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Microfoundations of Dynamic Capabilities for Environmental Innovation: A study of born green companies in the beauty and personal care industry

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Submitted by: Melissa Német
Matriculation Number: 01610523
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Supervisor: Dr.in Daniela Ortiz Avram

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Abstract

As the relevance of environmental sustainability continues to grow, companies are increasingly addressing this issue via environmental innovation. This enables companies to minimize their environmental footprint, counteract risks and achieve a competitive advantage. However, the sustainable environment is constantly changing, and its complexity also poses challenges for companies. Dynamic capabilities in this context are seen as a strategic tool that allows businesses to adapt to this environment and successfully bring environmentally sustainable solutions to the market. While existing research provides insight into companies not found on an environmentally sustainable philosophy, the goal of this thesis is to look at the dynamic capabilities of born green companies. Especially in the beauty and personal care industry, these companies are confronted with constant change and increasingly demanding customer expectations, making the possession of dynamic capabilities a deciding factor.

Based on interviews, the sensing, seizing and reconfiguring capabilities - according to Teece - and underlying microfoundations of born green companies in the beauty and personal care industry are studied in more detail.

The thesis finds that these firms by striving for increased sustainability and quality, are able to identify new opportunities. The sensing capability is further enhanced by leveraging internal resources and mechanisms, as well as by engaging with the external environment, particularly with customers and suppliers. Internal collaboration and knowledge sharing, feasibility assessments, and again the integration of the external environment are then essential for firms to capture the value of the identified opportunities. With regard to the beauty and personal industry, born green companies are focused on properly introducing their products to the market to facilitate their success. Lastly, by orchestrating their ecosystem, by adapting existing structures and collaboration methods, and by extending their product portfolio, born green companies are seen to reconfigure their business to enable current and future innovation projects.

Keywords: dynamic capabilities, environmental innovation, born green companies, beauty and personal care industry

Zusammenfassung

Da die Bedeutung der ökologischen Nachhaltigkeit stetig zunimmt, setzen sich Unternehmen zunehmend mit diesem Thema auseinander, indem sie Umweltinnovationen entwickeln. Diese ermöglichen ihnen, ihren ökologischen Fußabdruck zu minimieren, Risiken entgegenzuwirken und einen Wettbewerbsvorteil zu erzielen. Das nachhaltige Umfeld verändert sich jedoch ständig, und seine Komplexität stellt Firmen vor Herausforderungen. Dynamische Fähigkeiten werden als strategisches Instrument betrachtet, das es Unternehmen ermöglicht, sich an dieses Umfeld anzupassen. Während die bisherige Forschung Einblicke in Unternehmen bietet, die sich nicht auf eine ökologisch nachhaltige Philosophie stützen, ist es das Ziel dieser Arbeit, die dynamischen Fähigkeiten von ‚born green'-Unternehmen zu untersuchen. Vor allem in der Kosmetik- und Körperpflegebranche sind diese Unternehmen mit einem ständigen Wandel und immer anspruchsvolleren Kundenerwartungen konfrontiert, so dass der Besitz dynamischer Fähigkeiten ein entscheidender Faktor ist. Auf der Grundlage von Interviews werden die ‚sensing', ‚seizing' und ‚reconfiguring' Fähigkeiten nach Teece sowie deren zugrundeliegenden Aspekte in Hinblick auf ‚born green'-Unternehmen in der Kosmetik- und Körperpflegebranche genauer untersucht. Die Arbeit zeigt, dass diese Unternehmen durch ihr Streben nach mehr Nachhaltigkeit und Qualität in der Lage sind, neue Chancen zu erkennen. Die Fähigkeit, neue Chancen zu erkennen, wird durch die Ausschöpfung interner Ressourcen und Mechanismen sowie durch die Einbindung des externen Umfelds, insbesondere der Kunden und Lieferanten, weiter verbessert. Interne Zusammenarbeit und Wissensaustausch, Machbarkeitsanalysen sowie die Einbindung des externen Umfelds sind für ‚born green'-Unternehmen unerlässlich, um den Wert der erkannten Chancen darauffolgend zu nutzen. Im Hinblick auf die Schönheits- und Körperpflegeindustrie konzentrieren sich diese Unternehmen auch auf die optimale Einführung ihrer Produkte auf dem Markt, um deren Erfolg zu fördern. Durch die Orchestrierung ihres Ökosystems, die Anpassung bestehender Strukturen und Stakeholder-Zusammenarbeit sowie die Erweiterung ihres Produktportfolios transformieren Unternehmen ihr Geschäftsumfeld, um aktuelle und zukünftige Innovationsprojekte zu ermöglichen.

Stichworte: Dynamische Fähigkeiten, Umweltinnovationen, born green Unternehmen, Kosmetik- und Körperpflegeindustrie

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List of Abbreviations

BDIH	Bundesverband deutscher Industrie- und Handelsunternehmen
CAC	Command and Control
CSR	Corporate Social Responsibility
INCI	International Nomenclature of Cosmetic Ingredients
IP	Interview Partner
L.	Line
MBI	Market Based Instruments
OECD	Organisation for Economic Co-operation and Development
P.	Page
PP.	Pages
R&D	Research and Development
SDG	Sustainable Development Goals
SME	Small and medium-sized enterprises
UN	United Nations

1 Introduction

This chapter introduces the research topic by providing an outline of environmental sustainability and elaborating on current research on environmental innovation and the concept of dynamic capabilities. By mapping the problem statement and research gap in this regard, the research question and objective of this thesis are derived and presented. In the end of this chapter an outlook of the thesis structure is given.

1.1 Problem Statement

Sustainability has established itself, in a relative narrow period of time, as a popular term, particularly in the economic discourse. Its implications and current relevance of sustainability can be put as follows:

> The term 'sustainable development' thus enjoys seemingly unlimited popularity. It belongs like a building block in every speech about the future of our society, serves as a slogan for politicians, increasingly preoccupies lawyers, is a mega-topic among scientists and is increasingly discussed in the management committees of companies. (Reidel, 2010, 96, as cited in Spindler, 2013, p. 9)

The assessment is supported when analyzing the current institutional and market environment and their efforts towards sustainability. As an example for the institutional environment, all member states of the United Nations adopted 'The 2030 Agenda for Sustainable Development'. Comprising 17 Sustainable Development Goals this agenda targets health and educational matters, as well as inequality and economic issues all of which are interconnected with the goal of addressing environmental problems such as climate change (Department of Economic and Social Affairs, n.d.). Representing the market side, companies are connecting their business activities to the objectives suggested by the United Nations and integrate them into their sustainability reporting. In 2020 80% of companies worldwide reported on sustainability and even 96% of the 250 biggest companies (Bartels, King, Shulman, & Threlfall, 2020, p. 6,10). The multifaceted aspects of the SDGs and wide-ranging content of companies' sustainability reports – oftentimes addressing both the planet and society - display an important aspect of sustainability, that is the various dimensions this term encompasses.

The most well-known definition of sustainability originates from the Brundtland Commission of the United Nations in 1987, who defines sustainability as "meet[ing] the needs of the present without compromising the ability for future generations to meet their owns needs" (World Commission on Environment and Development, 1987). The three-pillar-model developed

thereafter by the Enquete commission – established by the German Bundestag – highlights the multilayered character of the term. Already implied by the Brundtland report the Enquete commission portrays sustainability as an interdisciplinary concept that incorporates not only ecological but also economic and social aspects (Wissenschaftliche Dienste des Deutschen Bundestages, 2004, p. 2).

While all three aspects can be found within the Sustainable Development Goals of the UN and most often in the sustainability reports of companies, KPMG finds that businesses in their business activities and reporting most frequently prioritize the SDGs targeting the contribution of decent work and economic growth (SDG 8), the assurance of sustainable consumption and production patterns (SDG12), and climate change action (SDG 13) (Bartels et al., 2020, p. 49). Particularly the latter two SDGs focus areas imply that companies give most importance to the environmental pillar of sustainability.

Even though environmental sustainability has been discussed over the last decades (Cohen, 2001, p. 22) it seems – as stated in the outset – to be more important today than ever before for consumers and governments, therefore affecting how companies are perceived and how they should conduct business. Al Iannuzzi (2020, as cited in Friedlander, 2020), vice president for sustainability at Estée Lauder Companies, affirms the market pressure by stating that "consumers are ensuring it is imperative for companies to embrace sustainability" which leads companies to analyze and dissect their value chain from their material sourcing and procurement activities to efforts regarding improvements in energy and packaging (Friedlander, 2020). In line with Iannuzzi's assessment, research by the Economic Intelligence Unit (2021, p. 6) concludes that an increasing amount of people are concerned with environmental issues, demonstrated by an 71% increase in searches for sustainable goods. Similarly, a recent Boston Consulting Group (Kachaner, Nielsen, Portafaix, & Rodzko, 2020) study shows that people expect companies to pay greater attention to environmental aspects in their business activities. Generation Z, considered in many cases to be the most sustainability-conscious age group, becoming the dominant generation, further reinforces the need for companies to consider their impact on the environment (Rafi, 2021).

While a shift towards environmental sustainability arises from changing customer mindsets, pressure is also exerted by institutional actors via regulations aiming to protect the environment (Y.-S. Chen, Lai, & Wen, 2006, p. 331). In view of these market and institutional developments also the stance and motivation of companies towards environmental sustainability has adapted and the extent to which companies integrate green solutions within their business changed.

Porter and van der Linde (1995, p. 97) assert that in former times the adoption of environmental issues and economic success were seen as contradicting each other. Consequently, environmental investments were considered a burden and only undertaken in order to comply with institutional regulations (Y.-S. Chen et al., 2006, p. 337). Put precisely, environmental solutions were merely seen as risk mitigation efforts. However, research conducted in the last years finds a positive relationship between green efforts and firms' competitive advantage and economic performance (Claver, López, Molina, & Tarí, 2007, pp. 616, 617). More specifically, Kruse, Mohnen, Pope and Santo (2020, p. 1) show that even though operating within the environmentally sustainable market requires substantial financial investment, early movers can expect higher operating profit margins. Also, or because of this, managers' attitude has changed, which is indicated by the increasing sustainability reporting by companies, outlined above. In a way, a paradigm shift has been observed with regard to sustainability, which is now even considered a 'driver of innovation' (Hollmann-Peters, 2011, p. 18, as cited in Spindler, 2013, p. 9). If one takes into account the positive impact green products and investments can have on firms' businesses and the fact that green products as a whole have been identified as substantial driver of purchasing growth (Whelan & Kronthal-Sacco, 2019) it comes as no surprise why increasing interest in so-called environmental innovation has emerged over the last years.

While there are several definitions for this specific term environmental innovation in general aims at reducing or avoiding environmental harm via novel or adapted processes, techniques, systems and or products (Kemp & Arundel, 1998, p. 1). It is most often divided into technical innovation – comprising product and process innovation – and organizational innovation (Frondel, Horbach, & Rennings, 2007, p. 573). Unlike in previous times, nowadays an abundance of opportunities is associated with environmental innovation that can subsequently lead to a competitive advantage. Chen et al (2006, pp. 337–338) conclude that environmental innovation not only acts as means for increasing resource productivity but also helps to design green products that allow the firm to ask for higher profits, to improve its corporate image and to gain a first-mover advantage. As a result, environmental innovation does not only protect companies from governmental penalties, as assumed earlier, but helps companies progress economically.

Even though bearing a lot of opportunities, innovating towards environmental sustainability is seen as risky, which results in companies facing challenges along the way. Environmental innovation oftentimes requires companies to depart from their current knowledge base, making it competency-destroying rather than enhancing. Accordingly, traditional innovation strategies

are no longer sufficient in this context (Hall & Vredenburg, 2003, p. 63). Even during earlier research on environmental sustainability, it was argued that existing capabilities and resources, if not adapted to the new environment, become 'core rigidities' indicating that customized capabilities and resources needed to be developed (Hart, 1995, pp. 989, 991). It is argued that the concept of dynamic capabilities addresses this necessity by providing a better understanding for managing the sustainable environment and engaging in environmental innovation (Iles & Martin, 2013, p. 38; Wu, He, & Duan, 2013, p. 255). Grounded in the resource base view dynamic capabilities are seen as "the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments" (Teece, Pisano, & Shuen, 1997, p. 516). Answering the call of Amui et al (2017, p. 319) and Dangelico et al (2017, p. 655) for future research in this context, a growing number of authors (da Giau, Foss, Furlan, & Vinelli, 2020; Khan, Daddi, & Iraldo, 2020; Mousavi & Bossink, 2017; Mousavi, Bossink, & van Vliet, 2018, 2019; Sandberg & Hultberg, 2021; Santa-Maria, Vermeulen, & Baumgartner, 2021) have begun looking into dynamic capabilities and the underlying practices enabling and contributing to environmental innovation.

1.2 Research Gap

However, literature has until now not investigated the beauty and personal care industry, a complex and challenging market that is very much the target of the increasing demand for sustainable products.

The beauty and personal care industry – generating revenue of $564.40bn in 2022 - is defined as the market comprising goods for body care and cosmetics and with a compound expected annual growth rate of 4.76% between 2022 and 2026, considered to be one of the fastest growing consumer markets. To be more precise, the industry can be segmented into cosmetics, skin care, personal care – comprising hair care, shower and bath, oral care, deodorants, and shaving - and fragrances. Especially the former two segments are seen as a driver of this thriving industry (Statista, n.d.). While the market is still dominated by L'Oréal, the market leader, Unilever, Procter and Gamble and Shiseido (Lüdemann, 2021, p. 4), in the last years the increasing popularity of small, niche-brands, so-called indie brands has emerged. These indie brands mostly focus on clean, organic, and vegan ingredients targeting the higher growth millennial and Gen-Z customer segment (Gupta, 2021). The emergence and rising importance of such brands and their portfolio confirms what has been anticipated to be an influential trend in the next years, namely green, clean, and natural features of beauty and personal care products.

It is even assumed that planet-friendly attributes will become as important as the functional benefits of such products (Euromonitor International, 2022, p. 8). This trend can be seen as countering to the traditional beauty and personal care market in which a wide range of chemicals is used to enhance the appearance or the odor of the human body. As consumers are constantly exposed to such products, which can lead to long-term health problems due to their ingredients, an increasing demand for alternative cosmetics can be observed (Liobikienė & Bernatonienė, 2017, p. 115), making natural cosmetics a growth driver (IFH Köln & KPMG, 2014, p. 23). Cosmetics Europe (2012, p. 2) concludes that "sustainable development is a demand that businesses must embrace sooner or later to be successful and even viable in the longer term. At present, it is not an obligation, but it is certainly an opportunity." However, the increased concern for green products can pose a challenge to companies operating in the cosmetic industry, as already suggested above. Products that are formulated with sustainable ingredients oftentimes lack performance and stability that is offered by unsustainable synthetic ingredients (Bom, Jorge, Ribeiro, & Marto, 2019, p. 277). What is more, companies aiming to create natural beauty and personal care products have reduced formulation option, as of the 22,000 ingredients listed International Nomenclature of Cosmetic Ingredients (INCI) only 10% are considered to be natural. Also, being restricted to only 2,200 ingredients often means missing out on the best performing ingredients and even if an effective natural one is found it is not guaranteed that this ingredient it is readily available. Other problems associated with beauty and personal care products are the increased difficulty to work with natural ingredients and - as mentioned in the outset - a possible sacrifice in performance (Romanowski, 2020). Similar to the difficulties experienced during the product formulation process, companies consider it tough to subsequently find sustainable packaging options that are compatible with the new product formulars (Bryant, 2020). All the challenges associated with the creation of green personal care products perfectly illustrates a complex environment in which dynamic capabilities seem to be necessary for companies wanting to succeed within this segment.

However, preceding research on dynamic capabilities for environmental innovation has mainly dealt with conventional companies (Khan et al., 2020; Mousavi & Bossink, 2017; Mousavi et al., 2019; Sandberg & Hultberg, 2021; Santa-Maria et al., 2021). Until now dynamic capabilities of born green companies have been disregarded. The beauty and personal care industry in this context acts as a showcase example for a market in which it is assumed that even companies that were found on a sustainable mindset need to adapt to a changing environment and thus possess dynamic capabilities.

Even though born green beauty and personal care companies and their founding philosophy meet the base criteria regarding sustainability, the market itself and customer expectations have evolved over time. What adds to the complexity is the fact that natural beauty and personal care products are not defined by law, which makes certifications all the more important (Was ist Naturkosmetik, 2021). In this regard a distinction has to be made between natural and organic beauty and personal care products. The former is concerned with the ingredients found in the products, while the latter investigates the ways these ingredients were farmed and sourced, and hence can be seen as an add-on. While natural beauty and personal care products rely on natural (flowers, pants) ingredients and renounce synthetical ones, organic products also ensure that harmful fertilizers or other pesticides were not used during the growing process of the plants and flowers (Soil Association, n.d.). While natural ingredients are still the most important purchasing factor within the green beauty and personal care market, increasing attention is given to products that respect the environment and that are packaged within more sustainable (recyclable and reusable) options (Mayo, 2021). Particularly the packaging aspect highlights the trend for circularity, which means that ingredients are reused or upcycled (Manson, 2021). What is more it seems that rather than looking at the products by themselves, a growing interest on the associated supply chain and therefore ingredients traceability has been observed. Because of this the responsibility is extended from the beauty and personal care companies alone to their partners and the practices of those (Marsh, 2022). All of these trends within the green beauty and personal care industry are framed by the increasingly informed customers that can easily access information that tells them if said companies are in line with their sustainable beliefs and expectations (CBI Ministry of Foreign Affairs, 2022). All of these trends imply that born green companies cannot rest on their laurels of having a sustainable founding philosophy but have to address the increasingly demanding consumer expectations in their niche. Resultingly, rather than focusing on natural ingredients born greens continuously need to broaden their sustainability spectrum to their value chain, their packaging and intensify their ingredients criteria. This dynamic environment and evolving demands seem to also make born green beauty and personal care companies at least partly reliant on dynamic capabilities which should enable these firms competitive in such a demanding and changing environment.

