Designing for Sustainability in Creative Companies

An explorative multiple case study on how sustainability commitments impact the design process

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Abstract

This thesis is positioned in the intersecting theoretical fields of creativity and constraints and aims at generating new knowledge on how sustainability commitments impact the design process of creative companies. Through an exploratory multiple case study of four creative companies in architecture and fashion that have integrated sustainability commitments into their practices, this thesis investigates the creative process of designing for sustainability within the setting of the creative industries.

To address our aim of research, a multiple-case study on projects at the two architecture studios JJW Arkitekter and GXN as well as at the two fashion brands Schulz By Crowd and CARE BY ME was conducted. Through within-case and cross-case analysis, the paper presents how sustainability commitments, both those defined by the company as well as those formalized by official certifications, affect different phases of the design process.

When companies decide to commit to sustainability, certain constraints arise, which influences the design process. The sustainability commitments added complexity to the design process by introducing constraints in two phases of the creative process: 1) product and process constraints in the task or problem presentation and 2) product constraints in the response validation phase. These constraints are likely to impact the creativity of the individuals involved in the design process by impacting their task motivation as well as raising the need for enhanced domain-relevant skills. This need was met through the involvement of different stakeholders throughout the process, which on the one hand allowed for the commercial viability of the designer's creative ideas and on the other resulted in an increased need for collaboration. Besides constraints connected to the implementation of sustainability commitments, considering the use of the final product was discovered as an unclassified constraint, which impacted the design process by highlighting the companies' potential to nudge sustainable behavior through design solutions.

With the insights of companies that have integrated sustainable practices into their business model, this study may serve as an inspiration for other companies interested in, but less familiar with the complex concept of sustainability.

Table of Contents

List of Appendices

Chapter 1: Introduction and background

Across industries, "sustainability" has become a known buzzword embraced by companies. Though not a new concept its relevance has been highlighted as the United Nations formulated the 17 Sustainable Development Goals, the "SDGs" in 2015 (United Nations Development Programme, 2020). Its popularity is present in Denmark, where according to the Danish not-for-profit institution State of Green (2019), big Danish companies such as Maersk, LEGO Group and Arla have set ambitious sustainability goals for the next decade. However, researchers (Gibson, 1991; Robinson, 2004) share the concern that the notion of sustainability allows broad latitude for interpretation resulting in confusion among researchers and practitioners. The growing body of certified sustainability standards for products and services across different industries attempts to confront the vagueness of the concept (Robinson, 2004). In addition to the political pressure by the United Nations, the consumer demand also appears to push companies towards integrating sustainability in their business models. It has now been proven by various researchers that a business model enhancing sustainability also contributes to its financial bottom line (Eccles, Ioannou, Serafeim & Hall, 2014; Khan, Serafeim & Yoon, 2016). But which companies have the abilities to implement effective sustainability commitments in their products and services?

In companies that rely on a designer for product innovation it appears relevant to investigate the role these key actors play for implementing sustainability. According to Tischner and Charter (2001) 80% of a product's environmental and social impact incurred throughout its whole life cycle is determined in the design phase. The focus on the designer is not new and design has historically been regarded as having an important role in society, both as causing an impact on the environment, but also as being an enabler of improving human conditions. In 1878, the artist and social activist William Morris would emphasize design as a crucial and powerful source for improving society (Morris, 1877/2003). In the 1960s, designers and academics such as Victor Papanek, Gui Bonsiepe, and Ezio Manzini instigated a critical voice towards the unsustainable product development of mass production (Leerberg, 2012). Papanek (1971/1997) addressed design as: "the most powerful tool with which man shapes his tools and environments (and, by extension, society and himself). This demands high social and moral responsibility from the designer." (p. 9).

Lawson (2005), who as an architect and an academic has studied the nature of the design process, notes how it is too complex to be compared to a clear and logical scientific method, as it is rather "messy" and involves subjective judgments. The complexity of the design process and its large impact on the sustainability of a product calls for a deeper understanding of the relation between the two to be able to address the issue it poses.

Two industries where a design process is central for the final product are fashion and

architecture, which both belong to the creative industries. In the debate on sustainability, each has been called out for their negative contributions while their potential for change has also been highlighted.

Fashion is by the UN Conference on Trade and Development considered the second most polluting industry in the world (United Nations, 2019). The Global Fashion Agenda launched in 2017 a 2020 Commitment at the Copenhagen Fashion Summit, which involved four immediate action points towards a sustainable and circular fashion economy. In the beginning of 2020, Copenhagen Fashion Week published a sustainability action plan to contribute to the industry's transition in 2020-2022 (Copenhagen Fashion Week, 2020). One might consider whether these efforts are a result of the notion that the industry has been and still is subject to criticism when it comes to sustainability.

Architecture is connected to the construction industry, which is also a strong contributor to the sustainability challenges in today's society. According to World Green Buildings Council (2018) buildings represent 40 % of the global greenhouse emissions. The non-profit organization Architecture 2030 (n.d.) is devoted to reduce these emissions regarding architecture as a central solution. In 2018, the Institute of Architecture and Technology, KADK, partnered up with the Danish Association of Architects and UIA Commission in developing "An Architecture Guide to the 17 Sustainable Development Goals" (Mossin, Stilling, Bøjstrup, Larsen, Blegvad, Lotz & Ros, 2018). Here, it is pointed out that architectural solutions are part of the current environmental challenges but also contributors to both environmental and social sustainability. In architecture and construction, the architecture is the designer (Lawson, 2005).

The architect's role has been highlighted as being *the* solution for a sustainable future. Ragheb, Shimy and Ragheb (2016) concludes in their article on green architecture that: "Any architect has the ability to change an entire building process by specifying materials with low carbon dioxide emissions." (p. 786). In the Architecture Guide to UN's SDG's, the previous president of UN's General Assembly, Mogens Lykketoft, stated that: "architects can provide basic ideas and proposals for regulations that make it possible for us to have sustainable cities and communities in the future." (Mossin et al., 2018, p. 4)

Similarly, in a global expert study on sustainable fashion it was pointed out that: "*Designers play a pivotal role in transforming the fashion industry. They have the opportunity to pave the way for various types of sustainable fashion, whether it concerns the introduction of new materials, changes in consumption patterns (such as laundry requirements), or the development of recycling/upcycling."* (Pedersen & Andersen, 2013, p. 17). On the other hand, Union of Concerned Researchers of Fashion has questioned this existing assumption of sustainability in the industry, saying that putting the responsibility on the fashion designers will let business leaders of the hook, when designers in reality do not have the power to decide on the processes related to production and material sourcing (Fashion

Revolution, 2019).

Whether designers have the power or ability to change their industry or not, the above suggests that corporate activities linked to sustainability commitments will somehow impact the work of the designer. In this context, one might consider whether the result is for the better or for worse. The authors Spangenberg, Fuad-Luke and Blincoe (2010) suggest a possible trade-off between sustainability and creativity by raising the suspicion of whether the considerations of sustainability in design could have a detrimental effect on creativity. In the paper by Galic, Shevchenko, Ghasemaghaei, Bontis and Tokcan (2019) sustainability considerations are introduced as a unique form of constraints, which improve organizational success by enhancing creative idea generation and implementation thereof. The conclusions of the paper are however purely based on theoretical observations and examples, demanding empirical research on the matter. Other types of constraints prior to this paper have shown to have impacts that enhance and inhibit creativity (Amabile, 1983; Moeran & Christensen, 2013; Rosso, 2014). Nevertheless, the setting of the sustainable constraints has never been explored empirically in connection to the creative process. These indications lead the researchers of this paper to wonder how this societal demand for sustainability will impact the designer's work through the different phases of the creative processes.

When investigating the impact of sustainability on the design process, the creative industries appear as a natural setting, since: "In the creative industries, there is a continuous, often unresolved, tension between creativity, which we may provisionally define as the ability to push boundaries, and constraints, which uphold them" (Moeran & Christensen, 2013, p. 13). In addition, the fact that the creative sector is adding significant economical value to society and the global trade of creative goods is only expanding (United Nations Conference on Trade and Development, 2019) supports the relevance of investigating this setting.

The societal debate on whether the designer makes a difference along with the notion that sustainable commitments are likely to bring yet unexplored implications for the design process raises questions on its final outcome. It states the relevance of investigating the design process to get further insights into who and what influences and determines the environmental and social impact of the product, thereby contributing to the ability of decision-makers to develop well-targeted policies embracing a more sustainable future. Consequently, we explore the following research question:

How do sustainability commitments impact the design process at companies within the creative industries?

To answer this question we will look into the following subquestions:

1. *How do employees understand the concept of sustainability?*

Our research aims at investigations on a firm level. Based on the notion that a company is constituted by an organization of individuals, we must look into the employees' understanding of sustainability in order for us to understand its implications on the company. Since a design process is part of a project-based product development, where several individuals are involved, we find relevance in investigating how different employees collaborating on the same project understand sustainability as a concept.

2. *How do the sustainability commitments take shape?*

To determine how sustainability commitments may have an impact on a company's design process, we must look into how these commitments take shape. This includes exploring whether the sustainability commitments are formulated by an external entity outside the organization, further referred to as externally formalized sustainability commitments or whether they are defined by the company itself, further referred to as internally defined sustainability commitments. Additionally, to understand the commitments' impact on the design process, it is necessary to inspect in which phase of the process these commitments take effect.

3. *What is the role of the designer in designing for sustainability?*

Finally, based on the employees' perceptions and company's commitments, we will look into the role of the designer in fulfilling the sustainability commitments of a company. The designers are one kind of employee, who based on the assumption seen in the societal debate, are identified as the main operator of and primary responsible for the design process of a company. However, to answer this question without bias, we will look for other people's involvement besides the titled designer in this process, which will enlighten the understanding of the designer's role in designing for sustainability.

1. Clarification of concepts

To clarify what we intent to investigate for this paper, the following represents a clarification of the concepts connected to the overall research question.

1.1 Sustainability

As sustainability is a widely discussed topic, we do not limit our research on one specific definition nor do we attempt to contribute with one. Rather, we present here the societal debate on this phenomenon. Following Robinson's (2004) reflection on how the lack of definitional precision for the inconmensurable area of sustainability may represent an important opportunity, our research discovers how this links to how sustainability is defined and practiced among case companies.

"Arguably, it makes sense for definitions, perhaps many of them, to emerge from attempts at implementing sustainable development, rather than having definitional rigor imposed from the outset. While intellectually frustrating from the point of view of science, this may be the appropriate approach in the messy world of the politics and policies of sustainable development." (Robinson, 2004, p. 374)

Along with the notion of a sustainable society (Brown, 1981), the concept of sustainable development emerged in the early and mid 1980s (Clark and Munn, 1986; IUCN/UNEP/WWF/FAO/UNESCO, 1980; World Commission on Environment and Development, 1987) as an attempt to bridge the gap between environmental concerns about the increasingly evident ecological consequences of human activities and socio-political concerns about human development issues. The term was framed in the famous "Our Common Future" report by the Brundtland Commission in 1987 and highlights the interdependency of poverty and environmental concern (World Commission on Environment and Development, 1987, p.16).

While Brown (1981) suggests a broader more socially oriented concept of sustainability which conveys the need to consider consequences beyond a short-term environmental scope pointing towards the institutional changes required, the Brundtland report gives prominence to socio-political issues less prone to argue for drastic changes in behavior and priorities. Robinson (2004) argues for a more integrative and action-oriented approach to sustainability which goes beyond technical fixes, incorporates a recognition of the social construction of sustainable development, and engages local communities in new ways. The author (2004) observes that academic and NGO sources have tended to use the term sustainability while government and private sector organizations have been more

inclined to adopt the term sustainable development to describe similar dynamics. One explanation for this terminological differentiation suggested by the researcher (2004) is that development is seen as synonymous with growth, which implies that sustainable development aims to ameliorate, but not to challenge, continued economic growth. Robinson (2004) argues that "the preferred term 'sustainability' focuses attention where it should be placed, on the ability of humans to continue to live within environmental constraints" (p. 370). He further describes: "[Sustainability] must be constructed through an essentially social process whereby scientific and other "expert" information is combined with the values, preferences, and beliefs of affected communities, to give rise to an emergent "co-produced" understanding of possibilities and preferred outcomes" (Robinson, 2004, p. 370).

By highlighting the interconnectedness of social and economic conditions in developing countries and their connection to environmental degradation, the Brundtland report layed out the foundation for the' Rio Declaration On Environment And Development' signed by the United Nations in 1992. Both United Nation documents initiated the growing societal consensus that states and businesses should adopt policies and practices that result in the advancement of the social, economic, and environmental conditions. Porter and Kramer (2011) argues that by integrating these practices into their business model and in the contexts they operate in, companies can create shared value for their business and society.

Combining the dimensions of social, economic and environmental sustainability is also referred to as the "three pillar approach" (Robinson, 2004). Different researchers agree that, ideally, a sustainable company is generating persistent profits, while consuming environmental resources efficiently and adding value to the community within which they operate. However, they also acknowledge that traditional profit-oriented behaviours cause a misalignment between the three dimensions making it difficult for many businesses to fulfil such expectations (Dyllick & Hockerts, 2002; McWilliams, Siegel, & Wright, 2006; Saviano, Barile, Spohrer & Caputo, 2017).

1.2 Design

When looking up "design" in Oxford Dictionary, it reads: "the art or process of deciding how something will look, work, etc. by drawing plans, making computer models, etc." (2020). This concept covers a wide range of design disciplines, and in the following we will clarify which form of design is the focus of this research paper.

Design can take many forms, as it as a practice is present in a broad sense of industries. Eder (2013) divides design into two overall categories: engineering design and artistic design. The two types overlap in similarities but also differentiate in scope in terms of design object and design

process. Within the artistic design form, which encapsulates artistic-architecture-industrial design, the object is a tangible product, whereas within engineering design, the design object can be a transformation process or a technical system. In engineering design, the design process is based on theories of designing, engineering design science and formal design methodologies. On the contrary, the artistic design involves a design process that is intuitive, collaborative and interactive. There are various products for which one would need both an engineering designer and an artistic designer. Eder (2013) uses the example of a car, where the engineering designer would be responsible for the elements not visible for the eye; safety modules, mechanical mechanisms, and any element that gives the car its function. Here, the role of the artistic designer would be to manage the decorative aspect of a car, making it appealing. This can be transferred to the context of architecture, where both engineering designers and architects might work collaboratively on a building. In our case, we are looking into the artistic form of design, where the design object is a tangible product and where the focus is primarily on the aesthetics.

