



SCHOOL OF ECONOMICS AND MANAGEMENT

Master's Programme in Innovation and Global Sustainable Development

Product development and organisational strategies in the context of sustainability

A qualitative study examining sustainable product development and the consideration of micro-level sustainability strategies

by

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This qualitative study investigates how organisations approach the development processes of sustainable products considering their micro-level sustainability efforts and ambitions and compare it to the model presented in the literature. The research follows a qualitative, social constructivist approach that enabled the researcher to work with pre-existing theories and the new empirical material. The empirical data was collected through seven semi-structured interviews. The findings contribute to the literature by elucidating how sustainable product development is applied within the fast-moving-consumer-goods food industry. Furthermore, the study has highlighted the circularity of SPD and the necessary addition of the Voice-of-customer in the model. Moreover, environmental certification, governmental regulations, and consumer (il)literacy have proven to be possible tools to further the ethical rationality in the process.

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I hope that you, as a reader, will find this thesis an intriguing and stimulating read!

Anja Wukisiewitsch

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List of Abbreviations

CEO	Chief Executive Officer
CS	Corporate Sustainability
EoL	End-of-Life
EP	Ecodesign Practices
FMCG	Fast-moving-consumer-goods
LCA	Life-Cycle-Analysis
NPD	New Product Development
R&D	Research and Development
RQ	Research Question
SI	Symbolic Interactionism
SPD	Sustainable Product Development
VoC	Voice of Customer

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1. Introduction

The latest IPCC (2022) has shown increasing evidence of the degradation and destruction of ecosystems by humans causing cascading and long-term impacts on people globally. As shown by the report, it is evident that the state of the planet calls for a large-scale sustainability transition involving the systemic adoption of markedly better environmental and social practices (Delmas et al., 2019). One of the main contributors to this dire situation is the wasteful and unsustainable way of consumption that causes massive pollution of the ecosystem and natural resources (Kammer et al., 2017). According to the Global Footprint Network, our society consumes resources at a rate 1.7 times higher than what the earth can sustain (Delmas et al., 2019). Moreover, Greenpeace (2018) has articulated that "the brands driving the growth in single-use plastics—the world's biggest fast-moving consumer goods (FMCG) companies—are not being held accountable for the growing crisis associated with the production, consumption, disposal, and pollution of single-use plastics" (p. 5). At the same time, the consumption of products is seen as a measurement of the wealth and prosperity of a society.

Bearing this in mind, one feasible way to address this wicked problem would be to build sustainable growth on eco-friendly, sustainable products that require fewer resources, limit pollution to the environment, and avoid waste generation. While consumers are increasingly open towards including environmental and social factors in purchase decisions, sustainable product design is not widespread (Kammer et al., 2017). While there are theoretical frameworks on sustainable product development in literature, there is a lack of research on these models in practice and how organisations' and individuals' sustainability strategies and efforts influence these development processes. As such, this qualitative study sets out to investigate these gaps by employing an abductive approach supported by empirical material collected through semi-structured interviews. This research strives to shed more light on the processes mentioned above and problem formulations by expanding the underlying understanding of sustainable product development combined with corporate sustainability strategies and accompanying concepts.

1.1. Research Aim

This research aims to fill the research gaps specified above, namely assessing how the development processes of sustainable products look in practice as compared to literature and taking a closer look at how corporate sustainability strategies and product development are connected.

The strategy to achieve this aim is specified as follows:

- Analysing current practices of sustainable product development and corporate sustainability based on the overview of the academic literature.
- Collecting empirical data through semi-structured interviews followed by coding and analysis.
- Summarising the data analysis findings.
- Predicating the empirical findings present a more detailed understanding of sustainable product development in practice.

1.2. Research Questions

This qualitative study aims to analyse how organisations approach the development processes of sustainable products considering their sustainability efforts and ambitions and compare it to the model presented in the literature.

As a result, the following research questions (RQs) have been specified:

RQ 1: What are the processes of sustainable product development in the literature?

RQ 2: How do the processes of sustainable product development look like in practice and how do they compare to the insights from theories?

RQ 3: In what ways do organisations approach the development processes of sustainable products considering their company-level sustainability ambitions?

This research adds to the body of sustainable product development and its relationship to organisational sustainability efforts. Due to a combination of theoretical and practical knowledge and insights, this study aims to be useful for academics and practitioners. An effort towards a comprehensive and industry-specific analysis of sustainable product development in connection with micro-level sustainability strategies is made.

1.3. Outline of the thesis

The following table is intended to present and explain the structure of this research paper.

Research Paper Outline	
<i>Chapter 2</i>	Theoretical underpinnings: This chapter will provide in-depth information on organisational sustainability (CS), new product development (NPD) and sustainable product development (SPD).
<i>Chapter 3</i>	Methodology: The methodology section will elaborate on the qualitative research approach, the empirical data collection, and this thesis's analysis process.
<i>Chapter 4</i>	Findings: This chapter will present and analyse the main findings collected during the data collection process.
<i>Chapter 5</i>	Discussion: This section focuses on the discussion of the main findings.
<i>Chapter 6</i>	Conclusion: Finally, the research aim, the practical implications and the possibilities for future research will be highlighted.

Table 1: Research Paper Outline

2. Theoretical underpinnings

This chapter aims to describe some of the key concepts and previous research on corporate sustainability, new-product development (NPD) and sustainable product development (SPD), and hence, tackle the first research question of “What are the processes of SPD in the literature?”. The literature review intends to ensure that readers from both academia and business can acknowledge the importance of implementing sustainability in strategy processes and product development processes. Throughout the chapter, the reader is provided with general frameworks and practical concepts from relevant fields.

2.1. Corporate Sustainability (CS)

Within today’s modern organisations, the topic of corporate sustainability (CS) is a complex phenomenon that can be interpreted and evaluated in many ways (Delmas et al., 2013). Nevertheless, regardless of the debates around it, every corporation and business across the world must make decisions directly or indirectly about societal questions related to their surrounding ecosystem (Joy, 2020) as well as the global social-ecological system (the biosphere) (Robért, 2012). These decisions involve manufacturing processes, the use of technology, labour relations, the acquisition and processing of raw materials, the products and services provided, and the emissions, waste, and by-products generated (Joy, 2020; Baumgartner & Rauter, 2017). However, due to its complexity and the multitude of different opinions, the topic can be debated at length among stakeholders, leading to the controversy surrounding the definition chosen for the company and the practices required to achieve it (Wijen, 2014).

Corporate sustainability, in general, has been the subject of research since the mid-1900s. Previous studies have mainly focused on how sustainability can safeguard the well-being of our socio-ecological systems and protect them from unregulated production activities that result in pollution and resource degradation (Christofi et al., 2012). According to the dominant interpretation, corporate sustainability is an organisation's integration of economic, social, and environmental concerns and goals into its business approach while taking the interests and claims of its present and possible future stakeholders into account (Ogorean and Herciu 2018). The focus on the three dimensions is reminiscent of the Brundtland report, where sustainable

development (SD) is defined as a concept with normative, descriptive, and systemic elements grounded on a three-pillar heuristic, namely, 'the triple bottom line' (TBL) (Elkington, 2018), which includes environmental, economic, and social equity-creating dimensions (Boyer et al., 2016; Lélé, 1991; Mensah, 2019; Zhai & Chang, 2019). Within the discussion about the topic of the three pillars of sustainability or rather sustainable development Barbier (1987) advocates for a unifying approach to SD that maximises the outcomes of all three (economic, social, and environmental) systems—i.e., a "systems approach" that ensures long-term socio-economic and environmental well-being. The issues to be addressed are intricately intertwined and entrenched within complex, interconnected systems. (Hjorth & Bagheri, 2006; Liu et al., 2015). As such, Barbier (1987) posits that "the general objective of sustainable economic development, then, is to maximise the goals of all these systems through an adaptive process of trade-offs" (p. 104). The systems approach assumes a comprehensive, multifaceted approach to sustainability (Clayton & Radcliffe, 1997; Costanza et al., 2016; Liu et al., 2015).

2.1.1. The rationales of CS

Regardless of this need to address the interconnected and interdependent economic, societal, and environmental concerns at different levels (Hahn et al., 2015), the question about the critical drivers from an organisational strategy perspective remains. Companies seem to pursue environmental and social goals for two fundamental reasons. First, organisations may be pressured by the owner, legislation, stakeholders, or market pressures. Second, companies voluntarily pursue meaningful sustainability efforts, either because they are ethically motivated (Wöhe and Döring, 2008) or because they expect economic benefits to be gained (Kurucz et al., 2008). In short, the desire to integrate sustainable issues may be driven by normative considerations, ethical rationality, or economic rationality (Baumgartner and Rauter, 2017). Nevertheless, it is also essential to highlight the possible gains for businesses by engaging in corporate sustainability. Kurucz et al. (2008) differentiated four benefits of CS management: reductions in costs and risks, improvements in competitiveness, improvements in reputation and legitimacy, and creation of value by seeking win-win outcomes.

Regardless of their level of involvement in sustainability, organisations are part of the business sector, and sustainability orientation can also enhance the competitiveness

of companies within their respective fields. Moreover, improving corporate environmental and social performance implies a readiness to engage in novel ideas regarding more sustainable technologies, structures, services, and products. It, therefore, poses a potential source for organisational innovation (Baumgartner and Rauter, 2017). Moreover, a willingness to question the value of current services, products, and processes furthers the engagement in critical self-reflection and allows organisational learning processes (Vollenbroek, 2002; Schiederig et al., 2012; Bönnte and Dienes, 2013).

Based on the information presented above, regardless of being "forced" or because of voluntary action, the overarching reason for choosing a corporate sustainability approach is to reduce the negative environmental and social impacts of corporate activities while improving (or, at a minimum, not reducing) the economic performance of the corporation (Baumgartner & Rauter, 2017). In an ideal situation, these efforts are followed by extended benefits such as, but not limited to, risk reduction and improvements in competitiveness.

2.1.2. Greenwashing

While this research focuses on the interconnectedness of corporate sustainability strategies and sustainable product development, it is imperative to address the criticisms of the topic of CS, namely the phenomenon of Greenwashing. In 1986, environmentalist Jay Westervelt first coined the term (Guo et al., 2018). The Concise Oxford Dictionary defines *Greenwashing* as "misleading information disseminated by an organisation to present an environmentally responsible public image" (Soanes & Stevenson, 2004. p. 580). Due to the multifaceted nature of the phenomenon, Greenwashing can be separated into two main approaches. First, Greenwashing as selective disclosure. When engaging in this approach, companies are commonly engaging in two main behaviours simultaneously: they retain the disclosure of damaging information related to their environmental performance and expose positive information regarding their environmental performance (de Freitas Netto et al., 2020). Marquis et al. (2016) define the approach as „a symbolic strategy whereby firms seek to gain or maintain legitimacy by disproportionately revealing beneficial or relatively benign performance indicators to obscure their less impressive overall performance" (p.483).

On the other hand, the second approach used is described as Greenwashing as decoupling. More specifically, this refers to greenwashing with solely symbolic actions. Organisations tend to deflect attention to minor issues and create a form of 'green talk' to appease stakeholders in terms of sustainability without any concrete action (Siano et al., 2017). Guo et al. (2014) explain that businesses engage in this behaviour to alleviate external public pressures, avoid conflict with external constituents and maintain corporate legitimacy.

Although Greenwashing is not the focal point of this study, the flawed practices of organisations concerning the transparency in communicating their environmental sustainability efforts and violations are inherently intertwined with the topics discussed in this thesis. Hence, it is essential to showcase the awareness around the criticism to be able to provide a reflective discussion on results.

2.2. New-product development (NPD)

As the focal point of this study will be the assessment of sustainable product development, it is imperative to understand how product development has evolved and what is now commonly referred to as best practice in the field. It is expected that every organisation, regardless of size, profit motive, or industry, experiences pressures to renew, expand, or modify its product or service portfolio (Leenders et al., 2003). Due to rapid changes and buoyancy in the market and technological changes, the capacity to develop new products has become central to competitive success (Gonzalez and Palacios, 2002). The concept of new products is like the topic of organisational sustainability, susceptible to various definitions. A definition considered fundamental, which will also be adopted for this study, describes a new product to cover original products, improved products, modified products, and new brands developed through an organisation's research and development efforts (Ulrike, 2000; Kotler, 1991). Within this definition, three distinct categories of new products are identified: first, products that are innovative and which satisfy unsatisfied needs. Second, replacement products which significantly differ from the existing ones in form, function, and benefits provided. Lastly, imitative products which are new to the organisation but not new to consumers (Petrick and Echols, 2004; Stanton et al., 1994). While various models present the steps within the new-product development (NPD) process, this study decided on Tzokas et al.'s (2004) framework as it combines the planning of new products with the strategic objectives of the organisation, which is an essential step in ensuring the

highest possibility of success. The steps are the generation of new product ideas, the development of an initial product concept, an assessment of its business attractiveness, the actual development of the product, testing it within the market, and the actual launch of the product in the marketplace. In parallel to each of these stages, an evaluation determines whether the new product should advance further or be terminated (Tzokas et al., 2004). The following Figure 1 displays the steps visually.