What makes the analysis of dynamic capabilities of born green beauty and personal care companies even more enriching is the contrasting corporate characteristics of such firms compared to firms studied by other researchers. Regarding dynamic capabilities Teece et al (1997, p. 518) assert that they are "shaped by the firm's asset position and molded by its evolutionary and co-evolutionary path." This makes the comparison of conventional companies and born green companies in the beauty and personal care industry, which display different paths and possess different resource bases, interesting and relevant.

1.3 Research Question and Research Objective

Referring to the identified research gaps, this thesis aims to identify the dynamic capabilities and their underlying practices enabling and contributing to environmental innovations of born green companies in the beauty and personal care industry. The most suitable approach in doing so is seen in Teece's (2007) framework. In his work the author disaggregates dynamic capabilities into the capacity to (1) identify and shape opportunities and threats – that is sensing, (2) to realize former – that is seizing and (3) to reconfigure the company's tangible and intangible assets. In analyzing practices and structures that undergird these capabilities, the author puts focus on the so-called microfoundations of dynamic capabilities (Teece, 2007, p. 1319). It is assumed that the microfoundation concept offers an extensive insight into how dynamic capabilities are manifested in the environmental innovation context. Deriving from this, the following research question is formulated:

What are the underlying microfoundations of dynamic capabilities that born green companies in the beauty and personal care industry demonstrate with regard to environmental innovation?

It is the overarching goal of this thesis to answer this research question and present the findings in a comprehensible manner. Due to the differing characteristics of the research objects in this thesis in comparison to previous empirical research, which focused on companies not inherently sustainable, it is expected to find differences maybe even discrepancies. However, it is not within the scope of this study to determine exactly what these differences are attributable to.

1.4 Structure

This introduction is followed by a theoretical background outlining the key-concepts relevant to this thesis, and an empirical part presenting primary data and putting it into context with the theoretical background.

The literature review begins with the introduction of environmental innovation and thus the theme in which this study is embedded. Presenting environmental innovation, its determinants, and its types, reflects the reasons and the need to address dynamic capabilities in this context. What follows is an overview of these dynamic capabilities on generic level and subsequently in context of Teece's (2007) framework. Here special focus is laid on the dynamic capabilities and underlying microfoundations associated with environmental innovation. After providing insight into the methodology and therefore the research approach, research design as well as the data collection and analysis method, the findings of the author are presented and discussed in the context of the preceding literature. In order to provide a pervasive pattern, the findings and discussion will adhere to the structure offered by Teece (2007). Finally, concluding remarks are offered, limitations are acknowledged and recommendations for upcoming research are made.

2 Literature Review

This chapter introduces the theoretical concepts in which this thesis is embedded. First, the author elaborates on environmental innovation, its determinants, and its different forms. By outlining the challenges associated with such innovation, a segue is made to the relevance of dynamic capabilities. The concepts of dynamic capabilities are first presented in generic manner before being put into the context of environmental innovation. This chapter ends with a preliminary conclusion.

2.1 Environmental Innovation

While creating and preserving a competitive advantage is crucial for all businesses (Lawton, Mcguire, & Rajwani, 2013, p. 86) the underlying reasons of such an advantage have changed over time. According to Barney (1991, p. 102) a competitive advantage is established by "implementing a value creating strategy not being simultaneously implemented by any current or potential competitors." It is shown that, conversely to common belief, this competitive edge can be attributed to constant business improvement and innovation rather than the simple possession of the cheapest inputs or the largest production scales (Porter & van der Linde, 1995, p. 98). With the growing environmental consciousness of company stakeholders, the constant improvement and innovation has been increasingly discussed in terms environmental innovation (Y.-S. Chen et al., 2006, p. 331). It has been shown that environmental innovation, as predicted by Porter and Van der Linde (1995, p. 98) over two decades ago, contains a variety of positive attributes. Literature indicates that companies aligning their business towards environmental sustainability experience higher returns, decreasing costs, a superior public image, and a differentiation position, among other things(Shrivastava, 1995, pp. 196–196). Ultimately Chen et al (Y.-S. Chen et al., 2006, p. 338) even find that environmental innovation is positively correlated with firm's competitive advantage.

As the name implies, environmental innovation evolved from conventional innovation and can be seen as a thematically focused manifestation of such. On a generic level the Oslo Manual (OECD, Eurostat, & European Commission, 2005, pp. 46–52) divides innovation into product, process, organizational and marketing innovation. Product innovation targets functional aspects of a product or a service which are technical, component and material characteristics. Process innovation considers the techniques and software of the production or delivery methods. Lastly, marketing and organizational innovation focus on the 5Ps (product, price, people, promotion,

place) and adaptions of business practices or external relations, respectively. To be considered innovative the essential aspects of each category must be novel or show at least substantial changes/improvements. Moreover, these new or modified solutions must have been introduced to the market to be considered an innovation.

Environmental innovation, as an extension to the generic understanding of innovation, is considered to comprise "new or modified processes, techniques, systems and products to avoid or reduce environmental harms. They can concern either technical or organizational innovation" (Kemp & Arundel, 1998, p. 1). It can be observed that the environmental component of such innovation is expressed by different terminologies in literature. Besides 'environmental innovation' scholars in their research are most often concerned with 'eco', 'green' or 'sustainable innovation'. As all these notions are used in relation to innovations that contribute to avoiding or reducing the environmental damage caused by businesses, they can largely be used interchangeably (Schiederig, Tietze, & Herstatt, 2012, pp. 180–182). However, this alignment cannot be transferred to the underlying objectives that firms have with regard to environmental innovation. While it is some companies' main aim to have a less negative or even a positive influence on the environment, there are other companies that consider positive environmental effects as secondary goals to their primary goals of efficiency or cost reduction gains (Kemp & Arundel, 1998, p. 2).

Another distinction between conventional and environmental innovation – besides the different focus areas - is the companies' investment behavior and the returns they gain from it. In most cases innovation is driven by the expectations of higher profits or other favorable performance KPIs. However, even though environmental innovations - as shown above - are associated with a number of economic benefits, they are not ubiquitous and are sometimes even absent. Since environmental innovations are often dictated by external stakeholders, such as regulatory bodies or customers with whom the company wishes to maintain good relations, they can / must be pursued even if they are not profitable (Kemp & Arundel, 1998, p. 5).

This shows that even though environmental innovations are associated with opportunities they also present challenges and contain risks. According to a qualitative study conducted by Dangelico and Pujari (2010, p. 481) integrating both environmental and conventional product characteristics is seen as a challenge due to the fear of compromising quality in favor of green attributes. In addition, the high development and manufacturing costs lead to uncompetitive prices that make the product unattractive on the market. Closely related to this point is the apparent discrepancy between consumer awareness and behavior regarding green products.

While creating consumer awareness can be achieved via eco-labeling and third-party certification, it is often more difficult to reflect this consciousness in consumer behavior and thus get people to buy more and spend more money on environmentally friendly products. Finally, even though environmental innovation may lead to technological and commercial benefit, investing in novel products and processes or significantly adapting them can be costly, and therefore not affordable to all companies. Being aware also of these negative aspects, the question arises why companies ultimately engage in environmental innovation, when it could be assumed that environmental innovation is sometimes even detrimental to companies.

2.1.1 Determinants of environmental innovation

In context of this question several authors have examined the specific drivers that lead companies to integrate environmental considerations into their operations (Cleff & Rennings, 1999; Horbach, 2008; Horbach, Rammer, & Rennings, 2012; Rennings, 2000). Most established in this regard has been Rennings' (2000, p. 326) framework which identifies regulatory push / pull, market demand and technology push as the most crucial determinants of environmental innovation. Later, firm specific factors were added as an element for initiating green orientation by companies (Horbach et al., 2012, p. 114).

Regulatory push / pull

Exploiting the opportunities presented by green products can be a motivator for engaging in environmental innovation. However, Porter and van der Linde (1995, pp. 98–99) suggest that these opportunities might not be identified by the companies themselves. This is due to the fact that while there are many potential innovation opportunities, companies cannot give unlimited attention to all of them. As a result, the authors argue that opportunities borne by environmental innovation must be presented to companies in the form of regulation that directly or indirectly - through consumers - affects the firms.

The introduction of environmental policies is closely related to the double externality problem proposed by Rennings (2000, pp. 325–326). He asserts that due to positive externalities in both the innovation, as well as the adoption and diffusion stage market failures arise that can hamper environmental innovation. As a result, the author concludes that green solutions need regulatory support, by granting financial aid and punishing behavior that is harmful to the environment. By introducing regulatory measures, companies are made aware of the negative impacts of their operations on the one hand and are presented with (unrecognized) efficiency gains that can be achieved through environmental innovation on the other. In addition, regulations reduce

uncertainty about whether environmental investments are worthwhile and act as a measure counteracting organizational inertia. In this sense the authors equate regulatory pressure with consumer and competitive pressure, which are both known to trigger innovation. Lastly, before learning effects that decrease the costs of sustainable products are in place, environmental regulation creates an even playing field. It makes sure that companies do not withdraw themselves from environmental investments to gain a cost advantage in comparison to companies that do invest in sustainability – and have yet to profit from learning effects (Porter & van der Linde, 1995, pp. 99–100). However, the effectiveness of regulations and their implication for environmental innovation varies.

As an example, soft regulations and therefore the voluntary measures and information instruments (eco-labels, …) are seen as beneficial tools with regard to environmental innovation, as they allow companies to leverage their environmental performance when addressing the market or negotiating with governments. Even though soft regulations seem to be sufficient for green innovators, hard measures (civil law and charges) still need to be in place to address non-innovative firms, that solely follow a passive approach regarding environmental issues (Cleff & Rennings, 1999, p. 201).

Another example for regulations having different effects on environmental innovation is the comparison of command and control (CAC) policies and market-based instruments (MBI). While CACs include emission and technology standards that target the questions how much and / or how businesses are reducing their emissions, MBIs aim at creating incentives for pollution abatement by introducing emission fees, marketable permits, and environmental taxes (on inputs or outputs) (Blackman, Li, & Liu, 2018, p. 382). Comparing these two regulatory mechanisms shows that market-based systems are more likely to foster innovation than command and control policies. What is more, by steering resources toward standard compliance, therefore encouraging a reactive approach, CACs may even hinder innovation. (Downing & White, 1986, p. 28; Milliman & Prince, 1989, p. 257).

While institutional actors have realized such measures via various international treaties, therefore pushing companies towards environmental innovation (Y.-S. Chen et al., 2006, p. 331) it is also the market that is pulling companies towards environmental innovation.

Market pull

The market-pull aspect is considered to be especially important in the diffusion phase of an innovation (Pavitt, 1984, as cited in Rehfeld, Rennings, & Ziegler, 2007, p. 92) and a source of environmentally friendly products, rather than eco-efficient technologies (Rennings, 2000, p. 326). Even though the market is seen as a determinant of environmental innovation, the relationship between consumers and green products is often not supported empirically (Horbach et al., 2012, p. 113) which might be attributed to the identified decoupling of consumer attitudes and consumer purchasing behavior (Prakash, 2002, p. 287). This problem is also illustrated in a study by Rehfeld, Rennings and Ziegler (2007, p. 99), in which environmental business innovators drew attention to the challenges they face during the product commercialization stage. According to them, it is mainly the higher prices of green products that lead to the unfavorable market performance. It is argued that this problem can be solved by demonstrating consumers not only the public benefits of green products, in form of a decrease in environmental pollution for example, but also the private benefits he or she gains (Reinhardt, 1998, p. 52). These private advantages can come in the form of cost and energy savings, improved product quality and durability or health benefits, all of which help companies to overcome the market challenge of environmental innovation. It is concluded that ecological aspects alone are not sufficient to sell a green product, but that these aspects must be combined with traditional purchasing criteria (Belz, 2005, p. 11). Also, by transferring some of the environmental benefits from the public directly to customers, companies can increase demand for their environmentally friendly products, thus increasing their return on their environmental investments (Kammerer, 2009, p. 2287).

Whilst companies may be influenced by external forces, drivers for environmental innovation may also lie within the company.

Technology push and firm-specific factors

Horbach (2008, p. 172) identifies improvements of technological capabilities – comprising the companies' physical and knowledge-based capital stock - as another important determinant for environmental innovation. This is based on the assumptions that highly developed technological capabilities are associated with path dependencies leading companies to not only be innovative in the present but also inducing future environmental innovations. Improvements of said capabilities can be achieved by investments in research and development and in human resources (Horbach, 2008, p. 164). Technology push factors are especially important in the initial phase of developing a product (Pavitt, 1984, as cited in Rehfeld et al., 2007, p. 92). In

contrast to market pull factors that rather drive green products or an environmentally friendly image, technology push factors, are considered to advance eco-efficient technologies (Rennings, 2000, p. 326). Lastly, firm-specific factors identified are knowledge transfer-mechanisms, network engagements (Wagner, 2009, as cited in Horbach et al., 2012, p. 114) or firm specific green capabilities (Hart, 1995, p. 991).

Having identified the need for environmental innovation through internal or external drivers, companies must then decide in which form that innovation will be carried out. Oftentimes this decision is very much connected to the underlying determinant, as already indicated above.

2.1.2 Types of environmental innovation

The proposed forms of environmental innovation closely follow the OECD's (2005, p. 46) categorization of innovation types. The most common conceptualization of environmental innovation differentiates between green product and process innovation, short green technological innovation (Y.-S. Chen et al., 2006, p. 332; Rennings, Ziegler, Ankele, & Hoffmann, 2006, p. 47). However, following the definition of Kemp and Arundel (1998, p. 1) environmental innovation may also concern organizational structures, routines, and practices of a company.

Environmental process innovation

In a generic form process innovation is seen as the "implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software " (OECD et al., 2005, p. 49). Adapted to the environmental context, environmental innovation may aim at the reduction of emissions, improvements in resource and energy efficiency, reduction in water consumption or moving from fossil fuels to renewable energy (Kivimaa, Kautto, Hildén, & Oksa, 2008, p. 19). Process innovation as a whole, is sub-divided into end-of-pipe technologies and cleaner production technologies. According to the Verein Deutscher Ingenieure (2001, as cited in Frondel et al., 2007, p. 573) end-of-pipe technologies are considered add-on measures to production processes that reduce the resulting harmful substances in order to meet regulatory requirements. Examples for end-of-pipe technologies are incinerations plants for waste disposal, waste-water treatment plants or sound absorbers. In contrast to end-of-pipe technologies, cleaner production technologies address the problem of environmental harmful behavior of firms at the source by substituting or modifying technologies and processes that were less environmentally friendly. Examples are the

recirculation of production inputs or the replacement of materials. In addition to the reduction of harmful by-products, cleaner technologies also reduce the energy and resource inputs. In their study Frondel, Horbach and Rennings (2007, p. 581) compare those two abatement measures in terms of their motivations and their outcomes. Even though both measures aim at reducing their environmental impact, cleaner technologies are seen as superior to end-of-pipe technologies with regards to their economic and environmental outcomes. In fact, environmental innovation is more often associated with cleaner technologies rather than end-of-pipe technologies. The driving factors of implementing such technologies also differ. While regulatory pressure has been identified as a stronger determinant for end-of-pipe technologies, cleaner technologies are driven by market-based factors, such as cost reduction and efficiency gains.

Environmental product innovation

Green product innovation is mainly concerned with decreasing the environmental impact by modifying the product design with regard to key environmental issues, such as energy, material / resources, or pollution / toxic waste (1996, Roy, Wield, Gardiner, Potter, as cited in Dangelico & Pujari, 2010, p. 472). More specifically, green product innovations may include improvements in the durability or recyclability, the reduction of raw materials, the selection of materials that are less harmful to the environment or the elimination of toxic and harmful substances (Kivimaa et al., 2008, p. 20). While considering the whole product's life cycle (manufacturing process, use and disposal) it is important to note that not all environmental issues occur (to the same extent) at each life cycle stage and that differences between products can be observed (Dangelico & Pujari, 2010, p. 472). Bearing this mind, Lai, Wen and Chen (2003, as cited in Y.-S. Chen et al., 2006, p. 336) identify various aspects by which green product innovation can be measured, independent of the specific product and its value chain. Frist, the company under considerations uses the least number of materials during the product design and development phase. Second, the chosen materials produce the least amount of pollution and consume the least amount of energy and resources during the said phase. Lastly, the firms consider the ease of product recycling, reusing, and disassembling during the product design and development phase.

While green process and product innovation are among the most prevalent aspects in the current sustainability context, they can be considered insufficient to deliver long-term environmental sustainability.

Environmental business model innovation

Bearing the restriction of product and process innovation in mind, literature has been increasingly looking into the organizational aspects of sustainable innovation. In this the significance of companies' business models have been highlighted, as they are important for driving and implementing (green) product and process innovation (Bocken, Short, Rana, & Evans, 2014, p. 42). Boons and Lüdeke-Freund (2013, p. 16) argue that increasing interest in business models is vital since previous literature treats companies innovating towards sustainability as a black box, without considering the business model and thus the essential element for the successful market introduction of the technological innovation. Adopting a business model perspective may help companies to overcome internal and external barriers, as business models may act as mediator for environmental innovation. Sustainable business models enrich the conventional business model concept by incorporating environmental aspects in the business models defining elements, which is the value proposition, the value creation, value delivery and value capture mechanisms of companies (Geissdoerfer, Vladimirova, & Evans, 2018, pp. 402–403). By this, value is distributed not only to investors, managers and employees, in line with the conventional business model, but also to society as a whole (Inigo, Albareda, & Ritala, 2017, p. 516). Examples for sustainability adapted business models are the circular economy, Cradle-2-Cradle or sharing asset approaches (Bocken et al., 2014).