1.3 The creative industries

The umbrella term of creative industries is used by Caves (2000) in a definition that covers broadly a wide set of industries united by: "supplying goods and service that we broadly associate with cultural, artistic, or simply entertainment value" (p. 1). His contribution includes a list of some of the industries that fall into this category: film and TV entertainment, visual and performing arts, book publishing, sound recordings, toys, and games. As part of the creative product's characteristic is a notion of "experience good", which implies that its consumer's level of satisfaction will be a subjective reaction to the experience of the product (Caves, 2000).

The authors Jones, Svejenova, Pedersen, & Townley (2016) add more industries to Caves' list including architecture, design, fashion and artistic perfumes and haute cuisine food. In their research they acknowledge that the interest around creative industries has increased throughout the past years and that researchers tend to include rather than to exclude new industries as products and services from less-conventional settings have grown in symbolic meaning.

Most recently, in United Nation's periodic Creative Economy Outlook (2018) the definition of creative industries includes: "architecture, arts and crafts, marketing and advertising, media and publishing, research and development, software, computer games, and other core creative work" as "the lifeblood of the creative economy" (p. 57). As a result, our definition becomes a combination of the above:

The creative industries are a wide set of industries which all supply goods and services that are associated with cultural, artistic, or entertainment value and which awakes a subjective response in the consumer. Industries that are part of the creative industries include: architecture, design, fashion, artistic perfumes, haute cuisine food, visual and performing art, arts and crafts, research and development, software, marketing and advertising, film and TV entertainment, publishing, sound recordings, toys and games.

Further dynamics and concepts implied in the context of the creative industries will be presented in the chapter of theoretical framework.

2. Delimitation

Certain delimitations have been required to fit the scope of our thesis to the research question. These will be explained in the following.

The thesis is empirically based on companies within the creative industries of fashion and architecture where designing is a dominant creative process essential for the product's outcome. Four companies have provided empirical ground for the analysis of this paper. The selected case companies do not necessarily reflect the dynamics of their respective industries, and so the objective of the findings is not to generalize on an industry level of fashion and architecture. Rather, it aims at providing insights on a firm-level of companies in the creative industries that are dependent on design as a tool for their creative product.

Sustainability efforts can be regarded in all parts of the business model. However, with our research question, we have limited the focus of research to be at how sustainability influence the artistic design process where the implementation takes the form of *products*. This implies that we get an understanding of the design process of each case company in order for us to understand the role played by sustainability in this process.

We are aware that by investigating how sustainability commitments impact the design process of creative companies, we base the research question of our thesis on the following premise: A design process of a company committing to sustainability is different from a design process of a company that does not work with sustainability. This assumption stems from previous knowledge of the field of creativity and creative processes and will be further elaborated in Chapter 5: Discussion.

3. Case descriptions

3.1 JJW Arkitekter

JJW Arkitekter (JJW) is a Danish architectural firm that has existed since 1986. Their projects are local and the majority of them are within a 75 km distance of their office placed in Frederiksberg, Copenhagen. Over 70 people are employed at JJW Arkitekter, each with different backgrounds within the area of architecture and construction. Several of the architects at JJW are DGNB certified and the company is currently in the process of becoming BCORP-certified. With over 70 employees, JJW Arkitekter is one of Denmark's largest design studios (JJW, n.d.-c). Furthermore, acknowledged for their design, one of their school projects was back in 2012 included in an exhibition on Nordic Architecture at the Louisiana Museum of Modern Art (JJW, 2012). Their website states:

We make the everyday room that we all need and finds ourselves in and meet at, into something special. Our approach is to take societal responsibility and create tailored rooms, buildings, settlements and urban spaces, that frame life and exchange between humans.
(JJW, n.d.-a)

3.2 GXN

GXN is an architectural firm that employs 16 people and has existed since 2007. It covers all phases in architectural consultancy, but with a particular emphasis on strategic analysis, concepts and design, and data driven evaluation of buildings (GXN, n.d. -a). The "G" stands for green, which highlights their focus on ecological design, and their goal is: "to create human centered design and develop buildings as man made ecosystems" (GXN, 2019). The company also engages in research collaborations with universities focussing on circular economy and circular design and its long term environmental impact. Back in 2015, GXN issued their first edition of the book "Building a Circular Future" (Jensen & Sommer, 2018) to challenge and rethink how resources are being used in the building industry today. This focus on circular economy and circular principles is a big part of how they design buildings at GXN. The approach at GXN is described as:

"The best way to intervene in any system is to recognise the part you play in it. Our approach seeks to forge new relationships in the wider built environment, advancing lasting solutions to contemporary challenges" (GXN, n.d.-b, para. 6)

Besides being focused on circular economy, their use of certifications will depend on the clients' demands as well as on the geography of the project. For this research purpose, we focus on a project

of national scale in Denmark. Here, DGNB and cradle to cradle are most prominent certifications in their projects.

3.3 Schulz by Crowd

Schulz by Crowd (SBC) is a Danish fashion company, which was founded in 2015 by Marie Schulz. Both the company's head office, stock space and store is placed at Lille Strandstræde in Copenhagen. Here, Marie and her employee Jennie handle everything from managing production, webshop orders, customer care and store services. The design aspect of the garments is outsourced to a crowd of around 100 designers, who all contribute to the style of the brand: clean, Nordic silhouettes with functionalities. Two key elements are reflected in SBC's business model, its sustainability and the crowdsourcing of design. The clothes are made out of GOTS-certified cotton and silk. Additionally, they have recently begun experimenting with fabric made out of milk production-leftovers. On their website, they highlight three key pillars of their company as:

"Timeless designs, long-life quality products, and respect for the environment and the people involved in the production." (SBC, 2020, para. 2)

3.4 CARE BY ME

CARE BY ME (CBM) was founded in 2012 by Danish designer Camilla Gullits. The company started as a philanthropic project and received financial aid from the DANIDA foundation until 2015. In 2017, Pernille Pold entered as a Partner and Commercial Director. According to the brand's website, they use the UN's global compact principles as "a leading star" in their company and uses GOTS-certified textiles for their products. The design aesthetic is classic, timeless and connected to Nordic minimalism (CBM, n.d.-a). Though the

company's product portfolio includes primarily wearables, the company does not identify itself as a fashion brand, but rather as a lifestyle brand (Interview, Camilla; Pernille). Additionally, the company produces homeware such as pillowcases and throws.

"CARE BY ME is a company owned and operated by women that designs exclusive products to embrace people in our part of the world, at the same time as they empower women in developing countries." (CBM, n.d.-b, para. 16)

The company works close with factories in Nepal and India where they get their garments produced. In India they get their cotton products produced, whereas in Nepal, the factories are less equipped with machinery and product are handmade.

4. Certifications used at case-companies

It should be noted that there exists a wide variety of certifications when it comes to sustainability that cover different industries. For the sake of the scope of our paper, which was a multiple case study of four companies, the following descriptions are restricted to involve certifications identified as used by the case companies.

4.1 B Corp

The B Corp movement started in the U.S. and came to Europe in 2016 (B Lab Europe, n.d.-a). The certification "B Corp" is for businesses, which are: "purpose-driven and create benefit for all stakeholders, not just shareholders" (B Lab Europe, n.d.-c). The certification is not solely focused on a product or service, but implicates the whole business model from supply chains to employee benefits. With the commitment to consider all stakeholders of a company, the B Corp assessment involves looking into how a company's business model impacts workers, community, environment and customers. The length of the certification process will depend on the size and complexity of a company (B Corp Europe Lab, n.d.-b).

4.2 Cradle to cradle

Cradle to cradle is an international product certification that is based on the idea of a circular economy, where the idea is that the product is developed within a circuit, where there is no waste. The certification was developed by the non-profit organization Cradle to Cradle Institute (2020). In Denmark the company Vugge til Vugge ApS, as the only one, performs corporate assessment and certifications of companies (Vugge til Vugge, n.d.-a). The certification is divided into different levels: bronze, silver, gold and platin. In each level there will be criteria in the areas of material health, recycling and reuse, renewable energy and carbon management, water resource management and social justice Vugge til Vugge, n.d.-b). In 2016, the American Green Building Council began a strategic partnership with Cradle to Cradle Product Innovation Institute in the recognition that sustainable building projects start with sustainable materials (Vugge til Vugge, n.d.-c). The cradle to cradle certification is in current revision for an updated version, and its expected launch, which will be the 4th version of this certification, is the end of 2020 (Vugge til Vugge, n.d.-b).

4.3 DGNB

DGNB was developed by the non-profit organization Green Building Council. This organization was established back in 2010 as a Danish council for sustainability in the building industry and in 2012 the Danish DGNB certification was launched based on the German version (Green Building Council,

n.d.-c). By referring to the Rio Declaration (1992), the DGNB is based on several criteria that considers both social, environmental and economic aspects of sustainability. The certification involves both a pre-certification of the project material before construction is begun as well as an additional certification of the completed building (Green Building Council, n.d.-a). The certification can be of different levels - bronze, silver and gold - depending on the company's ambition level. The five main areas of DGNB involves environmental quality, economic quality, social quality, technical quality and process quality (Green Building Council, n.d.-b). The DGNB is under constant development, so as noted on the Danish Green Building Council's website, what could have been approved as gold in 2016 is at risk of not being so in 2022 as a result of tightened criteria (Green Building Council, n.d.-a).

4.4 GOTS

GOTS (Global Organic Textile Standard) is a worldwide standard for textile processing organic fibres and based on ecological as well as social criteria. The GOTS label have different label grades, it can be 'organic' when it contains 90 % certified organic fibres and 'made with organic' when it's 70 % certified organic fibres. The certification provides criteria for processing and manufacturing. Besides the ecological requirements of organic cotton being free of pesticides, the certification requires compliance with further environmental criteria as well as requirements on technical quality, human toxicity criteria and social criteria. The social criteria are based on the key norms of International Labour Organization and include requirements such as no child labour, minimum wages and working safety.The GOTS has evolved over time, and this year the 6th version was launched, which is 15 years after the first version was introduced back in 2005 (Global Organic Textile Standard, 2020).

Chapter 2: Theoretical Framework

The following section lays out the theoretical setting in which our research is based. First, the situational context will be presented, as the empirical study takes place in the *creative industries* with the *design process* as shared research object across cases. Next, the theoretical areas that lay the foundation for our research will be introduced: *creativity, the creative process* and *constraints.* As these areas contribute to one another, a further discussion of how they overlap will be presented.

1. The creative industries

As presented in the introduction, this research takes place in the creative industries and we refer to our definition in the section 'Clarification of concepts'. Certain dynamics that are applicable in the creative industries are relevant to consider, as this is the context for the empirical data.

The *motley crew* is a property of the creative industries identified by Caves (2000), which is linked to the notion of complexity in creative products. The involvement of diverse teams in creative activities "require close temporal coordination" (Caves, 2000, p. 8). The author points out that this has different implications for the recruitment of team members whose inputs are not substitutable and which are necessary for the outcome to be commercially valuable. He highlights the necessity of coupling creative efforts with humdrum commerce for the commercial success of creative products and emphasises: "Artists of all types engage in creative processes and tasks that comes to completion only with the collaboration of "humdrum" (or "ordinary") partners" (p. 4).

Different from humdrums, creatives are not "just in it for the money" (Caves, 2000, p. 4). Caves notes that creatives are concerned with the traits and features of the goods and services they create, and that they will act passionately in achieving its originality and craftsmanship. While purely humdrum activities focus on production costs being lower than what buyers are willing to pay for it, the author argues that the personal involvement explained above adds complexity to the management of creative people, processes, and products or services. Although creative inputs come at low cost, their traits and terms of employment do not, as creatives tend to have difficulties precomitting or explaining their creative choices (Caves, 2000).

2. Design

As mentioned in the clarification of concepts, our research area is focused on the artistic-industrial form of design. In an attempt to theorize design we can refer to different authors, who have described

design and its complex form. This involves a look at design not only as a product, or process, but also the profession connected to it: the designer.

Design has in the industrialized world become a professional activity in a broad range of areas including architecture, interior, fashion, textile and graphic design (Lawson, 2005). Wong (1993) refers to design as: "a purposeful process of visual creation" (Wong, 1993, p. 41). He argues that there is a lot more to design than the aesthetic aspect, and that "beautification" is limited to only one aspect of design and distinguishes designing from other artistic disciplines such as painting and sculpting, as serving a practical need (Wong, 1993).

Design as a product is characterized by both the aesthetic and useful element (Demirkan & Hasirci, 2009; Varol, 2018). The elements of appropriateness, novelty, functionality and aesthetics are pointed out by Demirkan and Hasirci (2009) as performance criteria of the designed product and is connected to a product's level of creativity.

Lawson (2005) points out designers' shared attributes with artists, as they must "understand our aesthetic experience, particularly of the visual world" (p. 13). With this we can also link designers to Caves' (2000) conception of "creatives": "high-level creative achievement (...) is associated with creative problem-solving: the original and talented artist is the one successful at spotting novel problems and solving them in fruitful and compelling ways" (p. 22). The connection between the designer and creativity is also pointed out by Varol (2018), who refers to creativity as a characteristic that is expected from the designer. Similarly to the notion of design as both aesthetic and useful, Lawson (2005) notes how a designer both requires technical skills as well as an aesthetic appreciation. This is supported by Ollenburg (2018), who connects it to the context of post-industrial society that requires a designer to not only make things appealing, but also to be a 'thinking designer' that engages in complex cognition aimed at problem-solving. Ollenburg (2018) hints to the idea of thinking designers as necessary when dealing with the complicated problems that society faces nowadays, thereby leaving the designer to: "anticipating competencies and qualifications that go beyond design principles and involve understanding various perspectives" (p. 283).