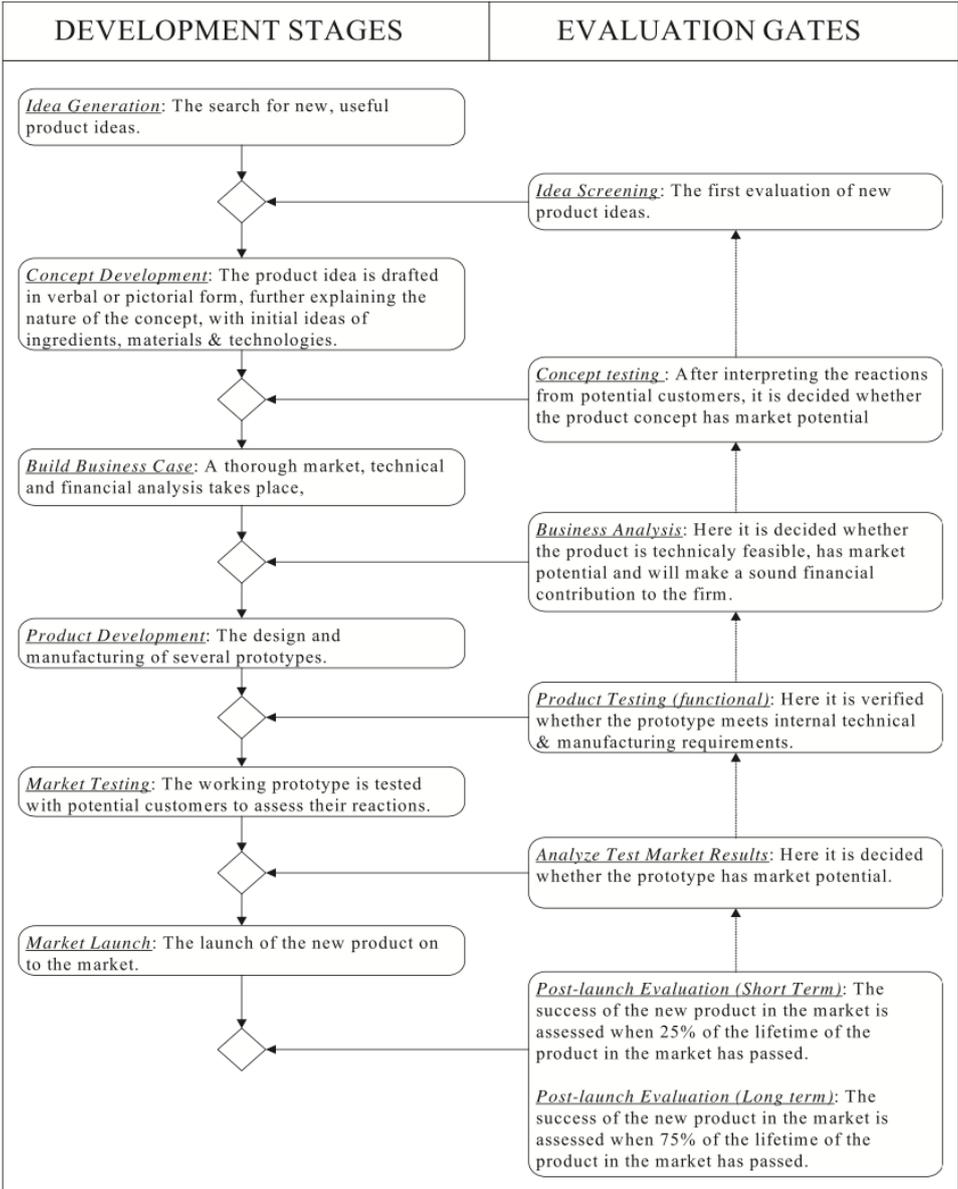


Figure 1: Development stages and evaluation gates in the new-product development process - Tzokas et al. (2004, p. 620)

While the framework mentioned above creates a solid understanding of new-product development processes, there have been quite a few developments since its creation. Most notably, Cooper’s (2019) identification of the drivers of success in new-product

development led to the development of a new framework that can be seen as an extension of Tzokas et al.'s as it includes vital aspects such as a strong market drive, the built-in voice-of-the-customer (VoC), as well as iterative development steps. Elements have been proven to be crucial for a successful NPD (Cooper, 2019). An in-depth understanding of the customer's needs and wants, the competitive situation, and the nature of the market are essential components of new product success (Cooper, 2013a, 2017b, 2018). Subsequently, a failure to adopt a strong market orientation, an unwillingness to undertake the needed market assessments, and leaving the customer external to the product development creates a high likelihood of product failure (Cooper, 2019).

The market focus, which should always prevail (Griffin and Hauser, 1996), starts with idea generation. It has been shown that the best ideas come from customers. That is why market-oriented idea generation activities such as Voice of Customer (VoC) research determine unmet needs or problems and lead to superior ideas (Cooper and Dreher, 2010). The strong influence of the end consumer also permeates the product design, where customer inputs have a vital role in the product's design, determining the product's requirements and specifications. Before entering development, it is imperative to test the product concept with the target customer to gauge the customer's liking and purchase intent. This can be done through methods like models, prototypes, or drawings. Overall, the VoC must be leveraged throughout the entire project and has to be seen as an iterative process to create a successful product (Cooper, 2019).

Building on market orientation and customer input, iterative development has also been identified as a success factor. Cooper (2019) refers to it as spiral development. It helps create the ideal definition and product despite the fluidity and volatility of information due to rapidly changing markets. Within the development phase, a series of deliberate iterative steps are built-in, whereby successive product versions are shown to the customer (Voc again) to seek feedback and verification. The specific steps are build (build something to show the customer), test (test each version of the product with the customer), feedback (gather feedback on what the customer likes and does not like and what value they see) and finally, revise (reset thinking, benefits sought, and product's design based on feedback). After those steps, the team moves on to the next iteration and repeats that process until satisfaction (Cooper, 2019).

Cooper (2017) developed a framework that would include these essential elements and expand Tzokas et al.'s (2004) model to account for these aspects. A visual representation can be seen in Figure 2.

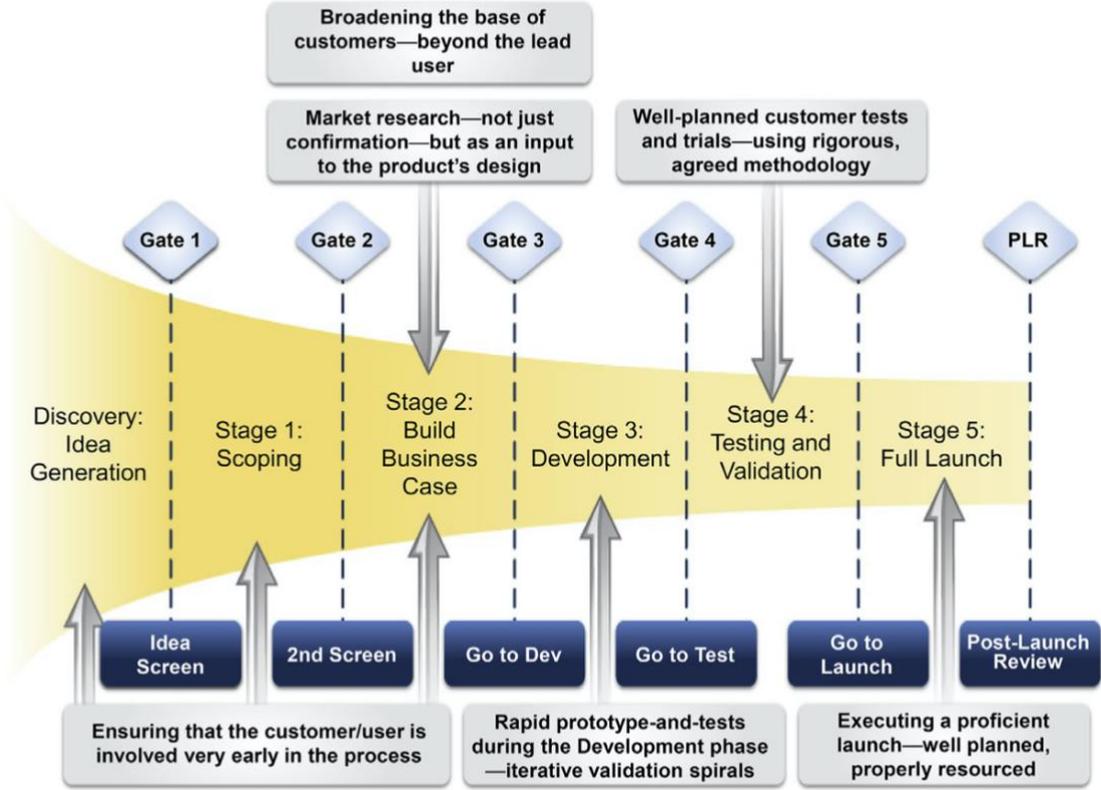


Figure 2: Development stages in new-product development including market drive, VoC and iterative validation spirals – Cooper (2017, p.214)

2.3. Sustainable product development (SPD)

Similar to the concept of corporate sustainability, sustainable product development aims to comprise the triple bottom line of environmental, economic, and social aspects. All these elements must be appropriately assessed and balanced if a new product is to be designed or an existing one is to be improved (Klöpffer, 2003).

2.3.1. Key model

While Cooper's (2017) model is a comprehensive guide for new-product development, it does not account for the aforementioned three dimensions. Su (2020) developed a comprehensive model that shows the sustainable product development process, which covers the whole product life cycle and accounts for additional elements and represents a further extension of the Coopers model (2017). While the "main" steps remain the same, Su (2020) summarises Discovery, Stage 1, Stage 2, and Stage 3 (see Figure 2) into the step "Product design" (including Product design specification, Conceptual design and Detail design) and then goes on to Prototyping and Test (equalling Cooper's (2017) stage 4). The next step is production (process planning, material selection, manufacture, assembly, packaging), which is not explicitly mentioned in Cooper's model, followed by distribution and retail, which could count as stage 5 in Cooper's model. The following figure shows the process in full.

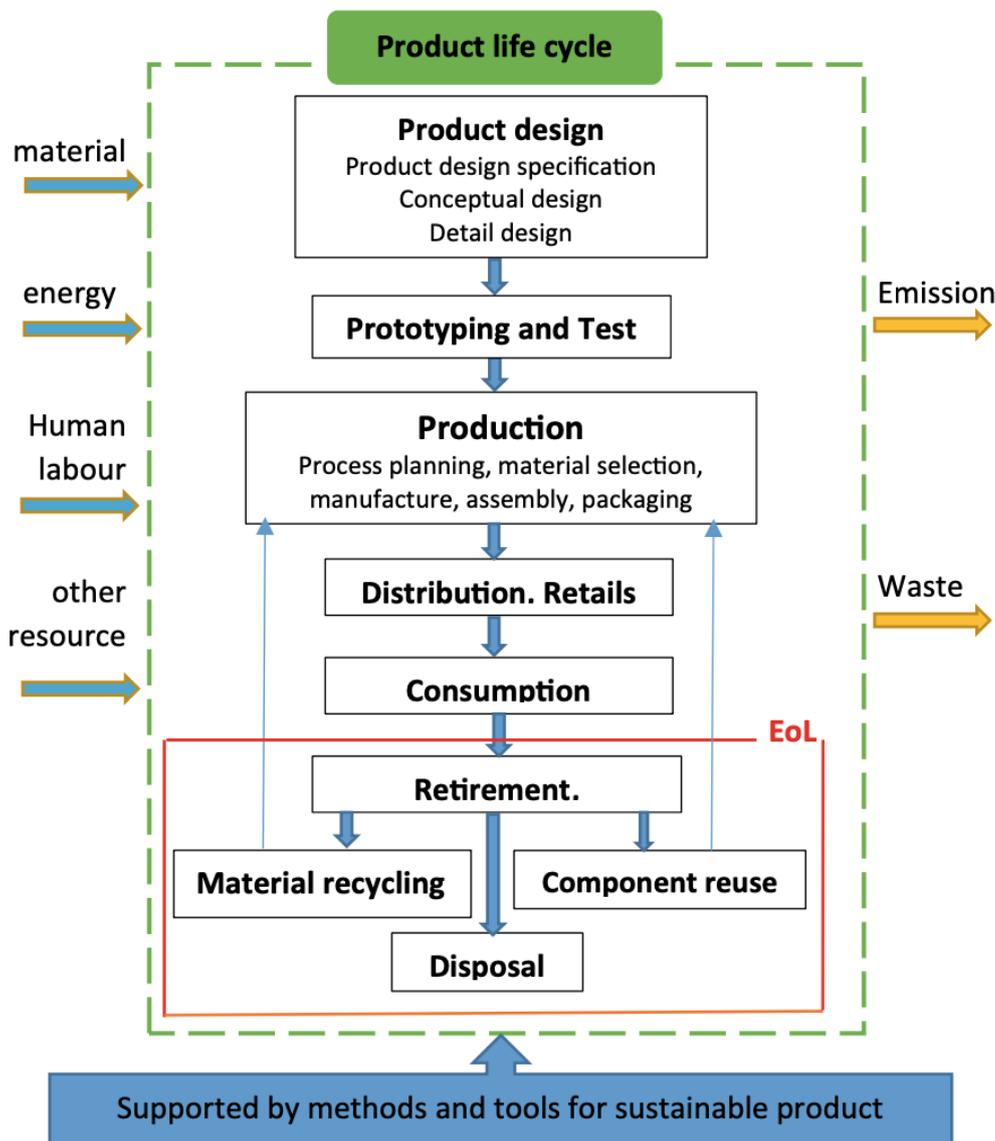


Figure 3: Sustainable product development process – Su (2020, p. 5)

The most notable difference to both Cooper's (2017) and Tzokas et al.'s (2004) model is the extension of Su's (2020) SPD process by the steps of Consumption, Retirement, Material recycling, Component reuse and Disposal. The latter 4 represent the product's End of Life (EoL). Consumption is the phase of product in service. Su (2020) elaborates that the consumers need to be encouraged to use the product correctly for energy-saving and enabling the products in service with its designed life or even extended life. The customer's goal is to recycle it or whatever is left as much as possible.