Even though environmental innovation – manifested by the introduction or adaption of products, processes and business models - is associated with gaining a competitive advantage (Y.-S. Chen et al., 2006, p. 338) the environment in which such takes place is seen as complex due to the uncertainty and increased variety of the market and technological domain in which the firms find themselves (Cainelli, de Marchi, & Grandinetti, 2015, p. 212). First, companies engaging in environmental innovation must integrate the interest of a broader stakeholder group. This implies a shift away from the sole shareholder perspective to the inclusion of customers, regulators and employees, community, and environmental advocacy groups (Gable & Shireman, 2004, pp. 7–8), all of which might have diverse agendas due to different understandings of sustainability (Vanclay, 2004, p. 266). Second, environmental innovation is often only made possible by departing from the current knowledge base resulting in companies being unable to pursue conventional innovation approaches (Hall & Vredenburg, 2003, p. 63). This partly unknown but simultaneously demanding environmental innovation environment makes Teece, Pisano and Shuen's (1997, p. 515) statement regarding the generic business environment even more prevalent in context of an environmentally conscious market. They

argue that winners in the market do not only display rapid and flexible product innovation but that these activities are coupled with the company's capability "to effectively coordinate and redeploy internal and external competences". Applied to the environmental innovation market Chen, Chang and Wu (2012, p. 375) identify the "ability to integrate, coordinate, build and reconfigure its competences and resources" an origin of green management and environmental innovation. While the three authors refer to this as the environmental capability it may also be seen as a dynamic capability and therefore referring to the concept introduced by Teece, Pisano and Shuen (1997).

2.2 Dynamic Capabilities

According to Teece, Pisano & Shuen (1997, p. 509) the dynamic capabilities framework looks into the sources and methods by which private companies operating in an environment characterized by change generate and capture wealth. The concept finds its roots in the resource-based view, which suggests that in order to gain a sustained competitive advantage firms must focus on resource heterogeneity and immobility and the so-called VRIN criteria. As a result, besides being heterogeneous and immobile, resources need to be valuable, rare, inimitable, and non-substitutable (Barney, 1991, pp. 103–106). However, the generic resource-based view is not able to explicate the underlying reason for firms' competitive advantage in an unpredictable environment (Teece et al., 1997, p. 509). This view is supported by D'Aveni and Gunther (2007, p. 85) who assert that in a highly dynamic environment established strategic measures such as barriers to entry, the strategic interplay of resources and opportunities, cost leadership, differentiation, long-term planning, and financial targets are no longer sufficient. Consequently, if a company is solely reliant on its VRIN resources without making use of potential dynamic capabilities its current superior returns will not last (Helfat et al., 2007, p. 45). This highlights the importance of dynamic capabilities in the current, ever-changing (environmentally sustainable) business environment.

Dynamic capabilities were first defined as "the firm's ability to integrate, build, and reconfigure internal and external competences to address the rapidly changing environments " (Teece et al., 1997, p. 516). As this definition is regarded as quite broad, several authors have refined and expanded and sometimes even contradicted the original definition over the years. Although there are multiple attempts to describe this concept, there is a general understanding that dynamic capabilities refer to processes within a business (Ambrosini & Bowman, 2009, p. 34). Zollo and Winter (2002, p. 340) consider dynamic capabilities to be "a learned and stable

pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness." Eisenhardt and Martin (2000, p. 1107) view dynamic capabilities as "the firm's processes that use resources […] to match and even create market change". Lastly, Helfat et al. (2007, p. 4) provide the most extensive definition by suggesting that "a dynamic capability is the capacity of an organization to purposefully create, extend, or modify its resource base". For reasons of understanding, this definition is disassembled and the various terms clearly defined. On a meta level, the general grasp of capabilities is that they are 'home grown', suggesting that they are developed by the company itself rather than acquired on the market, which is central to the assessment that they are a source of companies' heterogeneity (Helfat & Winter, 2011, p. 1244). A dynamic capability being the capacity to do something signifies that an organization is able to complete a task in an at least minimally accepted manner. Lastly, the resource base of a company refers to its tangible, intangible, human assets, as well as capabilities. Since the above definition understands that capabilities are part of the resource base, it follows that this applies to dynamic capabilities as well. Resultingly, dynamic capabilities can also target themselves (Helfat et al., 2007, pp. 4–5).

Resulting from its characteristics, dynamic capabilities must be distinguished from concepts that display similarities in one way or another. Operational or zero-level capabilities, for example, enable the firm to conduct their day-to-day business activities and are associated with a firm being in an equilibrium. In this state, a company produces and sells the same products to the same customer base, which may provide it with a (supra-)competitive return in the short term but cannot provide a sustained competitive advantage in the long term (Teece, 2007, p. 1344; Winter, 2003, p. 992). Resulting from this, zero-level capabilities are concerned with competing today and are static in nature, unless they are altered by dynamic capabilities (Ambrosini & Bowman, 2009, p. 34). Possessing a talent must also be differentiated from dynamic capabilities. Unlike dynamic capabilities, a talent does not emerge from patterns of experiences of individuals (Helfat et al., 2007, p. 5). Lastly, even though dynamic capabilities are considered to be essential in uncertain environments and by definition strive to extend or even modify the current resource base, not all activities meeting this definition must be dynamic capabilities. Ad-hoc improvisation, and therefore a direct response to a changing condition, being one example. In contrast, dynamic capabilities address a specific problem in a more routine manner that often requires long-term investments and resource commitments not observed in ad-hoc problem solving (Winter, 2003, pp. 992–993).

It is the concept of dynamic capabilities and some of its inherent characteristics which become prevalent in the context of sustainability and environmental innovation. For one it is argued that dynamic capabilities play an important role for companies by enabling them to overcome challenges that prevent them from achieving their green goals (Wu et al., 2013, p. 267). For another, Iles and Martin (2013, p. 38) argue that companies are most likely to bring new green solutions to the market effectively if their dynamic capabilities are built and managed around sustainability. As a result, obtaining an understanding of dynamic capabilities is necessary in order to manage and enhance the development process of environmental innovations. The inherent question is in what form this understanding can be substantiated.

Although there is extensive literature on dynamic capabilities, scholars' work on the dimensionalization of dynamic capabilities, and thus how they are characterized and structured varies. Providing a broad overview, research has focused on the degree of routinization, hierarchy, and focal unit of dynamic capabilities, as well as the functional domain in which they are applied (Schilke, Hu, & Helfat, 2018, pp. 397, 401). The greatest practical relevance is seen in procedural dimensionalization and thus insight into the types of processes in which dynamic capabilities are involved. Following this assessment, this thesis adopts the (procedural) dimensionalization by Teece (2007) and his focus on the microfoundations of dynamic capabilities. On a broader level, he disaggregates dynamic capabilities in the capacity to (1) sense opportunities and threats, (2) seize the opportunities and (3) reconfigure the company's tangible and intangible asset base and focuses on the microfoundations undergirding these capabilities (Teece, 2007, p. 1319). Microfoundations are seen as the origin of business routines and capabilities that can be identified by considering individuals, processes and structures and the interaction within and across these lower-level entities (Felin, Foss, Heimeriks, & Madsen, 2012, pp. 2–3). Within the course of the next chapters the focus will be precisely on these microfoundations in context of dynamic capabilites for environmental innovation.

After a short introduction of each capability, the following sections present the microfoundations and underlying practices associated with environmental innovation based on the thorough literature review conducted by the author. For this, the papers of Mousavi and Bossink (2017), Mousavi et al (2018, 2019), Khan, Daddi, and Iraldo (2020), Santa-Maria, Vermeulen and Baumgartner (2021), Da Giau, Foss, Furlan and Vinelli (2020) and Sandberg and Hultberg (2021) served as the foundation. An overview of the previously identified microfoundations underpinning the dynamic capabilities for environmental innovation is given by Figure 1.

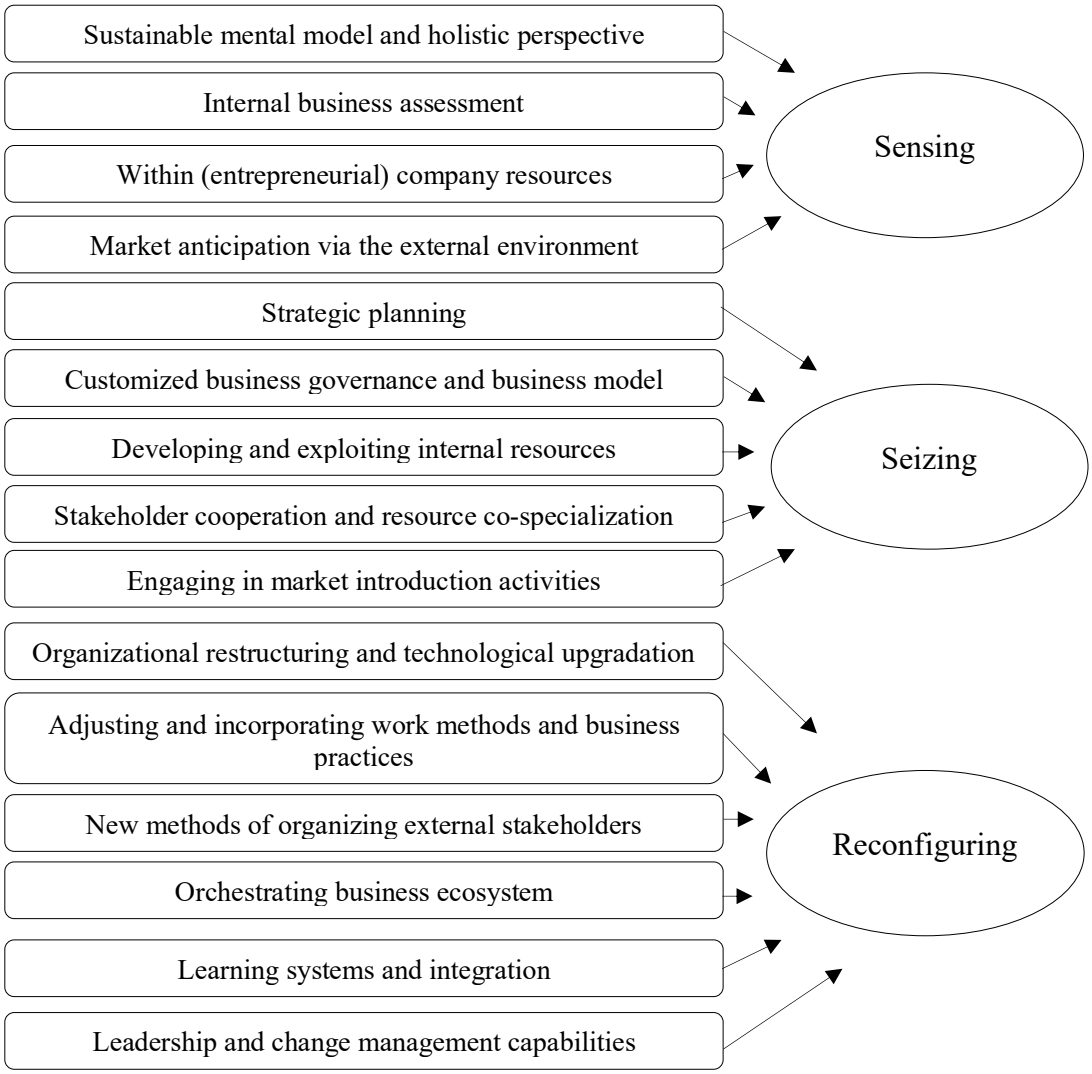

Figure 1 Dynamic capabilities for environmental innovation found in previous research

2.2.1 Sensing

In its essence the sensing capacity aims at obtaining knowledge concerning the internal and external business environment for companies to identify (green) business opportunities. To do so a company must constantly scan, search and explore its business environment to consequently learn and understand the market it is operating in. Building on the mere discovery of opportunities, companies must then be able to interpret and evaluate these opportunities correctly and assess them with regard to its competitors, suppliers and customers. Put simply, this capability comprises scanning, learning and sense making activities (Teece, 2007, p. 1322) and may be linked to the aspect of exploration (Katkalo, Pitelis, & Teece, 2010, p. 1178). While sensing may be considered as solely directed at the external environment, Babelyté-Labanauske and Nedzinskas (2017, p. 608) and other authors consider sensing to also comprise internal

aspects. Especially the internally focused practices can be seen to be particularly significant in the context of environmental innovation (Mousavi et al., 2018, p. 233). Possessing strong sensing capabilities in general becomes especially important for companies wanting to innovate towards sustainability. As companies encounter several obstacles – attributed to their inexperience and uncertainty– in this environment, sensing capabilities enable firms to not only overcome these obstacles but provide solutions to successfully engage in environmental innovation (Mousavi et al., 2018, pp. 226, 232).

The just stated complexity and uncertainty of the sustainable business environment underscores Khan, Daddi and Iraldo's (2020, p. 1483) observation. They find that rather than being dependent on only one sensing activity in the context of identifying environmental innovation opportunities, companies most often rely on multiple information sources as they are more likely to find green business potential. As just indicated, the answers to a knowledge gap cannot usually be found internally alone, nor do they rest within a single stakeholder. Even though costumers may provide information regarding their product and buying preferences, for example, they might be unable to express all aspects of them. As a result, both internal as well as external sources – such as industry reports or competitors - are required to complement and enrich each other. The necessity of knowledge coordination of both sources becomes evident in this sense (Sandberg & Hultberg, 2021, p. 5). With regards to these specific information sources, Mousavi and his colleagues (2018, p. 233) are being more specific in defining the concrete information and knowledge sources. They assert that knowledge can be found internally, in the public and market environment, as well as within the institutional domain. In their research internal sources comprise of sources within the company or enterprise group and procedures that detect the company's environmental impact. The public sources refer conferences and scientific journals, while the market sources include customers', suppliers' and competitors' knowledge. Lastly, the institutional domain comprises exchange with universities and governments among other institutional stakeholders. Their research shows that internal and public sources are the most and second most important information and knowledge sources for companies to sense environmentally sustainable innovation opportunities. In contrast, institutional sources are found to be least important in this regard.

The following sections take a closer look at the specific microfoundations found within the internal and external environment. Based on the conducted literature analysis, the author finds that (1) a sustainable mental model and a holistic perspective, (2) the assessment of the business, (3) the leveraging of (entrepreneurial) company resources and the (4) incorporation of the external environment for anticipating market trends and development are all important aspects for companies' sensing capabilities with regards to environmental innovation.

Sustainable mental model and holistic perspective

Displaying a strong sustainable mental model and directing internal strategic focus on sustainability is seen as a key driver for companies to bring the sensed opportunity to the next level, which is 'seizing' (Mousavi et al., 2019, p. 377). Mousavi and Bossink (2017, p. 11) even propose that "companies with a proactive sustainability strategy have greater sensing capabilities for recognizing the innovation opportunities for sustainability." Similarly, Sandberg and Hultberg (2021, p. 6) in their study find that companies do not see environmental innovation solely as a profitable market opportunity but also the possibility of having a positive impact on customer's behavior, values and beliefs and therefore initiating and driving change in this aspect. Adopting a more holistic perspective and looking at the bigger picture might help in this regard as the connection of a company's business to its environment can be better identified (Santa-Maria et al., 2021, p. 8)

Internal business assessment

In order to innovate towards sustainability, evaluating the current stance with regard to the company's sustainable goals is essential. Gaining awareness about the firms' environmental impact and therefore overcoming incomplete information about the business activities can be a first step. Environmental management systems and environmental audits have been identified as popular tools since they outline the current position of the company, the risks they face, and display stakeholder expectations (Mousavi & Bossink, 2017, p. 5; Mousavi et al., 2018, p. 235). Similarly, life cycle assessments disclose room for improvements to companies. Adopting a positive perspective, such improvements may be framed as opportunities that can be seized in the later course (Khan et al., 2020, p. 1486). Adding to this, internal business assessment Santa-Maria and his colleagues (2021, p. 8) find that companies in their sensing are guided by accepted sustainability frameworks, such as the Sustainability Development Goals or the Cradle-to-Cradle Initiatives.

Within (entrepreneurial) company resources

Internal company resources reference and encompass a wide range of resources including the capabilities of employees, as well as collaborative idea generation practices.

First, leveraging the skills of personnel has been considered vital for sensing opportunities. Encouraging employees is important as (the interaction of) highly skilled human capital can be the source of imitable or difficult to transfer knowledge which in turn leads to an innovative competence of the firm (Leonard-Barton, 1992, p. 116). Mousavi et al (2019, p. 373) in their study observed the process of a corporate scientist identifying a green business opportunity. Subsequently, the scientist, as its champion, made it his or her task to convince the company's executives of the idea's potential. In this sense it is important to acknowledge that, when aiming at seizing employee potential, actions must follow words. With regards to sustainability this means creating a business environment that allows the personnel to deal with green opportunity identification is inevitable. In the example just presented, the scientist made use of the internal 15% rule, which allows employees to use 15% of their working time as discretionary time which they may devote to their own green projects. If promising, a project may gain further corporate funding (Mousavi et al., 2019, p. 373).

Setting up an innovation center that acts as a business incubator in the company could be another option of capturing and exploiting (green) business ideas of employees. At such, ideas that are not yet ready for the market can be pursued or used in a way that fits the current product portfolio (Mousavi et al., 2019, p. 375). The existence of R&D centers has been recognized as even more important in the context of environmental innovation compared to conventional innovation (Cainelli et al., 2015, p. 218). Khan, Daddi and Iraldo (2020, p. 1484) also confirm this by finding R&D activities to be essential for the creation and expansion of knowledge within the firm and subsequently the identification of opportunities (Santa-Maria et al., 2021, p. 8). This also shows that even though it is clearly beneficial for a company to employ individuals that dispose of sensing capabilities it is even more desirable to have sensing capabilities integrated in company processes (Teece, 2007, p. 1324), as the organization as a collective (via its innovation and R&D centers) is more capable acquiring information than any individuals alone (Arrow, 1974, p. 53). Finally, it is found that companies also organize internal brainstorming meetings which can enrich the mentioned aspects above (Khan et al., 2020, p. 1484).