3. Creativity

As referred to in the theory on design, creativity is both seen as an essential characteristic of design as well as a trait of the designer. Salkind (2008) defines creativity as "the interaction among aptitude, process, and environment by which an individual or group is able to produce original (unique, novel, unusual) and adaptive (useful, appropriate, meaningful) interpretations, ideas, behaviors, solutions, or products." (p.195) The author highlights the importance of including adaptiveness as a criterion of creativity besides originality. This links to creativity as often being described as a form of

problem-solving (e.g. Taylor, 1975; Caves, 2000).

Considering both the novelty and usefulness, Salkind's definition reminds of the one presented in the paper by Amabile and Pratt (2016), who define creativity as: "the production of novel and useful ideas by an individual or small group of individuals working together" (p. 158). Their definition can be seen as a summarized version of one of the author's conceptual definition of creativity in her previous work (Amabile, 1983).

Creativity has been seen as defined both in relation to products and processes. In Amabile's paper: "The Social Psychology of Creativity: A Componential Conceptualization" (1983), the author contributes with a conceptual definition of creativity: "A product or response will be judged as creative to the extent that (a) it is both a novel and appropriate, useful, correct, or valuable response to the task at hand and (b) the task is heuristic rather than algorithmic." (Amabile, 1983, p. 360). This definition specifies two task characteristics. Unlike algorithmic tasks which have a clearly identified goal and route to achieve it, the heuristic tasks lack an even path to the solution, and the problem solvers even might have to the define the goal themselves (Amabile, 1983).

Salkind (2008) and Amabile's (1983) definitions embrace both a product and process focus of creativity. In an empirical setting, a definition that focuses on the product is argued by Amabile (1983) as most appropriate. First of all, the author argues that a clear description of the process is not possible and second because when identifying a thought as creative, it would depend largely on the outcome of that thought, hence the product. Nevertheless, though in an empirical context the creativity would be bound to the product, Amabile adopts the point of view that assessing a product's creativity can never be done objectively. She notes that assessing creativity will be based on social judgment similarly to identifying an individual as attractive: though there are particular characteristics one will look into whether it relates to rating a person's physical attractiveness or a product's creativity, the final choice of those characteristics will be subjective. With this, rather than an objective set of criteria, Amabile argues that the criteria are based on a historical and social context and puts creativity in the frame of a continuum, where products are rated as more or less creative.

Amabile's (1983) research approach is a response to the trait-focused research scope in the area of creativity that focuses on trait characteristics of creative and non-creative persons (Nicholls, 1972). Amabile argues for the incompleteness of the trait-approach through her componential conceptualization of creativity, where she highlights the role of the social and environmental factors, which in previous literature have been neglected as impacting creative performance.

Amabile's theory proposes three components that are essential in creative performance: domain-relevant skills, creative skills and task motivation. Notably, Amabile (1983) suggests examples of elements within each component (Figure 1), but notes how the completion of the listing will be dependent on progress in creative research.

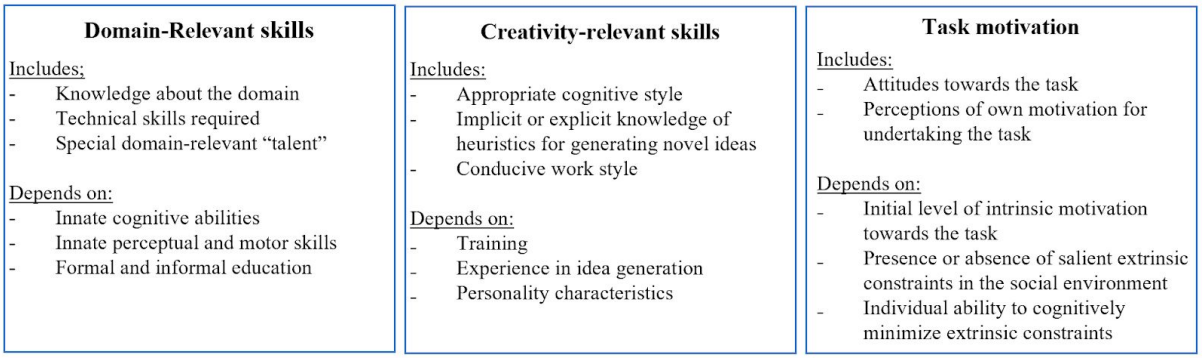

Figure 1. Components of creative performance (Adopted from Amabile, 1983)

Amabile (1983) categorizes creativity-relevant skills as being active at the most general level of a task, influencing the response generation of the individual, where the appropriate cognitive style reflects the ability to understand complexities and work them out through problem-solving. Domain-relevant skills are those relevant to a general domain and entail factual knowledge or principles, which establish the set of cognitive pathways for solving a given problem or task (Amabile, 1983). Task motivation operates at the most specific task-level, as it involves how the individual perceives their motivation in relation to performing a given task (Amabile, 1983). Amabile explains task motivation as being determined by two elements: whether motivations are stemming intrinsically from the individual or arise extrinsically. In the author's theoretical context, the intrinsic motivations refer to the degree that the task complements the individual's personal interests and liking. Extrinsic motivations are regarded as extrinsic constraints: factors arising from the social environment which intend to control the individual's performance of a given task (Amabile, 1983). In Amabile's theoretical framework, she refers to the proposition shared by other researchers (e.g. Deci, 1971, 1972; Lepper, Greene & Nisbett, 1973) that an intrinsic motivation will enhance creativity, whereas the extrinsic motivation is likely to undermine the intrinsic and thereby impedes the creative performance.

Creativity's role in design

Creativity is in literature seen as an inevitable part of design, which becomes apparent when comparing the criteria for creativity and for design, which overlap in terms of 'usefulness' and 'originality' (Christiaans, 2002; Demirkan & Hasirci, 2009; Varol, 2018). Christiaans (2002) talks about creativity as a design criterion that determines the quality of the creative product. Cross (1997) refers to the concept "the creative leap" (p. 311) as an essential aspect of design, which covers the event of getting creative insight and should be regarded as "building a creative bridge" (p. 311) between the design requirements and the design structure of a new product. Casakin (2007) argues for

creativity's essential role in design with that it: "enables the talented designer to transcend conventional knowledge domain so as to investigate new ideas and concepts which may lead to innovative solutions." (para. 5)

3.1 Creative processes

Lawson (2005) points out that there are numerous attempts to map out the design process and criticizes its theoretical limitations. He establishes that the design process is never sequential but rather a reciprocal process with several loops along the way. Lawson notes that the design process is categorized as a process moving from problem to solution, and that in a theoretical setting, one can highlight analysis, synthesis and evaluation as embracing the existing maps in literature. Analysis involves structuring the problem and synthesis entails creating a response to the problem by generating solutions (Lawson, 2005). Finally, the evaluation involves a critical evaluation of the proposed solutions based on objectives identified in the analysis stage (Lawson, 2005). As the model (Figure 2) suggests, there will be loops in the process, as new problems are revealed along the way.

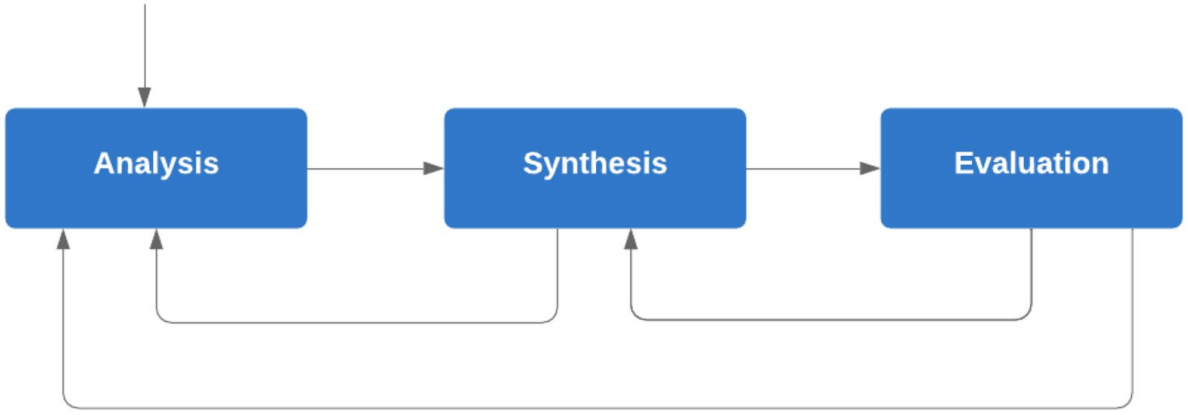

Figure 2. A generalized model of the design process (Adapted from Lawson, 2005)

Lawson (2005) criticizes the general map for being too abstract, noting that though it appears logical, it is rather superficial since "reality is more messy" (p. 39). To get an understanding of the design process, we will in our research regard it on an empirical level. As noted by Lawson (2005), an attempt to map out the design process empirically is difficult, as it to a big extend takes place within the minds of designers. There are elements considered general for the design process: a brief is assembled, the designer understanding the requirements, solution being produced, testing the solutions against criteria, and communicating designs (Lawson, 2005). However, the author questions the order of these activities and whether they can be reviewed as separate events.

We find it relevant to understand the design process by approximating it on a theoretical level. With creativity's role in the design process, we see the creative process as a bridging tool between the two. In our attempt to theorize and understand the creative process as is the design process, we look to Amabile's (1983) creative componential framework, which poses the componential understanding of creativity into the setting of a creative process. Different factors will impact the creative performance of an individual and Amabile's model (Figure 3) proposes where in the process these will have an impact.

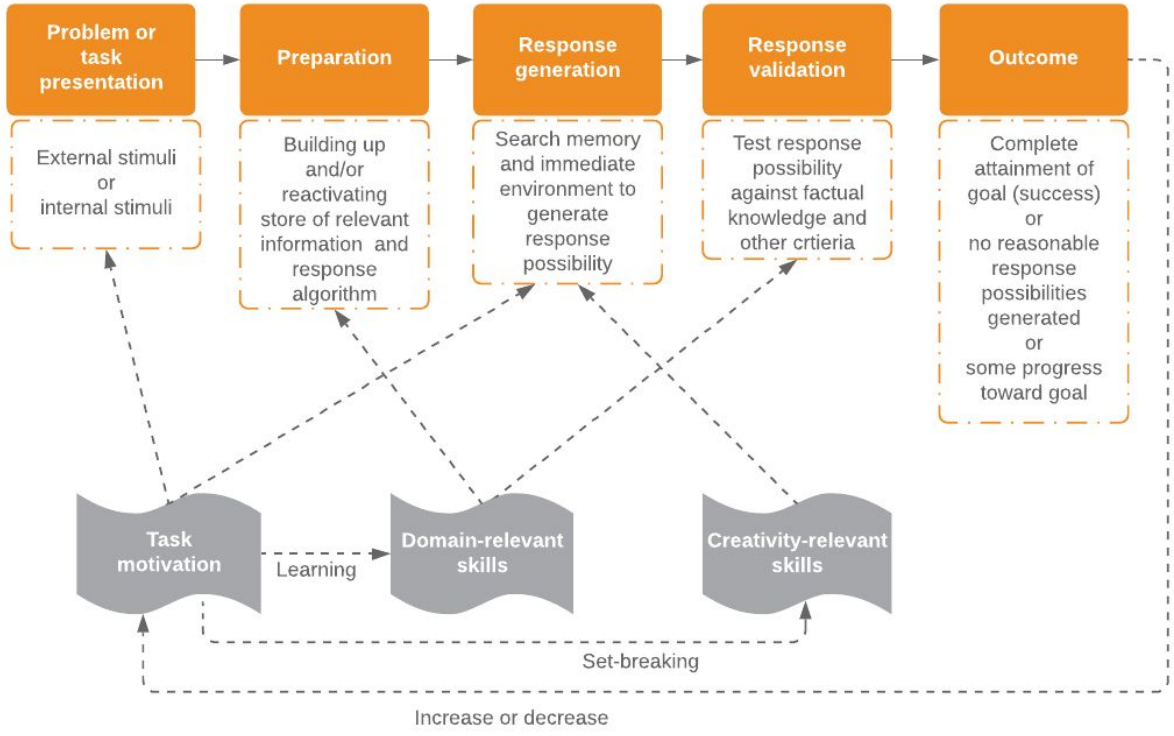

Figure 3. Componential framework of creativity adapted from Amabile, 1983 (Broken lines indicate the influence of particular of factors of others and solid lines indicate the sequence of steps in the process)

The framework of the creative process proposed by Amabile attempts to explain how an individual might get to a solution, product or response by collecting and using information. Amabile's framework is similar to previous theorists' models of the creative performance (e.g. Wallas, 1926; Hogarth, 1980) and suggests that the level of creativity at each phase in the process will be a function of the three components of creativity. The five phases through which the individual goes include: 1) Problem or task presentation, 2) Preparation, 3) Response generation, 4) Response validation, and 5) Outcome. Notably, the process is characterized by a loop determined by the outcome of the response validation.

The phase of response validation can be seen in the context of the creative industries by linking to Becker's (1982) notion of *editorial moments* (p. 198). The author argues that in different stages of a creative product's production, there will be editorial moments, which entail making choices about the creative work. The choices will not be made by the individual, but as a result of creatives working along with the humdrums, making the creative process a social and cooperative venture (Becker, 1982). As a result of this interference, Becker notes how there is a need for the creatives to establish relations of trust with the other personnel involved.

In connection to Amabile's (1983) proposition that the creative performance is a result of the individual interacting with the social environment during the creative process, according to Salkind (2008), the ideal creative context needs to be identified for each individual and will vary across individuals, time, process, and environment and can not be generalized.

4. Constraints

Amabile's (1983) componential conceptualization of creativity highlights the role of social and environmental factors, which in previous literature have been neglected as impacting creative performance. She refers to them as "salient extrinsic constraints in the social environment" (p. 366) and defines them as factors intended to control or perceived as controlling the individual's performance on a specific task. Amabile distinguishes extrinsic constraints which are extrinsic to the task and introduced by the social environment from internal factors such as "the individual's ability to minimize cognitively the salience of such extrinsic constraints" (p. 366). According to the author the two are interdependent as they have a joint impact on the individual's self-perception of motivation with regards to the task.