The final part (titled EoL) is the phase where the product's service life terminates. If possible, the EoL product should be disassembled into different components.

Afterwards, there are three possible routes: material for recycling, components for reuse, and disposal. Material for recycling goes back to the manufacturing stage, and components for reuse are routed back to the assembly stage in the production phase. The disposal section includes landfill, physical, chemical, biological, and sustainable treatment, and incineration (Su, 2020).

Moreover, the arrows going into the SPD process on the left side of figure 3 represent the input to the product life cycle, including materials and energy and human labour. On the other hand, the arrows on the right side show the output from the product life cycle, which mainly includes harmful emissions and waste (Su, 2020). Both elements, again, represent an extension of Cooper's framework and highlight how the economic, social, and environmental dimensions are considered throughout the SPD process. Finally, the whole product development process is supported by utilising relevant sustainability tools and methods (Su, 2020).

2.3.2. Ecodesign Practices (EPs)

While Su's (2020) framework explains the SPD process in theory, it fails to elaborate on specific actions to take within each step of the model. It is common knowledge that various industries are involved in the production of different consumer and non-consumer products, and as mentioned before, the current state of our planet calls for a systemic sustainability transition towards better environmental and social practices (Delmas et al., 2019). Within the development of sustainable products, one way to address this problem and understand which concrete actions are needed is to adopt the concept of "Ecodesign" (Singh and Sarkar, 2020). This approach considers the integration of environmentally friendly practices in the development of products throughout the entire product life cycle from raw material to the end of life (ISO, 2011) – and thus includes the EoL extension of Su's. (2020) SPD model as well as the input aspect. Ecodesign consists of a set of practices commonly referred to as Ecodesign Practices (EPs) that lead to designing and developing a sustainable product (Charter and Tischner, 2001). The EPs can be adopted to design and produce products which are safe and sustainable and, whenever possible, include a circular process to ensure that the end of a product's life is the birth of something new (Singh and Sarkar, 2019 a, 2019 b), which is represented in Su's model in the aspects of material recycling and component reuse. Through analysing a multitude of studies, Singh and Sarkar (2019a) have aggregated a list of 41 individual EPs that are used, adjusting for commonalities

among these EPs in the studies (e.g., one article mentions an EP as “Avoid toxic materials” and in another article, an EP is mentioned as “Choose non-toxic materials”). The EPs obtained are given with a short description in Table 2.

Ecodesign practices	Description
1. Selection of non-toxic materials	Avoiding materials that contain hazardous substances such as asbestos, lead, lithium etc.
2. Avoid caustic and/or flammable materials	Avoiding flammable materials such as ethanol, rubber, acetone etc.
3. Selection of renewable energy	Avoiding materials which are derived from the sources which are not replenished naturally or require very long time to replenish (i.e., minerals, tropical wood, fossil fuel, zinc, platinum, copper, and tin)
4. Selection of low energy content materials	Choosing materials which consume very little amount of energy during their extraction and production
5. Selection of recycled material	Using materials which have already been used in some other products so that the energy consumed in the extraction of these materials is not lost
6. Avoid variety of material	Using variety of materials to not hinder the recycling process and not reduce the productivity because different materials may have different methods of processing
7. Choosing recyclable material	Choosing a material that ensures a significant amount of material recovery through recycling (e.g., Aluminium)
8. Choosing biodegradable material	If a product has short life span, then it is preferable to use biodegradable materials such as Polyesters and Polyanhydrides
9. Choosing materials that require no or less post processing	Avoiding materials which require post processing such as painting, surface finishing, cleaning etc. because it will result in increased production steps
10. Reducing the material requirement	Reducing the material requirement by optimising the size of the product
11. Using alternative manufacturing techniques	Choosing manufacturing technique which has lesser environmental impact
12. Reducing production steps	Reducing the number of steps in production of the products. It should be considered during the selection of materials and manufacturing techniques
13. Ensuring easier maintenance and repair	Indicating the parts that require frequent inspection

14. Enhancing durability and reliability	Reliability and durability are the vital characteristics of a product. Use methods like failure mode and effect analysis
15. Less and clean consumables for production	Ensuring that less amount of supporting materials (i.e., consumables) is required during production process. If required, then it should not contain hazardous substances
16. Installing protection against release of pollutants and hazardous substances	Ensuring that there is no or minimum release of substances such as harmful gases and hazardous liquid or solid consumables
17. Less and reusable packaging	Lesser the packaging, higher will be the saving of material and energy during transportation. Thus, it reduces the possibility of waste and emission
18. Choosing recyclable packaging	Choosing packaging materials that can be recycled easily and have high percentage of recyclability (e.g., plastics and cardboards)
19. Choosing lightweight materials for packaging	Lightweight materials for packaging reduce the volume to be transported and stimulates easy take back of packaging materials
20. Energy efficient mode of transport	Transport through ships or trains is most favourable followed by road transport. Air transport causes the highest impact on environment
21. Energy efficient logistics	Ensure that the transport is loaded efficiently and at the same time distribution logistic is efficient too
22. Reducing total volume of the product	Lesser volume will ensure a greater number of products to be transported at a time. Also, it will be easier to maintain and repair
23. Reducing energy consumption during usage	If product has a heating component, then it must be well insulated. Each energy intensive product during usage must have a default power down mode
24. Clean and low energy consumption for production	Choosing energy sources that cause less consumption and less emission (e.g., in case of coal, choosing coal with less Sulphur content (anthracite))
25. Minimising production waste	Optimising the production system in such a way that production wastes can be minimised inside the company
26. Choosing a clean source of energy for usage	Clean source of energy ensures lesser emission of harmful substances in the environment especially in case of a high energy consuming product
27. Reducing the number of consumables during usage	Designing the product in a way that it requires only a few consumables for its proper functioning (e.g., use permanent filters rather than paper filters in coffee makers)

28. Ensuring no wastage of energy or consumables during usage	Designing the product to enhance the user's ability to use it as per the need to avoid the wastage. Use techniques such as eco-feedback or forced functionality
29. Shared use of the product	When a product or service is used or shared by several people than the product is used more efficiently
30. Stimulating reuse of the entire product	Reusing the product either for the same purpose or for some other purpose. The environmental benefits are better if the product retains its original features
31. Stimulating remanufacturing and refurbishing	Designing the product so that working components or sub-assemblies can be taken out easily to use in other assemblies
32. Stimulating recycling of material	If possible, use same type of material for the entire product. If not possible then use materials having compatibility with each other
33. Ensuring closed-loop recycling	Closed loop recycling ensures no, or minimum wastage of material and the recycled material can be used to manufacture the same product again
34. Ensuring safe incineration with energy recovery	If reuse and recycling is not possible, next option is to incinerate the product or its remains along with energy recovery. Certain metals are also recovered during this process. It is also known as 'thermal recycling'
35. Emphasising a modular product structure	Designing the product in different modules so that it can very easily adopt the required changes (e.g., additional memory slots in computers)
36. Ensuring safe disposal of product remain	If it is not possible to recycle or recover energy from the product remains, then it should be disposed safely
37. Targeting a classic design	Designing the product for significant aesthetic life at least up to its technical life because people tend to change the product if it goes out of fashion
38. Reducing number of parts or components	The lesser the number of parts or component, the easier will be the assembly and disassembly
39. Ensuring a strong product- user relation	Adding certain features in the design of a product that develops a strong relation between the product and the user
40. Ensuring integration of product functions	Integrating various product features in a single product result in the saving of material and space
41. Optimising the functionality of product	Eliminating unnecessary features that are added to products to achieve lucrative appearance

Table 2: List of Ecodesign practices with short description - Singh and Sarkar (2019a, p.4-5)

While the EPs listed above have been identified as applicable in any sustainable product development scenario (Singh and Sarkar, 2019a), they do not indicate which ones are chosen at what time in the product development process. It would be interesting to understand which practices can be allocated in SPD processes and how that corresponds to the theory and the new empirical material.

2.4. Conclusion and comparison

In this chapter, key concepts and definitions were presented and elaborated upon. The concept of the three sustainability dimensions (economic, social, and environmental) permeates both the theory of corporate sustainability and sustainable product development, highlighting the interconnectedness and interdependency of the topics within organisations. While the previous section highlighted how NPD could be used as a foundation for SPD and extended to include the entire life cycle of a product, they are still very static concepts. They only overlap in certain parts (such as the primary steps). Moreover, the academic literature shows a lack of research on the actual implementation of the SPD model in practice and reports on how individuals within organisations approach these processes in light of their corporate sustainability ambitions and strategies. The following table aims to give a comprehensive and concise overview of the similarities and differences in the literature on NPD and SPD.

Literature source	Main steps*	EoL built in	VoC built in	Market orientation built in	Iterative validation built in	Input to PD built in	Output from PD built in	EPs allocated within the process
<i>Tzokas et al. (2004)</i>	Yes	No	No	Yes	No	No	No	No
<i>Cooper (2017)</i>	Yes	No	Yes	Yes	Yes	No	No	No
<i>Su (2020)</i>	Yes**	Yes	No	No	No	Yes	Yes	No
* Idea generation, scoping, building business case, development, testing and validation, and market launch								
** Albeit summarised in the steps product design, prototyping and test, production and distribution and retails								

Table 3: Similarities and differences in literature frameworks

Based on table 3 (above), several questions arise. Is Su's (2020) SPD process as outlined above applied in practice? Are there elements that might be missing, such as VoC and iterative feedback loops from Cooper (2017), especially in the non-overlapping parts of the models? When are the EPs considered and applied in the SPD process? Most importantly, is this a "one-size-fits-all" framework, or does it have to be adapted to a company's sustainability strategies? If so, how does that take place? These gaps in the literature are addressed by the chosen research questions of "How do the processes of sustainable product development look like in practice and how do they compare to the insights from theories?" and "In what ways do organisations approach the development processes of sustainable products considering their company-level sustainability ambitions?" and answering them presents the overall goal of this thesis.

3. Methodology

This chapter aims to elaborate on the research approach of this study and the selected qualitative method. First, the significance and influence of the interpretivist tradition - with a focus on the sub-tradition of symbolic interactionism - on this thesis will be highlighted. Furthermore, the section will shed light on the qualitative research design. Next, the qualitative data collection - one of the most fundamental parts of this study - will be presented with the empirical material accumulated through semi-structured interviews. Following that, there will be a deep dive into the data analysis process and an explanation of the different steps and measures that were undertaken. Finally, the aspect of reflexivity and the possible limitations of this research will be reflected upon.

3.1. Research approach

The research approach proposed to conduct the thesis is the social constructionist perspective. Due to the qualitative nature of the paper, it is critical to understand that the (lived) reality of the individuals participating in the interviews is socially constructed through the acts of interpretation undertaken by the individuals themselves (Prasad, 2018). Consequently, the author is interested in how individuals responsible for and involved in the development processes of sustainable products perceive and give meaning to their engagements considering their company's overall sustainability strategy. By focusing on the interpretive tradition of Symbolic Interactionism (SI), the author wants to enhance the chosen research approach.

Herbert Blumer (1969), widely regarded as SI's primary architect, developed three fundamental assumptions that serve as the foundation of symbolic interactionist thinking (Prasad, 2018). (1) Human beings act towards objects on the basis of the meaning that these objects hold for them (Prasad, 2018, p.21), (2) The meaning of such objects arises out of the social interactions one has with the larger society (Prasad, 2018, p.21), (3) These meanings are not entirely predetermined but are constantly being modified through a series of individual interpretations (Prasad, 2018, p.21). The relationships between language (Rogers, 2004) and the meaning-making activities of individuals engaged in the product development processes and the sustainability strategies of their organisations can be described, interpreted, and explained by using the SI approach.

The relationship between data collection and analysis and theory and data can be discussed using three types of reasoning: deduction, induction, and abduction (Kennedy & Thornberg, 2018). The study outlined in this proposal focuses on abduction as the reasoning. It seeks to discover new concepts, ideas, and explanations by uncovering unexpected phenomena, data, or events that prior knowledge cannot explain. This entails using codified knowledge on the researched subject matter (in this case, organisational sustainability, product development and sustainable product development) and modifying, elaborating on, or even rejecting theory if necessary, or combining old ideas in novel ways to examine, understand, and explain the new data (Kennedy & Thornberg, 2018). The practical application of this theory entails being open and sensitive to data collected during interviews while also allowing for the use of pre-existing theories (Alvesson & Sköldberg, 2008), as outlined in the thesis' theoretical underpinnings section.

3.2. Qualitative research design

In a qualitative study, "research design should be a reflexive process operating through every stage of a project" (Hammersley & Atkinson, 1995, p.24). These activities, including data collection and analysis, theory development and modification, elaborating or refocusing research questions, and identifying and dealing with validity concerns, frequently occur in tandem. Each factor has the potential to influence others (Maxwell, 2008).

Maxwell (2008) developed the model of research design presented in this chapter and the model that was used for the research study. It is intended to aid in understanding the actual structure of the study and the plan for how this study will be carried out in practice. The model is made up of five parts, each of which is critical to the coherence of a study (Maxwell, 2008). First, this study seeks to investigate how individuals involved in developing sustainable products navigate the meaning-making process while taking their micro-level sustainability strategies into account. Second, the conceptual framework for achieving the said goal would be based on the research of prior literature (see chapter 2, Theoretical underpinnings) on the topics of Corporate Sustainability (CS), New Product Development (NPD) and Sustainable Product Development (SPD).