Even though leveraging the expertise of individuals and establishing internal processes that direct R&D are important, a large percentage of information can be found in the environment external to the firm (Teece, 2007, p. 1324). Powell, Koput and Smith-Doerr (1996, p. 142) strengthen this assumption by finding that in changing environments innovations are mostly embedded in networks of interorganizational relationships rather than within the firm itself. However, companies must be aware that the environmental innovation environment displays a particularly complex setting for the engagement with stakeholders. This may be attributed to the different backgrounds and the conflicting assessments of success and failure of those involved, as well as the need to engage in yet unfamiliar collaborations (de Marchi & Grandinetti, 2013, p. 569; Driessen & Hillebrand, 2013, p. 369). Nevertheless, it is necessary for companies to tap a wide range of external parties to explore sustainability opportunities and novel solutions to environmental problems, as companies lack information and are inexperienced in sustainability issues (Mousavi et al., 2018, p. 235).

Market anticipation via the external environment

Before establishing direct linkages to stakeholders, the company might commence by analyzing the external market as a whole by identifying technological developments, industry, and business trends, competitors' behavior and customer needs with regard to sustainability (Khan et al., 2020, p. 1483; Mousavi et al., 2018, p. 235). Santa-Maria et al (2021, pp. 7–8) in this context talk about external sensitivity which also comprises the identification of key internal and external stakeholders from which the just mentioned market trends and developments can be derived from. Information from the external environment can be obtained by working closely with the marketing department and preparing customer surveys, analyzing press releases and public documents, working with academic centers or consulting firms (da Giau et al., 2020, p. 1513) or conducing primary market research, competitor analysis and competitive positioning (Mousavi et al., 2019, p. 373).

A crucial aspect that is brought into connection with external sensitivity is the acknowledgement of firms that sustainability challenges are complex in nature and that external support in finding solutions might be necessary to solve them (Santa-Maria et al., 2021, p. 8). Exchanging and working directly with external partners and stakeholders – by attending conferences and events (da Giau et al., 2020, p. 1513) - can therefore be another tool to identify green opportunities and thus acquire the technologies and techniques needed for sustainability (Inigo et al., 2017, p. 532). Important stakeholders can be the companies' suppliers, which oftentimes are considered to have greater awareness for emerging trends. What is more, as they

have other customers too – the company's competitors among others – suppliers might be able to benchmark the company against its rivals (da Giau et al., 2020, p. 1513).
Even though direct engagement with mentioned rivals might not seem very common, so-called coopetition – a merging of the word competition and cooperation – has been identified to be beneficial for advancing sustainability goals for the own company but also the industry as a whole. Engaging in such networks provides so-called hidden sensing. By exchanging experiences and information, ideas how to change the industry are advanced and discussions are initiated (Sandberg & Hultberg, 2021, p. 6).

As discussed in the sub-chapter 2.1.1 environmental innovation governmental regulation and policies have great influence on the sustainability efforts of companies. As a result, monitoring policy changes related to environmental issues has been considered a driver for identifying environmental innovations. Learning about anticipating regulatory changes enables the company to take a proactive stance on these topics and to develop new (green) solutions for customers (Inigo et al., 2017, p. 532). As an example, KLM observed emerging regulations about CO_2 footprints in its industry and expected them to become more relevant in the future. To become a frontrunner, they started addressing this regulatory direction very early on and began their development on biofuels (Mousavi & Bossink, 2017, p. 5).
While (traditional) direct stakeholders, such as customers, competitors or governments are often given more importance by companies, especially the voice of indirect stakeholders gains relevance in the context of sustainability. Even though the sustainability needs of non-governmental organizations and interest groups are more distant and unfamiliar, special attention must be given to them by managers and their search routines, as these indirect stakeholders have emerged as monitors and sometimes even enforcer of environmental standards (Hart & Sharma, 2004, p. 8; Wu et al., 2013, p. 261). Hart and Sharma (2004, p. 7) present the example of an agriculture biotechnology firm. The company, without breaking any laws and even gaining governmental approval, had to revoke one of its technologies due to possible human health side effects and associated protests from so-called fringe-stakeholders. The authors conclude that integrating indirect stakeholders, such as non-governmental organizations, allows companies to identify sources of problems that might arise, as well as opportunities and business models in the future (Hart & Sharma, 2004, p. 10; Wu et al., 2013, p. 261).

2.2.2 Seizing

Once a (green) business opportunity has been identified, it must be exploited or - to be consistent with Teece's terminology – seized through the introduction of new products, processes or services and the associated mobilization of corporate resources (Teece, 2007, p. 1326). Consequently, seizing involves the inspiration and mobilization of the organization and its ecosystem to be able to capture the value of the recognized opportunities (Feiler & Teece, 2014, p. 15).

With regard to the dynamic capabilities literature on environmental innovation the author identified (1) strategic planning, (2) the customization of the management approach and governance structure, (3) the adaption of the business model, (4) the development and exploitation of internal resources, (5) the cooperation with external stakeholders and (6) the use of market introduction activities to be microfoundations of the seizing capability.

Strategic planning

Strategic planning lays the foundation for the successful realization of identified opportunities, irrespective of their sustainability aspect. However, the challenges posed by the process of sustainable innovation undoubtedly contribute to companies establishing a strategy for the innovation project. A clear vision that acts as a north star throughout the innovation initiatives may be crucial in this context (Santa-Maria et al., 2021, p. 12). Developing long-term strategies helps companies adapt to the changing environment and guides them in developing and implementing their environmental innovation projects (Mousavi & Bossink, 2017, p. 6; Wu et al., 2013, p. 262). Besides strategy formulation, strategic planning can comprise the search of strategic partners, the establishment of an investment plan and capital budgets or the recruitment of employees (Khan et al., 2020, p. 1487). Part of this process can also be the creation of a decision matrix in which previously sensed opportunities are compared based on several criteria. Parameters might be the difficulty of implementing the business opportunity, the existence, or non-existence of needed (green) technologies, the fit with the current product or production process or the perceived pressure of NGOs. Based on the assessment, a prioritization of the green projects can be made (da Giau et al., 2020, p. 1513).

The project prioritization criteria used imply that the resource component is taken into account. As a company's resource allocation process has long-term and far-reaching implications on how companies approach environmental innovation, companies put special focus on investment planning and capital budgeting activities. Resources and investments might not only be directed at R&D activities, and again at market probing but also acquisitions (Khan et al., 2020, p. 1487; Mousavi et al., 2019, p. 380).

Customized business governance and business model

Closely tied to strategic planning is the company's management and their involvement and approach realizing green business opportunities. Da Giau and colleagues (2020, p. 1514) saw that in seizing environmental opportunities, companies employ both top-down and bottom-up approaches depending on the complexity of the endeavor. While hard-to-implement projects were very much guided from the top, the bottom-up approach was seen to be more useful in non-complex solutions. What is more, Khan et al (2020, p. 1487) observed adjustments to the governance structure of the company as a whole. They found that the changes to the board of directors and executive management were undertaken and that specific committees were established, whose sole purpose it was to oversee the implementation of green projects.

Moreover, it has to be acknowledged that management directing the company's focus to environmental issues requires major internal innovation of firms, that is among others the business model (Eccles & Serafeim, 2013). Being the organizational and financial framework of the company, a business model makes assumptions about the monetary in- and outflows of a firm, and the market behavior. Furthermore, the construct provides options on how to profitably address consumers and competitors. Decisions that are undertaken concern the technological choices, the target market, and the strategic approach just there. The business model must be well formulated as it actively influences the success of the new products, processes or services put on the market (Teece, 2007, pp. 1329–1331). In the context of sustainability, the business model represents the connection between the economic and environmental innovation perspectives of a company. Developing a new revenue model is an example that is considered to be important when innovating toward sustainability, as green alternatives are oftentimes more costly to fund (Mousavi & Bossink, 2017, p. 9). Similarly, the new business model may be adjusted to the new target group and the structure of the new value chains (Mousavi et al., 2019, p. 375). All this leads Mousavi and Bossink (2017, p. 11) to propose that "companies with a business model that is open for sustainability value propositions have greater seizing capabilities for implementing and commercializing the innovation

opportunities for sustainability." With regard to new value chains, companies have been observed to analyze the value chains of the prespecified (green) industries. By evaluating the strengths and weaknesses of the company and its products within this value chain, the firms aim to identify opportunities and to develop suitable market-entry and commercialization strategies for their products for environmental sustainability (Mousavi et al., 2019, p. 380).

Developing and exploiting internal resources

Staying with the internal aspect of seizing, again internal R&D activities, as well the companies' employees, their skill deployment and enhancement have been identified to be one of the most crucial factors for the introduction of environmental innovations teams (Mousavi et al., 2019, p. 379) that focus on the activities related to the exploitation and execution of green projects. What can be observed is the diversity of these teams, achieved by using employees not only from different business unit but also different backgrounds (da Giau et al., 2020, p. 1514). The importance of internal personnel is further highlighted by Khan et al (2020, p. 1487). They note that human resources activities were even specifically planned for green projects. Training (new) personnel does not only have the positive effect of technical knowledge transmission but also brings awareness to the importance of sustainability issues and motivates employees in this regard (Cainelli et al., 2015, p. 218). This means that management must make it their goal to increase the sensitivity and commitment for sustainability issues of their employees, as only then environmental strategy is adopted (Y. Chen, Tang, Jin, Li, & Paillé, 2015, p. 495). This is in line with the findings of Santa-Maria and his colleagues (2021, p. 12) who identify the establishment of an innovation and continuous improvement culture to be crucial in the seizing process. As is the training and education of company's employees and their empowerment to come up and initiate environmental innovations.

Stakeholder cooperation and resource co-specialization

In addition to internal resources and capabilities, external stakeholders too are necessary for seizing green opportunities. Similar to sensing, these partners and stakeholders can be found within the market, public and institutional environment. Again, compared to conventional innovation the presence and incorporation of external partners is considered to be even more important in the context of sustainability (Mousavi et al., 2018, pp. 234–235). Networks established when sensing opportunities must now be formalized and governed to make the identified opportunities happen (Sandberg & Hultberg, 2021, p. 6). Engaging with external stakeholders could lead to several direct and / or indirect benefits. Collaborations and partnerships enable companies to gain complementary tangible resources but also provide the

requisite intangible knowledge firms need to engage in environmental innovation (Khan et al., 2020, p. 1487). Mousavi and Bossink (2017, p. 9) in this context mention resource co-specialization which refers to "synergistic gains that arise from interaction of different resources within a business eco-system". With regard to resource co-specialization companies particularly look for partners that offer complementary resources and competencies (Mousavi et al., 2019, p. 380). Specific partners can be universities, research centers, customers, or clients (Khan et al., 2020, p. 1487; Mousavi et al., 2018, p. 233).

Governments may also be a target and subsequently, could become a collaborating partner. Engaging in a dialogue with the institutional environment can prove especially important in the seizing phase, since green alternatives are oftentimes more costly and the margins thinner and more price sensitive. Thus, lobbying regulatory bodies for more stringent regulations creates a more even playing field for green innovators (Mousavi & Bossink, 2017, p. 8). Comparing the importance of some of the just mentioned stakeholders, Mousavi et al (2018, p. 233) conclude that when innovating towards sustainability, collaborations with suppliers are more important than collaboration with customers and clients. Regarding the significance of knowledge partners the authors propose that universities have a smaller impact – but higher performance - than governmental and private research institutes or consultants. In general, the results show that market partners are more important than knowledge partners in the realization process.

Engaging in market introduction activities

Lastly, considering the buying preferences of future target groups through market probing and integrating market feedback leads companies to avoid ambiguity and uncertainty for market acceptance for environmental innovations (Mousavi et al., 2019, pp. 373, 380). To further decrease ambiguity and to build a strong business case companies engage in piloting and therefore experimentation in the actual business setting with actual end-customers (Mousavi et al., 2019, p. 375; Sandberg & Hultberg, 2021, p. 5). Initial market introduction activities are also important for attracting more partners and customers since some environmental innovation may be rather expensive or in general not that attractive in the beginning. By demonstrating a new solution early on, achieving awareness for it and proving its technology, external stakeholders can be locked-in, therefore helping to make the product more scalable and affordable in the future (Mousavi & Bossink, 2017, p. 7). After these novel sustainability solutions have been developed, applied and proven successful in the (collaborating) environment, it is equally important to subsequently bring the knowledge back to the firm itself and disseminate it across organizational business units (Wu et al., 2013, p. 262).

2.2.3 Reconfiguring

When opportunities are sensed and seized in a successful manner, enterprise growth and increased profitability can be expected. These outcomes may lead to a change in the company's resource base and may cause path-dependencies and therefore the retention of current capabilities. To overcome such a 'capabilities trap', experience sustained profitable growth, create a better fit to the changing environment and to enable the companies to continuously sense and seize opportunities, the alignment and realignment of resources is key (Teece, 2007, p. 1335). The dynamic capabilities literature for environmental innovation identifies six main microfoundations of this reconfiguration capability. Said crucial microfoundations include the (1) organizational restructuring and technological upgradation, (2) the adjustment and incorporation of new work methods and business practices, (3) new methods of organizing external stakeholders, (4) the orchestration of the business ecosystem, (5) learning systems and knowledge integration as well as (6) the companies' leadership and change management capabilities.

Organizational restructuring and technological upgradation

When looking into the organizational performance in dynamic environments it is argued that companies must overcome the tension between flexibility and efficiency. Businesses have to react rapidly to unforeseen changes while simultaneously being efficient (Eisenhardt, Furr, & Bingham, 2010, p. 1264). However, businesses must be aware that especially traditional hierarchies that place decision-making at the upper level can lead to inefficiencies (Teece, 2007, p. 1335). Fittingly, Santa-Maria and his research partners (2021, p. 12) identify organizational flexibility as a microfoundation of the reconfiguration capability. Companies in this context have been observed to adjust their internal structure and technological asset base with respect to their green projects. More specifically, Khan et al (2020, p. 1487) observed restructuring in terms of the addition and acquisition but also abandonment and selling of specialized units, facilities and or subsidiary firms. Rationales behind these decisions are multifaceted. For one, the sale of organizational parts unrelated to green projects may provide capital, which in turn could be invested in just these green projects. For another, by adding organizational parts related to the green goals, synergies with the already established facilities can be exploited.

Adjusting and incorporating work methods and business practices

Besides adapting their structures and technological infrastructure, companies have been seen to adjust and/or add internal procedures and work methods in order to benefit from the potential of sustainability. Both Wu et al (2013, p. 263) and Khan et al (2020, p. 1489) observed the integration of best practices, such as environmental management systems and the introduction of new work methods. Reorganizing work responsibilities and decision making by establishing cross-functional teams may be one example of internal adjustments that provide support of environmental innovation in this regard (Mousavi & Bossink, 2017, p. 9).

What is more, Mousavi and Bossink (2017, p. 10) find that for companies to successfully innovate towards environmental sustainability they need to reconsider their current business practices and be open towards new routines and practices – such as open innovation. As already outlined external stakeholders play a crucial role in the sensing, as well as the seizing process of companies. Resultingly, open innovation strategies and therefore the inclusion of customers, suppliers and research institutes can be a new form of a new business practices (Mousavi & Bossink, 2017, p. 10; Mousavi et al., 2019, p. 381). Collaboration and partnerships may also have a positive impact on companies by increasing their reach via new markets or providing them with increased legitimacy (Mousavi et al., 2019, p. 381).

New methods of organizing external stakeholders

Building up on the just mentioned aspect of establishing new business practices is the creation of new methods of organizing the stakeholders within the external environment. Company spanning networks are specifically important regarding sustainability challenges since one company alone has only a limited ability to tackle them. New collaborative ties in this regard might be built with governments or non-governmental organizations (Mousavi & Bossink, 2017, p. 10).

Orchestrating the business ecosystem

Orchestrating the business ecosystem and therefore the exploration and coordination of the entire value chain has been identified as a crucial microfoundation for the companies' reconfiguration capabilities. A case company in Mousavi and Bossink's (2017, p. 10) study stresses this by explaining that green solutions are not just one project but a combination and collaboration of several intertwined projects that need to be coordinated. Ecosystem orchestrating in this context involves the selecting, partnering, and building of relationships with external stakeholders. Consequently, it is the responsibility of the management to not only

be concerned with the direct management of the environmental innovation project, but also the establishment, promotion and management of the cross-organizational stakeholder infrastructures associated with the innovation project (Mousavi et al., 2019, p. 381).

Learning systems and knowledge integration

When adjusting an organization's structure and ecosystem, managers must bear in mind that in order to successfully reconfigure and adapt the company's resource base to the newfound opportunities it is also indispensable to establish a sophisticated learning system that enables the exchange and integration of knowledge and information within the company (Teece, 2007, p. 1339). This makes it necessary for organizational designers to create structures that let the individuals engage with their relevant environments to learn, share, and aggregate knowledge in order to make well-informed decisions (Felin & Powell, 2016, p. 81). New learnings and information concerning the market must be centrally collected, analyzed, and shared as new knowledge. While interpersonal interaction may be enough in smaller companies, this is increasingly difficult as the organization grows (Sandberg & Hultberg, 2021, p. 5). Closely connected to learning activities are training activities not only for employees but also for supply chain partners (Wu et al., 2013, p. 263).

Leadership and change management capabilities

Lastly, companies must always be aware that the changes to a company's internal and external asset base might not be received positively, and that resistance arises. In order to overcome these barriers and to successfully adapt the resource base, manager's cognitive capability for language and communication, as well as social cognitive capabilities are important in such a transformation process (Helfat & Peteraf, 2015, p. 842). In this regard Santa-Maria et al (2021, p. 13) refer in their paper to the importance of leadership and change management capabilities. Their findings display the need of commitment and support of the top management during the innovation process, as well as being proficient in change management. Linked to the change management proficiency of a company is the microfoundation of integration of environmental innovation into general growth strategies identified by Sandberg and Hultberg (2021, pp. 6–7), which should enable permanent change.

2.3 Preliminary Conclusion

Due to the increasing awareness towards environmental sustainability environmental innovation has gained prominence as way of addressing this topic. By introducing new or modified solutions companies can, on the one hand, reduce or even avoid their harmful environmental impacts (Kemp & Arundel, 1998, p. 1) and, on the other hand, depending on the underlying objective, counteract pressures and comply with regulations or even make economic profits (Y.-S. Chen et al., 2006, pp. 337–338).

