐ 4 - Agree
- ☐ 5 - Strongly agree

24. Older companies find external cooperation for eco-innovation easier compared to younger ones.

- ☐ 1 - Strongly disagree
- ☐ 2 - Disagree
- ☐ 3 - Neutral
- ☐ 4 - Agree
- ☐ 5 - Strongly agree

25. Fostering a unified organizational culture for eco-innovation is more challenging for large companies with more employees.

- ☐ 1 - Strongly disagree
- ☐ 2 - Disagree
- ☐ 3 - Neutral
- ☐ 4 - Agree
- ☐ 5 - Strongly agree

26. Large companies' in-house R&D and training resources benefit eco-innovation.

- ☐ 1 - Strongly disagree
- ☐ 2 - Disagree
- ☐ 3 - Neutral
- ☐ 4 - Agree
- ☐ 5 - Strongly agree

27. Thank you for participating. I would greatly appreciate to learn more about your answers. If open to a 20-30 min follow-up discussion, please provide your contact information. Your insights are invaluable, and your details will be confidential.

THE SURVEY RESPONSES:

Driver and barrier question answers 1-12 in the form of Likert scale. Each factor in this section of the survey was allowed to be evaluated as both a driver (4,5) or a barrier (1,2). 3 is a neutral score.

Nr	Size	Age	Country of Operations/ Origin	1		2		3		4		5		6		7		8		9		10		11		12	
1	1-9 (micro)	11-20 mature	Sweden	3	4	3	3	3	4	3	3	3	5	3	5	3	5	3	5	3	5	2	5	2	3	3	3
2	1-9 (micro)	0-10 young	Sweden	3	5	2	3	3	4	2	3	3	3	2	4	3	4	3	4	3	5	2	5	2	3	2	3
3	1-9 (micro)	11-20 mature	Denmark	3	4	2	3	3	5	3	3	3	3	3	3	3	4	3	4	3	4	2	4	2	3	2	3
4	50-249 (medium)	21-inf old	Denmark	3	4	3	4	3	3	3	4	3	4	3	4	3	4	3	4	3	5	3	5	3	5	3	4
5	1-9 (micro)	0-10 young	Sweden	3	5	3	3	3	3	3	3	3	3	3	3	3	5	3	4	3	4	3	4	3	3	3	3
6	10-49 (small)	21-inf old	Sweden	3	3	3	5	3	3	3	4	3	4	3	3	3	4	3	4	3	5	3	5	3	4	3	5
7	50-249 (medium)	21-inf old	Sweden	3	5	3	4	1	3	3	4	2	5	3	5	3	4	3	4	2	4	1	4	1	3	2	3
8	1-9 (micro)	21-inf old	Norway	3	4	3	4	3	3	3	4	3	5	3	4	3	3	3	4	2	3	1	3	1	3	2	3
9	10-49 (small)	21-inf old	Sweden	2	5	3	4	2	4	3	3	3	4	3	3	3	4	3	4	3	3	3	3	3	4	3	4
10	1-9 (micro)	0-10 young	Sweden	3	4	3	3	3	3	3	3	3	4	3	3	3	3	3	4	3	4	3	4	3	3	3	3
11	50-249 (medium)	21-inf old	Denmark	3	4	3	4	3	3	3	3	3	5	3	4	3	3	3	4	3	4	3	4	3	3	2	3
12	50-249 (medium)	21-inf old	Sweden	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4
13	50-249 (medium)	21-inf old	Finland	3	5	3	5	3	4	3	4	3	4	3	3	3	5	3	5	3	4	3	4	3	4	3	4
14	250-Inf	21-inf old	Sweden	3	4	3	4	3	4	3	5	3	5	3	4	3	3	3	4	3	3	2	3	2	3	3	4
15	250-Inf	21-inf old	Denmark	3	5	2	5	3	3	3	4	3	5	3	3	3	4	3	3	3	4	2	4	2	3	2	3
16	50-249 (medium)	0-10 young	Denmark	3	4	3	4	3	3	3	5	3	4	3	4	3	4	3	5	3	5	2	5	2	3	3	3
17	50-249 (medium)	21-inf old	Denmark	3	5	3	5	3	4	2	3	3	5	3	5	3	4	3	4	3	4	3	4	3	4	3	4
18	50-249 (medium)	21-inf old	Sweden	3	4	3	3	3	5	3	5	3	5	3	4	3	3	3	5	3	4	1	4	1	3	3	4
19	1-9 (micro)	21-inf old	Denmark	3	5	3	4	2	3	1	3	3	4	3	3	3	4	3	4	3	4	2	4	2	3	3	3
20	10-49 (small)	21-inf old	Denmark	2	3	3	4	2	3	3	3	2	4	2	4	3	3	2	3	2	3	1	3	1	3	2	3
21	10-49 (small)	11-20 mature	Denmark	3	4	3	4	3	3	3	4	3	4	3	3	3	4	3	4	3	3	2	3	2	3	2	3
22	10-49 (small)	11-20 mature	Denmark	3	4	3	3	3	3	2	3	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4
23	1-9 (micro)	21-inf old	Sweden	3	4	3	3	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4
24	10-49 (small)	11-20 mature	Norway	3	4	3	5	3	3	3	3	3	5	3	4	2	4	3	4	2	4	2	4	2	3	2	4
25	250-Inf	11-20 mature	Finland	3	4	3	4	3	4	3	5	3	4	3	5	3	5	3	4	3	4	3	4	3	4	3	4
26	250-Inf	21-inf old	Denmark	2	4	3	4	3	5	2	3	3	4	3	4	3	4	3	4	2	3	3	3	3	4	3	4
27	50-249 (medium)	21-inf old	Denmark	3	3	3	5	3	3	2	3	3	5	3	5	3	3	3	4	3	3	2	3	2	3	2	3
28	250-Inf	11-20 mature	Sweden	3	4	3	5	3	3	2	3	3	5	3	5	3	4	3	4	3	5	2	5	2	3	2	3
29	10-49 (small)	11-20 mature	Sweden	3	4	3	4	3	4	3	4	3	5	3	5	3	4	3	4	3	4	3	4	3	4	3	5
30	250-Inf	21-inf old	Denmark	3	4	2	3	3	4	3	4	3	4	3	4	3	3	3	4	2	3	3	3	3	4	3	4
31	10-49 (small)	11-20 mature	Sweden	3	5	3	4	2	4	3	3	3	4	3	4	3	4	3	5	3	4	1	4	1	3	3	3
32	1-9 (micro)	21-inf old	Sweden	3	4	3	5	3	5	2	3	3	5	3	4	3	4	3	3	3	4	3	4	3	3	3	4
33	50-249 (medium)	21-inf old	Denmark	3	5	3	3	3	4	2	4	2	5	3	4	3	5	3	5	3	4	2	4	2	3	3	3
34	250-Inf	21-inf old	Sweden	3	5	3	5	3	4	3	5	3	4	3	4	3	5	3	5	3	4	3	4	3	4	3	4