Third, based on the previous chapters' information, the following research questions have been identified: "How do the processes of sustainable product development look like in practice?", "How do these processes compare to the theoretical framework presented in the literature?" and "In what ways do organisations approach the development processes of sustainable products considering their company-level sustainability ambitions?". Fourth, semi-structured interviews were used to collect data and achieve the study's goal of answering research questions (more information will be presented later in this chapter). Furthermore, various techniques will be used to analyse the data and then build arguments based on the results.

Focusing on collaborating with sustainable food fast-moving-consumer-goods (FMCG) companies in Germany (except for one company operating in the German-speaking part of Switzerland) stems from the fact that green consumption has continuously increased over the past years. A growing number of consumers in Germany buy green, eco-friendly, or sustainable products (Steinemann, Schwegler, & Spescha, 2017). Within the FMCG market, there is a distinction between food and non-food products (Niedermeier et al., 2020). Considering that the food sector accounts for 73% of the total retail market in Germany (Zehntes & Rittinger, 2009), a broad number of stakeholders could be interested and benefit from the study.

Prior to the interviews, various documented sustainability activities (e.g., sustainability reports, sustainability engagements) of the interviewee's organisations were researched to understand how sustainability is represented within their organisational environment. Finally, to address the topic of reliability, certain limitations that could

have influenced the credibility of the empirical material are highlighted (see chapter 3.5).

3.3. Qualitative data collection

Data collection is critical for all research projects (Bryman, 2012) because it allows for grounding the research work in the empirical world (Bogdan & Biklen, 2007). When collecting qualitative data, various techniques such as field notes, individual or group interviews, observation (ethnography), official documents, photography, and official statistics can be used (Bogdan & Biklen, 2007). Considering all the options mentioned above, semi-structured interviews with several organisational individuals involved in sustainable product development were chosen as the primary source of data collection.

Elaborating further on the aforesaid data-collection choices, the method of semi-structured interviews was selected and subsequently conducted. This technique allows for capturing unexpected aspects and information (Somekh & Lewin, 2005) that could add another layer of complexity to the study. Because of the emphasis on the interviewees' socially constructed realities, it became necessary to level the playing field by adjusting the interview settings to meet their individual needs and, thus, create a conducive conversational environment. On the other hand, it is essential that specific themes were covered for the interviews to be comparable later in the study. As a result, the semi-structured approach is the best fit. There is flexibility in the direction in which the interviewees take the conversation because a 'road map' of questions that guide us through the interview is produced (Adams et al., 2014). Furthermore, if a significant theme emerges during the interviews, this method of interviewing allows for iteratively adjusting the research's focal point (Bryman, 2012).

A preliminary interview outline with a broad thematic overview (see Appendix A) was designed and distributed to convey the intentions behind the choice of semi-structured interviews. The purpose was to give the interviewees a general idea of the topics intended to be touched upon. After securing all the interviews, the preliminary document was revised, and the interview guideline was produced (see Appendix B). The interview guide's design was centred on a specific set of vital questions that served as an anchor to the line of questioning. The questions were categorised and classified

(Wellington & Szczerbiski, 2007). The research was conducted following what Maykut and Morehouse (1995) refer to as 'categories of inquiry' (p.84). Questions were chosen by grouping them into groups or clusters, and five relevant themes were identified. These themes aided in maximising the potential of the interviews and partly guided the empirical data analysis.

1. **Theme 1:** Professional journey and capacity
2. **Theme 2:** Corporate sustainability
3. **Theme 3:** Sustainable Product Development (SPD)
4. **Theme 4:** Other elements in SPD
5. **Theme 5:** Barriers

Overall, seven interviews ranging from 30 to 60 minutes were conducted. The goal was to have enough time to interact with the empirical material until response saturation occurred. Furthermore, and addressing the number of interviews, it is common knowledge in research that the credibility and insights generated by the qualitative inquiry are dependent on the richness of the information and the researchers' observational and analytical abilities rather than the sample size (Patton, 2002).

The table below summarises the interviewees, their professional titles, and the industry in which they work. All identities have been anonymised under the ethical requirements of qualitative research, and the organisation's title has been removed.

Name (Interview date)	Position/Title	Industry	Company
<i>Interviewee 1 (30.03.2022)</i>	CEO	FMCG - Food	Company A
<i>Interviewee 2 (31.03.2022)</i>	Product management	FMCG - Food	Company B
<i>Interviewee 3 (31.03.2022)</i>	Customer and Community Communication	FMCG - Food	Company B
<i>Interviewee 4 (08.04.2022)</i>	Production manager	FMCG - Food	Company C
<i>Interviewee 5 (05.04.2022)</i>	CEO	FMCG - Food	Company D
<i>Interviewee 6 (01.04.2022)</i>	CEO	FMCG - Food	Company E

<i>Interviewee 7 (08.04.2022)</i>	Product management and Sustainability	FMCG - Food	Company F
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Table 4: Interview Participants

Due to the limitations of the COVID-19 pandemic and the geographic restriction, the interviews were conducted online over the video-telephony software Google Meet, Zoom or Microsoft's Teams (depending on the participants' preference). Two interviews were conducted over the phone due to technical difficulties with the video telephony software indented for the interview. The companies for the analysis were selected based on an in-depth analysis of their product portfolios and an analysis of all their published material regarding their sustainability efforts in operations. It was essential to ensure comparability by choosing companies in the same industry (food FMCG), similar in size and with an equal or similar level of sustainability throughout their entire organisation. The following table gives an overview of the companies' specialisation, employee count and sustainability efforts.

Company Name	Specialisation	Company size	Sustainability efforts (summary)*
<i>Company A</i>	Sustainable juices, cereal, and broths (vegan, organic)	40+	<ul style="list-style-type: none"> - Food waste from juice production will be used for broth production - The rPET of the bottles is recycled and cardboard, insulation (made 100% of renewable energy sources) and cold packs (consist of 99.5% water) are reused. - Compensation of CO² emissions (supporting a marine conservation project)
<i>Company B</i>	Sustainable and healthy chocolate, protein shakes and protein bars (vegan, organic)	100+	<ul style="list-style-type: none"> - For every sold product a tree will be planet (reforestation product) - Organic and plastic free packaging (fully biodegradable at home)

<i>Company C</i>	Sustainable snacks with alternative protein source (organic)	5+	<ul style="list-style-type: none"> - Alternative protein source needs considerably less resources (water, feed, etc.) compared to meat - Less GHG emissions from the alternative protein source - Regional and European supply chain - Animal friendly
<i>Company D</i>	Sustainable and healthy crudités foods (vegan, organic)	10+	<ul style="list-style-type: none"> - Plastic free packaging (only biodegradable alternatives) - Regional supply chain - Made by hand (local manufacturing) - powered by 100% renewable energy
<i>Company E</i>	Sustainable, biodegradable, and edible cutlery alternative (spoons, swizzle sticks, straws) (vegan)	10+	<ul style="list-style-type: none"> - Reducing plastic waste and GHG emissions - Upcycling waste material from other supply chains to produce products - Compensation of remaining CO² emissions (supporting a drinking water project)
<i>Company F</i>	Sustainable snacks and meals (organic, vegan)	60+	<ul style="list-style-type: none"> - Focused on social impact (supporting world hunger initiative) - B-corp certified - In process of climate neutral certification
* Based on published material (reports, website, etc.)			

Table 5: Interviewed companies

During the interviews, the "delicate balance between cognitive knowledge seeking and the ethical aspects of emotional human interaction" (p.125) was kept in mind by Kvale. In addition, attention was paid to the lived interview situation (Kvale, 1996) by focusing on the interviewee's voice, facial, and bodily expressions as they made statements. It was critical to focus on these aspects to provide richer access to the subject's meanings (Kvale, 1996), primarily since the interviews were conducted online.

Because the interviewees were all from German or German-speaking countries and thus native German speakers, all the interviews were conducted in German. To maintain the transparency and accuracy of the content gathered, it was decided not to change citations from interviews, even if they contained grammatical errors. The form in which transcripts can be brought to paper varies (Ives, 1974). However, the efforts

were focused on remaining as true to the original material as possible, ensuring that the interviewee's accounts were not skewed towards what they might have wanted to express based on personal preference.

3.4. Data analysis

The interviews were taped, transcribed, and translated into English. Following sorting, the data was codified (categorised into themes) and analysed. To ensure that all the interviews were recorded in their entirety, both a laptop and a phone were used to record the conversations. An artificial intelligence transcription software (trint) was then used to complete the transcription process.

After completing the transcripts, the process moved on to codification. The following illustration gives a concise overview of the analytical data scheme used in the analysis.

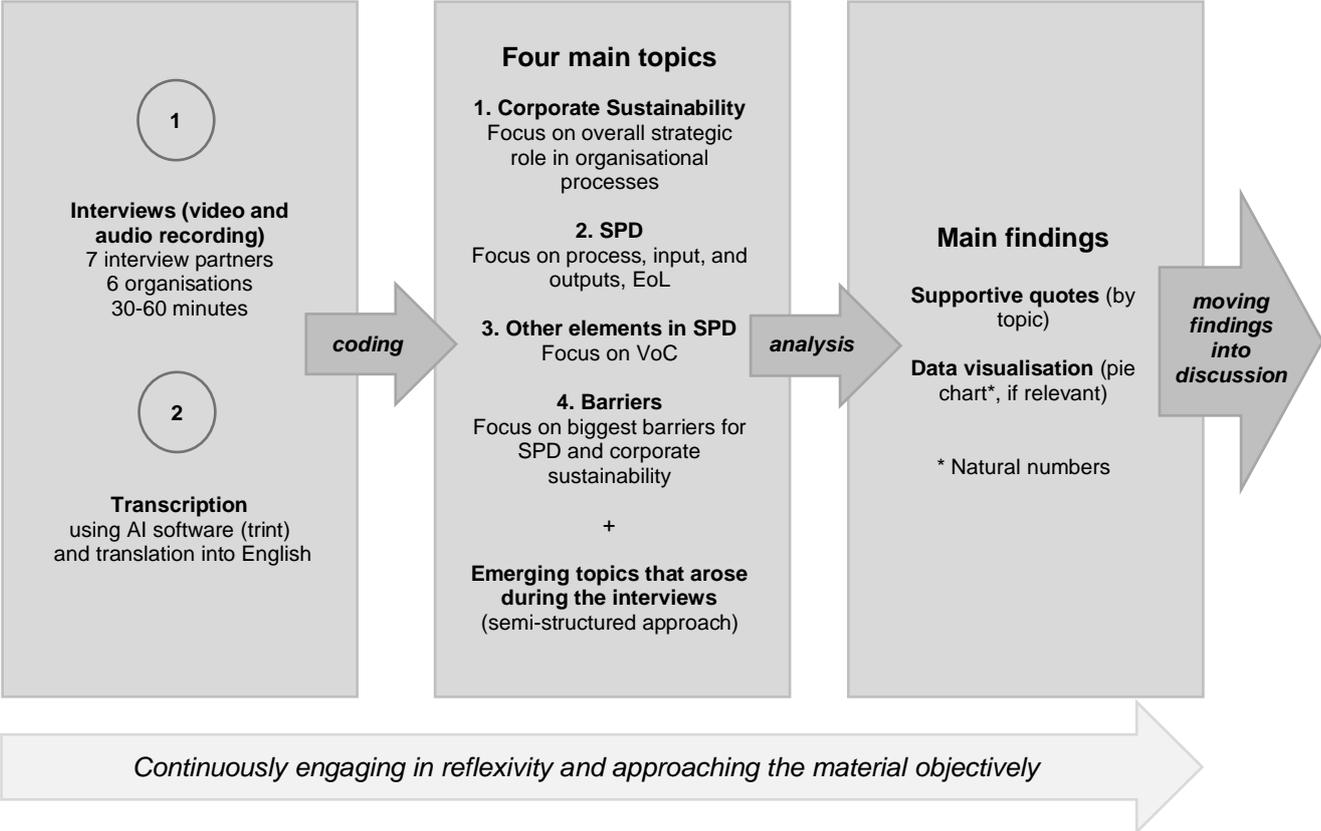


Illustration 1: Visualisation of data analysis process

Gubrium and Holstein's (1997) 'whats' and 'hows' and analytical bracketing were used in the analysis process. Due to the limitations of conducting the study digitally, Baker's (2002) approach was decided upon, and the interviews were analysed

ethnomethodologically rather than naturalistically. This entails viewing the interview as a social environment (Rennstam & Wästerfors, 2018). The interviews were observed by paying attention to "the interactive work taking place during question-and-answer processes in interviews" (Rennstam & Wästerfors, 2018, p. 48).

Furthermore, as previously stated, the 'whats' and 'hows' of Gubrium and Holstein (1997) were used to analyse the interviewees' social reality and the constitutive activity. The duality of social reality was recognised and incorporated into the study through analytical bracketing. There is a shift from approaching the material as constructionists, asking how-questions, and looking at the data from a naturalist perspective to asking what questions (Rennstam & Wästerfors, 2018). In other words, this entails participating in the interplay between an interest in 'how' something is done and an interest in 'what' it is made of (Gubrium & Holstein, 1997).

Three phases of data analysis were carried out, as defined by Roulston (2014): (1) data reduction, (2) data reorganisation, and (3) data representation. Researchers have considerable variation in how these phases are named and enacted (see Miles et al. 1994; 2013), but it was decided to concentrate on Roulston's approach. The grounded-theory approach of understanding the main ideas via codes (as previously mentioned) (Roulston, 2014) was used to conduct the first phase of the analysis. In practice, this entails noting the various themes (codes) and highlighting them in the documents and highlighting specific terms or words used by interviewees to describe, justify, or motivate a statement.