Bringing novel or enhanced products, processes and business models to the market however does not only provide companies with opportunities but also bears challenges, risks, and complexity along the way. Companies for example need to engage in activities beyond their current knowledge base (Hall & Vredenburg, 2003, p. 63) and incorporate a (broader) stakeholder group to which attentions might not have been given before (de Marchi & Grandinetti, 2013, p. 569; Gable & Shireman, 2004, pp. 7–8). Traditional strategic measures have been considered insufficient in this regard (D'Aveni & Gunther, 2007, p. 85).

As a result, empirical research has begun deploying the concept of dynamic capabilities which provides an insight how companies can obtain a sustained competitive advantage in complex and changing environments. In this theoretical framework, companies' environmental innovation activities are brought into connection with their "ability to integrate, build and reconfigure internal and external competences" (Teece et al., 1997, p. 516). Especially the analysis of the microfoundations undergirding these capabilities enrich the knowledge on company processes and resources that contribute to firms identifying (sensing), realizing (seizing) green opportunities and reconfiguring their tangible and intangible asset base around them.

With regard to sensing green opportunities, standing empirical research highlights the importance of multiple knowledge sources. A proactive approach towards sustainability (Mousavi et al., 2019, p. 377) can be a factor for companies looking to identify new opportunities, as can assessing the company's environmental impact (Khan et al., 2020, p. 1486) or leveraging within company resources (Cainelli et al., 2015, p. 218; Mousavi et al., 2019, p. 373). These internal sources are most often supplemented and amplified by practices targeting the external environment to anticipate changes in the market. Conducting market research (Mousavi et al., 2019, p. 377) and going into exchange with suppliers, partners, but also competitors and institutional actors is seen as purposeful in this regard (da Giau et al., 2020, p. 1513).

Strategic planning (Mousavi & Bossink, 2017, p. 6; Wu et al., 2013, p. 262) and changes to the company's governance structure (Khan et al., 2020, p. 1487) and business models (Mousavi et al., 2019, p. 380) are subsequently seen as contributors to the realization of the opportunities found. Similar to the sensing capability companies are seen to develop and leverage internal resources and exploit and manage the knowledge provided by the external environment (Mousavi et al., 2018, p. 233). Market introduction activities are then a mean to scope the market and pre-test the developed products and processes (Mousavi & Bossink, 2017, p. 7).

In order for a company to sense and seize it is argued that companies must reconfigure their businesses. In context of environmental innovation, it is seen that companies adapt their organizational structures and resources (Khan et al., 2020, p. 1487) adjust their work methods, and engage with new stakeholders (Mousavi & Bossink, 2017, pp. 9–10). Establishing internal learning systems (Sandberg & Hultberg, 2021, p. 5) and demonstrating leadership and change management capabilities (Santa-Maria et al., 2021, p. 13) support the environmental innovation process even further.

All of the above aspects of dynamic capabilities are related to green innovation efforts by companies that are not inherently familiar with such ventures. The goal of the following sections is to look at companies that are very familiar with environmental sustainability, namely born green companies in the context of the beauty and personal care industry. By taking the continuously changing and increasingly demanding environmental trends of this market into account it becomes apparent that even companies found on environmentally sustainable principles are departing their existing knowledge base to address these trends. Creating a beauty or personal care product without synthetical ingredients might not pose as much of challenge for companies not having experience in this field. However, it is assumed that born green companies need to resort to dynamic capabilities in order for them to successfully address the constantly evolving trends within their niche – that is upgrade of ingredients to organic standards or circularity of their products, among other (Mayo, 2021).

3 Methodology

To expand and enrich the current literature on dynamic capabilities for environmental innovation and to ultimately answer the research question, the author gathered primary data in form of ten interviews. This chapter frames the concept of primary data collection and analysis by offering a description and justification of the research method used and providing insight into how it was implemented.

3.1 Description and Justification of the Research Method

Section 3.1 provides a more detailed insight into the research method of this thesis using corresponding literature. The following sub-chapters outline the chosen methodology and research design and the reason why they are considered appropriate for this study. Lastly, the data collection and analysis methods are explained and justified.

3.1.1 Methodology and research design

To answer the research question and therefore become familiar with the underlying phenomenon a researcher can decide between a quantitative, qualitative or a mixed methods research approach. The former, on the one hand, puts a focus on theory testing by looking into the relationship of measurable variables. Qualitative research, on the other hand, focuses on exploring and gaining a deeper understanding of the research problem. By that, this approach to research is very much driven by inductive data analysis. Lastly, the mixed methods approach, as the name implies combines aspects of the former two approaches (Creswell & Creswell, 2018, p. 41).

Since dynamic capabilities are assumed to reside within the companies' processes (Teece et al., 1997, p. 518) and are oftentimes not even visible to the firms themselves, they are difficult to measure, making quantitative research unsuitable for this thesis. Qualitative research, on the other hand, is seen as particularly purposeful when a concept or phenomenon has been relatively unexplored (Creswell & Creswell, 2018, p. 57). This is consistent with the goal of this thesis to gain a deeper insight into the dynamic capabilities for environmental innovation in the context of born green companies in the beauty and personal care industry – an unexplored phenomenon until now.

Within the qualitative research approach, this thesis relies on the abductive logic manifested by systematic combining by which the author is led 'back and forth' between practice and theory which allows her to expand the understanding of the problem (Dubois & Gadde, 2002, p. 555). Dubois and Gadde (2002, p. 559) stress that this process aims at developing rather than generating a theory, meaning that it is built on refining theory rather than establishing new ones. This interplay of inductive and deductive research enables the author to build on the standing theoretical and empirical research and expand it with her own empirical findings, which is why this logic is deemed appropriate for answering the research question of the thesis at hand.

3.1.2 Data collection method

Literature (Creswell & Creswell, 2018, p. 264) presents several means by which data for qualitative research can be collected, interviews, observations, documents, or audiovisual digital materials being some examples. For this thesis, the author considers the problem-centered interview by Witzel (2000) appropriate as it is very much in line with the characteristics of the abductive logic described above. Similar to the abductive logic, the problem-centered interview is considered to be an interplay between induction and deduction during the interview and evaluation process. This interview type is outlined by three basic principles. First, the problem-centered orientation draws attention to the objective analysis of the problem statement which enables the researcher to formulate appropriate questions before the interview. Second, the object-orientation gives the researcher the scope to adapt the method according to the research object. Lastly, the process-orientation emphasizes the openness towards new insights which are included in the problem analysis and resultingly broaden the problem field. An interview guide, which outlines the topics serves as a tool to ensure that all aspects of the problem are addressed. The interview itself is guided by the predefined lead questions on the different topics of the problem that - due to their open character - enable the interviewee to tell his or her story. Ad-hoc questions make the interviews comparable by giving the researcher the freedom to ask for specific aspects that were not mentioned before, that are however relevant to the research. To limit conceptual ambiguities, Witzel (2000) acknowledges the need to include comprehension generating questions during the interview process.
The problem-centered interview is seen as the most suitable data collection method as it is closely linked to the chosen research approach. Especially the semi-structured characteristics of is this interview type are then seen as an aspect that makes it more likely substantiate and extend the findings of prior research and put them into context with the setting of this thesis.

3.1.3 Method of data analysis

The thesis at hand ultimately made use of the Gioia method (2012) for the data analysis, which - similar to the data collection method – can be very much connected to the abductive logic and by that aims to bring "qualitative rigor to the conduct and presentation" to this research approach (Gioia et al., 2012, p. 15). It does so by structuring the analytical process around several steps that lead to the establishment of 1st order concepts, 2nd order themes which ultimately lead to the emergence of aggregate dimensions (Gioia et al., 2012, p. 20):

In the first step the researcher goes through interview transcripts and starts to code the raw data. In this context, the importance given to the informants is significant to the understanding of the Gioia method. He views the informants as 'knowledgeable agents' that are very much capable of communicating and making sense of their environment. This positions them as crucial enablers for knowledge discovery (Gioia et al., 2012, pp. 17–20). Given the relevance of the interviewees, it is important in the first phases to stick to the interview partner's wording and make little to no attempt to establish wide-ranging categories. However, to establish a more manageable amount of data, codes displaying strong similarities in their content and wording are grouped into 1st order concepts that are assigned with a descriptor that again puts the informants' terms in the center. While the first stage puts the informant in the center, it is the task of the researcher in the subsequent stage to make sense of the data and look for a deeper structure within these 1st order concepts. This process is now incorporating the theoretical lens by referring to standing literature, on the one hand, while simultaneously identifying aspects not already captured by preceding research, on the other hand. This process results in the establishment of 2nd order themes. Lastly, the identified 2nd order themes are then distilled into aggregate dimensions (Gioia et al., 2012, p. 20)

Significant for the decision to adopt the Gioia method the is the role a knowledgeable actor that is not only asserted to the interview partner but also to the researcher. This implies that the researcher is able to identify patterns and structures in the data and connect them meaningfully to existing theory (Gioia et al., 2012, p. 17). This assumption gives the researcher a great responsibility but also freedom during the different phases, which further facilitates the discovery of new knowledge and thus makes it the appropriate method of analysis for this work.

3.2 Implementation of the Empirical Research

This chapter gives insight into how the empirical research was conducted in practice and highlights possible deviations from the (theoretical) method described in the sub-chapter 3.1. More specifically the following sections are concerned with the introduction of the research object and the presentation of the underlying selection criteria, as well as the implementation of the data collection and data analysis.

3.2.1 Research object

When deciding on research objects, literature distinguishes between probability and non-probability sampling which differ in the underlying chances cases are selected and whether statistically derived statements can be made about the target population of the sample. While in the first method the samples are selected randomly, the second method is the result of a subjective judgment (Saunders, Lewis, & Thornhill, 2019, pp. 296, 297, 315). Since the author's intention is to derive at least partially generalizable conclusions about the dynamic capabilities of born green beauty and personal care companies, the researcher sought a research object group that would reveal similarities and thus make this possible. The author considered homogeneous sampling - a form of purposive sampling - for which a number of criteria are established, to be the most purposeful (Saunders et al., 2019, p. 318). In the context of this research's setting the following selection criteria were set:

First, due to the industry, this thesis is concerned with, all companies used for this study needed to operate within the beauty and personal care industry. Resultingly, all of the companies' product portfolios comprise at least hair care products, shower and bath products, oral care products, deodorants, shaving products or fragrances.

Second, as the master thesis title suggests all research companies are considered born green companies, meaning they were established on the basis of an environmentally sustainable mindset. In conjunction with this criterion, the researcher considered it important to focus on established companies in the beauty and personal care industry that were found before 2012. This criterion was considered purposeful as it assumed that dynamic capability enabled these companies to adapt to the changing and increasingly demanding sustainability trends within the beauty and personal care industry and to stay successful over the years.

Third, to ensure that this thesis would not be constrained by marketing misleadings or green washing attempts, only companies whose products have been certified were considered. To further strengthen this sustainability criterion the author only included companies whose products comply with the BDIH (Bundesverband deutscher Industrie- und Handelsunternehmen), the NATRUE, Ecocert or COSMOS (common natural cosmetics standard for Europe, developed in cooperation by BDIH, Ecocert, Cosmebio, ICEA and the Soil Association) requirements and therefore with the standards of the most important natural cosmetic certifications in Europe (Schreier, 2018). Due to this specification, companies – some considered pioneers and industry champions – had to be disregarded as they were certified by organizations that accepted ingredients not allowed by the above-mentioned certification offices. During the search process, rankings and expert opinions were drawn upon, ultimately leading to the selection of the companies shown in Table 1:

	Interview Partner	Size	Certification	Product Portfolio
A	Product development CSR manager	Large company	COSMOS Ecocert EU-Ecolabel	Face care, body care, hair care, food supplements
B	Department head product conception	Large company	NATRUE	Face care, body care, cosmetics, medicinal products
C	Product manager Product development	SME	BDIH COSMOS	Face care, body care, men care, deodorants, sun care, shaving care, soap, detergents
D	Product development Product manager	SME	NATURE	Face care, body care, men care, juices
E	Managing Director	SME	NATRUE	Face care
F	Founder	SME	Ecocert	Hair care

Table 1. Overview of the research objects

3.2.2 Implementation of the data collection

The companies ultimately considered to be appropriate research objects were first contacted via E-Mail between 8th of February and 6th of April. In the initial e-mail the author introduced herself and the research and gave an outline of the topics discussed in the interview. After agreeing to an interview, the respondents were asked for their consent with regard to the recording and subsequent transcription of the exchange.

Ultimately the author conducted 10 interviews via Zoom spread over six companies, displayed in Table 2. On average, the interview lasted 39 minutes. The interviews were held both in German and English. After conducting the first interviews in English the author acknowledged that German was more suitable as it is the mother tongue of the author and most interview partners, which created a more natural environment enabling a smoother information flow. The interview with the founder of company F was again held in English, as the interview partner does not speak German.

IP	Company	Position	Interview Length
1	A	Product developer	65 minutes
2	A	CSR manager	34 minutes
3	B	Head of product conception	39 minutes
4	C	Product managers	33 minutes
5	D	Product developer and quality manager	42 minutes
6	D	Product management	28 minutes
7	F	Distributor	26 minutes
8	E	Managing director / Founder	39 minutes
9	F	Managing director / Founder	45 minutes
10	C	Product developer	32 minutes

Table 2. Overview interview partners and data material

The interviews were transcribed afterwards to integrate the information into the paper as accurately and comprehensively as possible. The transcripts of the interview were created with Amberscript, an online software, and subsequently proof-read by the author. Only misunderstood terms were corrected, and dialects were phrased more formally. (Incorrect) sentence structures were kept, however, and only adapted when the interview partner was directly quoted in the findings section. This was considered necessary to enhance comprehensibility and the reading flow. What is more, to adhere to the promised anonymity, the author made adaptions to the transcripts if the company representative mentioned specific names and / or the company's name.

3.2.3 Presentation of the interview guideline and implementation

In his descriptions of the problem-centered interview Witzel (2000) suggests that it is necessary to thoroughly study the aspects that are the subject of the conversation prior to it. Accordingly, the author analyzed the companies in detail ahead of the interviews. Resulting of the research topic, special focus was put on environmental innovation within the portfolio and therefore on products that seemed to be novel or experienced substantial improvements and that had been introduced to the market (OECD et al., 2005, pp. 46–47). These products served as an anchor and guide throughout the interview.

The interview itself was structured around three phases (1) the introduction and warm-up phase, (2) the research problem related phase framed by the interview guideline and (3) the closing phase. In the first few minutes the setting, the recording and the process of the interview was agreed upon. The author again introduced herself in more detail and gave insight into the research topic and her motivation behind the study. For the second phase the author made use of the prepared interview guideline as suggested by Witzel (2000) which comprises lead questions that introduce the specific interview sections, and topic bullet points (with question ideas) that serve as an orientation framework. In its structure the interview guideline closely adhered to Teece's (2007) conceptualization of dynamic capabilities, manifested by each lead question concerning one of the capabilities, proposed by the author. In establishing the interview guideline, the author also oriented herself on other researchers and their approach to this topic in their interviews (Mousavi et al., 2019, pp. 386–387).

The sensing capability was addressed by the authors asking the respective interview partners how and at which level their projects were initiated and asked them to provide an overview of the early project discovery stages. Follow-up questions were concerned with the influence of the internal and external environment and overall mechanisms to identify possible innovation opportunities. The author then asked the interview partners to provide information about the procedures after the project was initiated and how the realization process was organized / formalized. In this section the author again established topics – concerning the organizational processes, the influence of the various environments, among others – that served as an orientation. Lastly, the author addressed the reconfiguring capability by asking the company if organization structure, routines and practices that had been introduced or abandoned during the innovation process. Guiding topics during this section were the companies' supply chain and business models and their stakeholder networks.

As outlined above, Witzel (2000) raises attention to comprehension-generation strategies which the author of this thesis made use of by asking for clarification if needed and posing follow-up question in case of new and interesting insights. Due to the rather open approach of the problem centered interview the author allowed and welcomed answers that were not particular to one product. This made it possible for the author to gain broader insight into the companies and their practices as a whole. The interviews were most often concluded by asking the interview partner for other topic related insights that had not been discussed before or other ending remarks on their company and their approach towards environmental innovation.

3.2.4 Implementation of the data analysis

As described above, the author adhered to the Gioia method (Gioia et al., 2012) when analyzing the collected data. MAXQDA data analysis system was used as a support tool during this process.

Staying faithful to the chosen method, in the initial stage every interview was read by the author and interesting and insightful words, sentences and paragraphs were marked and labeled with codes reproducing the respondents' wording. As sometimes whole paragraphs were coded, the author had to resort to labels deviating from the informants' wording in order to concisely summarize what was said. During this process the author made use of the memo feature of MAXQDA, writing thoughts and notes which were thought to be helpful in the subsequent stages. For enabling and simplifying the recognition of company spanning codes, each company was assigned a specific color in data analysis system. As the analysis progressed the author searched for nearly identical statements within those codes, leading to the reduction of codes and the emergence of the so-called 1st order categories which were labeled retaining the respondents wording as far as possible. To increase the validity of the results the author only included 1st order categories that were present in two of the six companies. Resultingly, practices present in only one company were disregarded.

In the second stage the author sought for similarities and differences within these 1st order categories. Based on the found relationships the author built 2nd order themes, corresponding to the microfoundations of dynamic capabilities. As suggested by Gioia and his colleagues (2012, p. 20) this stage incorporated the standing literature of dynamic capabilities. Consequently, the formation of 2nd order themes was guided to some extent by previously found microfoundations. Thus, the author paid attention to the inside and outside perspectives of the categories and remained faithful to pre-existing microfoundations when the data of this thesis and previous

empirical research coincided. However due to the inherent characteristically differences in the research objects of this thesis in comparison to previous research, differences in the microfoundations were expected and found. As Gioia et al (2012, p. 17) assign the role of a knowledgeable actor to the researchers, the author of this thesis was able to establish microfoundations not identified before.