Amabile's (1983) differentiation between internal and external constraints served as a starting point for Rosso's (2014) empirical research "Creativity and Constraints: Exploring the Role of Constraints in the Creative Processes of Research and Development Teams". The implications will be presented in the following.

In Rosso's (2014) study, he applies a more neutral definition of constraints which may arise internally as well as externally with both positive and negative consequences for the creative process. While investigating the key constraints experienced by R&D teams in multinational corporations, Rosso develops a useful typology of constraints which divides them into two categories: process constraints and product constraints. Process constraints, on the one hand, relate to *how* the work is done and involve factors such as time, money, equipment, and organizational structure. These factors revealed a tendency of enhancing creativity in situations where they led to a boost in motivation and novel approaches to difficult challenges. However, process constraints would inhibit creativity when they were perceived as restricting possibilities and harming the intrinsic motivation. On the other

hand, factors such as product requirements, customer and market needs, business needs and regulations belong in the category of product constraints, as they constrain the *outcome* of the product. These are likely to enhance team creativity when they contribute with a sense of focus and structure, a common framework. Yet, the product constraints would harm the creativity when reducing a perceived challenge or maintaining the status quo. Overall, Rosso's empirical investigations showed that process constraints were more likely to inhibit team creativity, while product constraints were more likely to enhance it. The reason for these dynamics is linked to how these different constraints impact the individual's intrinsic motivation. While process constraints risk to reduce a sense of empowerment and autonomy, product constraints tend to operate differently and can function as a well-defined creative challenge. Rosso concludes that although product constraints contribute in providing a common goal, but do not meddle in how to achieve it.

As presented in our introduction, the creative industries provide an ideal setting to study constraints, as with their focus on creativity they introduce a continuum of freedom and constraints (Moeran & Christensen, 2013) The authors Moeran & Christensen (2013) bring up Friedman's (2001) metaphor of 'the iron cage of creativity' to support their argument, which links back to Amabile's (1983) notion that the role of social and environmental factors impact the creative performance:

> "Creativity is only recognized in terms of its constraints. It is the latter that determine the nature of its intelligibility. The constraints are products of an organization of shared experience, of shared implicit attributions of meaning to the world." (Friedman, 2001, p. 48)

To layout the various ways in which the work of creatives is constrained, Moeran and Christensen (2013) develop typology of six conditions that are of particular relevance for the creative industries: (1) *material*, (2) *temporal*, (3) *spatial*, (4) *representational*, (5) *social* and (6) *economic*. As the terms 'conditions' and 'constraints' are used interchangeably by the authors, we took the freedom to stick to 'constraints' to increase coherence.

(1) *Material constraints*

Moeran and Christensen suggest that the use of standard equipment and materials is shared among all creative industries. The use and form is based on conventions held in the industry. The authors link the emergence of a set of conventions to the introduction, or lack, of particular materials.

(2) *Temporal constraints*

The authors present three different ways in which the use of time impacts creative work. The first is interlinked with Caves' (2000) 'time flies' property of the creative industries which implies that established deadlines for a creative work to be ready have a backwards effect on it planning and execution. The second approach regards time as a constraining factor on the practice of evaluating creative goods when completed such as the release of a movie aiming to be nominated for a specific award. Finally, Moeran & Christensen highlight the importance of time with regards to historical continuity with the notion that creative products are conceived, produced and received in a historical context of all similar, preceding products.

(3) *Spatial constraints*

Moeran and Christensen observe the work of creatives to be impacted by spatial constraints of different kinds. While the authors acknowledge that physical separation might foster certain creative processes, they also point out detrimental effects depending on the context.

(4) *Representational constraints*

Constraints in representation are primarily aesthetic and essential to creative practice. The authors present aesthetics as closely interrelated with material and technical conventions. To which extent conventions can be changed depends "both on the nature of the product and on the social world of which it is a part - the looser the aesthetic constraints, the easier it is to innovate, and vice versa." (Moeran & Christensen, 2013, p. 22)

5) *Social constraints*

The authors frame social constraints on creativity in three loosely defined categories: (1) those stemming from the fact that most forms of creative work consist of close contact and communication among networks of cooperating personnel, (2) those connected with the fact that much creative work is commissioned and (3) that affect the content of the creative outputs themselves.

The first category is linked to Caves' (2000) motley crew with creatives being dependent on collaborations with humdrums. As previously noted, Becker (1982) points out how trust is central to the cooperation of different stakeholders in the creative industries. This is also noted by Moeran and Christensen (2013):

> "*Designer, product manager, modellers, and glazing engineer have to trust that their company's managers know what they are doing, and vice versa. If trust fails to be built up satisfactorily by all parties concerned, or if existing relations of trust are for some reason broken down (...), then things go awry.*" (p. 28- 29)

Social constraints in the creative industries are often organizational which affects the content of the creative outcomes in different ways (Moeran & Christensen, 2013). The authors note how the fact that creative work is often commissioned e.g. businessmen, collectors, curators and government departments influences the form it takes.

6) *Economic constraints*

Moeran and Christensen (2013) highlight two main economic constraints in the creative industries. The first is the general state of a country's economy which is very likely to impact the extent to which the creative industries can be creative. The second is formed by the budget for a creative project. The authors acknowledge that although economic constraints find their most obvious expression in price, they are often a product of material, organizational and representational constraints.

Sum up of the theoretical framework

The creative industries are seen in a context, where constraints are constantly posed onto creative processes. Constraints are not necessarily harmful to the creative outcome, and their effect should be seen in the light of their interference in the design process and how they meddle with the individual's motivations and perceived domain-specific and creative skills.

Chapter 3: Methodological framework

To investigate our research question, we conducted a qualitative, exploratory multiple case study. The combination of sustainability's impact on the design process of a creative firm represents a complex phenomenon in real-life context. This resonates with Ogawa and Malen's (1991) take on exploratory case studies. The authors suggest that "the primary purpose of exploratory case studies is to extend our understanding on complex, real-life phenomena" and is "(…) a sound, sensible first step (…) when the topic of interest has not been the subject of extensive empirical examination" (p. 271). This research approach enabled us to conduct an open-ended search for relevant information, identify the major themes and patterns associated with the phenomenon of interest, develop or adopt constructs that embrace the patterns, articulate tentative hypotheses about the meanings of the constructs and their relations, and refine questions and/or suggest conceptual perspectives that might serve as fruitful guides for subsequent investigations (Yin, 1984; Lofland, Anderson, Snow & Lofland, 2005). In the following, the methodological implications of our research approach are elaborated.

1. Qualitative research approach

The qualitative research approach allowed us to develop an in-depth understanding and provided us with a certain level of flexibility throughout the process. Qualitative research covers a set of research strategies, "(...) which allow the researcher to obtain firsthand knowledge on the empirical social world in question" (Chadwick, Bahr & Albrecht, 1984, p. 206). The authors suggest that the nature of the qualitative data collection methods enables the researcher to get a deep level of understanding of the life world of the subject. Furthermore, the methods provide flexibility if surprising data arises, which leads to a path that was not necessarily considered by the researcher beforehand (Chadwick, Bahr & Albrecht, 1984). This resonates with the exploratory approach we chose, which gave us the opportunity to discover new relevant themes during the data collection and to explore them further. One example is how we identified that there were other people involved early on in the design phase besides the designer, which called for further investigation.

Nevertheless, the level of flexibility also leads to the risk that Chadwick, Bahr and Albrecht (1984) term as "floundering" (p. 214), which entails that the flexible nature of the qualitative research leads to an unstructured data collection, where nothing meaningful emerges from the field work. The authors call for keeping the data collection focused on central issues and in a limited scope. Consequently, to maintain focus in our collection of qualitative data, as explained in the delimitation, our research was throughout the research process focused on how sustainability commitments impact

the process of designing products. With this delimitation, our focus is on a particular aspect of the organization and a specific process. To keep this focus, we followed Yin's (2015) advice of creating a case study protocol (Appendix 1), a strategic tool that ensures transparency but also contributes to our research focus as it involves laying out a frame of inquiry in terms of topics and questions, yet leaving space for unexpected discoveries and turns.

With our research we adopt the social constructivist approach as discussed by Berger and Luckmann (1991). The authors (1991) consider knowledge as emerging when it is created through interactions in society. Similarly, we regard sustainability as a concept that has emerged in society rather than discovered. With this philosophical position we regard knowledge as constructed instead of created (Andrews, 2012). This is closely linked to our research design, as we through qualitative data obtain findings that are linked to individuals' perceptions of how sustainability commitments impact their work. Consequently, when looking at our data we do not regard it as objective facts but rather as subjective constructed realities.

2. Multiple case studies

The case study is a qualitative, empirical inquiry which focuses on understanding the dynamics present within single settings (Eisenhardt, 1989). According to Yin (1984), this can involve either single or multiple cases, multiple levels of analysis and moreover employ a design that allows for multiple levels of analysis within a single study. The aims of conducting a case study range from providing description, over testing theory, to generating theory from case study evidence (Yin, 1984). Since the primary interest of this research is the latter, a multiple case study design was chosen. According to Yin (2003) this method is particularly applicable "when the boundaries between phenomenon and context are not clearly evident" (p. 13). Identifying similarities and differences across cases will help generating new context-dependent knowledge on how increasing sustainability demands shape the work of firms in the creative industries and can thus serve as a starting point for future studies.

2.1 Case screening

Naturally, the scope of the research question helped us identifying suitable cases. Prior to choosing a specific case selection strategy, a set of initial screening criteria was defined. The aim was two-fold. First, these criteria were thought to ensure each case's relevance with regards to the research question. Second, they allowed for comparison and cross-case analysis. To investigate the impact on

sustainability requirements on the design process in creative firms, the initial screening criteria included that:

(1) Each company operates within fashion or architecture.

(2) The activity of each company includes a design process.

(3) Each company engages in sustainability efforts.

(4) Each company has an office space in Copenhagen.

Criteria (1), (2) and (3) represent our field of interest and criteria for the companies to be relevant cases contributing to answering our research question. Criteria (4) is favorable for the outcome of a study to engage in face-to face encounters as emphasized by multiple researchers (e.g. Davies, 2007).

In order to find relevant case companies, we conducted an online search for "sustainable fashion brands in Denmark" and similarly for architecture. We also consulted our personal and professional network for relevant firms that worked in the intersection of sustainability and design. For architecture, an online search was conducted to identify reputable Danish firms with a focus on sustainability. An initial list of 23 companies was composed. Additional criteria were access, capacity and geographical proximity for each firm. The geographical aspect narrowed the list down to 13 relevant companies to contact.

Out of the 13 companies we got in touch with, five companies were available for a talk, and out of them, four companies were relevant as case companies, as they had the possibility of setting us up with relevant interviewees. Additionally, we were able to conduct one expert interview.

2.2 Case selection

After having established the initial screening criteria, the following section will discuss the strategies for selecting cases. Using a strategic sampling strategy, we are aiming explicitly at selecting projects and cases that will help in exploring the research question (Davies, 2007).

Our approach followed an information-oriented case selection strategy which aims to maximize the utility of information from small samples. Flyvbjerg (2004) suggests that in contrast to random selection, the cases are chosen based on expectations about their information content. He links this selection strategy to four different types of cases: (1) extreme/deviant, (2) maximum variation, (3) critical and (4) paradigmatic cases.

Aiming to understand the impact of sustainability demands on the design process of creative companies led us to work with maximum variation cases in a critical case setting of sustainable companies. Here, the sample contains cases that are purposefully as different from each other as

possible with the aim of obtaining information about the significance of various circumstances for case process and outcome. Following Flyvbjerg (2006), this allows the researchers to investigate the particularities of each case as well as patterns that are shared across the variation.

When selecting cases for a multiple-case study "every case should serve a specific purpose within the overall scope of inquiry" (Yin, 2003, p. 47). Feeding into the maximum variation approach in the critical setting of all companies sharing sustainability as an integrated part of their business model, the cases studied varied along the criteria: age, size, markets, customers, design process, type of management and industry context (Table 1). With regards to the design process, SBC is the only company who outsources the design process, representing an unusual case within the fashion industry. According to Flyvbjerg (2006) atypical cases often reveal more information because they activate more actors and basic mechanisms in the situation studied.

	JJW	**GXN**	**CBM**	**SBC**
Age (founding year)	1986	2007	2012	2015
Size (number of employees)	72	16	2	2
Customers	B2B	B2B	B2B/B2C	B2B/B2C
Markets	Local	Local + global	Local + global	Local + global
Design process	Inhouse	inhouse	Inhouse	Outsourced
Management	Led by C-level	Led by C-level	Founder-led	Founder-led
Industry	Architecture	Architecture	Fashion	Fashion

Table 1. Overview variation of case companies

3. Data collection

In our research we gained both primary and secondary data with the aim of enlarging the grounding for meaningful findings. One advantage of working with case studies is the "ability to deal with a full variety of evidence." (Yin, 2003, p. 8). Embracing multiple sources of evidence allows for the triangulation of data and thereby corroborating key findings and ensuring validity in the construction of the research (Eriksson & Kovalainen, 2008; Yin, 2015).

As all case companies work project-based, interviewing employees about a project appears relevant, as this is a shared set of frame they work within. This approach allowed us to explore the

design process in-depth and thereby to produce meaningful and concrete findings on a firm-level. In fashion, a project was considered a collection, in architecture a building.

3.1 Primary data

Interviews

Our primary data involves 12 semi-structured interviews with 11 interviewees. Among these 11 interviewees, ten of them functioned as direct data to the case studies, and one contributed with expert and background knowledge.

In the process of conducting the interviews, we followed the seven stages of interviewing by Kvale (2007): thematizing, designing, interviewing, transcribing, analyzing, verifying, and finally reporting our findings.