When addressing the coding phase in practice, this study orients itself on the data structure proposed by Gioia et al. (2012). At the beginning of the analysis process, similarities and differences among categories are sought. Due to the abductive approach of this research (the back and forth between theory and empirical material), the 1st-order analysis and subsequently all steps that follow are informed and, to some degree, shaped by the four main themes from the interviews (as described in illustration 1). After this step, the 2nd-order analysis takes place. Here it is examined whether the concepts suggest themes that might help describe and explain the phenomena at hand. The focus here is mainly on nascent concepts that do not seem to have been adequately represented in the existing literature (Gioia et al., 2012). Once a workable set of concepts and themes is at hand, it is investigated whether it is

possible to distil the previous work even further into “aggregate dimensions”. Based on these three elements, the data structure of the study can be explained. The following illustration visualises the process and exemplifies it.



Illustration 2: Process for data structure. Reproduced from Corley and Gioia (2004)

After following the above-described data structure, four aggregated dimensions with various themes were identified.

Aggregated Dimensions	Theme(s)
<i>Corporate Sustainability</i>	<ol style="list-style-type: none"> 1. Ethical rationality over economic considerations
<i>SPD in practice</i>	<ol style="list-style-type: none"> 1. Alignment with Su’s (2020) model or experimental approach 2. Considerations of inputs and outputs 3. Consideration of EoL
<i>Other Elements in SPD</i>	<ol style="list-style-type: none"> 1. Consideration of VoC, 2. Research and development (R&D) as new input
<i>Barriers and facilitators to SPD</i>	<ol style="list-style-type: none"> 1. Governmental regulations 2. Consumers illiteracy 3. Environmental certification

Table 6: Aggregated dimensions and themes

The different concepts represented through quotes from the interviewees have not been included in the table as they will be presented in the next chapter (findings).

To represent the data, various options were chosen to highlight the versatility of the collected material. There is a constant shift between themes, which is supported by direct quotations from interview transcripts, descriptions, and narratives that represent the participant's experience and point of view (Roulston, 2014). There was a constant engagement in what Rennstam and Wästerfors (2018) refer to as re-sorting and re-analysing during the analysis mentioned above process. "Sorting is more a question of creating order" (p. 101), and it is sometimes necessary to adjust and recreate that order. The goal was to remain open-minded about the empirical material and the findings and allow for the questioning and re-work of orders and findings that were initially thought to be conclusive.

3.5. Reflexivity and possible limitations

Reflexivity is recognising that the product of research invariably reflects parts of the researcher's background, environment, and predilections. In theory, sound research should be objective, accurate, and unbiased, but the author is aware that this cannot be guaranteed. Qualitative researchers cannot claim to stand outside and above the text of their research reports, despite their best efforts to approach their material objectively (Gibbs, 2007).

Rather than eliminating their effects as a researcher, the author wants to comprehend and explain them as they were observed and reported (Gibbs, 2007). As Brewer (2000) posits: "We are encouraged to be reflexive in our account of the research process, the data collected and the way we write up because reflexivity shows the partial nature of our representations of reality and the multiplicity of competing versions of reality." (p. 129). Thus, as a thesis writer seeking the same level of reflexivity, the author will emphasise the circumstances and other external aspects I encountered throughout the study to ensure complete transparency.

The possible influence of the interview environment

Considering the status (April 2022) of the global COVID-19 pandemic and with the interview participants located outside of Sweden, it is necessary to collect the data through interviews on video telephony platforms. Hence, it is essential to touch upon

the possible limitations that go hand in hand with these circumstances. The plan is to engage in synchronous interviews, which are conversations in real-time so that the questions posed are answered immediately by the participants (Bryman et al., 2019).

Source Critique

Finally, it is of utmost importance to allude to the aspect of source critique, which refers to a careful evaluation, reflection, questioning, rejection, and probing of the empirical material collected – in this case – through semi-structured interviews (Schäfer & Alvesson, 2017). During the thesis work, the author tried to the best of their abilities to analyse and view the statements made in the interviews as a source that "tells us something about the past which we should not uncritically accept" (Schäfer & Alvesson, 2017, p.35) and not take what has been said at face value. The author actively avoided treating their material as an authority, implying viewing it as "evidence of something we uncritically accept as a form of definite testimony" (Schaefer & Alvesson, 2017, p.35). Still, it is essential to note that the author, as a novel researcher, is not immune to human error and thus would want to mention the possibility of them not engaging in source critique throughout the entire process, even if unintentionally.

4. Findings

After laying out the methodology, this chapter will present the main findings predicated on the seven semi-structured interviews conducted in the last week of March and the first week of April 2022. The structure will revolve around the four aggregated dimensions (Corporate Sustainability, SPD, other elements in SPD, and barriers) and their respecting themes presented in chapter 3.4. The findings will be emphasised by presenting interviewees' quotes representing their own and their organisations' reality. A visual description of the process can be seen in illustration 2 in chapter 3.4.

4.1. Corporate Sustainability

Within the dimension of corporate sustainability and its overall strategic relevance for the organisation, the theme of deciding on ethical rationality over economic considerations and vice versa, meaning economic feasibility over ethical impact, occurred. The statements presented below showcase the reasoning for either concept. Interviewee 1 described their approach to CS as follows:

“We have a few core values and sustainability is absolutely one of the core elements [...] that's why it's often a bit of a decision against profitability and for sustainability [...] But yes, sustainability is one of the basic themes for us, which actually runs through all decision-making processes...”

Interviewee 1, CEO, company A

Interviewee 2 also emphasised the importance of sustainability as one of the core values and exemplified how they are actively going against economic profit for environmental sustainability by their choice of packaging.

“... our current values have to be considered in combination. On the one hand, sustainability, but also the health aspect, [...] This is expressed on the one hand through the ingredients in the sugar content, and then through the packaging, which is plastic-free and can be composted at home. [...] This packaging is extremely expensive, and that has to be said. If we simply wrapped our bars in a normal - in the industry jargon it is called a plastic tubular bag, which is what you normally see, that would probably be 20 per cent of the cost, but it simply has to be worth it for one to make a contribution to sustainability.”

Interviewee 2, product management, company B

While CS is seen as a vital red thread to follow through all interviewed businesses, some interviewees admitted to the entrepreneurial struggle of aligning economic goals – such as the venture's survival – with the desired sustainable actions. Interviewee 7 explained their stance as follows,

“...That means that if the question is whether you change the packaging to recyclable, but the prices go up as a result and you end up with a very poor margin, then we would undoubtedly still opt for more environmentally damaging packaging, because if you have too low a margin and then can't get off the ground, then that's not sustainable either, because you might have to close down the shop because you simply can't pay the salaries any more so it's not the only top priority at all cost.”

Interviewee 7, product management and sustainability, company F

The quotes presented in this section clearly illustrate the role sustainability plays in the overall direction of the companies, permeating all processes such as supply chain management, product development and organisational strategy. 50% (companies A,

B, and D) of the interviewed companies stated that they put ethical rationality over economic consideration, which often leads to the loss of economic profit for the more sustainable solution (e.g., product packaging). On the other hand, three companies (companies C, E, and F) have highlighted how price structures and economic feasibility often lead them to sacrifice additional sustainability efforts, not for more return or company growth but rather to sustain the business. The following illustration (2) showcases the split in company strategies regarding CS.

Corporate Sustainability - Ethical rationality over economic considerations

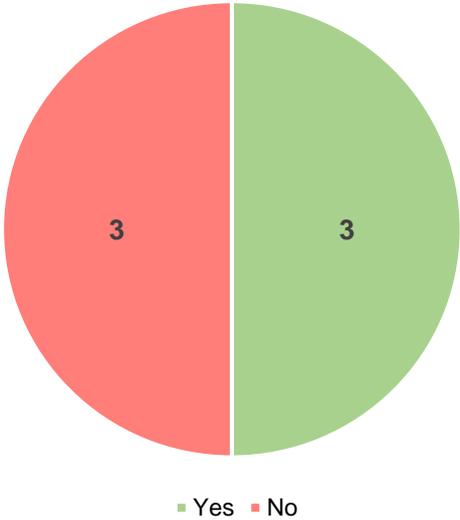


Illustration 3: Visualisation of organisations' rationality focus

4.2. Sustainable Product Development

After establishing the value of sustainability in the interviewed organisations and the different approaches in terms of strategic decisions, this section seeks to provide insights into the SPD process in practice and how it compares to the theory in literature. Within this aggregated dimension, three themes were identified. First, whether SPD in practice aligns with the main steps Su's (2020) model. Second, whether inputs and outputs are considered to the same extent, and third, whether EoL is seen as an element within SPD in practice.

4.2.1. Alignment with Su's (2020) model

The empirical material showed that the majority (4) of the researched companies followed a structured product development process similar to Su's (2020) model, where product ideation and product design were based on market data and competitor analysis, followed by prototyping and testing (reinforced by internal and external focus group testing), and concluded by production and distribution. To exemplify how the practitioners verbalised their SPD processes, Interviewee 7's statement was chosen as they give intricate detail as to how the steps look in practice:

"... we just understand that we want to have a frozen pizza [...]. And then one task is to see which varieties we want based on market data. What are the usual varieties in the vegan sector? And also in the conventional sector. [...] Then you simply go and research or look in the database of producers and contact them and tell them what you want to make for products, what you want to make for varieties, and they make you direct recipe suggestions. Or you try it out yourself in the kitchen, so to speak, to see what combinations are good [...] And then, if necessary, to give the producers alternative raw materials to hand. And then you taste the recipes from the producers, compare prices and see which producer suits you best. And then it's all about the different varieties, which you taste again. Then we usually have a target persona type, that is various external people who fit into the target group who are then interviewed again to see whether the product is really popular. And then it's time for price negotiations, quantity negotiations with the producers and delivery conditions. Then, for some products, a large-scale test has to be carried out [...] if it is a, a, perhaps a new product with a new raw material, a large-scale trial is first carried out and then it goes into production."

Interviewee 7, product management and sustainability, company F

In stark contrast to the above-described methodological step by step structure stands the SPD processes of both Company E and Company D. Due to their smaller organisational structure and novelty of their products in terms of raw material used and processed, their SPD was somewhat experimental. Their ideal product stood at the beginning, and utilising experiments and R&D; they produced their product.

"... with us the product always came first and then the production possibility for it. So, everyone does it differently. The people first look at what's running on the machines and then they somehow make sure it tastes good. They do it backwards and we do it like this - we

make our perfect product and then we see if we can somehow get it produced, [...] And that's why in product development, the only thing we ever really focused on was health and sustainability."

Interviewee 5, CEO, company D

The excerpts above explain that while all companies have similar goals concerning sustainability, their methods of approaching the SPD can vary quite drastically. The illustration below (3) shows that four companies (companies A, B, C and F) follow processes similar to Su's (2020) product life cycle part in the model in both planning and execution. In contrast, two companies (companies D and E) take up a more experimental approach to find a product that is on par with their demands in terms of sustainability, performance, and other elements such as healthiness.

Sustainable Product Development - aligned with Su's (2020) Model

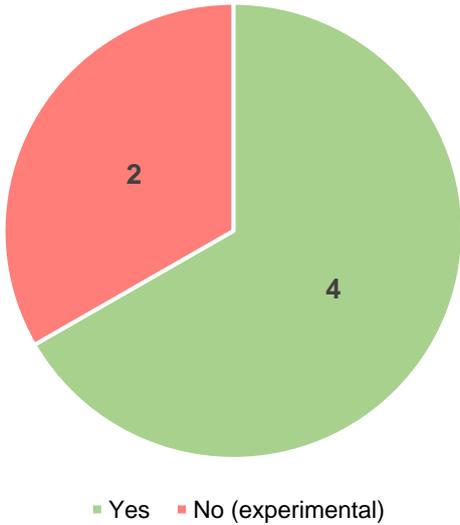


Illustration 4: Visualisation of alignment of SPD with Su's (2020) model

4.2.2. Inputs and Outputs

Within SPD, it is interesting how the inputs (material, energy, human labour, and other resources) and outputs (waste and emissions), as presented by Su (2020), are considered in practice. Overall, there seems to be a holistic approach by the companies considering all inputs and outputs.

“...we have to look at the product level of what we buy, what has been produced before and after, both water consumption and energy consumption, and then of course look at the production and also at our company, be it the office aspects, but also the travel routes of the employees, we actually look at all of them.”

Interviewee 1, CEO, company A

However, certain companies have portrayed a particular focus, namely either targeting the supply chain to be regional and sustainable through shortened transport or focusing on CO² emissions as a measurable output in the production of the product. The following excerpts demonstrate some focal points of different organisations:

“...we use these raw materials that have a low carbon footprint, use regional things as much as we can, which is certainly something we haven't focused on so much in the past. Now we are saying that if we really want to be sustainable, we have to do better in the future. We simply have to use more regional raw materials, except of course for cocoa. Of course, we can't get that from [region in Germany] yet [...] CO² is the main focus for us, from which, of course, many subdivisions then flow off again.”

Interviewee 2, product management, company B

The interviews indicate that practitioners consider the inputs and outputs rather holistically, but by their sustainability strategies and efforts, raw materials in the supply chain and CO² emissions as process output can take precedence over other elements.