Lastly, these 2nd-order themes were distilled into aggregate dimensions. These dimensions in their entirety follow Teece's (2007) categorization of dynamic capabilities in sensing, seizing and reconfiguring. The allocation to of the microfoundations to the aggregate dimensions was thus driven by the description of the sensing, seizing and reconfiguring capability by literature.

4 Findings

This chapter presents the findings of the ten interviews conducted with the six born green beauty and personal care companies. The findings are displayed according to Teece's (2007) framework and therefore categorized into sensing, seizing, and reconfiguring. The data analysis enabled the author to identify 25 1st order concepts that are specific practices that underpin the dynamic capabilities of the firms under consideration. These specific practices were subsequently grouped into 11 microfoundations that were then - according to their characteristics - assigned to the three main dynamic capabilities, which are sensing, seizing, and reconfiguring. The discovered microfoundations and the practices are described in detail in the sections 4.1 to 4.3 and visualized in Figure 2.

4.1 Sensing

The author identified 10 1st order concepts – aggregated into three microfoundations – that support the sensing of novel green products or improvement opportunities for products already existing in the companies' portfolios. 2nd order themes were considered microfoundations of the sensing capability if it became apparent that they enable the company to identify opportunities by analyzing and making sense of its business environment (Teece, 2007, p. 1322). The microfoundations found within this thesis can be seen as having an internal perspective - that is the companies' (1) continuously aspiring for increasing sustainability and quality and (2) leveraging internal idea generation mechanisms – on the one hand, and an outside orientation, exemplified by the (3) companies exchanging with and integrating the external environment, on the other hand.

4.1.1 Internal sustainability and quality aspirations

As all six companies under consideration were established on a sustainable mindset thus considered to be born greens, internal sustainability and quality aspirations play a crucial role in the companies' ability to sense new green product opportunities. By the means of their own motivation to keep up with green market standards the born green companies are capable of identifying and creating new green business opportunities for themselves.

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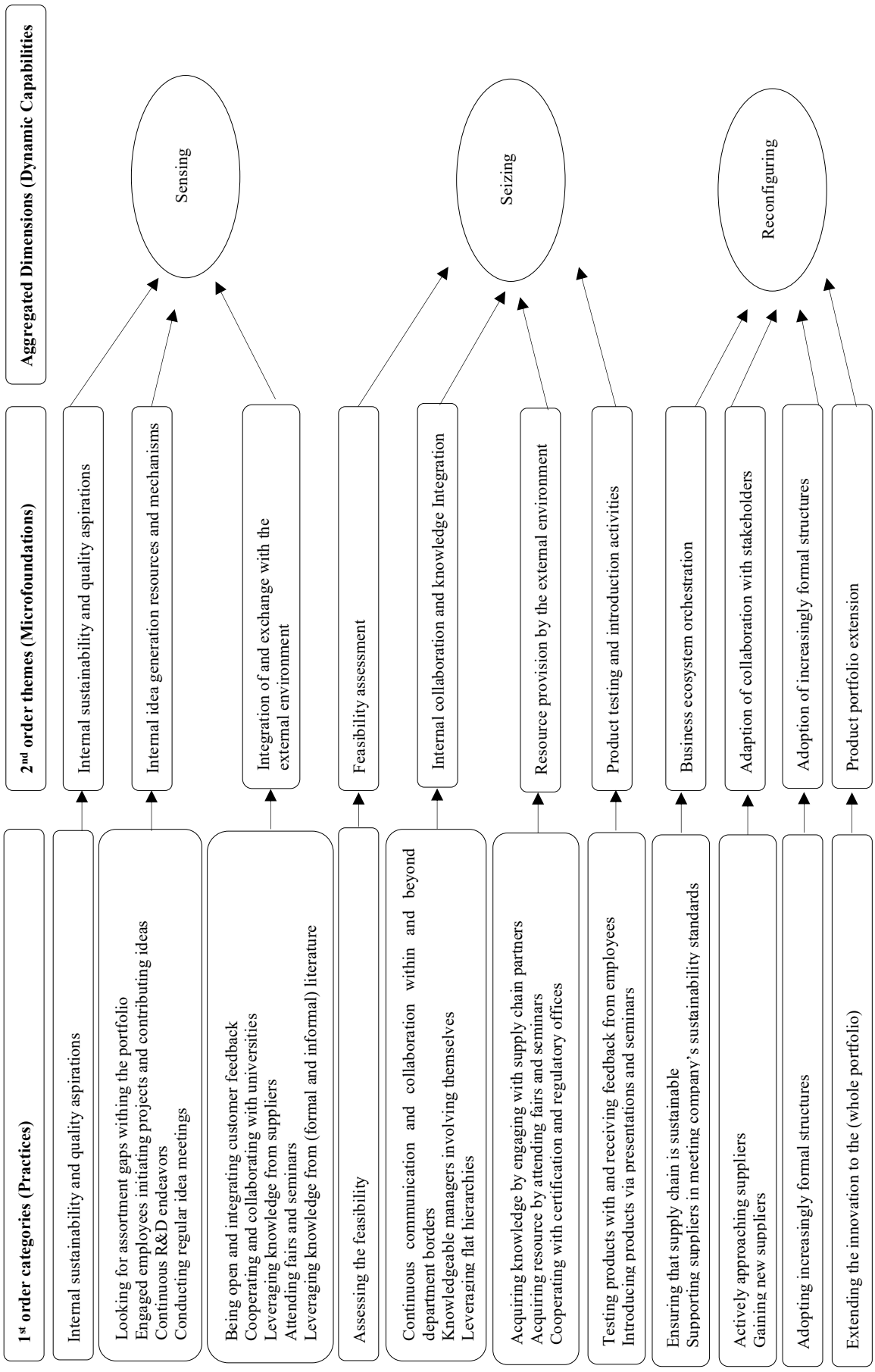

Figure 2. Structure of the findings

Especially the adherence to the corporate sustainability agenda and thus addressing environmental concerns such as water conservation (IP9, 2022, p. 83, l. 49-50) can be seen as a decisive aspect and guiding factor in new product developments and advancements (IP1, 2022, p. 7; l. 304-308; IP4, 2022, p. 34, l. 56-60; IP8, 2022, p. 74, l. 214-216). A very strong example of this mindset can be observed in Company D, which is even willing to accept possible downsides of more sustainable options in order for the company to stay faithful to its sustainability agenda.

> Sustainability really is important to us. And you can also see in the product development that sustainability also plays a very important role. The [compostable] containers are relatively expensive compared to the normal, common containers that you find on the market. [...] This [compostable] container is significantly more expensive to produce and purchase, but for us, sustainability takes precedence over costs. (IP5, 2022, pp. 43-44, l. 94-102, translation by the author)

This attitude towards new product developments and enhancements is based on the belief and hope that "that the end consumer will eventually recognize sustainability and green products as the new luxury" (IP6, 2022, p. 58, l. 200-201, translation by the author).

A strong manifestation of the adherence to the corporate sustainability agenda is seen in the firm's continuous improvement cycles to keep up with sustainability standards - Company A (IP1, 2022, p. 2, l. 68-72) even redeveloping their products every two to three years in order for them to stay at the current most scientific level and therefore at the forefront of the natural cosmetics market. Similar to Company A, Company B (IP3, 2022, p. 31, l. 294-296, translation by the author) too stresses that there are "constant improvements not only through product introductions or product launches. It is that we have a constant improvement cycle and ask ourselves 'how do we get better?'". This constant improvement cycle – also observed at Company C (IP4, 2022, p. 39, l. 294-297)– results from the dynamism of the environment as new and more sustainable materials and ingredients are continuously introduced to the market (IP1, 2022, p. 6, l. 252-253). However, even though these companies aim at staying at the edge of natural cosmetics market standard and are therefore in some way influenced by market developments, this cannot be transferred to all developments in the external environment. It becomes clear that reacting to changing scientific standards and transformative market developments must not be mistaken for following short term trends. Company A (IP1, 2022, p. 7, l. 272-275) and B (IP3, 2022, p. 26, l. 82-83) stating that they neither can nor want to follow trends originating from TikTok or other new media platforms.

4.1.2 Internal idea generation mechanisms

As just outlined internal aspects are given great importance when looking for new product opportunities. This is substantiated by three internal mechanisms facilitating the identification and generation of new product ideas. That is companies (1) analyzing their portfolio for assortment gaps, (2) employees actively engaging in, even initiating new projects (3), the firms continuously focusing on R&D efforts and (4) conducting regular idea and brainstorming meetings in which first three aspects are addressed.

First, while expressing to not simply follow every short-term trend, market and treatment needs are still observed by the companies. However, these market demands are put into perspective with the current product portfolio (IP5, 2022, p. 42, l. 37-38; IP6, 2022, p. 55, l. 64-65) and the question "Where do we have gaps within our assortment? Where are consumer needs or where are treatment needs?" (IP, 2022, p. 26, l. 56-58, translation by the author). This approach is also expressed in Company F (IP7, 2022, p. 63, l. 53-54), a hair care company that in former times focused solely on hair coloration. However, in conjunction with the desire to reduce water consumption the company introduced a hair soap, which belongs to hair care but was missing in the assortment. Unlike continuously aligning the company with the newest trends it seems that some case companies broaden their portfolio only after analyzing if missing product fit within the current product portfolio.

Second, Elon Musk's statement that "a company is only as good as its employees and their passion for creating" is very much applicable to the case companies as sensing for new green products in these firms can be seen to not only depend on the companies' sustainability culture but on the initiatives of the individual employees working for these companies. The product manager at Company D explains this as follows:

> By having a very sustainable internal philosophy, I actually believe that it is the employees at Company D themselves who are striving for new innovation and sustainability. [...] So it is the employees who come out with the initiative, so to speak. (IP5, 2022, p. 45, l. 155-161, translation by the author)

The need and power of individual sustainability mindset is also expressed at Company A, Company C (IP4, 2022, p. 35, l. 132-140), Company E respectively. In the former it was an employee at the product development department that initiated the reformulation of three existing products including its packaging and for the company to obtain a new, more demanding natural cosmetics certification (IP1, 2022, p. 5, l. 210). What is more, by creating an environment in which employees feel comfortable and motivated to express their thoughts, products might be elevated due to sometimes unconventional ideas, such as the resource saving

triangular packaging at Company E (IP8, 2022, p. 77, l. 346-350). Company A (IP2, 2022, p. 18, l. 112-113) creates such an environment for employee idea initiation with its CSR email address to which employees can direct ideas and wishes regarding the company's products.

Third, besides solely identifying assortment gaps that address market and treatment needs, companies are continuously working on separate R&D endeavors besides specific product development assignments. In such, interesting and company philosophy appropriate ingredients are scoped, tested, and experimented with for them to see what is new and feasible within natural beauty and personal care products (IP3, 2022, p. 27, l. 127-131; IP8, 2022, p. 72, l. 101-105, IP9, 2022, pp. 90-91, l. 404-407; P10: 53-61).

Lastly, it is seen that all companies hold regular (idea) meetings in which product ideas can be expressed by individuals, collective brainstorming activities are undertaken and separate research endeavors by the product development department are be presented. What is evident within the data is that these idea Jour Fixes are not constrained by department affiliation but that the group of people meeting is comprised of people from product management, product development, marketing, sales and even estheticians providing feedback from working with the customers (IP1, 2022, p. 6, l. 260-263; IP3, 2022, p. 27, l. 125-127, 136-140; IP4, 2022, p. 37, l. 207-211; IP5, 2022, p. 42, l. 34-37, 119-125; IP8, 2022, p. 74, l. 228-234). The head of the product conception department at Company B in this context speaks of a

> so-called dialogue culture where a lot of consultancy and a lot of exchange between all the departments is included in order to have transparency. [...] You try to have a good overview of all aspects that a product needs or that actually comes together in the final product. There are different views from all over the place. (IP3, 2022, p. 28, l. 144-148, translation by the author)

4.1.3 Integration of and exchange with the external environment

While internal aspects, such as the firm's sustainability and quality aspirations and idea generation mechanisms represent a big part of the companies' ability to identify and create opportunities, a certain amount of this ability is brought into connection with the companies' external environment. If purposefully integrated external environment too is seen as an information source for future product opportunities. The research objects of this thesis scan, learn or interpret their external environment by (1) being open with regard to stakeholder feedback, (2) by cooperating and collaborating with universities, (3) by leveraging knowledge from suppliers, (4) by attending fairs and seminars and (5) by reading formal and informal literature about developments in the natural and organic beauty and personal care market.

First, as just stated, the case companies demonstrate openness to customer feedback and are willing to integrate such in new product developments or adaptations. Most often feedback is received via new media channels such as Facebook, Instagram, or more traditional channels such as customer complaint management systems, E-Mails, and phone calls (IP1, 2022, p. 11, l. 460-462; IP3, 2022, p. 26, l. 88-89; IP5, 2022, p. 43, l. 38-40, 77-79; IP6, 2022, p. 53, l. 59-63; IP7, 2022, p. 53, l. 57-61; IP8, 2022, p. 73, l. 178-182). Company B (IP3, 2022, p. 26-27, l. 88-91) even works together with its retailer and through them obtains customers feedback and input on which field the company should and could explore in the future. What makes especially direct customer and blogger feedback all the more valuable is that the company obtains the perspective from oftentimes loyal customers who know the company and its products very well and therefore offer the business an informed opinion (IP5, 2022, p. 45, l. 178-183) rather than vague statements with which the company might not be able to work with. If perceived as valid and arising on more than one occasion, customer feedback might lead to the introduction of new products (IP8, 2022, p. 94, l. 187-192) or the reformulation and improvement of already existing products (IP10, 2022, p. 99, l. 347-350).

Second, customer feedback can be enriched and enhanced by information from project-related collaborations with universities (IP3, 2022, p. 31, l. 280-282). Interacting with universities but also going into exchange within sustainability networks enable the company to consult and obtain new perspectives that consequently help the company be up-to date (IP2, 2022, p. 20, l. 211-226).

Third and unsurprisingly, it is not only the customer and more distant stakeholders that provide new insights but direct partners such as the company's suppliers that are approaching and inspiring the companies with new ingredients or packaging material (IP5, 2022, p. 50, l. 405-412; IP10, 2022, p. 94, l. 122-125).

Fourth, closely related to the supplier aspect, born green companies are seen to participate in seminars (IP6, 2022, p. 59, l. 272-276) and fairs. If suppliers did not actively approach the companies beforehand, fairs are an opportunity to discover the suppliers' new products (IP10, 2022, p. 95, l. 140-144). Adding to that, seminars and fairs enable an overarching discourse with the stakeholders mentioned before, that is suppliers, other companies and again customers who might leave feedback at the fair booth (IP7, 2022, p. 66, l. 181-183; IP10, 2022, p. 98, l. 293-303).

Lastly, employees of Company B (IP3, 2022, p. 27, l. 92-95), C (IP4, 2022, p. 37, l. 200-204) and D (IP5, 2022, p. 45, l. 168-172; IP10, 2022, p. 98, l. 284-289) express that they continuously inform themselves about market developments by the means of formal and informal literature,

that is industry magazines, target group reports and supplier newsletters – from which interesting information is sometimes marked and put on a to-do list.

Regarding all preceding aspects just mentioned, Company C (IP3, p. 27, l. 92-93) however expresses that, even though they make use of information provided by the external environment, they do not themselves order overall market research studies– even though this company would have the resources to do so. Similarly, Company A (IP1, 2022, p. 7 l. 270-271), which is in exchange with universities and therefore also leveraging external knowledge, states that in general formal external (market scanning) factors do not play that big of a role to the company. At Company C the market is scanned in a more informal but continuous manner:

> And then actually also by going through the drugstore. Of course, you look at what the others are doing, what is on the market. I always like to see what is new on the conventional market, because they are always one step ahead, because they have a much larger selection of ingredients. [...] What is new and how could I maybe create that with my natural cosmetics ingredients? (IP10, 2022, p. 98, l. 310-317, translation by the author).

4.2 Seizing

With regards to the capability of seizing the author identified nine 1st order concepts, which stand for nine specific practices that enable the case companies to realize their previously sensed opportunities. These practices are aggregated into four microfoundations underpinning the seizing capability. 2nd order themes were identified as microfoundatios of the seizing dimension if they contribute to the firm's ability to capture the identified product opportunities(Teece, 2007, p. 1326). Similar to sensing, inward oriented microfoundations – such as (1) feasibility assessments (2) and the leveraging of the internal collaboration and discussion culture– play an important role during this process. These internally embedded microfoundations are supplemented by (3) the utilization of the expertise of the external environment and therefore an outside stemming microfoundation. Lastly, (4) company spanning product testing and introduction activities enable the subsequent market success of the new or modified products and by that close the seizing process.

4.2.1 Assessing the feasibility

After identifying a potential product, the idea and concept of course must be properly evaluated before the product is realized on a large scale. If the idea is put in sequence, it be seen as the first step of mobilizing company resources to realize the opportunity. While this process already

finds it roots in the sensing stage – Company E (IP8, 2022, p. 75, l. 239-245) talking about a ranking list in which ideas and projects are prioritized – the later stages focus on the product itself, looking into the (technical) realization ability as well as a cost-benefit analysis (IP2, 2022, p. 18, l. 130-132; IP3, 2022, p. 26, l. 70-71; IP6, 2022, p. 55, l. 81-82; P7, 2022, p. 63, l. 61-63; IP8, 2022, p. 77, l. 337-339). At Company B (IP3, 2022, p. 28, l. 157-161) this is a very structured process for which the responsible people create a theoretical presentation about the product including the ingredients used, the composition, the packaging, the positioning, as well as a pricing idea. After approval and the allocation of a budget the concrete development can be started, and first product tests are conducted.