THE SURVEY RESPONSES:

Company size/age effect hypothesis section question answers 15-26 in the form of Likert scale. Each question was evaluated in accordance to the company representative's agreement with the hypotheses. (1 - strongly disagree, 3 - neutral, 5 -strongly agree).

Nr	Size	Age	Country of Operations/ Origin	15	16	17	18	19	20	21	22	23	24	25	26
1	1-9 (micro)	11-20 mature	Sweden	4	3	2	4	4	1	3	5	5	4	5	3
2	1-9 (micro)	0-10 young	Sweden	2	4	3	4	4	3	4	4	4	4	3	3
3	1-9 (micro)	11-20 mature	Denmark	3	4	4	4	3	4	4	4	4	2	4	4
4	50-249 (medium)	21-inf old	Denmark	2	2	2	2	2	2	2	3	2	2	4	4
5	1-9 (micro)	0-10 young	Sweden	5	3	1	1	1	3	5	5	5	5	5	5
6	10-49 (small)	21-inf old	Sweden	3	4	4	4	4	3	5	5	4	5	4	4
7	50-249 (medium)	21-inf old	Sweden	4	5	4	4	3	4	5	5	5	4	4	5
8	1-9 (micro)	21-inf old	Norway	3	5	3	4	2	3	4	4	4	3	4	5
9	10-49 (small)	21-inf old	Sweden	2	4	3	4	4	3	4	3	2	2	3	3
10	1-9 (micro)	0-10 young	Sweden	3	3	2	2	2	3	3	2	2	2	3	3
11	50-249 (medium)	21-inf old	Denmark	4	4	3	4	4	3	4	4	3	2	4	3
12	50-249 (medium)	21-inf old	Sweden	3	4	3	4	2	3	4	4	3	3	3	3
13	50-249 (medium)	21-inf old	Finland	2	4	3	3	4	4	4	4	4	4	4	4
14	250-Inf	21-inf old	Sweden	4	4	3	4	3	4	4	4	2	3	4	3
15	250-Inf	21-inf old	Denmark	5	5	1	5	3	2	4	5	5	2	4	5
16	50-249 (medium)	0-10 young	Denmark	4	4	3	2	1	2	4	4	3	3	3	4
17	50-249 (medium)	21-inf old	Denmark	4	4	3	2	1	1	3	4	2	3	4	3
18	50-249 (medium)	21-inf old	Sweden	4	5	3	4	2	3	4	5	4	3	3	4
19	1-9 (micro)	21-inf old	Denmark	2	4	2	4	3	2	4	4	4	2	2	4
20	10-49 (small)	21-inf old	Denmark	2	4	3	3	4	3	4	3	4	3	4	4
21	10-49 (small)	11-20 mature	Denmark	3	4	3	4	4	3	3	3	3	3	3	3
22	10-49 (small)	11-20 mature	Denmark	3	4	3	4	4	2	3	4	4	3	4	4
23	1-9 (micro)	21-inf old	Sweden	4	3	3	4	4	4	3	4	4	4	3	3
24	10-49 (small)	11-20 mature	Norway	4	4	3	3	2	2	4	4	3	3	3	4
25	250-Inf	11-20 mature	Finland	4	4	3	3	2	2	4	4	4	4	4	4
26	250-Inf	21-inf old	Denmark	4	4	4	4	4	4	4	4	2	2	4	4
27	50-249 (medium)	21-inf old	Denmark	2	4	3	4	3	4	3	4	4	2	3	4
28	250-Inf	11-20 mature	Sweden	4	4	3	4	2	3	4	4	2	2	4	4
29	10-49 (small)	11-20 mature	Sweden	3	4	3	2	2	2	4	4	4	3	3	2
30	250-Inf	21-inf old	Denmark	4	4	2	5	4	2	4	5	4	2	2	4
31	10-49 (small)	11-20 mature	Sweden	3	4	3	3	3	3	2	4	3	3	4	3
32	1-9 (micro)	21-inf old	Sweden	4	4	3	4	4	3	3	3	3	2	2	4
33	50-249 (medium)	21-inf old	Denmark	3	4	2	3	2	2	2	4	3	3	2	4
34	250-Inf	21-inf old	Sweden	3	4	4	4	3	4	4	3	3	3	3	3