As previously touched upon, the exploratory nature of our research embraced the possibility of getting wiser along the way, discovering new complexities and dimensions of our research topic. This entailed that in the stage of designing the interview, we would add and adjust the areas to investigate in our interview guide based on knowledge from previous interviews. Additionally, designing the interview as semi-structured, we were also able to develop our knowledge during one interview session. At the same time, throughout our interviews, we aimed at maintaining some questions that were similar across interviews, as this allowed us a level of comparability for contrasting and complementing our findings (Seale, Gobo, Gubrium, Silverman, 2004). The interview guide is shown in the case protocol (Appendix 1).

The research design of semi-structured interviews implies the purpose of obtaining descriptions of the interviewees' reality, thereby allowing us to interpret the meaning behind these descriptions (Kvale, 2007). Our semi-structured interview approach can be related to the concept of active interviewing by Gubrium and Holstein (2001), where the interviewee is regarded as a source of knowledge, and the interview is an interpretive practice, an interaction between the interviewer and interviewee, where meaning is constructed.

Since the purpose of the interviews with employees in the case companies served a different purpose than the expert interview, they will be treated separately in the following.

Case company interviews

With an exploratory qualitative approach, our interviews do not have the purpose of testing a hypothesis or create predictions, but rather to understand the life world of the employee in order to understand the firm. Kvale (2011) responds to the issue of how many subjects to interview with:

"Interview as many subjects as necessary to find out what you need to know." (p. 11). Thereby our aim was never to interview as many as possible, as the quality of our result is more dependent on investing resources in preparing interview as well as analyzing them (Kvale, 2007). This will be further discussed in the section on validity and reliability.

In our case, our recruitment process of interview subjects of the case companies depended on different factors. The ambition behind recruiting interviewees was to have an interview with at least one designer and one project manager, who have worked collaboratively on a project. This ambition was developed based on three reasons. First, there was a pragmatic aspect that one employee would not be able to cover all themes in our interview guide, which stretched from creative processes to management. Second, the complexities of the creative processes would be difficult to cover through one person, especially considering that the process in practice involves different professional perspectives. Third, the multiple perspectives on the same project would allow for an element of comparability and create the possibility of validation of the interview findings. In some case companies, the roles of designer and project manager would overlap, but by interviewing more than one individual, we would still achieve the multiple perspectives in capturing the complexity of the research area.

Our interview process involved two rounds of interviewing at each case company. In practice the first round entailed that we would have introductory interviews with a representant of the company. At JJW, we talked initially with the CEO, at CBM and SBC with their founder, and at GXN the initial contact was made through an architect. By having introductory talks with these representants, the aim was to gain ground knowledge for the coming interviews. Furthermore, it served to establish a relationship to develop a level of trust that would transfer to the remaining interviews. The issue of trust is relevant to consider, as it can result in interviewees being more open and truthful (Douglas, 1985, in Seale, Gobo, Gubrium, Silverman, 2004). An overview of the interviewees in each company can be seen in Table 2.

JJW	CBM	GXN	SBC
Mette Seiding CEO **Katja Viltoft**, Partner **Peter Sager** Project Manager **Niels Wendelboe** Architect	**Camilla Gullits** Founder and Creative Director **Pernille Pold** Partner and Commercial Director	**Alexander Kongshaug**, Architect **Casper Østergaard** Project Manager	**Marie Schulz** Founder and Creative Director **Adela Fraud** Freelance Designer

Table 2. Overview over interviewees for the case studies

Expert interviews

Experts can be defined in the way that they "are equipped with explicit specialist knowledge gained through specific training which provides them with an in-depth understanding of a particular topic or field and enables them to provide clarification or resolve specific issues or problems" (Froschauer & Lueger, 2009, p. 220). In our context, our interview was with an external expert, who thereby contributed with concrete topics to investigate further within our research area as well as background information (Froschauer & Lueger, 2009).

Talking to experts in the exploratory phase of a research project is an efficient and focused data collection method that can serve to optimize the research process (Bogner, Littig & Menz, 2009). Therefore, in the very beginning of our research, we conducted an interview with Alberte Rothenberg, who has an academic and professional background in sustainable design in fashion and currently works as a consultant on circular design. This gave us an overview of issues in the field of sustainability and design and suggested relevant sources to look into.

Although Alberte is a consultant in sustainable design in the field of fashion, she points out that when looking at sustainability from a design strategy point of view, there are similarities across architecture and fashion. Also, as noted in clarification of concepts both architecture and fashion are jointly categorized in the same group of artistic design. This gave us the confidence to use her input for the cross-case analysis. Table 3 shows an overview of the expert interview and its purpose.

Name and position	**Purpose**
Alberte Rothenberg Consultant on circular design	*Expert interview* To get an overview of sustainability in the context of design

Table 3. Expert interview

3.2 Secondary Data

To improve the craftsmanship of our interviews, we used secondary sources to enrich our knowledge of the case companies, their projects and the industry. To make qualified interviews it required that we would familiarize ourselves with the topic of sustainability in the different industries before starting the empirical part of our research (Kvale, 2007). In the following, we will describe the different types of secondary data used along with their purpose in our research project.

3.2.1 Digital sources: reports, articles and websites

We used various reports as secondary sources to support background and industry knowledge. The report "Design Responsibility: Potentials and Pitfalls" (Leerberg & Wul, 2009) which was created in the context of a seminar by Nordcode (Nordic Network for Research on Communicative Product Design) provided great insights into the view on designers' responsibility in society.

The study: "The SocioLog.dx experience: a global expert study on sustainable fashion" (Pedersen & Andersen, 2013), which was conducted Copenhagen Business School in collaboration with GfK (Growth from Knowledge) layed out identified barriers as well as proposed solution to sustainability in the industrial context of fashion.

The guide book: "An Architecture Guide to the UN 17 Sustainable Development Goals" (Mossin et al., 2018) published by KADK explains how each Goal interacts with the built environment and gives examples of realized projects. Particularly, the guide's theoretical contribution to Goal 12: "Responsible Consumption and Production" highlighting the role of design, provided a starting point for fruitful conversations between the researchers. Additionally, the article: "Green Architecture: A Concept of Sustainability" (Ragheb, Shimy & Ragheb, 2015) provided knowledge on sustainable design in an architecture context and puts forward the architect's role in relation to implementing green design solutions.

Ellen MacArthur Foundation's (2013) report: "Towards the Circular Economy" provided us with a foundation to understand the emerging concept and its take on the limits of linear consumption. Additionally, the two reports from Ellen MacArthur Foundation: "Circularity in the built environment" (2016) and "A new textiles economy: Redesigning fashion's future" (2017) were considered to draw the linkage between Circular Economy and the two industrial contexts of our case companies.

Furthermore, our background knowledge was shaped by investigating the existing discourse in society on sustainability and design within fashion and architecture. This includes the websites of The Global Fashion Agenda (2019), Fashion Revolution (2019), Copenhagen Fashion Week (2020) and ArchDaily (n.d.).

3.2.2 Archival documents

During our research, we also gained access to some archival documents related to the companies' projects. This includes GXN's Circle House project (GXN, 2018), JJW's Grøn Byskole (JJW Arkitekter, n.d.-c), SBC's Crowd Bible for the Spring Summer 2019 collection and CBM's catalogue for Spring Summer 2020 (Appendix 2). These written records are treated as ethnographic data that can

be analyzed in a particular setting (Silverman, 2014). GXN's, CBM's and JJW's documents provided insights into the projects, whereas SBC's document represents a creative brief to designers and thereby contributing with background knowledge to get an understanding of the design process.

With our social constructivist approach, the documents should be analyzed in the context of being social facts and thereby not transparent representations of reality (Atkinson & Coffey, 2006). They help to get an accurate understanding of the design process by giving us an additional depiction of the respective phases of the process.

The Crowd Bible was treated as a confidential document and could therefore not be shared in this paper. Though providing documents enhances transparency, we found greater value in being able to publically share our findings.

4. Analysing qualitative data

The particular interest of this research was to generate new insights on the impact of sustainability requirements on the design process using case evidence from different companies in the creative industry. For this matter, a suitable approach needs to be selected for both analyzing within-case and cross-case data. According to Eisenhardt (1989), the aim of within-case analysis is to become intimately familiar with each case as a stand-alone entity which allows the researcher to recognize its unique patterns before generalizing patterns across cases. Although no standard format exists, within-case analysis typically involves detailed descriptions of each case, helping the researcher early to cope with the often overwhelming volume of data (Eisenhardt, 1989). In our case our within-case analysis contributes with descriptions of the case companies' projects and their respective design process. The process of both our within-case and cross-case analysis will be presented in the following.

4.1 Interview Coding

We followed Miles, Huberman and Saldaña's (2013) advise of "analysis concurrent with data collection" (p. 70), thereby allowing us to cycle back and forth between our data in an ongoing effort to eliminate blind spots and improving our data along the way.

Transcriptions of interviews can be done at different levels, depending on the level of desired detail (Miles, Huberman and Saldaña, 2013). We chose a transcription strategy that involved transcribing spoken words from interviewees but not pauses or body language. As Miles, Huberman and Saldaña note, this involves a somewhat simplified version of the raw data and allows us to focus on words as the medium. The transcriptions of our interviews can be found in Appendix 3-14.

To analyze our data, we conducted a coding of our interview transcriptions. Coding is described by Miles, Huberman and Saldaña (2013) as: "a deep reflection about and, thus, deep analysis and interpretation of data's meaning". (p. 72). The coding process consists of two phases, First and Second Cycle. The First Cycle involves an open approach, where one assigns different categories or labels to the data by dividing it into chunks to detect any recurring patterns (Miles, Huberman and Saldaña, 2013). The Second Cycle implies working the categorizing the labeled sections into smaller groups of themes and categories (Miles, Huberman and Saldaña, 2013).

Based on our expert interview, we had a start list of areas of interest that might appear in the interviews. During the coding process, codes from the start list would be modified, deleted or new codes would emerge. This coding approach is in line with the provisional coding method described by Miles, Huberman and Saldaña (2013) and is appropriate for qualitative studies that take into consideration previous investigations. We applied evaluation coding in addition to provisional. Evaluation coding is a way of applying codes onto data in relation to merit the significance of programs or policy (Miles, Huberman & Saldaña, 2013). In our case, this was a methodological tool to analyze the interviewees' evaluation of sustainability commitments in designing sustainably. As part of Eisenhardt's (1989) cross-case approach, the first cycle of coding was a within-case analysis. This implied that the coding was done on a single-case level to understand each case in-depth before comparing across cases (Eisenhardt, 1989).

For our Second Cycle of Coding, pattern coding was a method that allowed us to process the data. Pattern coding is ideal for multiple case analysis, as generating pattern codes produces the basis for a cross-case analysis as common themes will emerge (Miles, Huberman and Saldaña, 2013). In our process of pattern coding, we worked with loosely set meanings, so we were able to accommodate any appearing data that would point to other directions, thereby avoiding the risk of "(..) getting locked too quickly into naming a pattern, assuming you understand it, and then thrusting the name onto data that fit it only poorly." (Miles, Huberman & Saldaña, 2013, p. 87). The pattern coding can be seen in relation to Eisenhardt's (1989) cross-case data analysis approach of selecting dimensions, and then to look for within-group similarities coupled with intergroup differences. She highlights that these dimensions can originate from different sources such as the research problem, existing literature and theory or the researchers themselves. This tactic of cross-case searching enhances the likelihood of the researcher capturing novel findings which may be hidden in the collected data, the foundation of building new theory as attempted in this research project.

5. Validity, reliability and generalizability

Validity

Validity is related to: "the degree that a method investigates what it is intended to investigate" (Kvale, 2007, p. 122). From a positivist perspective the understanding of validity involves finding that one truth that exists (Kvale, 1996). However, with a social constructionist view we accept that there is no obtainable objective truth (Berger & Luckmann, 1991). This is also linked to our active interviewing approach, where the validity of interview answers is not connected to an idea of correct and incorrect answers or from interviewee's attribution of meaning, but rather on whether interviewees can convey their experiential realities for us to comprehend (Gubrium & Holstein, 2001). In this context, the concept of basing the design process on a particular project that both interviewer and interviewee had common ground knowledge on, could work as a facilitator of the interviewees' conveying their experiential reality.

Enhancing validity in this context calls for a needed emphasis on the quality of the craftsmanship and entails that validating findings involves constantly checking, questioning and theoretically interpret our findings during our investigation (Kvale, 1996, 2007). This can be related to "the risk of attitudinal fallacy" put forward by Jerolmack and Khan (2014), who argue that we cannot "draw conclusion on people's behavior based on what they tell us" (p. 179). This risk becomes highly relevant in our case, as we did not conduct observations of their work processes. However, one way of minimizing this risk was to cross-check interviewees' answers within one case company as well as organizational documents which provided project information.

All interviews were conducted in English, which was not the native language of neither the interviewees nor interviewer. As noted by Fersch (2013), this issue should be considered, as these can contribute with barriers for interpretation and Welch and Piekkari (2006) suggest that the choice of language can impact the accuracy and authenticity of the data. As the interview in our case is regarded as a interpretative practice between interviewer and interviewee, it calls for a reflection on our own pre-understanding stemming from the cross-language analysis setting (Fersch, 2013; Welch & Piekkari, 2006). We did experience that the foreign language could initially appear as a barrier for the interviewees, when they would sometimes have a difficulty in expressing themselves in English. However, with the choice of using a shared language, one avoids the use of a translation where there is a risk of bias (Welch & Piekkari, 2006) and where meanings can get lost (Fersch, 2013). By asking clarifying questions and talking to multiple interviewees one might overcome the initial barriers (Welch & Piekkari, 2006). In our case, as part of our interview technique we asked follow up questions to clarify and interviewees would use examples to illustrate their understandings. When

analyzing the design process, our triangulation through interviewing multiple employees of the same company as well as screening archival documents contributed to the level of accuracy. The foreign language factor also opens up a possibility, since the researchers would not be as familiar with linguistic implications as a native speaker, thereby leading to a more thorough inspection that prevents too-early interpretations (Fersch, 2013).

Reliability

In the context of interviews, the reliability is discussed in terms of questions being asked in a leading way by the interviewer and thereby influencing the interviewees' answers (Kvale, 1996). To avoid the formulation of leading questions, we discussed how to approach the different topics of the interview without guiding to a specific answer. Also, we were aware of the potential pre-set biases that could linguistically appear, if we for example in the interviews would have labeled sustainability requirements as constraints, as this might suggest a negative association and influence the interviewees' answers. Additionally, in the analysis, the coding will be a result of the researcher's pre-understanding, which influences the reliability of the findings.