4.2.2 Internal collaboration and knowledge integration

Internal communication and collaboration are seen as a key aspect during the project realization that help the company capture the value a product idea. This is shown by the born green companies (1) who are continuously going into exchange within and beyond department borders and the (2) interested, and knowledgeable managers of those firms involving themselves in the innovation process. Lastly, the case firms are seen to (3) leverage their flat hierarchies.

First, while at Company A (IP1, 2022, p. 9, l. 394-399) employees within the same department are most often responsible for their own specific projects and tasks, a constant exchange takes place in order for them being able to work on other projects in case a colleague is not present The same applies to the communication across the department during the realization process, even though this can be considered more structured and formally organized. At regular meetings – similar to the above-described idea meetings – employees from different departments outline the progress made within each department and provide an overall status update on the product. Progress might be displayed by R&D via first product samples (IP8, 2022, p. 79, l. 450-454, IP10, 2022, p. 97, l. 235-243). It is however not solely the regular communication via Jour Fixes but the active collaboration during the several realization stages. Company D (IP5, 2022, p. 47, l. 244-251) describes this as a fluid process as department tasks are very much dependent on information and support provided by the other departments, such as the product development providing a detailed description of the hero ingredient which the marketing department should focus on (IP1, 2022, p. 8, l. 342-345).

Second, what is important in context of communication and collaboration at the case companies is the active participation – not to be mistaken with micromanagement – of the management.

As in Company A, C (IP4, 2022, p. 40, l. 347-350), E (IP6, 2022, p. 55, l. 71-73) and F (IP7, 2022, p. 67, l. 230-231; IP9, 2022, p. 86, l. 211-212) the manager(s) are either the founders or the next generation of the founders, they are very much involved parties that can provide valuable input. The R&D employee at Company A describes this as follows:

> Maybe what separates us or what is really unique at Company A is that our founders, they were both formulating the cosmetic products in the beginning by themselves. So, they really know what you are talking about and they are very easily to get a hold of what you were saying. This makes a lot of processes easy because they know the whole process. (IP1, 2022, p. 8, l. 320-325, translation by the author)

As implied above, the author did not get the feeling that direct and constant involvement is in any connection with micromanaging but rather interest and excitement for the products. This interpretation was supported by the owner of company F (IP9, 2022, p. 86, l. 200-208) who, while solely focusing on R&D, is a great supporter of delegation, as well as training and sharing knowledge with his employees in order for the company to grow and to remain successful. This is in line with the corporate social responsibility manager at company A (IP2, 2022, p. 19, l. 138-142). He suggests that even though there are overall sustainability targets and innovation goals in place - such as no conventional plastic or recyclable plastic - within the company, he sees it to be within the scope of the employees (how) to reach this goal.

One mechanism that supports the constant communication and collaboration within and across departments as well as often informal exchange with the managers are the flat hierarchies observed at Company A (IP1, 2022, p. 6, l. 260), C (IP4, 2022, p. 34, l. 62-65), E (IP8, 2022, p. 80, l. 466-468). The product manager at Company C (IP4, 2022, p. 34, l. 64-65) believes that such a structure enables the company to be flexible and fast in their processes as they are more likely to find each other faster.

4.2.3 Resource provision by the external environment

As it is the case with the sensing capability, not all answers and resources can be found within the company but in the environment external to it. This makes it necessary for the company to also mobilize its external environment to realize the projects. Within this thesis this effort is displayed by the born green companies receiving (1) information and knowledge from external stakeholders during the realization process and (2) developing new resources and capabilities by attending seminars and fairs. Adding to that, the companies (3) stay in close exchange with their certification offices and deal with the demands made by regulatory bodies with regard to beauty and personal care products.

First, even though the case companies are themselves very much established within the natural beauty and personal care industry, suppliers and other partners are still experts in their field and are able to provide missing and necessary information for a company during the project realization phase (IP1, 2022, p. 10, l. 422-425, IP4, 2022, p. 36, l. 166-168). Resultingly, collaborating with them is essential. When company D (IP8, 2022, p. 73, l. 154-163) decided to redesign their packaging in a more sustainable manner, company employees visited a recycling firm to get an insight how the process exactly works and which criteria their new packaging should meet in an ideal scenario. Based on the external firm's input the company decided on its packaging material.

Second, while fairs and seminars may act as an inspiration during the sensing process, they also become a mean by which companies develop resources and competences. Company E (IP8, 2022, p. 78, l. 416-417) and Company F (IP7, 2022, p. 66, l. 177-178) for example found their suppliers and distributors at a natural cosmetics fair. Adding to that, workshops enable companies to acquire intangible resources by connecting and exchanging ideas with participants (IP4, 2022, p. 40, l. 324-328; IP8, 2022, p.72, l. 126-130).

Third, the more formal exchange with the certification bodies seems to be especially important as they oftentimes guide and support companies in their efforts to receive the certification in question (IP9, 2022, p. 82, l. 39-40). This became evident in Company A (IP1, 2022, p.5, l. 182-183, 420-423) which made it their aim to receive a new and more demanding certification which before was mostly given to detergent products. As this company was only the first high end cosmetics manufacturer to ultimately receive this certification, a lot of information was not given in the realization process. This made it necessary for the company to establish a process with the certification office to identify what information must be available to obtain the certification. While the certification bodies support and guide companies in specific endeavors, they also offer seminars and workshops making them an input factor in other sensing and seizing activities. Lastly, spanning over the whole innovation process is the constant incorporation of regulatory demands, that is in Europe the EU cosmetics regulation (IP5, 2022, p. 42, l. 24-26).

4.2.4 Internal product testing and market introduction

After mandatory product (stability) tests are successfully completed, the question arises (1) how it is evaluated if these products will also be accepted by the customers and become a success on the market and (2) how they are properly placed on the market to ensure the first point.

First, almost all companies distribute initial product samples to employees, friends and family and obtain feedback from them by the means short surveys for example (IP1, 2022, p. 8-9, l. 357-359; IP3, 2022, p. 32, l. 329-330; IP9, 2022, p. 85, l. 128-130; IP10, 2022, p. 99, l. 364-367). The product manager at Company D considers this way of (market) testing more meaningful as these are parties

> who are ultimately associated with Company D and know what it is all about. It makes no sense to give a product to someone completely outside the industry, who then compares it to their conventional product and says, that does not fit. (IP6, 2022, p.56, l. 105-108, translation by the author)

Second, while informal testing, especially with company employees, is done before market placing, most companies also incorporated tactics to introduce and establish their new products on the market. Company A (IP1, 2022, p. 13, l. 553-560) for example introduced its products before the Covid-19 pandemic via two large conventions which due to the pandemic have been transformed into smaller online presentations. While Company A shows a more general approach regarding market introduction, Company D, E (IP8, 2022, p. 72, l. 182-184) and F (IP7, 2022, p. 62, l. 33-37) display a more differentiated approach by organizing seminars for direct and indirect customers. The product developer at Company D explains this process and reasons behind these activities as follows:

> We have a basic training. When a new chain in Austria takes our products, our seminar leader goes there and does a training explaining our concept, our history, why the products are special and what they should look for. [...] But if the retailer has been with us for 20 years, then we offer completely different training and seminars when new products come out [...] so that [sic] you are prepared for the questions from customers. (IP5, 2022, pp. 50-51, l. 423-435, translation by the author)

4.3 Reconfiguring

The last section of the interview was dedicated to potential reconfiguration activities - the author asking the question if the company had changed or introduced new processes, structure or assets during the innovation processes. While companies stated that no significant changes had occurred due to their sustainable founding philosophy (IP4, 2022, p. 39, l. 285-286, IP5, 2022, 50, l. 415-418), smaller reconfiguration measures were found. Ultimately, the author identifies (1) business ecosystem orchestration, (2) the adaption of collaboration methods with external partners, (3) structure changes and (4) portfolio extensions as microfoundations of the reconfiguring capability. This is justified by the transformative effect that the practices describing these microfoundations have on the value chain, structure and product range of the companies thus enabling continuous innovation success.

4.3.1 Business ecosystem orchestration

Similar to the companies' sustainability and quality aspirations treated in section 4.1.1 internal motivation is very much prevalent in the project realization stage. This aspect is manifested by (1) the firms making sure that the companies' sustainability and quality standards are met along the supply chain and by (2) providing support for stakeholders with regard to their own products and projects. By aligning their business ecosystem according to their objectives, born green firms are seen to create themselves an environment that empowers them to maintain their competitiveness.

First, what became apparent during the interviews is that companies transfer their sustainability and quality aspirations onto their suppliers or in the beginning only choose suppliers that fulfil the company's standards. It is important to explain that often these standards are self-set and do not constitute must-meet criteria in order for the company to obtain a natural cosmetic certification. As an example, Company C (IP10, 2022, p. 95, l. 165-170) explains that if ingredients work equally well, the ingredient which is best aligned with the company's philosophy is chosen. Similarly at Company A (IP1, 2022, p. 14, l. 596-600) the company is internally obliged to – if available –choose organic ingredients, even though they are more expensive. However, it must again be emphasized that those organic ingredients are not always required to get the beauty and personal care products certified. Nevertheless, Company D states that

> We check all our manufacturers again to see how they deal with the issue of sustainability. That is, where the products are manufactured or whether they really do have green electricity. Do they have a water treatment plant? We now have to deal with the issue of sustainability even more thoroughly. It is no longer enough for people to have such a philosophy internally and to transfer that to the products. You also have to do more and more in the broad sense now in order to simply not fall behind (IP5, 2022, p. 52, l. 495-503, translation by the author).

Second and closely intertwined with the first aspect, some companies even invest and support their partners by means of conducting meetings and organizing trainings for farmers, for them to meet the quality requirements of the company (IP9, 2022, p. 87, l. 260-263). The employee of Company B (IP3, 2022, p. 30, l. 241-251) illustrates the underlying reasons for such partner support almost as a self-reinforcing system. The company initiated an organic ingredient project - which was the first of its kind – and subsequently opened and sold this organic ingredient to the whole natural cosmetics market. With that they refinanced their suppliers and the project. These suppliers then started to develop their own ingredient which they then offered first to Company B. Summarized, the initial support of partners led to future advantage of Company

B. Even though Company B gained value through supplier investments, the department head also expressed that it is the company's wish to help the suppliers grow and for them to not be solely dependent on the company, which implies that these supplier investments are not undertaken solely for self-benefit.

4.3.2 Adapting the collaboration (method) with external stakeholders

Meeting companies' self-set sustainability and quality aspirations to stay ahead often implies that competitors have not yet done anything similar, and that partners may not initially be able to meet the expectations and requirements of the company. This was the case at Company A (IP1, 2022, p. 4, l. 168-171) where the company's suppliers did not conduct experiments – which until then were not required – with certain ingredients. These experiments were however required in order for Company A to get the new natural cosmetics certification. Having no specific direction or comparison, companies need to actively approach their suppliers for them to obtain specific information but also ingredients and materials to realize their projects, as seen in Company D (IP 6, 2022, p. 59, l. 245-249) and Company E (IP8, 2022, p. 78, l. 404-407). Company C expressed this process as follows

> There was no such thing as bio-based packaging, and we were really looking for it. [...] We really scoured the manufacturers with our colleagues in the laboratory and with our colleague from purchasing, who was responsible for procurement. Where can we somehow get alternative materials, how can we do that as a small company? (IP4, 2022, p. 34, l. 88-93, translation by the author)

Even though especially Company D (IP5, 2022, p. 50, l. 385-390) states that they have long-term relationships with their partners and that those parties grow with the company other companies provide another, more dynamic picture. Company A (IP1, 2022, p. 13, l. 568-571) for example explains they constantly gain new and loose old suppliers in order to find and use the best ingredients that fit the company's quality standards. As just stated, oftentimes companies had to actively approach their suppliers in order for them to realize their new product. What has been observed at Company C (IP4, 2022, p. 40, l. 361-364) and Company D (IP8, 2022, p. 77, l. 371-375) is that they acquired new partners to make - in their cases – the most sustainable packaging possible.

4.3.3 Changes in the structure

Changes have also been observed in the structure of both small and large born green companies. Company A (IP2, 2022, p. 17, l. 68-78), D (IP5, 2022, p. 49, l. 357-363; 479-481) and E (IP8, 2022, p. 79, l. 449-456) all mention an increase in structure by the means of more scheduled and specific meetings, and the deployment of sustainability managers and teams that act as a central contact point in the company for sustainability matters. These changes in structure are attributed to the reconfiguring capability as they are seen as mean to continuously enable (organized rather than chaos driven) innovation behavior. Important and simultaneously challenging in this context is the retention of the communication culture and the innovative and explorative mindset and therefore the existence of an ambidextrous environment.

> We are currently working out a lot of structures and processes that are still a bit in their infancy due to our growth [...]. But we must not inhibit ourselves in this. That is one of the most important things for the management. We are not married to anything except our philosophy and where we want to go. And there, even with the size, we still must be spontaneous and flexible (IP2, 2022, p.23, l. 347-357, translation by the author)

4.3.4 Extending the innovation to the (whole) portfolio

Lastly, while some reconfiguration practices took place in the course of the innovation processes, the innovation itself introduced a reconfiguration process after the product was launched and established in the market. Company A (IP1, 2022, p. 12, l. 515-516), C (IP4, 2022, p. 35, l. 121-123) and D (IP5, 2022, 43 l. 89-94) all reformulated and redesigned their portfolio – where possible – in accordance with the newly introduced products. In case of the born green companies, transforming their product portfolio can be seen as initiating the continuous innovation cycle.

5 Discussion

The findings show what has been suggested in the introduction. The increased concern for environmental sustainability is neither limited to specific industry, nor to specific company characteristics. Meaning that not only big corporations in the oil and gas industry – as an example - are exposed to this issue, but also beauty and personal care companies already born on a green, environmentally sustainable mindset. From this it is also seen that not only big polluting corporations create new or modify existing products, processes or business models to reduce their environmental footprint but also beauty and personal care companies, already born on a green, environmentally friendly mindset. However, certain industry and company specific aspects can be observed with regard to environmental innovation.

As an example, research (Horbach et al., 2012, p. 113) – by referring to different environmental innovation determinants – highlights that the underlying reasons why companies engage in green innovation differ. In context of the beauty and personal care industry, the market-pull seems to be most appropriate in describing the increasing sustainability orientation of the biggest players in this market, such as Estée Lauder Companies (Al Ianuzzi, 2020, as cited in Friedlander, 2020). As mentioned at the outset, however, this trend cannot be reduced to company characteristics. As a result, beauty and personal care companies founded on environmentally sustainable principles are also seen to be captured by increasingly sophisticated customer expectations for new products (Manson, 2021; Marsh, 2022; Mayo, 2021). What makes these born green companies even more interesting in terms of green innovation is that they are not only driven by market-pull aspects, but also by their own philosophy and their established skillset – as displayed in the findings section -, which can be presented as characteristics of the firm-specific determinant of environmental innovation (Horbach et al., 2012, p. 114).

The various determinants for environmental innovation oftentimes imply certain types of green. In this regard it is said that market-pull factors are more likely to predict environmental product innovation, rather than environmental process innovation (Pavitt, 1984, as cited in Rennings, 2000, p. 326). This seems to be supported when looking at the environmental trends within the beauty and personal care industry, in which an increasing amount of companies' product portfolio consists of natural or organic beauty and personal care products. It is most definitely supported by the born green companies analyzed within this thesis. It has been observed that these companies in their innovation behavior have engaged in product innovation by redoing

and improving their product formulation or refining the packaging by using less and more sustainable packaging material

However, differences between companies and industries with regard to environmental innovations are not only evident in the content of the specific innovation projects, but also in the innovation behavior itself. Thus, analyzing born green companies in the beauty and personal care industry based on their dynamic capabilities - which are thought to have enabled the companies in their innovation behavior and adaptability to the market - reveals both similarities and differences to the innovation behavior of conventional companies.

5.1 Sensing

As already suggested by previous studies (Khan et al., 2020, p. 1483), also born green beauty and personal care companies' sensing capabilities – rather than being dependent on only one source – are embedded within both the internal and external environment and therefore multiple knowledge sources.

However, it needs to be highlighted that born green companies in the beauty and personal care industry seem to rely to a greater extent on their internal sources, in particular their sustainable mindset. While previous research on non-green companies acknowledges a sustainable mindset as microfoundation of sensing which contributes to the company's recognition of new business opportunities (Mousavi et al., 2019, p. 377) this microfoundation appears to be even more instrumental for born green companies in the beauty and personal care industry, as displayed in the findings. Through their sustainability and quality aspirations, these firms engage in practices that are more formally carried out in conventional companies. That are for example life cycle analyses via which conventional companies detect improvement possibilities that result in new sustainable products, processes, or business models (Mousavi & Bossink, 2017, p. 5; Mousavi et al., 2018, p. 235). In comparison born green companies in the beauty and personal care industry seem to regularly assess – in a more dynamic manner - their products according to green market standards. These assessments, similar to the life cycle analyses observed in conventional firm, lead to the discovery of new opportunities.

Besides the born green companies' sustainability and quality aspirations, this study's findings are in line with previous empirical literature suggesting that there are also other practices and mechanism that enable the firm to recognize green opportunities. Research and development activities being inevitable in this context for conventional firms (Khan et al., 2020, p. 1484;

Mousavi et al., 2019, p. 377; Santa-Maria et al., 2021, p. 8) as well as born green companies in the beauty and personal care industry, as displayed in sub-chapter 4.1. For the latter (formulation of) natural and organic beauty and personal care products is still associated with a great number of challenges. It is assumed, that the possible lack of stability and quality of such products (Bom et al., 2019, p. 271) and often fewer effective ingredients available during the formulation process (Romanowski, 2020) make R&D especially purposeful for born green companies in the beauty and personal care industry to compete with the quality and efficacy standards of conventional products.

Cross-departmental idea and brainstorming meetings are seen as another meaningful internal mechanism that helps companies to sense new opportunities (Khan et al., 2020, p. 1484). When analyzing how born green companies identify new projects, this thesis' findings support the importance of such meetings. Especially the diverse department composition of such meetings is relevant for born green companies wanting to progress in the beauty and personal care industry. Bearing in mind that the sustainability developments in this market are multifaceted, targeting not only the ingredients but also the packaging and the supply chain (Manson, 2021; Marsh, 2022; Mayo, 2021), the author argues that born green companies need to adopt a holistic perspective to which naturally the R&D department alone cannot contribute.