4.2.3. EoL

In addition to inputs and outputs as part of Su's (2020) SPD model, the interviews have highlighted how in the FMCG-Food industry, the EoL, so when a product's service life terminates, mainly revolves around the decision of biodegradable or recyclable packaging as the content of the product itself commonly is consumed. Within this theme, the interview participants and the organisations can be separated into three categories: recyclable packaging, recyclable and biodegradable packaging or neither option (yet).

Companies A, B, and D represent the three companies that have developed partly recyclable and partly biodegradable packaging. For company A their EoL efforts are as follows:

“...you can look up at the bottle and it's 100 percent recycled, [...]. But it's also important that it's also 100% recyclable. [...]. That's something we took into account at an early stage and said, okay, it has to feed itself back in somehow afterwards. [...] just as with the cardboard packaging and such. So, we try to reuse as much as possible [...]. But yes, the disposal or that, the end product, what happened to it afterwards, we still take a close look at that.”

Interviewee 1, CEO, company A

“From the beginning, we didn't use Styrofoam insulation material, but straw, and we said that we wanted it to be biodegradable, that it could be used again [...]. So it depends on the cardboard packaging, which I think is used up to two or three times. The insulation materials even more often, except when they break, when they break it's straw. That means you can throw it all on the organic compost.”

Interviewee 1, CEO, company A

Company E has focused on the packaging that is recyclable and reusable for their consumers' day-to-day lives, to extend the packaging's life cycle as well.

“...part of the packaging has to be thrown away, but our B2C packaging that we offer in the online shop, for example, is reusable, so we chose packaging that you don't have to throw away urgently, but it can also be used again.”

Interviewee 6, CEO, company E

Lastly, two interviewees have mentioned how switching to recyclable or biodegradable packaging to consider the EoL aspect. However, they have not yet achieved the transition.

“... because as a company they basically have the goal that the packaging is either recycled or returned to a cycle through recycling or through compostability, which would then ideally be garden compostability, [...] So that's exactly what we're aiming for, that we convert the packaging to 100 per cent recyclable or compostable.”

Interviewee 7, product management and sustainability, company F

The excerpts above show that four companies are considering the retirement element of EoL in either all or part of the three options provided by Su’s (2020) framework, namely Material recycling, Disposal and Component reuse. The remaining two companies (company F and C) have expressed their ongoing efforts to engage in the same processes in the future. The following illustration (5) visualises the different EoL approaches.

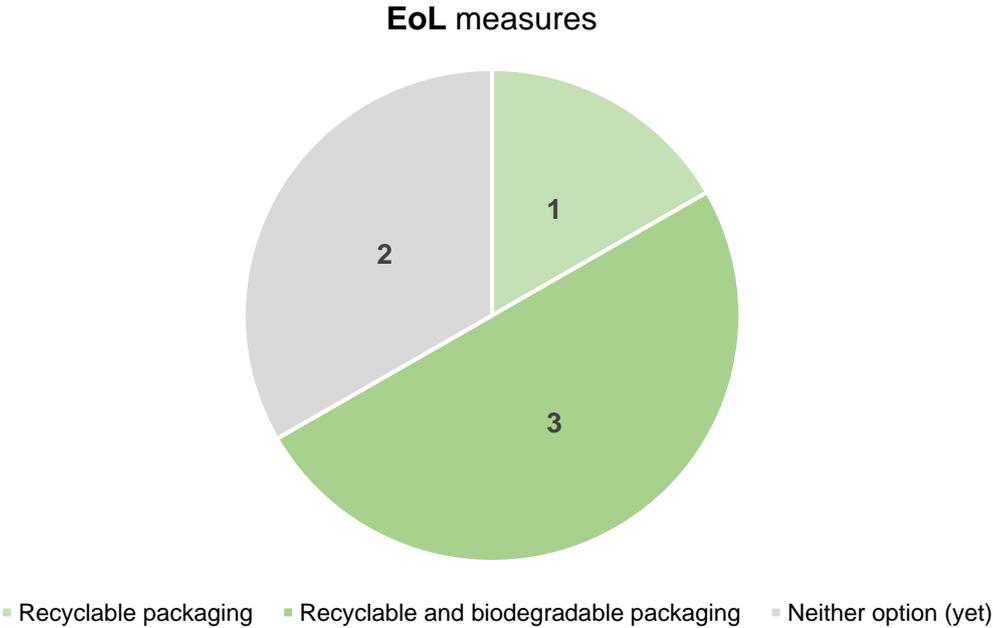


Illustration 5: Visualisation of organisations’ EoL approach

4.3. Other elements in SPD

The third aggregated dimension builds on the insights of the organisation’s CS and SPD efforts by discussing the themes of inclusion of the VoC, which is not accounted for in Su’s (2020) SPD model and the emergent topic of Research and Development (R&D) that has been raised throughout several of the interviews.

4.3.1. VoC

As previously highlighted in chapter 2, it has been shown that Voice of Customer research and including customer wants and needs in the product development process leads to better performance (Cooper and Dreher, 2010). While Su’s (2020) model does not include the VoC element, the interviews have shown that most organisations include their customer’s feedback as both a point of departure and after-sale to be able to improve their product offering consciously.

“Interviewee 3 and I always have our hourly meeting once a week [...] where I practically get the information from her. What does our community say [...]. So, I get the feedback from her in advance, and it flows directly into the product concept and thus also into the product briefing that goes out to the producers. So that already takes place and in addition we have [...] these after sale surveys [...] I also evaluate these after-sales surveys and this feedback from the surveys then flows back into the new products.”

Interviewee 2, product management, company B

“I don't know if you've been following our Instagram account lately [...] that is, we always post a story, you are asked questions, so to speak, and these things are evaluated. [...] And all of that then flows into our further planning of the company, so to speak.”

Interviewee 3, Customer and Community Communication, company B

While the statements above exemplify the importance that is assigned to the role of VoC in SPD by the interviewees, company D explained that they do not include this element in their operations as they focus on products that meet their internal sustainability, taste, and quality standards rather than customer needs.

“Yes, I would say that we are actually not really good at that. So that would be one thing. We hardly ever ask our customers. We just do what we want, what we come up with internally. [...] we just offer what is very extremely sustainable and either you are ready for it or you don't want it. But we are not at all willing to stray from that.”

Interviewee 5, CEO, company D

Lastly, company F and C both emphasise the importance of market data and retailer input and do not explicitly refer to integrated customer feedback elements like the other companies. Interviewee 7 describes their approach as follows:

“So first of all, maybe we start by always looking at what products we want to make [...] And we also look at what people don't yet have and what they need [...] I think the first step is that we focus mainly on market data and also a lot of feedback from the sales force. So that those who are then also in contact with the retailers, partly also get input: we absolutely need the product or there is a lot of demand for it.”

Interviewee 7, product management and sustainability, company F

The excerpts in this section have illustrated how the element of VoC is used for both initial inspiration and continuous improvement after the sale has already been conducted. While two companies have not explicitly mentioned VoC, they refer to market data as part of market orientation, which Cooper (2019) has identified as an essential factor for successful product development. The following illustration (6) showcases the consideration of VoC in the SPD process within the interviewed company pool.

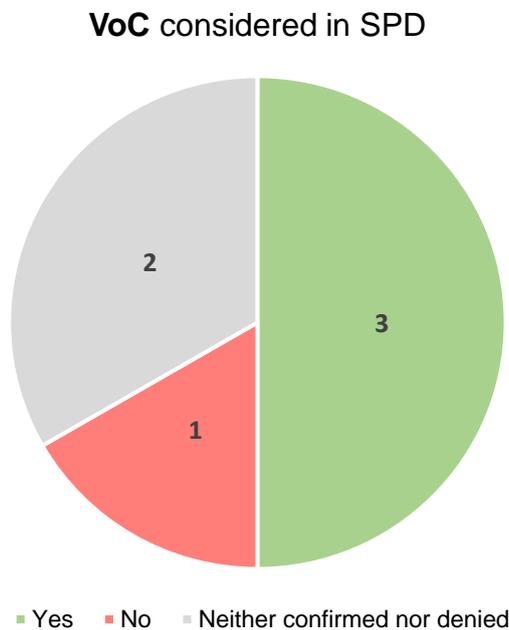


Illustration 6: Visualisation of VoC consideration in the SPD process

4.3.2. R&D as new input

As part of an abductive qualitative approach enriched through semi-structured interviews, a novel theme, which previously was not identified as a critical element, emerged during the interviews. When discussing the organisations' efforts to meet their sustainability aspirations in terms of CS and SPD, the aspect of R&D as an essential input arose.

“Of course, at the very beginning we still used normal PET bottles, for example. Then we realised that somehow this is all an issue, both for the customer and of course for ourselves.

We said plastic is a problem and then relatively quickly [...] we switched to one hundred percent recycled PET. However, at that time we still had to pay for all the tests and such. [...] If you're the first to do it, you have to pay for everything and then all the other people can just copy-paste what you've put into your brand. [...] The bottles are then also, we had to develop a new adhesive so that they are not only one hundred percent recycled, but also 100% recyclable.”

Interviewee 1, CEO, company A

As part of their product development, company A had to engage in extensive initial investment (both financially and timewise) to produce and package their products in a (more) sustainable way. This refers to their business approach of ethical rationality over economic considerations. Company B and F also elaborated on the struggle of investing in R&D. Interviewee 2 puts it as follows:

“It [their packaging] is a composite of different cellulose materials and is also printed with water-based organic inks. This means that we have 100 per cent recyclability. It has to be said, however, that this is of course still a fairly new packaging concept and therefore it is naturally also a large matter of expense for us [...]”

Interviewee 2, product management, company B

Company C has shown one of the most significant investments to further their company's sustainability agenda and their scale-up ambitions by building a farm close to their production site and HQ.

“I think I, we have our own farm that grows the [alternative protein]. That has been a very, very big step towards producing more sustainably as well, because we are self-bio certified and our raw material is verified, controlled and less than 10 kilometres away and from here and this, can guarantee this sustainability, in this sense because it is one of the basic raw materials, the [alternative protein] which we also try to incorporate in several products.”

Interviewee 4, production manager, company C

This study decided to classify company C's investment as a R&D expenditure as it not only helps with creating new products, but it also aided in developing more efficient productive processes (Lee, 2009; Stam and Wennberg, 2009). The first element can be identified in the company own production of their main ingredient and the

subsequent facilitation of implementing it in new product development, and the latter is represented by the shortening of their material and product transport.

While sustainability-related R&D expenditures were initially not considered an official input element in Su's (2020) model, the excerpts above make a case for its importance for corporate sustainability strategies and SPD. The investments can go from smaller-scale testing and package development to infrastructure facilities. The following illustration (7) shows how most of the studied businesses have confirmed their R&D efforts as pivotal to their operations.

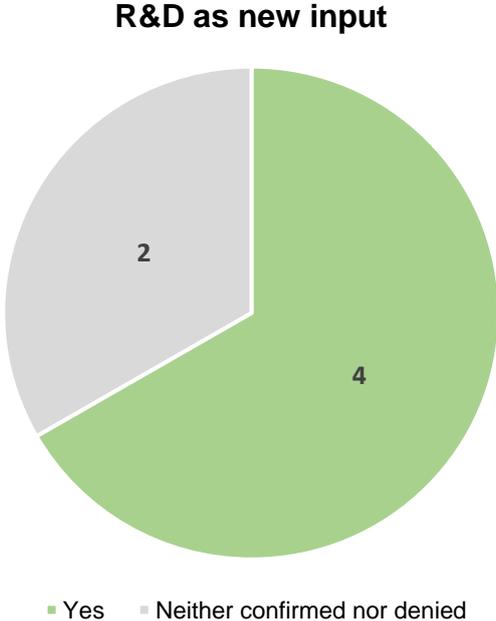


Illustration 7: Visualisation of R&D as a new input in the SPD processes

4.4. Barriers and facilitators to SPD

While the interview questions were targeted at barriers and troubleshooting efforts within SPD, the empirical material collected, and the subsequent analysis has led to the aggregated dimension of barriers and facilitators. The interviews have revealed two significant themes governmental regulations and the need for more education of the consumers.

4.4.1. Governmental regulations

There is an equal division between companies that do consider governmental regulation as a barrier (company A and F), that do not consider them as obstacles

(company C and E) and those that neither confirmed nor denied it. The following excerpts give insights into all these circumstances.

Interviewee 1 elaborated on a particularly grave problem for company A when a national regulation was instituted with very short-term communication in advance. Thus, making it challenging to adapt to it in general and especially in a sustainable manner.

“Now, in the last few years, everything has somehow become much, much more bureaucratic. [...] with the introduction of the mandatory deposit, which was only communicated at extremely short notice. We didn't know until two or three months beforehand that this was really going to take place and how it was going to take place, which also led to it being a great, sustainable issue for us. [...] now we have 30-40000 euros worth of labels that we can't use because they are not deposit labels. Can you think about what 30-40000 euros in kilograms also means in terms of plastic that actually has to be thrown away?”

Interviewee 1, CEO, company A

However, not every organisation faces governmental regulations as barriers. Company C is even going as far as explaining how the novelty of their product allows them to work with the national government to achieve the correct guidelines and values and thus levelling the path for future brands to come.

“...since we ourselves were the first to legalise, [...], the consumption of [alternative protein] in bulk sales in 2016. [...] In this sense, as far as certification is concerned, we are actually free, because the state is not yet that far advanced and we work together with the patents, with the cantonal food inspectorate and determine certain microbiological values, etc. and still have a lot of leeway.”

Interviewee 4, production manager, company C

As illustrated above, the aspect of national regulations is a very contextual element and does not apply the same way to every organisation and their circumstances. The following illustration (8) visualises the equal division between companies regarding the aspect of governmental regulations.