In case studies, strengthening the reliability is connected with making the data collection procedure transparent (Yin, 2015). As previously mentioned, we created a case study protocol (Appendix 1), which was helpful in keeping the research focus and also contributes to the needed transparency. The procedure of triangulating findings during the data collection enhances the reliability (Yin, 2015). The author defines triangulation as occurring "when the evidence from several different sources converges on the same finding" (p. 198). By conducting a multiple case study, where each case offered multiple perspectives on the same areas of investigation, we strived for triangulated findings between interviewees and between cases to enhance the reliability of our findings.

In terms of the coding process, by both researchers coding the same data sets and discussing our results, it contributed to the reliability of our findings (Miles, Huberman and Saldaña, 2013).

Generalizability

The issue of generalizability has been highlighted particularly in relation to case studies (Kvale, 1996; Yin, 2015). In relation to case studies, the ideal generalization is analytic generalization, where sets of principles are being claimed to be applicable in cases beyond those of the study (Yin, 2015). This analytic generalization is proposed at a conceptual level, and as Yin (2015) notes reaching this level is not easy, but this is where linking findings to related research literature, identifying overlaps and gaps is helpful. Consequently, we relate analytical findings from our case studies to research literature within fields of sustainability, creativity, constraints, and design. In our case, one might raise the question whether the findings of the multiple case studies can be applied to other cases in the creative industries. Eisenhardt (1989) argues that case studies can be a starting point for theory development

and suggests that a cross-case analysis involving four to ten case studies may provide a good basis for analytical generalization. This argument supports the generalizability of our findings by contributing on a conceptual level. However, we are aware that there could be differences stemming from the context of fashion and architecture when comparing to other design industries in the creative industries.

6. Ethics

Ethical issues of the interview method are important to consider, as the research involves human participants, whose contribution can have an impact on their life outside of the interview situation (Kvale, 1996). To remain an ethical approach in our research, we considered the three ethical guidelines collected by Kvale (1996): informed consent, confidentiality and consequences.

With *informed consent* it involves informing the interview subjects on the overall purpose of the investigation, the design of the interview, and any possible risks that follow the interview participation (Kvale, 1996). It also implies that the interview subjects participates based on voluntarily motives (Kvale, 1996). As Kvale points out, including an informed consent will raise some issues in terms of balancing out how much information to give the informants and when as withholding information can be essential for the interview's purpose (1996).

For our initial interviews, we explained that our overall research project was on "sustainability in the creative industries" and for the later interviews we highlighted which of their projects we wanted to focus on. Additionally, we informed the interviewees beforehand about the overall topics that we wanted to touch upon, so they would feel somewhat informed and comfortable going into the interview. However, we did not send specific questions beforehand to the interview subjects. This is related to our semi-structural approach, but also to ensure authentic answers from interviewees. Kvale (1996) points out that an informed consent entails that the researcher must know the outcome and result of the interview, but this prediction is not always possible. Notably, for this research there is a limit to the degree of how informed the informed consent could be, as a result of the explorative nature of our study.

In terms of *confidentiality*, an essential factor to be considered was that this information was being made publically available. Since our research project was going to be made public, we gave the interviewees the option to be anonymized. This was a way to protect our interviewees and ensure a transparency in information sharing. Prior to the interview, we provided a declaration of consent for them to sign, which included details on how their information would be used, The signed declarations of consent can be found in Appendix 15. There lies a conflict between on the one hand an ethical call for confidentiality, and on the other hand the scientific principle of whether results can be replicated

(Kvale, 1996). Nevertheless, when posing the question concerning the importance of anonymity of this study, we concluded that we wanted to give the interview subjects space to criticize their company's processes and for them to be truthful about their views on sustainability without being concerned with impressing the public.

For the third ethical guideline of *consequences*, we considered any possible distress for the interview subjects as a result of being participants. As we would ask about challenges in their work project, it might involve criticizing existing practices of the workspace. Again, the option to be anonymous would protect them from any impact in a future work space, as this keeps them from being identified outside of the organization. However, since the interview subjects are a result of an initial recruitment process, they would still be identifiable within the company. Thus, in addition we gave the employees the option to review their interview transcriptions and allow them to delete parts if requested. None of the interviewees required anonymity nor requested parts of their interview transcriptions to be deleted. Ideally, the interview would involve an outcome that is beneficial for the participants as well, so they feel they are getting something out of this study that they are contributing to. In our case all interviewees were informed before the actual interview, that we would provide them with a customized report based on the findings of our research, with the intention of contributing to their business.

The ethical considerations also involve a broader level, of what is the desirable use of the knowledge we obtain (Kvale, 1996). This relates to the view on interviews as a moral enterprise where its knowledge being produced will contribute to our understanding of humans and that social science's central aim is to contribute to the human condition (Kvale, 1996). By investigating how sustainability is implemented in companies that are well-versed in the process, this research generates relevant and novel knowledge potentially contributing to a more sustainable future.

7. Research design

The explorative nature of our research along with the aim to generate knowledge as a starting point to create novel theories suggests an inductive research approach (Ogawa & Malen, 1991). However, our research process can not be classified as purely inductive.

The initial expert interview provided us with valuable insights on sustainable design in addition to our personal knowledge resulting from a shared intrinsic interest in both industries. The resulting pre-existing understanding of certain dynamics shaped our research from the start. The use of theory as a guiding tool was reflected in both data collection and the analysis of the interviews. When conducting semi-structured interviews, we were guided by pre-existing knowledge while

simultaneously aiming to leave room for surprises. In the analysis of the data collected, we relied on codes that were both theorized by using existing labels as well as by us building new ones. Moving back and forth between theory, data collection and analysis enabled us to stay open to the emergence of new patterns throughout the entire research process which is in line with the exploratory nature of this study and the inherent aim to add to existing theory.

Chapter 4: Analysis

The overall topics for our interview guide were based on our expert interview. Our analysis is two-fold. When processing the data, first we examined the interviews on a single-case level to understand each case and project separately. The findings are presented in the within-case analysis. Second, we studied the data from a cross-case angle, looking for different patterns and levels of comparisons (Eisenhardt, 1989). These findings were expressed and theorized in codes, the code-labels being based on empirical observations and theoretical pre-assessments and are presented in the cross-case analysis. The two levels of analysis will be presented in the following.

1. Within-case analysis

By studying at each case separately, we were able to understand each project and get an insight into the design process, which led up to the final design solution. The following is a descriptive analysis of each company's project and design process.

1.1 JJW Arkitekter - Project: Grøn Byskole

The project is the winning proposal of a public tender that was published in December 2018 by Copenhagen's municipality, who is the client of the project. The project is expected to be completed in 2023.

The prerequisites for the design of the new school at Sluseholmen were very specific. Despite a small building site in a complex place in the city, the mission by the municipality was to create a building with both school, gym and parking garage. JJW's proposal has succeeded in fulfilling these ambitions as the City of Copenhagen states:

> *The winning proposal does not simply fulfill the municipality's vision of a green city school and a meeting point for citizens. When the school is built, Copenhagen has also been given a new architectural landmark (*JJW, 2019*)*

JJW conceptualizes the school as "a green lunge for the entire neighborhood" (JJW, 2019). The designs of Grøn Byskole are centered around circuit thinking which is reflected in four different circuits:

1. "Nature Circuit" highlighting nature as a central part of the learning

2. "Social Circuit" focusing on the how the school can be used also after school-hours by the local community
3. "Movement Circuit" that links school, sport and local neighborhoods together.
4. "Building Circuit" related to the building's sustainable material selection, ensuring long-lasting construction.

Design process

The following is a description of JJW's design process using the project Grøn Byskole as a tangible example and starting point. The outlay of the design process is primarily based on the interview with Niels, an architect on the project.

1. *Client delivering brief*

   The project of Grøn Byskole was in the form of a public competition, where companies could participate in the bidding round with their design solution. The client delivers the task in the form of a brief to all companies participating in the bidding round. The brief will consist of the task description along with the requirements of the final outcome. In Grøn Byskole's case, it included information such as site location, how many children would use the school, budget, and bases for "how should we decide" and "what demands should the constructor deliver" (Niels, p. 6, l. 228-230). As the Grøn Byskole project setup was a competition, none of the participants in the bidding round were allowed to have contact with the people potentially using the school at any point. "It's a really bad decision. Because you would think that understanding the people that has to use the building would be a clever thing when you design it, right. But that's in order to be able to make this bid round (...)" (Niels, p. 6, l. 251-253). In the design process it entails looking at the brief and identifying the "problems" of the task: "We started out with opening the problems. We had this series of documents. And we said okay, we have this plot. We have this idea of a financial limit. We have these these demands from the municipality in terms of city planning, we have a railroad, we have a very much polluting and almost like a highway passing by the school, we have legislation saying that there has to be a certain amount of quiet around the school and there's pollution." (Niels, pp. 6-7, l. 263-267).

2. *Brainstorm: "Jam"*

   This is an open-ended process where the designers try to figure out what is going on in terms of challenges and what are the possibilities available. In the project's case, one challenge involved how to put a school next to a highway and avoid the noise pollution.

3. *Creating scenarios*

   Here, the designers come up with different scenarios ("A", "B", "C", etc.) that represent the different design options with this problem-solving approach, where they should meet the given requirements and identified problems. These scenarios are made visible through big cardboards of A3 prints.

4. *Testing: Evaluating scenarios*

   This entails evaluating the scenarios by understanding them from certain parameters, which could be how expensive it is, how "green" it is, is it allowing other people to use the building during after-school-hours, how sustainable is the material for this scenario. Based on the evaluations, certain scenarios are sorted away and others are added. The scenarios are shared in meetings, where challenges of the different scenarios are discussed and findings solutions. These meeting involve the project manager, architects as well as constructors, who jointly have to agree on solutions.

5. *Not a linear process*

   The design process is not linear so the steps of creating, understanding and evaluating scenarios are repeated.

6. *A design solution is chosen*

   The final scenario is selected and framed in a way to convince the client: "We tell everyone a story, as if it is the only story told in the world" (Niels, p. 7, l. 300).

7. *After winning*

   After winning the projects, leading up to the construction phase, there will be smaller design details to be decided, such as what should the handrail look like. However, there is no flexibility on larger elements in this implementation part of the process. "So if we are at this stage and I say oh I want a pancake instead, or I want a tower, it's a tremendous problem" (Niels, p. 8, l. 318-319).

1.2 GXN - Project: Circle House

The client of this project is Lejerbo, a social housing organization that was instructed by the municipality of Aarhus to design 60 general housing units in Lisbjerg outside Aarhus. Lejerbo hired GXN as consultants on the project, which represents Denmark's first circular housing project and

became a collaboration involving GXN, Lendager Group and Vandkunsten and a diverse set of representatives from the building industry. The number of companies involved grew from initially 25 to 60 throughout the process. The project is expected to be completed in 2022.

In addition to serving as housing, Circle House is a research and development project that aims at giving the building industry new knowledge about circular construction. The declared objective is that 90% of the materials being used for the buildings, can be reused without losing significant value.

One outcome of the project is a what Casper and Aleksander refer to as "building system" or "material filter". This building system consists of 15 principles that have been developed as guidelines and strategies for implementing reuse and circularity in the building industry. The principles are divided into three categories: Design for Disassembly, Material ID and Circular Economy. The building system takes shape in the second more tangible outcome of the project - a scalable demonstrator of the Circle House in Valby..

Design process

The entire project can be summarized in four successive phases: (1) designing, (2) building the demonstrator, (3) tendering and (4) constructing.

The following description zooms into the design phase of the project and is based on an interview with Casper who was the project manager of the Circle House project.

1. *Idea generation/ Brief*

   Casper describes the design phase of Circle House as "a very intense 8 weeks sprint" (p. 2, l. 83). The process started in spring 2017 after committed funding by the municipality of Aarhus and the assembly of a diverse team of stakeholders including manufacturers and engineers. After assessing different directions and ideas, the project brief was jointly developed by the client Lejerbo and the project's core unit consisting of architects from the studios GXN, Lendager Group and Vandkunsten.

2. *Sketching*

   The sketching phase of Circle House had a two-fold purpose. Besides the "traditional architects sketching phase" (Casper, p .2, l. 76), the process included the development of 15 principles for a circular building system. The latter were composed during workshops in the first half of the sketching phase and involved a diverse set of stakeholders aimed to represent the "whole industry" (p. 3, 90). Teams and workshops were divided into four areas: structure,

skin, fit out and process. Casper had the role of facilitating the workshops and aligning the different stakeholders towards the same goal.

3. *Mid-crit/ "Reality check"*

   After the first round of the sketches, the municipality of Aarhus joined the process to provide feedback on the sketched designs and developed principles in a process referred to as "mid-crit".

4. *Re-sketch*

   The last two weeks of the sketching phase were used to implement the feedback by the municipality and finalize the designs. Generally, the sketching phase was not linear but characterized by loops, redesigns and optimization along the process.

   The outcome of this first phase was the circular building system, including the 15 principles and the sketch for the demonstrator. Now that the demonstrator has been built, the next step for GXN is the bidding round in which they choose the architect studio designing the housing units in Aarhus based on the developed principles.

1.3 SBC - Project: Spring Summer 2019 (SS19)

SBC's SS19 collection was one of the two yearly collections at SBC. It was conceptualized by Marie with the theme of 'an artsy inspiration to reinvent the folklore of Tibet'. In the Crowd Bible, the design brief that she sends out to the designers. After the Crowd Bible was sent out, the designers had two month to deliver different styles before samples were sent to Bulgaria for production. The garments were available in shops in spring 2019. For the company's founder, the goal of her collections is to provide the customer with high quality clothes made of natural fabrics only. The project goal reflects Marie's motivation to found SBC:

> "So I also urged for you know the craftsmanship of clothes and you know getting back to like buy something that you have in your closet for a long time that you really cherish. I was very tired of this you buy a dress and then you wear it this one time and then it breaks and you throw it out." (Marie, p. 8, l. 335-337)

Design process

The following design process is based on an interview with SBC's founder, Marie Schulz and uses the CrowdBible for SS19 as an example.