Lastly, the analyzed interviews suggest that individual employees who work in the various departments appear to be another particularly valuable source for the born green companies' sensing capability. Even though previous research recognizes the importance of following employees' insights (Mousavi et al., 2019, p. 273), this seems to be even more critical for born green companies. Although born green companies might be one step ahead of conventional beauty and personal care companies in terms of sustainability, they still face increasingly demanding sustainability expectations within their niche. Employees that are themselves driven by sustainability issues (IP5, 2022, p. 52, l. 482-485) may relate to such demanding customers. It is believed that this makes their involvement all the more important, as born green companies - through (the motivation and knowledge of) their employees – might be more likely to be able to identify the challenging environmental trends in the beauty and personal care market.

While already established in the outset of this chapter, companies sensing capabilities are multifaceted and not reliant on one singular practice or stakeholder. Resultingly, both previous studies and research on born green companies find practices leveraging the knowledge of the external environment constitute a microfoundation of companies' sensing capabilities.

As an example, when analyzing their portfolio, born green companies also consider the wishes and needs of the beauty and personal care market, as displayed in the findings section. Research on conventional companies' environmental sensing activities found that wide ranging primary market research is conducted to get a grasp of the external environment (da Giau et al., 2020, p. 1513; Mousavi et al., 2019, p. 373). Born green companies are seen to engage with the external environment in a more immediate and problem centered manner. In this context, a practice hardly paid attention during research on other companies is the integration of (customer) feedback in the market scanning stage. Almost all born green companies in this thesis expressed the importance of consumer insights, some even actively stating that the given input guides the firm regarding product introduction or adaptions. This is attributable to the circumstance that the born green companies' beauty and personal care market environment is very much influenced by the stringent and increasingly specific customer expectations. Therefore, integrating the feedback of knowledgeable and demanding customers is seen particularly valuable for these companies in comparison to conventional companies in other industries who might also - due institutional pressure – have to regard other stakeholders. Besides customers, suppliers seem to be other immediate partners of born green beauty and personal care companies that are able provide valuable insights that might also indicate future market developments, which is also suggested by da Giau and colleagues (2020, p. 1513).

Key Finding

In their sensing capabilities born green companies in the beauty and personal care industry very much rely on their internal sources, that is their R&D activities, the drive and expertise of their employees and the company's inherent sustainability and quality aspirations. Even though also previous empirical research (Mousavi et al., 2018, p. 233) considers the internal sources to be most important, it seems that even more weight is given to them by born green companies. This can be attributed the notion that oftentimes born green companies with their deeply rooted knowledge and experience can be considered the pioneers within this market making them not as dependent on external sources. When engaging with the external environment, the author considers 'industry specific discourse' to be the most fitting description, as most focus is laid on customers, suppliers and exchange at specific fairs and seminars. Since it appears that born green companies are not subject to regulatory push factors (Horbach et al., 2012, p. 113) engagement with the institutional environment is not important for identifying opportunities.

5.2 Seizing

Similar to what has been observed within sensing, also the seizing capabilities are seen as multifaceted and embedded within the company, its capabilities and resources, as well as the environment external to it. For this literature and thesis are standing in agreement.
Previous research highlights the importance of strategic planning – by the means of strategy formulation and resource allocation - to capture the identified opportunity in earlier innovation stages (da Giau et al., 2020, p. 1513; Khan et al., 2020, p. 1486; Mousavi & Bossink, 2017, p. 6). Strategic planning in such a comprehensive way has not been observed within the born green beauty and personal care companies in this thesis. The author assumes that for them strategic planning may not need to be as pronounced, as these born green companies mostly focus on changing and improving existing products. However, for (conventional) companies needing to establish a sustainable ecosystem from the ground up, thorough strategic planning - as seen in previous research – makes the difference.

Another departure from what previous empirical research suggests, is seen in the business governance adaptions (Khan et al., 2020, p. 1487), but more importantly business model adjustments (Khan et al., 2020, p. 1487; Mousavi & Bossink, 2017, p. 8; Mousavi et al., 2019, p. 380; Santa-Maria et al., 2021, p. 12) as a practice that facilitates the seizing capability. Even though born green companies experience transformation during the innovation process, their business model as a whole is not a target of such. This is again attributed to the founding philosophy of these companies which already geared the value proposition, creation and delivery and capture elements (Geissdoerfer et al., 2018, p. 402) towards environmentally sustainable solutions – making the customization business model in their cases obsolete.

As explained in the outset, internal resources and mechanisms play an important role during the project realization. The importance of employees and their capabilities is seen as a given in both literature and this thesis. However, literature highlights the importance of training employees (Cainelli et al., 2015, p. 218) and creating sensitivity but also enthusiasm for sustainability issues (Y. Chen et al., 2015, p. 495; Santa-Maria et al., 2021, p. 12) within the workforce. Even though employees of the born green companies are also seen as indispensable, the need to excite and train employees for sustainability issues is seen as redundant in the context of born green companies due to the already established skill set and culture regarding sustainability. Furthermore, research conducted on green innovation by conventional companies (Mousavi et

al., 2019, p. 379) find that cross-functional collaboration within the firm acts as a facilitator during the realization process. This is also seen to be important within the born green beauty and personal care companies as they repeatedly expressed the importance of communication and collaboration across departments during the product development process, as displayed in the findings section.
What has not been observed, however considered purposeful in the context of born green companies and thus display in the findings section, are managers and founders involving themselves in the innovation process and providing valuable input. This again shows that for born green companies, environmental innovation is to a large extent a philosophy-driven endeavor that affects all parts of the company. It is also argued by the author that sustainability projects finding support at the top level of the company are easier and more likely to be implemented. However, this does not imply a top-down approach, observed in (complex) innovation projects by da Giau et al (2020, p. 1514).

Both conventional firms engaging in green innovation and born green companies in the beauty and personal care industry acknowledge that the external environment has an impact on their project realization process. Even though external partners are essential for the born green companies during the project realization process by providing packaging material and manufacturing premises, collaborations and (tangible) resource co-specialization in the traditional sense - as described by previous studies (Khan et al., 2020, p. 1487; Mousavi et al., 2019, p. 380) – do not take place within born green companies. Other researchers argue that resource co-specializations are necessary for companies due to their lack of knowledge and experience in this field. This argument however does not hold true for born green companies. Rather collaborations of born green beauty and personal care companies with manufacturers and suppliers are designed for information sharing around specific questions, as the findings section suggests. One might refer to this as intangible resource co-specialization.

Both research on conventional companies' environmental innovation activities and this thesis identify product testing as an essential part for avoiding market ambiguity and uncertainty in later stages of the innovation process. However, while previous studies (Mousavi et al., 2019, p. 375; Sandberg & Hultberg, 2021, p. 5) focus on demonstrating early product (prototypes) to the external market, the findings section of this thesis shows that early testing of beauty and personal care products was mainly conducted within the firm or the close family and friend circle. Very important in the context of born green companies in the beauty and personal care

industry seem to be specific market introduction activities, that is product presentation and seminars for retailers and customers. By demonstrating the quality and further substantiate on the positive properties these products embed, companies can counteract negative sentiments towards the quality of natural and organic beauty and personal care products This seems to be in line with Belz's (2005, p. 11) assertion that environmental aspects alone are not enough to sell environmentally friendly products.

Key Finding

Research on environmental innovation in context of conventional and born green companies agrees that various factors, internal and external, facilitate the successful realization of a project. The specific activities indicated by this aspect however differ in some regard. While conventional companies focus employee training and motivation (Cainelli et al., 2015, p. 218), born green companies in the beauty and personal care industry leverage on the internal managerial and structural capabilities that supplement the regular coordination meetings activities. The practices embedded within external environment too act as an essential party for company's seizing capabilities (Mousavi et al., 2019, p. 380). However, collaboration undertaken in the project realization processes of born green companies in the beauty and personal care industry seem to be more knowledge focused and in general less pronounced than what research on conventional companies would suggest. Lastly, while prior studies identified business model adjustments as a microfoundation of seizing (Khan et al., 2020, p. 1487), such adaptions are not relevant in the case of the born green beauty and personal companies as their business model is built around a green product portfolio.

5.3 Reconfiguring

Reconfiguration – also referred to as transforming – describes changes during and due to environmental innovation processes. Because of the inherent differences between the companies analyzed in preceding studies and the born green companies looked at in this study, naturally differences in their need for reconfiguration and transformation emerge. This becomes apparent when contrasting previous empirical research and the author's findings.

Especially Teece (2007, pp. 1335–1336) in his early work stresses the structural rigidities that come with traditional top-middle-lower management, making a decentralized structure more important. In connection with this argument Santa-Maria and his colleagues (2021, p. 12) identify flexibility as a microfoundation of the reconfiguration capability. While the born green

companies – as displayed in the findings section – are not seen to adapt their structure for and during the innovation process, they did increase formality of doing business over the years to enable continuous innovation. This might be interpreted as contrasting previous research. However, it must be acknowledged that these small structural reconfigurations can most likely be attributed to the growth processes of these companies which - if not managed properly - may lead to chaos. Also, it seems as if born green companies do not need to acquire or modify (existing) assets or adapt their current work methods and business practices to enable the innovation projects' success. This is again justified by the fact that their company's ecosystem and practices are already tailored to create environmentally sustainable products.

Prior empirical research suggests that due to the conventional companies' innovation projects, ties to new stakeholders need to be established (Mousavi & Bossink, 2017, p. 10). Due to the nature of their sustainability endeavors also born green companies in the beauty and personal care industry need to establish new connection with suppliers that can realize the companies' product ideas. What seems to be descriptive for born green companies is that they and their customer base in the beauty and personal care industry are most often one step ahead in terms of sustainability ideas. Resultingly – as indicated the findings - born companies in the beauty and personal care industry are seen to adapt their approach towards external stakeholders– in that they actively approach suppliers to make their project ideas happen.

In the context of business ecosystem orchestration prior research seems to focus on the exploration and coordination of the value chain (Mousavi & Bossink, 2017, p. 10; Mousavi et al., 2019, p. 381). Born green companies in the beauty and personal care industry – as seen in the findings section - illustrate another (supplementing) aspect for such value chain management. That is the transfer of the companies' sustainability and quality standards along the value chain by evaluating ingredients and suppliers according to certain criteria. To achieve the sustainability and quality transfer born green companies even directly elevate their partners by means of conducting meetings and organizing trainings for or investing in projects of them. These practices are also seen to reflect the trend found within the beauty and personal care market. That is that environmental sustainability does not stop with the product ingredients but that such mindset should be passed down and reviewed along the value chain (Marsh, 2022).

Lastly, previous research highlights the importance of centrally collecting, analyzing, and sharing new knowledge and in this regard establishing sophisticated learning systems (Felin &

Powell, 2016, p. 80; Sandberg & Hultberg, 2021, p. 5; Teece, 2007, p. 1339). Specific to born green companies in the beauty and personal care industry is that innovation does not conclude with one project but is an on-going process, as described by the interview partners. As a result, knowledge is continually integrated within the born green companies in form of product portfolio extensions. Adapting or extending the existing portfolio according to the newly introduced innovation in this regard can also be linked to the company's change management capabilities, which Santa-Maria et al (2021, p. 13) consider a microfoundation of the reconfiguring capability of a company.

Key Finding

Both previous research (Mousavi et al., 2019, p. 381)and this thesis identify business ecosystem orchestration as a microfoundation of the reconfiguring capability even though their focus area in that differ. Also, it seems necessary for both conventional and born green companies to adopt new methods of organizing external stakeholders for their environmental innovation projects. Similar to conventional companies (Sandberg & Hultberg, 2021, p. 5) learning and knowledge integration mechanisms are undertaken by born green companies by the means portfolio extensions. Beside these aspects born green companies do not (have to) drastically change structure or their technological resources according to the innovation project.

6 Conclusion

Against the backdrop of increasing market and institutional demand for environmental sustainability, more and more companies are addressing these issues via environmental innovation. By that companies create new or adapt existing products, processes or business models that reduce the firm's environmental footprint, mitigate risks, and may even earn the business economic rents. However, the innovations themselves and the environment in which they are embedded are seen as complex, making traditional strategic means partially redundant. It is assumed that companies disposing of dynamic capabilities are enabled to address these challenges in a more successful manner and by that achieve a sustained competitive advantage. While previous research on dynamic capabilities in context of environmental innovation has centered around various types of companies, none of it has addressed dynamic capabilities of born green companies.

Exemplified by the beauty and personal care industry, it is argued that even companies that were found on an environmentally sustainable mindset, are targeted by the dynamism and the increasingly sophisticated customer expectation within this market, making the possession of dynamic capabilities purposeful.

In this regard it was the aim of this thesis look to into the born green companies' dynamic capabilities - more precisely into the microfoundations undergirding them - that enable these companies to adapt to and succeed in the beauty and personal care market.

The first part of this thesis introduced the two concepts outlining this research, that is environmental innovation and the dynamic capabilities framework according to Teece. The following section reflected the qualitative research conducted by the author and presented the data collected from six born green companies operating in the beauty and personal care industry. To answer the research question 'What are the underlying microfoundations of dynamic capabilities that born green companies in the beauty and personal care industry demonstrate regading environmental innovation?', the author concludes the following.

The findings show that the sensing capabilities of born green companies in the beauty and personal care industry are very much driven by internally embedded microfoundations. Hence, their sustainability and quality aspirations, as well as internal idea generation mechanisms, manifested in ongoing R&D activities and active employee involvement, are believed to be the main contributors to companies identifying green business opportunities. These internal aspects are further amplified by the external environment and the information embedded within

knowledgeable and theme specific stakeholders, such as the company's suppliers and demanding customers.

The seizing capabilities of born green companies in the beauty and personal industry can be attributed to feasibility assessments that set the base for the subsequent realization stages. This research also shows that internal collaboration and knowledge integration manifested by regular meetings and exploitation of managerial and structural resources act as important factors during the implementation phase. Moreover, the knowledge from the external environment is captured by going into exchange with supply chain partners and the certification offices, and by attending fairs and seminars. Lastly, (target group specific) product testing and product introductions enable the firm to properly place the innovation on the market.

The author finds that the reconfiguring capability of born green beauty and personal care companies is not as pronounced as the reconfiguring capability of companies not found on an environmental mindset. This can be traced back to the companies' established ecosystem that already supports green product development. However, a microfoundation associated with reconfiguration in the context of born green companies is the orchestration of their business ecosystem, manifested by the firms transferring their sustainability efforts along the value. What is more, born green companies are seen to adapt their collaboration methods with their partners, and integrate knowledge - acquired through preceding innovations - via product portfolio extensions. Lastly, due to their growth process born green companies undergo structural adjustment to continuously facilitate the sensing and seizing capability with regard to green innovation.

6.1 Managerial Implications

Based on findings gained from these companies - that over at least ten years and have been able to continuously adapt to a changing and complex environment - the following managerial implications can be drawn.

First, the insights from born green companies do very clearly depict the importance of internal sources. Since natural and organic beauty and personal care products already go beyond the basic requirements of sustainability, a sustainable orientation / mindset can almost be considered a prerequisite for further progress in this area. Properly communicating a sustainable culture and clearly outlining the underlying reason for and outcomes of such a culture is essential. Ultimately, it should be the aim of these measures to motivate the company's employees to work towards the set goals. Born green companies show that committed

employees who initiate product introduction or adaptions, volunteer to put one or two extra hours into the projects and come up with interesting ideas can be essential in identifying new opportunities.

Second, since natural and organic beauty and personal care products - at this stage - are very much driven by market pull, consumer involvement and consideration of their feedback is can be essential to identify new opportunities and adapt to the market. Integrating a diverse set of internal and external knowledgeable parties throughout the innovation is also seen as necessary as the trends emerging in this market are not specific to one aspect but are multifaceted.

Third, born green companies whose products are oftentimes already established in the market are nevertheless seen to conduct seminars for its retailers and consumers. The author suggests that this should also be considered by other firms as such events counteract prejudices against green products.

Lastly, as seen by born green companies transferring sustainability standards along the value chain can ensure quality and further strengthens the image of the company in that it takes sustainability issues seriously.

6.2 Limitations

The thesis at hand is subject to certain limitations. First, as the research sample comprises only six companies the author acknowledges that the findings may not be transferable to all born green companies within the beauty and personal care industry. This is also magnified by the fact that due to the scope of this thesis, the researcher conducted interviews that lasted on average 39 minutes, which do not offer the same insight of a larger set of longer interviews or in-depth case studies.

Second, generalizability is also limited by the context-specific findings of this work. Although it was the goal of this work, the reader must be aware that the findings on dynamic capabilities may not be transferable to non-born green companies in other markets.

Third, it must be noted that the differences occurring between born green companies and conventional companies may derive from to the content and scope of the respective environmental innovation endeavors. The corporate environmental innovations analyzed in previous research involved either the firms' business models or product innovations, which generally appeared to be larger and more financially intensive than the innovations projects looked at in this thesis.

6.3 Possibilities for further Research

The topic and findings of this thesis also open the door for further research. The author sees the most proximate research opportunity in the comparison between born green companies and companies not found on a sustainable mindset. Even though in the discussion, this research was juxtaposed to empirical research on conventional companies' environmental innovation behavior, little insight is provided into the concrete reason why microfoundations of such companies differ. Analyzing the underlying factors/antecedents in greater detail can be of great interest.

Furthermore, the companies studied in this paper are predominantly small and medium-sized enterprises, which may also have had an influence on the manifestation of dynamic capabilities presented in the results. The author therefore encourages further research to look at the differences between SMEs and large companies, as these display different features - similar to born green companies and conventional companies – that might have an impact on the respective sensing, seizing and reconfiguring capabilities.

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Appendix

The interview guide, interview transcripts and data analysis can be found in a separate document