Governmental regulations

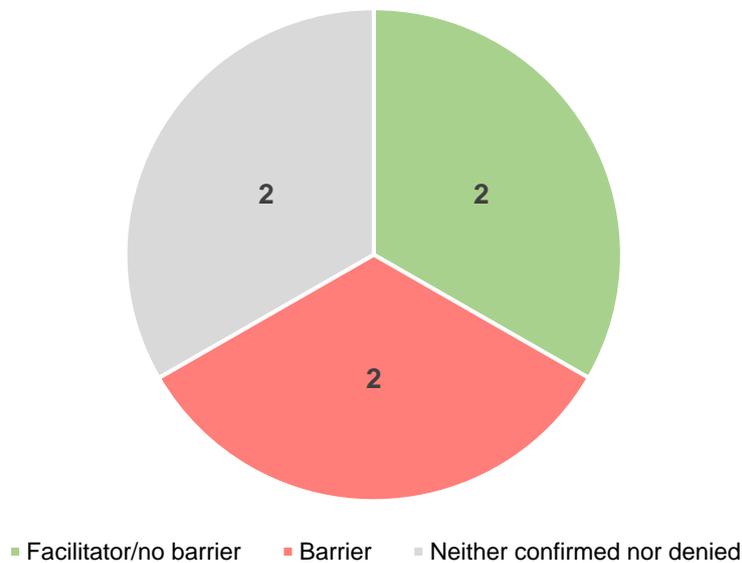


Illustration 8: Visualisation of governmental regulation as a barrier

4.4.2. Education of the consumer

Even though the original focus concerning the consumer lay on their input through feedback (VoC), another theme emerged surrounding the customer that needs to be addressed. Several companies have highlighted their struggle to explain and, to some degree, justify their sustainability decisions towards their consumers as there seems to be a lack of adequate education surrounding the topic. While the businesses have calculated and researched to ensure the most sustainable decisions (sometimes including economic considerations), the consumer might interpret it as unsustainable due to a lack of professional knowledge. Companies A, C and F have explicitly referred to this issue. Interviewee 7 described it as follows:

“And yes, I think that is still a lot of window dressing and disinformation. And then the question of a company is also sometimes they put themselves forward as supposedly sustainable because the customers expect that and expect us as [company F] now, for example, to be completely plastic-free. Then it's better because people think it would be more sustainable or I don't do it, because as an informed person who is perhaps in a position to make decisions, I say I don't do it because from an environmental point of view it makes no sense at all. And then I stick with plastic and would be perceived as even less sustainable

and lose customers as a result. That is always an issue. Sustainability is always a very emotional, very emotional topic, unfortunately.”

Interviewee 7, product management and sustainability, company F

While the consumer's input is crucial in SPD to determine which products are needed or desired, the lack of adequate knowledge of non-specialists surrounding sustainable practices is causing friction between what the companies know is the most sustainable option and what their customers think it is. If companies gave in to this pressure and moved towards less sustainable options just to be able to communicate what consumers consider sustainability to be, that would be considered greenwashing, a topic explained in section 2.1.1., which will also be touched upon in the next chapter.

4.5. Environmental certifications

The topic of environmental or climate-neutral certification is an emergent theme and imperative to sustainability and sustainable practices. The subject arose during several interviews and can be described as ambivalent in how practitioners regard it. The interviews have shown that the individuals experience the dichotomy of climate-neutral certification as, on the one hand, it is seen as a best practice that they might disagree with, but since the competitors engage in it and there is societal pressure, they do it too. Certifications like carbon-neutral have been criticised for their offsetting practices (of Greenhouse gas emissions) and false claims of carbon neutrality. The benefits of compensating emissions by those means are questioned due to corruption cases and the fact that these certifications are earned by temporal carbon removal, e.g., reforestation projects, instead of reducing fossil fuels (Bock, 2013). Interviewee 6 explains her company's reason for engaging in the practice as follows,

“I think that's the important thing, that you somehow understand the whole thing correctly and also present it correctly to the consumers [...] we also work together with a certification partner. But here, too, you always have to ask questions. And that's what we do, because at the end of the day we know that it's really just another marketing tool and that's why we have to deal with the issue. So, whether the money we pay for it really gets there and is used there is somehow not really transparent. But at the end of the day, it's just what has somehow become accepted and that's why we're taking part in it.”

Interviewee 6, CEO, company E

On the other hand, while the interviewees are aware of the criticisms and advocate them themselves, they also explain one advantage of going through the certification process, which they leverage to their benefit: the aid in measuring their emissions and impacts. Interviewee 2 puts it as follows:

“So, we actually look at, well, we are, we are, we are certified climate neutral, both as a company and on a product basis. That means we always have to look at the entire process anyway, [...] in the course of this certification process, there is almost nothing that we don't look at, [...]. Because then you actually realise okay, where are the CO² balances actually created, now in terms of CO², but also how much energy is lost. And what can be saved, where can it be saved. [...] Because we said that we don't just want the product to be neutral, but we also want to include the office and everything else as a company. [...] Of course, there is still a big issue that we still don't really find cool. Climate certificates. I don't want to say that this is greenwashing. But it is of course something that we did not find ideal.”

Interviewee 1, CEO, company A

Overall, the excerpts above highlight the previously mentioned ambivalence of the topic. Practitioners are torn between engaging in climate certifications as a form of best practice despite its apparent criticisms and appreciating the effect of having an external entity measuring their emissions and impacts through audits. While greenwashing and its practices are not a focal element of the study, it was necessary to address this topic as it is relevant even within organisations focusing on sustainability to a much greater extent.

4.6. Chapter Summary

The findings collected from the semi-structured interviews is summarised in the table below. The structure follows the four aggregated dimensions with their respective themes.

Company	A	B	C	D	E	F
<i>CS – Ethical rationality over economic considerations</i>	Yes	Yes	No	Yes	No	No
<i>SPD aligned with Su’s (2020) model</i>	Yes	Yes	Yes	No	No	Yes
<i>Inputs and outputs considered</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>EoL measures</i>	Recyclable & biodegradable packaging	Recyclable & biodegradable packaging	Neither option (yet)	Recyclable & biodegradable packaging	Recyclable packaging	Neither option (yet)
<i>VoC considered in SPD</i>	Yes	Yes	Neither confirmed nor denied	No	Yes	Neither confirmed nor denied
<i>R&D as new input</i>	Yes	Yes	Yes	No	No	Yes
<i>Governmental regulation</i>	Barrier	Neither confirmed nor denied	Facilitator/ no barrier	Neither confirmed nor denied	Facilitator/ no barrier	Barrier
<i>Education of the consumer needed</i>	Yes	Neither confirmed nor denied	Yes	Neither confirmed nor denied	Neither confirmed nor denied	Yes
<i>Ambivalence of environmental certification</i>	Yes	Neither confirmed nor denied	Neither confirmed nor denied	Neither confirmed nor denied	Yes	Yes

Table 7: Analysis summary structured by empirical findings

5. Discussion

After the presentation of the empirical findings and considering the aim of this study to understand what SPD looks like in practice, the following section will present and discuss the new model created based on the material highlighted in the previous chapter.

5.1. The circularity of SPD

After carefully considering how the empirical data affects the previous theoretical foundation on SPD, in combination with CS, the following model has been developed. To facilitate the identification of the new elements in the model they have been highlighted in yellow (see below).

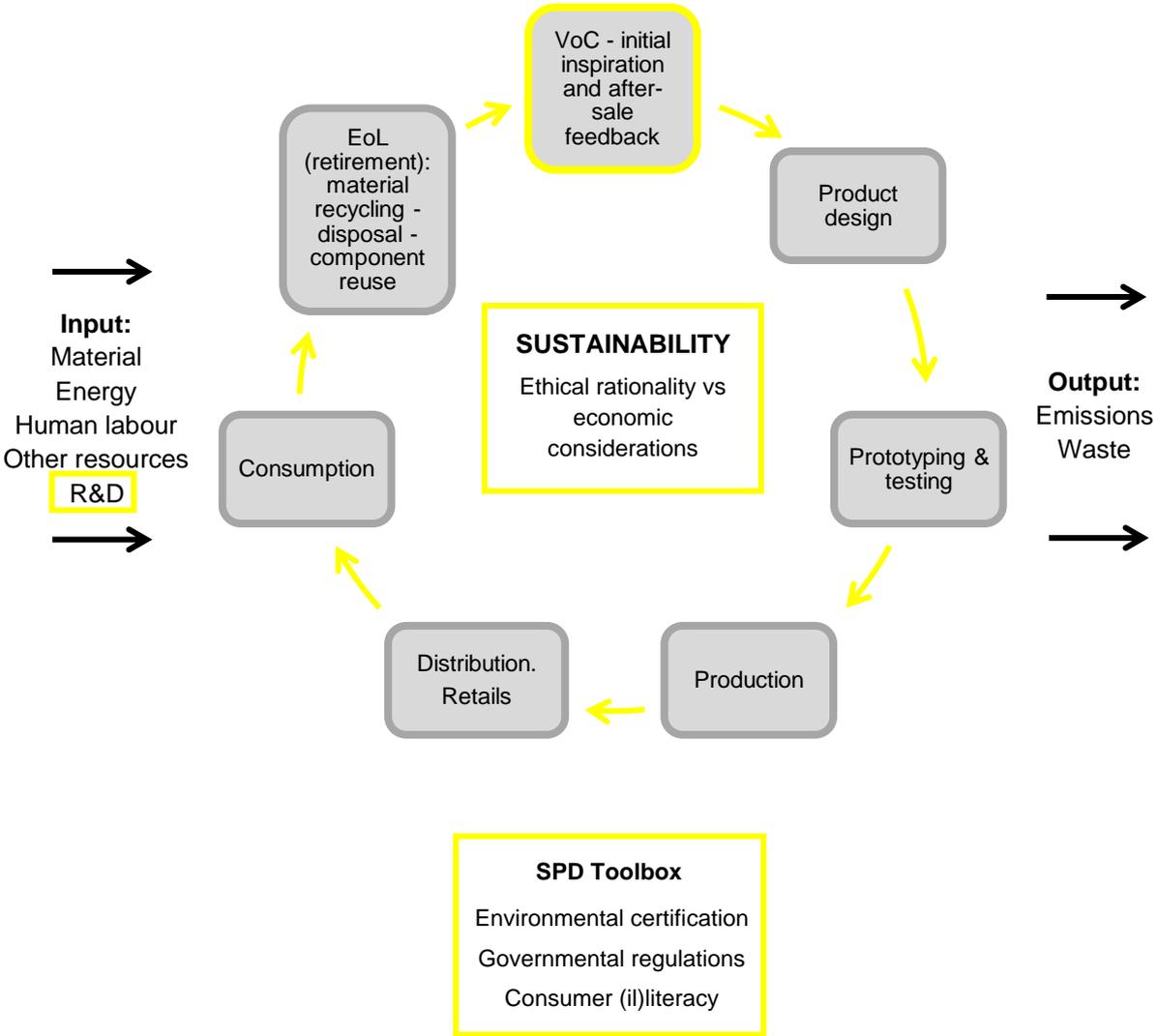


Illustration 9: Circular SPD Model – an extension of Su’s (2020) (p.5) model

The circular SPD model represents an extension of Su's (2020) model along with the addition of certain success factors as determined by Cooper (2019). First and foremost, one of the most striking changes in the model is the circular structure. Based on the interviews, the element of the VoC represents initial inspiration and concludes the SPD process as after-sale feedback. The feedback stemming from the customer after a purchase is often used as an iterative feedback loop to optimise the products, hence kicking off the same circle again. Considering the constant exchange between customer feedback, optimisation ideas and product development, the circular structure is a natural development of Su's (2020) linear model. As displayed in illustration 9, the element of Voc is the only addition as a main step within the model since the interviews have shown that Su's (2020) product cycle elements are still applicable in practice.

Additionally, the interviewee's statements on their own CS values have shown that while sustainability is the core value of all SPD processes, there often is a tension between ethical rationality and economic consideration that impacts their day-to-day decision making. As an essential element to the interconnectedness of SPD and CS, it is represented in the core of the SPD model, indicating it as the value that the process revolves around. While it would be an overstatement to say the interviews have shown clear signs of a degrowth movement, it is fair to state that the focus on long-term sustainability decision making and practice of ethical rationality over economic considerations does fit with the basic idea of voluntarily downsizing economic processes to reduce the ecological footprint to a sustainable level (Research and Degrowth, 2010).

5.2. Additional elements in the SPD model

After elaborating on the new circular structure of SPD, this section will focus on explaining the identified additions to the model, namely sustainability-related R&D expenditures and the SPD toolbox.

The elements of SPD output stay the same and have proven to be relevant to practitioners. However, the empirical data has revealed that several interviewed organisations have pointed towards their R&D efforts as part of substantial input into their product development processes. As they range from smaller-scale package development and testing to large scale investments such as constructing infrastructure

to further product development, it is necessary to highlight the importance of R&D in the new model. It is now included in the input section.

The newly developed toolbox, also represents an entirely new aspect of the model, complementing Su's (2020) framework. Su highlights the support of sustainability tools or methods, but that refers to more technical aspects such as Life-Cycle-Analysis (LCA) rather than external and internal circumstances that can be leveraged to an organisation's benefit. The fundamental idea of the toolbox is for businesses engaging in SPD to understand the methods and concepts provided as possible utensils to accelerate or facilitate their SPD processes. Based on the empirical material, environmental certifications, governmental regulations, and consumer (il)literacy are twofold and could be used to an organisation's advantage if applied correctly.

As discussed in the findings section, the element of environmental certification is ambivalent as it is, on the one hand, seen as a sort of greenwashing practice. On the other hand, practitioners have highlighted it to aid in measuring the organisation's footprint by considering GHG emissions and waste, both on an organisational and a product basis. Hence, allowing them to optimise their SPD and organisational processes to move towards even more sustainable practices. Due to this possible advantage concerning an organisation's input, output, and process metrics, environmental certifications can be leveraged to a business benefit if the choice for this practice is communicated accordingly and transparently.

Furthermore, the interviews have shown the vital role governmental regulations play in the process of SPD. While they can impede a swift process (such as in the case of company A), they can also aid in communicating and accelerating a company's business idea and product which can be seen in the case of company C.

The last tool presented in the model is the consumer's (il)literacy regarding actual sustainability practices. It is essential to highlight that the term illiteracy is not meant to carry any negative connotation but should instead illustrate the consumers' lack of knowledge on this specific topic. The specific scientific knowledge required to understand many environmental issues is often complex and ever-changing, making it difficult for the public to comprehend. Frequently comparisons are made limited to only a single environmental benefit, making a claim incomplete and misleading (Furlow, 2010). A good example is a comparison made by our interviewees between plastic and

paper packaging. While consumers believe paper packaging is more sustainable than plastic, the organisations have calculated and evaluated that plastic packages are more sustainable in some instances, forcing them to explain their decisions to their consumers to appease them. Although adding this element to the toolbox might seem questionable, the consumer's illiteracy regarding sustainable business practices can be leveraged to justify and strengthen an organisation's ethical rationality. Businesses can further sustainability within their consumers' lives by providing sustainable products and educating their customers on why certain practices might be less sustainable despite it competing with what consumers assume might be the most viable option regarding the environment.

It is essential to highlight that the tools in the toolbox can both accelerate and impede the SPD process. Due to them being highly contextual, they were chosen to be an additional and to some degree external element to the core circular SPD model to emphasise that it is at every organisation's discretion to try and utilise them to further their product and sustainability agenda.

Finally, to touch upon the practices in SPD, the EPs presented in chapter 2 have been allocated in the model (see elements highlighted in blue in Appendix C). It is imperative to state that the EPs are not industry-specific (Singh and Sarkar, 2019a). Hence some might not apply to this study's context (FMCG Food). However, they can be applied to the model in general, and it is helpful to understand in what part of the process EPs are relevant.

5.3. Chapter Summary

The following table highlights how the new circular model compares against all three theoretical models presented in chapter 2. Additionally, some of the novel contributions not included in Su's (2020) model are highlighted (yellow) to facilitate the identification of the new additions. Due to the table structure, the additional elements (see section above) are not highlighted here but can be seen in illustration 9.

Model	Main steps*	EoL built in	VoC built in	Market orientation built in	Iterative validation built in	Input to PD built in	Output from PD built in	EPs allocated within the process
<i>Tzokas et al. (2004)</i>	Yes	No	No	Yes	No	No	No	No
<i>Cooper (2017)</i>	Yes	No	Yes	Yes	Yes	No	No	No
<i>Su (2020)</i>	Yes**	Yes	No	No	No	Yes	Yes	No
<i>Circular SPD model (2022) ***</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes****
* Idea generation, scoping, building business case, development, testing and validation, and market launch								
** Albeit summarised in the steps product design, prototyping and test, production and distribution and retails								
*** based on practitioner insights								
**** see Appendix C								

Table 8: Comparison of theoretical models with newly developed circular model

6. Conclusion

The first section of the conclusion will address the research aim and research questions. Following that, the implications for practitioners will be elaborated upon, and finally, areas for future research will be proposed.

6.1. Research Aim

As elaborated in the introductory chapter of this study, the research aim was specified as filling in the gaps in the literature pertaining to the lack of knowledge on SPD processes in practice and in combination with micro-level CS strategies. Thus, the research aim has been successfully fulfilled by engaging in an abductive study based on semi-structured interviews and researching, analysing, and connecting the previously mentioned focal points.

To reiterate, the aim of the study was achieved utilising the following structure:

- Analysing current practices of sustainable product development and corporate sustainability based on the overview of the academic literature.
- Collecting empirical data through semi-structured interviews followed by coding and analysis.
- Summarising the data analysis findings.
- Predicating the empirical findings present a more detailed understanding of sustainable product development in practice.

The listed steps were successfully carried out in various chapters of this study. The first point corresponds to chapter 2 (theoretical underpinnings), the second to chapter 3 (methodology) and the fourth and fifth are fulfilled in chapters four (analysis) and five (discussion).

6.2. Research Questions

After successfully conducting the research, the research questions can be concisely answered as follows:

RQ 1: What are the processes of SPD in the literature?

The theoretical underpinnings have shown that when initially considering the new-product development processes, as shown by Tzokas et al.'s (2004) model, there is a comprehensive overview of the main steps (i.e., idea generation, scoping, building the business case, development, testing and validation, and market launch). However, due to continuous developments and the identification of vital success factors in practice, Cooper's (2017) NPD model was compared to Su's (2020) SPD model to identify potential overlaps and missing elements in the SPD processes. Su presented an excellent overview of the main steps (albeit summarised in the steps of product design, prototyping and test, production and distribution, and retails) as part of the product lifecycle and the extension of EoL along with process inputs and outputs. Nevertheless, the analysis of the theory has shown that Su is not considering Cooper's (2019) success factors of VoC, market orientation and built-in iterative feedback loops. The SPD processes in the literature did not account for aspects that have previously been identified as essential for product development. Hence, there was a need to compare and extend Su's model it with practioners' insights.

RQ 2: How do the processes of sustainable product development look like in practice and how do they compare to the insights from theories?

Considering the additions made to the theoretical model the interviewees engage in a more circular approach to SPD where previous feedback feeds back into new processes. In practice, it can also be said that there is a more focused approach rather than a holistic one, which means that due to the enormous cost, it is not possible to focus on every aspect of sustainability at all times. The study has shown that there often is a focus on CO² emissions and sustainable packaging.

Furthermore, compared to Su's (2020) SPD model, general overlapping elements include the main steps, the output, and part of the input. However, the empirical

material has shown that practitioners rely on the VoC as initial inspiration and after-sale feedback. Furthermore, the aspect of R&D has been added as a vital input. It has shown that this element prepares for and supports the SPD process to a certain extent and needs to be appropriately addressed in the model. Lastly, an essential element added to the new model is the SPD toolbox. It reflects the elements practitioners mentioned which can be used to help them tackle certain obstacles or further sustainability within their organisation or, to some extent, even in their external environment (i.e., their customers). It can be said that Su's (2020) theoretical framework builds a solid foundation for practitioners' day-to-day SPD operation, but in the case of the FMCG food industry, there must be some additions made.

RQ 3: In what ways do organisations approach the development processes of sustainable products considering their company-level sustainability ambitions?

The research has shown an interconnectedness of SPD and CS mainly manifested in the tension between ethical rationality and economic considerations. While some organisations are prepared to sacrifice growth and margins to create a more sustainable product, other brands have explained how an adequate price structure and decisions against sustainability are not a matter of economic profit but rather for the continuation and, in drastic cases even the survival of the business.

6.3. Practical Implications

The practical implications of this study are twofold. For the consideration of academic interests, it is vital to understand how theoretical models need to be complemented with practitioners' insights to reflect the processes accurately. Additionally, the research has shown how the combination of frameworks can help the researcher look for specific elements (such as the VoC) that might not have been considered previously.

Turning to the business sector, this paper has highlighted how the SPD processes are implemented in practice for the FMCG Food industry. Businesses and practitioners can use the new circular SPD model as a point of departure for their whole process or, at a minimum, a reconsideration of their current processes. Additionally, by allocating the EPs in the new model, organisations can use the lists of actions as a guide toward becoming more sustainable in their product development.

6.4. Future Research

While this study sufficiently highlighted SPD and the interconnectedness with CS in the FMCG Food sector in Germany and German-speaking regions, the author recommends researching the topic further. A broadening of the scope could lead to developing a more holistic model that can be utilised across industries and countries. Thus, it could lead to more easily accessible guidelines for making products and product development more sustainable. Considering the empirical material presented in this paper, it is beneficial to include practitioners' insights to investigate their experiences and let the interview partners lead the researcher to new emerging topics. This could lead to a model that would be even more encompassing and hence useful for organisations in all industries and all geographical locations.

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Appendix

Appendix A – Brief Interview Outline

Brief outline: Interview structure & overarching themes

Virtual meeting protocol

Interview outline	I would like to talk with you about your insights regarding various themes, ranging from corporate sustainability, sustainable development processes, and business outlook on the aforementioned. What I learn from today's discussion will hopefully enable me to achieve the purpose of my thesis work. That is, to shed more light on sustainable product development and its relationship with corporate sustainability.
Guidelines	<p>Before our eventual virtual meeting, I would like to review a few guidelines for the discussion:</p> <ol style="list-style-type: none"> 1. I will be asking you several questions relating to the subject matter. However, given the semi-structured nature of the interview, I may end up not adhering to any particular order- I aim to engage in conversation with you. 2. As mentioned in point 1., please feel free to treat this as a discussion and respond to anything you may or may not agree with. There are no right or wrong answers. I am just asking for your opinions based on your personal experience. I am here to learn from you. 3. If there is a particular question you don't want to answer, you don't have to. 4. I will treat your answers as confidential and anonymise all details regarding your person and organisation. I will not provide anything that could identify you, neither in my transcripts nor in the final thesis. 5. I intend to screen-record or tape-record (depending on the chosen format) our discussions. I will also take additional notes so as not to miss any crucial minor details in your comments. 6. Finally, this discussion is going to take about 45–60 minutes.

Topic Themes

Topic 1	<p>Topic #1: Summary about your professional journey</p> <p>My intentions with this line of questioning are to gain a little more insight into your background.</p> <p>Example question: "Give me a general view of your current (or most recent) responsibilities. What do you do on a day-to-day basis? "</p>
Topic 2	<p>Topic #2: Corporate sustainability strategy</p> <p>Now, I'd like to discuss your impressions of corporate sustainability as a business and strategy process. I am interested in learning your views on the subject matter. I would like to gain insights into how you experience your organisation's sustainability efforts and how much of a role they play considering all processes.</p> <p>Example question: "What role does sustainability in your organisation? To what extent does it permeate your organisational processes? "</p>

Topic 3	<p>Topic #3: Sustainable Product Development (SPD)</p> <p>Now, I'd like to discuss the topic of sustainable product development and the steps and elements attached to it.</p> <p>Example question: "Can you briefly guide me through the product development processes for sustainable products?"</p>
Topic 4	<p>Topic #4: Other elements in the SPD</p> <p>I am interested in exploring if and how you, or rather your organisation, incorporates other elements, i.e., your own sustainability strategy, Voice of Customer, etc., into the SPD processes.</p> <p>An example question: "How are you accounting for your own sustainability aspirations in the SPD process?" Are you adjusting certain elements? "</p>
Topic 5	<p>Topic #5: Troubleshooting</p> <p>The last thing that I'd like to discuss with you are your troubleshooting efforts—if there are any—regarding the SPD processes in your company.</p> <p>Example question: "In what ways do you or your organisation have to adjust your SPD processes in the past or present and why?" What were the causes of it? "</p>
Review and Wrap-Up	Final thoughts on the subject matter and other miscellaneous information.

Appendix B – Interview Guide

Thematising:

- *Why?*: I want to shed light on the lack of literature surrounding the practical implementation of the sustainable product development processes.
- *What?*: I want to investigate if and how organisational sustainability strategies and sustainable product development impact each other and how SPD differs in practice (from theory).

Topic 1 – Brief summary about yourself:

- Tell me what sort of background or education do you have?
- How did you get started working in this field as xxx?
- Describe your role in your organisation?

Topic 2 – Corporate sustainability strategy:

- What role do you think sustainability plays in your company's overall strategic plan?
 - PROBE: How do you think your organisation will approach sustainability in the future?
- To what extent does sustainability permeate your organisational processes (all kinds)?
 - PROBE: What do you mean when you say...?
- What have been major obstacles which you have had to overcome to get to your current sustainability strategy?

Topic 3 – Sustainable Product Development (SPD):

- Can you briefly guide me through your product development processes for sustainable products?
- What inputs and outputs are you accounting for in the process?
 - PROBE: How did you/ your organisation deal with them?
- Are you focusing on the EoL of your products? If so, how?
- Tell me about an important goal you have set in the past for SPD and what were the outcomes?

Topic 4 – Other elements in the SPD:

- Do you think your organisational sustainability strategy is accounted for in the entire product development process?
 - PROBE: If so, how do you make sure of that
- Which element in the SPD process do you think is especially important regarding any of the three sustainability dimensions (economic, social, and environmental)?
- How important are external aspects (such as VoC) and how do you account for them?
- Are there additional elements that we have not talked about that are crucial to your SPD process?

Topic 5 – Barriers:

- Explain what big barriers or frustrations your organisation faces when engaging in SPD?
 - PROBE: How did you/ your organisation deal with them?
 - PROBE: How did you overcome these barriers/frustrations?
- Can you explain what setbacks were experienced whilst working towards your sustainability objectives?
 - PROBE: How did you deal with them?
- Was there ever a time when an upper-level decision or a policy change held up your work with SPD and organisational sustainability?
 - PROBE: What did you do?

Conclusion:

- Thank you for all the valuable information, is there anything else you'd like to add before we end?

Appendix C – EPs in the new circular model

Allocation of EPs (based on table 2) in circular SPD.