1. *The brief*

   Marie will develop the Crowd Bible based on a theme. The brief will always include the same info on the brand's identity and key customer. There will be a mood board for the collection with different pictures. Furthermore, there will be information on how SBC's collections are composed and the different items required. Other than that, the brief includes a description of the possible materials, and the colour options available for each material.

2. *Two months of designing*

   The designers will have two weeks to develop their design before they have to hand it in. In this period they can choose to come by the SBC's office to have a look at the collection's materials. The designers usually deliver between three and 50 styles.

3. *Feedback of selected designs*

   In a period of two weeks after designs are handed in, Marie will choose the ones she finds suited for the collection. Marie might have some alterations for the design, such as making a dress shorter or changing the colour of a print. Usually 16 different designers are represented in each collection. The designers whose proposals were selected will be invited to a 3-hour mandatory workshop at SBC. SBC may also choose to reuse styles from previous seasons and just adjust the colour or the fabric.

4. *Workshop*

   At the workshop, Marie and Jenny from SBC, their hired clothing constructor and the selected designers will be present. The new collection will be presented to the designers. Here, a dialogue will take place with the designers, SBC and the constructor on any possible changes or questions regarding the design. The designers sign a contract that enforces the 3.000 DKK they are paid for their design and royalties for every item sold.

5. *Ready to produce!*

   The samples are now ready to be sent to the factory SBC works with in Bulgaria for production.

1.4 CBM - Project: Spring Summer 2020 (SS20)

The SS20 collection consists of tops, poplins and scarves made of organic cotton, silk and cashmere. Additionally, the CBM introduced some new colours of older styles and a new a hand-knit sweater in mohair and wool. While some of the pieces were produced by their GOTS certified partner factory in India, others, like the handknit sweater, are hand-made by underprivileged women in Nepal, who are in close contact with Camilla on an everyday basis. The objective of the collections can be seen in the more general context of CBM's commitments:

> "(...) I decided to make a project, where I would educate women in Nepal, and take them away from prostitution and poverty and make sure that they actually got an education within craftsmanship. Most of them already know how to for instance knit by hand or printing and things like this, but, but they don't know Danish design and they don't know our design process and how we quality assurance and all these things (...). So, I wanted to make products to embrace women in our part of the world in the same time they empower women in developing countries." (Camilla, p. 1, l. 21-29)

Design process

The design process of CBM is described based on the interview with the founder Camilla and the Commercial Partner Pernille.

1. *The idea*

   Camilla has an idea of a concept for a collection. This concept gets formalized by visualizing it in a moodboard. The input can be add-ons to an existing collection by being a new colour pallette of existing pieces, or variations of existing items, new combination of materials or new styles. Since CBM reuses their styles from previous collections, a new collection would typically consist of a selection of styles from last season and adding new styles for the new season. In adding new styles Camilla must consider the limitations their partner in Nepal faces when it comes to machines as well as the fabric choices made of the brand, choosing only natural materials.

2. *The commercial input*

   Camilla will present her ideas to Pernille, who will provide her input from a commercial perspective. She will evaluate whether the new pieces or elements added will be sellable and she might suggest to add a product within a cheaper price range. For their last season, Pernille

removed a product from this first draft of collection, as her evaluation revealed that due to high level of handicraft, it would have been too expensive to be sellable.

3. *Testing: Samples*

   CBM will receive samples and Camilla will see if any alterations should be made. The level of novelty of the new product will determine the complexity level for the craftswomen and thereby also determine the need for testing.

4. *Final handover*

   Implementing a new colour is rather simple and easy, whereas a new style or a new technique requires more effort. When it is a new technique, depending on its level of complexity, Camilla will either send some samples to Nepal or travel there herself to teach the workers how to do it. Because everything in Nepal is handmade, they have the possibility of testing new styles and different techniques within the knitting and weaving area. Non-handmade items will be produced in their GOTS-certified factory in India.

Findings of within-case analysis: Design process

As a result of our within-case analysis, we managed to get an understanding of each company's design process. This gave us an overall idea of the design process and made us able to generate an illustrative figure of our findings of the descriptive analysis. The result is the following (Figure 4) that sums up the companies' design process in a synthesized universal design process based on our within-case analysis.

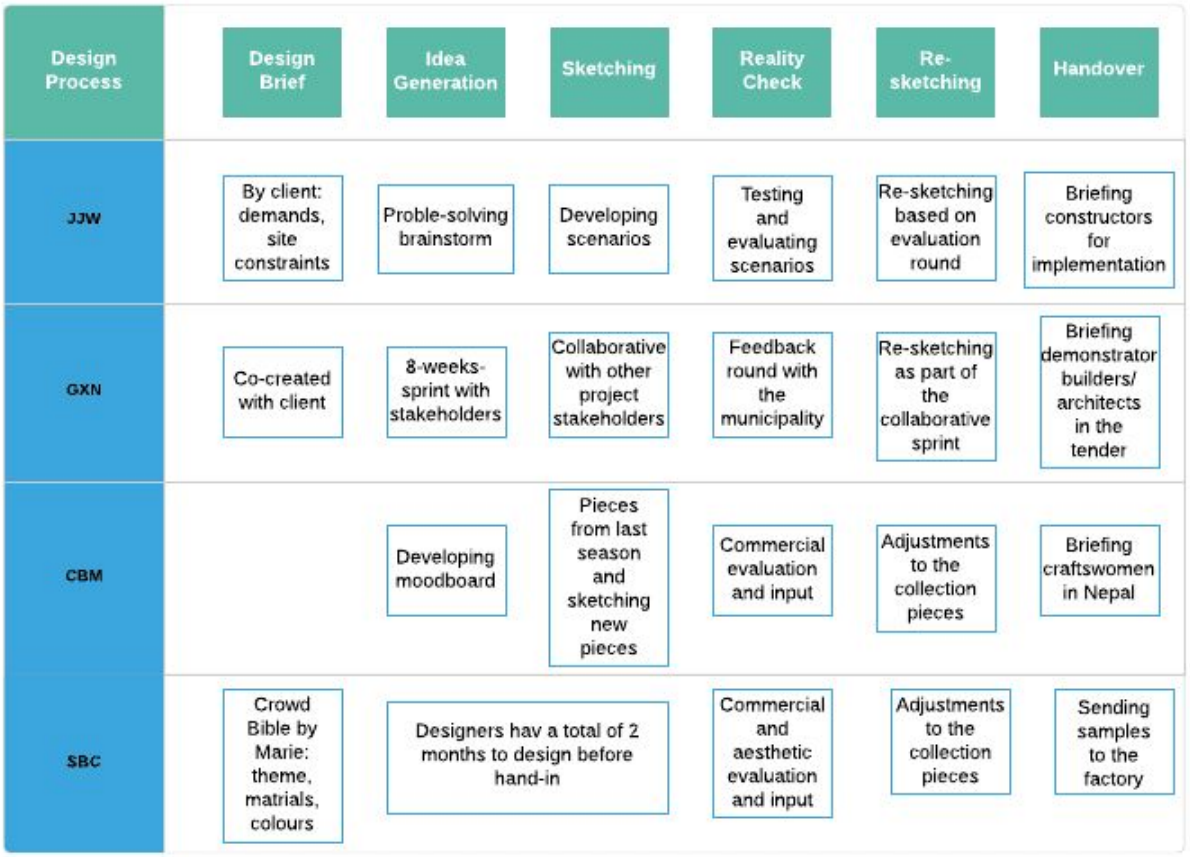

Figure 4. Steps of the design process of case companies

2. Cross-case analysis

The following is an analysis of the patterns and differences identified across the four cases based on the interviews. We have structured our cross-case analysis after the three sub-questions we set to investigate in order for us to answer our research question. The codes used as headers represent the patterns we recognized. As stated, the codes are based on the expert interview we conducted before interviewing the companies' employees, as well as theoretical background and what we identified empirically during our research.

2.1 How do employees understand the concept of sustainability?

In our interviews we asked the employees to explain to us what the concept of sustainability meant for them. It should be noted that by also interviewing freelancers and company-owners, the term employees also covers self-employed individuals.

Though there was a presence of nuances in their responses, the employees' understandings of sustainability overlapped in terms of what it entailed and its implied challenges. Based on the interviews, we conducted a cross-case analysis of how employees expressed their understanding of sustainability. The most prominent patterns we identified in our analysis were related to the categories of: *complexity, certifications reduce ambiguity, making your own rules, holistic understanding, money matters, dynamic, circularity, longevity, material and production and finally use and consumption.* These findings will be presented in the following.

Complexity

When asked to explain sustainability, several of the employees would refer to it as a wide and complex phenomenon:

> "(...) "it's a very wide span of complexity"" (Katja, p. 1, l. 31-l. 32)

> "Sustainability. That's a big." (Adela, p. 2, l. 40)

> "So, it's a very huge area, sustainability." (Peter, p. 1, l. 18)

> "Well it's a broad term nowadays" (Casper, p. 1, l. 24)

> "(...) it is very difficult to navigate in, also for us." (Marie, p. 7, l. 282)

Though CBM' employees, Camilla and Pernille, did not in the same way explicitly express complexity in relation to sustainability, its implied challenge arises when Pernille talks about communicating sustainability commitments to customers:

> "(...) so there's many aspects within the social sustain[ability], which are really important for us and for the brand, that is actually it is in some way, a little bit difficult on my side, on the commercial part, to communicate that. So it's it's a lot of values to put into a product. And it's very difficult to get the message across." (p. 2, l. 60-66)

The perception of sustainability as a complex phenomenon was also exemplified by Katja from JJW's:

> "And when we think of it, for instance also sustainability, you can also build a very sustainable house, but if you have to take your car to go to work in the city, it's more sustainable to build a less sustainable house in the city, where you can walk or take your bike. So sustainability is is a wide question." (p. 1, l. 26-29)

Katja's points towards a necessity to consider more than one aspect when talking about sustainability which is shared by SBC's founder Marie, who presents the many options and at the same time criticizes companies that simplify sustainability:

> "For clothes it's very difficult because it can be organic cotton, but it can also be tencel, which is made in a closed loop, it's a bit more difficult to explain. It can also be deadstock, many different kind of aspect and still be the sustainable bla. So it makes it very hard to be the consumer and make the right choices, also because there are many [companies] that then claim they are sustainable, and then because they make two t-shirts that are organic cotton, then the consumers suddenly think that the whole brand is sustainable. So it is very difficult to explain it and to explain it simple." (p. 8, 358-354)

Certifications reduce complexity

When talking about the complexity that comes with the area of sustainability, Alexander mentions that using certifications is a way of reducing the complexity connected to sustainability:

> "We need certifications to have a common goal. When we are talking about DGNB, it has a certain set of rules which everyone can relate to. So in the process it's very important. You know because people can have different meanings of saying green or whatever. (...) Then it's good to have certifications which you can rely on and then the developer comes to the architect saying, we want a DGNB goal certified building. " (I1, p. 3, l. 90-93, l. 97-98)

This notion of using certifications to set a common set of rules is agreed by Niels, when he reflects upon what the initiative of becoming B Corp-certified can add to JJW:

> "But getting an understanding of how to, again, back to the thing of getting a language and getting parameters. It's extremely important because if you have a language you can talk about it, if you haven't talked about it, you can define parameters, and if you have parameters, you can go do. (...) So yeah, more language, better definitions. More action." (p. 11, l. 461-466)

Camilla also sees the value in certifications to deal with the diversity, as they provide a legitimate guide:

> "I mean, there are so many different ways at the moment. So I think it's really important to stick to the existing certifications and the ones where you know that you have external people doing the audits and things like this." (p. 7, l. 291-293)

Similarly, Marie understands certifications as a way of reducing complexity in the area of sustainability. She talks about how the complexity makes it difficult for the consumer in a fashion context, as here there is not the same indicating navigator as in the food industry:

> "Because there is no like, you know for food we have det røde Ø [Danish certification for organic food], and that's easy. But in clothes it's very difficult." (Marie, p. 8, l. 347-348)

Certifications are not adequate

The certifications are seen as not always being sufficient to reduce the complexity of defining sustainability as Marie explains:

> "(...) it is difficult when there is no guidelines. And also who should make these guidelines, what is right and what is wrong? That's also very blurry. So if you buy something GOTS you know it's good, because it's not only organic, but you can also trace it down all the way to the field, where the cotton is grown. It's also about the environment that the people are working in and everything so that's good. So of course those certifications are the easiest guideline, but I think that when you talk about sustainability, it's much more than that. It's also about cherishing your clothes, buying less, choose quality, something like that, yeah. " (p. 10, l. 436-446)

This notion that certifications do not cover all areas of sustainability is also expressed by Katja:

> "It's not part of the certifications of did you really need those 250 square meters? And I think that's the most important. So I think in these, we both have to do all the things for the

certifications, we should know all the details about the materials. But we should not forget to ask the big questions, that is what really matters." (Katja, p. 7, l. 293-295)

Pernille shares the inadequacy of certifications, but here in relation to the social aspect of sustainability:

> "I mean so many people or brands are fighting to get a legal or certification or something in order to justify what they are doing, in order for the climate and the climate is very important and that's also why we GOTS certified on the organic cotton part of things. But, and it is more difficult to certify on being social and taking a social responsibility." (p. 2, l. 41-43)

Camilla expresses how setting your own rules of sustainability is risky when you want to claim it as a standard:

> "And then when you do your own standards or trying to do something even better than the standards existing does, you should be very careful about saying it's a new standard or a real standard because it's actually just the way we drive our business." (p. 7, l. 292-296)

Holistic understanding

Though sustainability is described as a complex and wide area with elements of ambiguity, there are two aspects of sustainability, which are repeated in the interviews. Several expressed a holistic understanding of sustainability, where both the environmental and social aspects were considered. Katja refers to the two aspects as interdependent:

> "And we value very much the sustainability, the social sustainability, saying that if we can build the most sustainable houses, if they're not suited for people, if they don't give us a good city, then we have lost everything. So, we can't just take the environmental sustainability, we have to look at the social also" (p. 2, l. 34-38)

Marie at SBC also covers both an environmental aspect while indicating a social dimension when referring to the companies' sustainability focus:

> "And then we use organic and natural fibers, so that's also. And for us it's also about treating people right. That's also sustainable for us. So choosing the right factories to work with, pay our designers, stuff like that, is also a sustainable mind for us." (p. 4, l. 156-159)

Casper at GXN considers both aspects as well when talking about sustainability:

> "(...) creating closed loop systems that are indeed let's say self-sustainable and can they work without this yeah, using finite resources. (...) But of course sustainability is also about the

> economic part of it, like it needs to be economically sustainable to do something. (...) And then of course there's the social part of sustainability as well, that it needs to be good buildings that you want to be in and work in." (pp. 1-2, l. 26-27, l. 32-33, l. 46-47)

Casper mentions in addition to an environmental and social part, an economic aspect. This threefold understanding of sustainability can be linked to Camilla's consideration:

> "(...) even though our focus is primary the social part, the social sustainability, of course we also need to consider both the environmental and the financial part of sustainability. So we actually work with this triangle when we talk sustainability, at CARE BY ME." (Camilla, p. 2, l. 50-52)

Money matters

For Camilla, there is a notion that the economical sustainability of the holistic triangle works as a premise for the other two. This appears to be a realization that resulted from the termination of financial support by the government in 2015:

> "And to be honest, I mean CARE BY ME started a bit philanthropic because I just wanted to do this project, but after the earthquake and the shutdown of DANIDA in Nepal, I realized that if this should be long lasting we really needed to also focus on the financial part, because I don't have a tree in my backyard where I can pick them on it to support the project." (Camilla, p. 3, l. 87-90)

Camilla and Casper are not the only ones who bring up an economic aspect in relation to sustainability. Alexander also highlight the financial as an essential element, a premise to even consider the others parts:

> "Because for us, it obviously makes sense when we are talking about the environment, CO2 emissions and so on that you are not using CO2 to produce new products but you are reusing old ones and taking them back into your own loop and so on but for us it is just as much about optimizing a building process and seeing a business in it. Because if there is no business in it, then no one wants to do it" (I1, p. 2, l. 62-66)

That sustainability also has to be a good business is generally agreed and is not a shocking finding in the light of all employees working in a profit-oriented company. Notably, the financial aspect is described by Marie as a constraint on her process of making SBC a sustainable company. She points out the financial challenges of being a small company that wants to source sustainable fabrics:

> "(...) the biggest hurdle in being a sustainable company is that when you source the fabrics, you have much higher minimums, and when you are a new company, you know, you cannot make 1,000 pieces, you can maybe buy 200 pieces, but you have to buy 1,000 meters. But if you want conventional cotton, you can buy 200 meters, so that's why we in the beginning couldn't be all sustainable, because it's also in the bitter end about money." (Marie, p. 7-8, l. 321-325)

Not everyone shares the experience that sustainable options will always be expensive. Casper notes this in the context of GXN's project but also acknowledges the challenge it implies:

> "And with the Circle House specifically, it's also a social housing project, so it's very low in square meter price, which also is a good point of course it's an extra challenge to actually build something cheap and circular and to develop that. But we can also prove that it doesn't have to be expensive to build sustainable, which is I think is another really important point about the project."(p. 2, l. 40-45)

Notably, both Casper and Alexander refer to the necessity of sustainability being a good business. However, we see that in relation to a sustainable business, where being a good business in this context is not understood as necessarily keeping costs low. In the project of Circle House, Casper points out that for the bidding round, the winner will be not selected based on lowest budget:

> "So, and also we know that we just want as much response as possible so price is not a factor for the tender, but just, we have this amount of money, build the best thing you can do for that. So we don't want them to build it cheaper. We just want them to build it better." (p. 5, l. 185-189)

When asked what is meant by 'better', Casper replied: "like a better quality of materials, or even more circular" (p. 5, l. 193). It could be related to JJW who won the bidding round for Grøn Byskole by managing to solve all the municipality's ambitious demands. In this case, the solutions' overall qualities were more important than solely focusing on price, as Niels notes:

> "In this project, we were not the cheapest ones by far. We were like 30 million over the cheapest one. But we still won. That's sort of the best thing we can get to right, being chosen even though we're not the cheapest." (p. 4, l. 195-197)

Dynamic

In general, we see that the employees regard sustainability as a dynamic concept which is in an ongoing development. This understanding is also expressed as "trends" of sustainability by Katja,

who mentions how within architecture 10 years ago, the concept of passive houses was the big trend, then DGNB became the focus and how now circular economy is the latest area of sustainability of the built industry (p. 6, l. 239-246). She refers to a need to stay updated on these developments:

> "(...) the field of sustainability is the one that moves the fastest. So maybe you had a specific cause two years ago, maybe that's not relevant anymore, you have to have a specific one this year, and two years later, you have to have another one. But you can't wait and say I will wait until the right cause is here. You have to take them all along the way so it's kind of more you build on top." (Katja, p. 6, l. 234-237).

The description of sustainability as a dynamic concept is shared by others. Casper assents Katja's notion of how sustainability standards in their industry changes:

> "I think for many years it has just been about optimizing it in terms of energy but sustainability is so much more. And specifically now seeking a more and more focus on materials like how much energy they embody but also like how do they react, and can they be used inside, are they healthy, which indoor environment do they provide." (Casper, p. 1, l. 28-31)

Niels explains how sustainability has evolved in the sense that the standard for what is acceptable is rising:

> "(...) what was considered in 2005 like hey this is flagship sustainability project, is now illegal, because it is simply not enough. So it's really moving rapidly" (p. 1, l. 27-28).

Whereas the employees working in architecture talk about trends within sustainability, the employees in fashion talk about sustainability in the context of being a current trend. When Marie talks about SBC choosing to be a sustainable company she notes:

> "We knew that was the way we were heading and not because it was suddenly in fashion to be sustainable. But because that was what made sense for me. (p. 8, l. 330-332)

This notion of "in fashion" can be related to to SBC's designer Adela, who points out that she experiences sustainability being more prominent now:

> "I think when I started working, we were not so focused on it. I studied five years ago, so it was here the theme of sustainability but not as strong as now." (Adela, p. 2, l. 59-60)

This perception of sustainability being a trend right now and how it has not always been that way can be related to Camilla's comment, when she refers to people's reactions when she founded her company in 2012:

> "Why, social, why, because, you know, it was not really so fashionable or trendy as it is these days." (Camilla, p. 3, l. 94-95)

Circularity

In the talk on sustainability, the idea of circular thinking came up. Its relevance in understanding sustainability is supported by concepts closely linked to circular economy, such as recycling, upcycling or circular thinking that were mentioned during the interviews. Though the idea of circularity as a concept cannot be traced back to one single date or author, the Ellen MacArthur Foundation (2013) developed a framework which is applicable across industries. The framework is based on three principles: (1) Design out waste and pollution, (2) Keep products and materials in use and (3) Regenerate natural systems. Although not part of our interview guide, the notion of circularity came up in different contexts across cases.

As already mentioned Katja refers to circular economy as the latest trend. In addition, she expresses a need for circular thinking in relation to sustainability:

> "But it's kind of it is the sustainable thought that you can't, nothing is linear, it's always a circle right, you always have to find a way of making things go on. (Katja, p. 3, l. 104-105)

Casper also puts importance on circularity describing it as a tool to tackle the social sustainability in architecture:

> "That is where the circularity, the whole flexibility part of it that we can always adapt our buildings and make them relevant to their time so we don't have to tear them down, when something, so that whole flexibility thing can really support the social part of sustainability." (p. 2, l. 48-52)

His colleague, Alexander describes the potential value that lies in circularity:

> "So the closer you come to reusing an element in a more direct way the higher the value of it is because we are not only talking about reusing the volume and the mass of the material, we are actually talking about reusing those technical skills, time and education which went into the solutions of those products." (I1, p. 2, l. 58-62)

At the fashion companies, the employees appear to regard circularity as the 'next big thing'. When Camilla is asked about where sustainable design is heading in the future, she responds:

> "(...) I'm really really fascinated by recycling different products, re-using, upcycling using different techniques to make new clever wearable things (...)" (p. 10, l. 407-409)

A specific example in which this interest in circularity takes shape at CBM is:

> "(...) a new product called waste quilt, where we actually every day clean up the floor from our knitting in our living factory and then we stuff all the waste into a linen cover, and they have this kind of quilt." (Camilla, p. 4, l. 148-150)

Marie also expresses this interest for circular thinking. SBC sells scrunchies made from leftover fabrics and buttons from seashell waste. Additionally, the company has recently started to work with fabric made of leftover milk production. Marie points out some limitations by the industry's level of development when it comes to circularity:

> "And I think that these processes are very interesting and something we would very much like to work much more with, but it's still in the very early stages, it's very difficult to find fabrics and again the quality question comes in, because you can maybe find something, we found the milk fabric, but the quality wasn't that good, so half of the fabric that we received couldn't be used." (p. 6, l. 247-250)

Alexander also addresses challenges related to circular economy in an industry context:

> "(...) one which is really the focus on right now is the circular economy. (...) today in the building industry, we are calculating with a linear economy which means that you get a certain amount of money and time and based on that process from when you are starting to build the building to when you are handing over the keys that is where the economic calculation is going. If you do that and when you try then to implement some of our circular principles then those two worlds don't come together." (I1, p. 1, l. 18-24)

When talking about circularity Alexander brings up two circular initiatives in relation to sourcing material for the Circle House demonstrator:

> "So this is one part of the facades and it is collected household waste from households in Amsterdam, like old shampoo bottles and so on that get sorted out into colours and then they hand press these tiles here which can be just put up with a screw and then they protect the surface of the house. (...) This is another facade out there, a wooden shingle. And this is actually wood waste from the metro construction site. In Denmark, there are 50,000 tons of wood being used on the building site which is not a part of the final building. (...) So there is a big big waste stream there that we are trying to tap into and then transform into value. (I1, p. 240-252)

Longevity

Casper mentions flexibility in the context of circularity, as it makes buildings continue to stay relevant, prolonging their life cycle. This idea that sustainability involves designing something that will stay relevant in the long term was a pattern we saw across companies. Katja also points out the need to stay pertinent over time to be sustainable:

> "So, when we work with sustainability, we have to think that what we built is useful, and many generations ahead, which we don't know what they will need. But when we look back in time, we can see that a lot of buildings were built hundred, two-hundred years ago, and they are still very valuable. That's very sustainable. So we try to learn from history, and see why do these buildings last. Why are they not torn down, because the most unsustainable you can do is build for a very short term. So, so if you have this very, you can build the most sustainable house, if you tear down 10 years after it's the most unsustainable in the world. So you always have to think of time as a very important part, and then what is it that you're going to do." (p. 1, l. 17-26)

In the fashion world, Camilla also sees the need for clothing to stay relevant:

> "We also do really basic new styles, but but we try to do, you know, try to make sure that that it's not styles that you wouldn't wear in one year." (p. 4, l. 150-152)

The vision of creating garments that last is also shared by Marie at SBC who connects durability to the quality:

> "(...) we have worked a lot with the garment so we know that it's high quality. For example the silk we use has what is called a french seam, which makes it more stronger, because it's like double sewn. So instead of the zigzag it is double sewn. So all these small details for us is also about sustainability, because it makes the garment last." (p. 4, l. 154-157)

Material and production

The pattern identified of sustainability being understood as designing a product that stays relevant over time can be related to the importance placed on the materials used for production. Adela's first thought when having to define sustainability refers to material: "(...) it's trying to think of material, and how you use it and where it's coming from." (Adela, p. 2, l. 41-42). Being a freelance designer at SBC, Adela is not the one to choose the materials, as this is Marie, who also acknowledges the material's importance:

> "A part of being sustainable in this business is very much about choosing the right fabrics." (Marie, p. 4, l. 151-154)

Peter also points at materials as a relevant element: "Sustainability is going from, how you use, and rebuild on all the materials, (...)" (p. 1, l. 15). His superior Mette points out a challenge in this context, specifically when following a DGNB certification:

> "For this tool, one of the topics will be around choosing materials and there are no publicly accessible statistics or libraries where you could go to and see this material is better than that one. Your sort of start your own process every time." (Mette, p. 6, l. 271-273)

At GXN, Casper shares Peter's view that the material's outcome is related to a product's sustainability:

> "And specifically now seeking a more and more focus on materials like how much energy they embody but also like how do they react, and can they be used inside, are they healthy, which indoor environment do they provide." (p. 1, l. 29-31)

His colleague Alexander also points out the material's importance. When bringing up circular economy as the focus right now he adds: "And the material. And the use of it" (I1, p. 1, l. 19),

For both fashion companies SBC and CBM the material choice is based on the criteria that it is natural and high quality. In addition to linking sustainability to the sourced materials, the production's frequency also has an impact. Adela points out industry-related issues in relation to sustainability when asked about how she sees fashion moving forward:

> "I think people are trying. But I mean, people are trying but there's also, we're still facing the same patterns, like that there are so many collections. There's always something new. So they [companies] keep on producing a lot." (p. 12, l. 508-511)

Adela's view is shared by the other employees in fashion. When Marie is asked in relation to SBC's choice of having two collections a year instead of the fashion industry's standard of four, she explains:

> "But we think that's also not sustainable to try to push collections all the time, so we do only two. And if some of our stores they are like oh but two, we need some new around summer, then we hold something back and drop it later. But it's still only two collections." (p. 11, l. 503-505)

This is also seen at CBM, where the employees consciously took the same decision as a reaction to the industry's standard, as Pernille explains:

> "(...) we try not to launch too many collections a year, we try to have a solid base and then do some add ons throughout the season and really trying to fight the fashion industry's

> overproduction in this world, and making a produce a lot to order, and not just overproduction and stock items." (p. 3, l. 113-117).

Notably, the employees at CBM see a tension here between a sustainable production and the fashion industry. Whereas Marie regards SBC as an example of being a sustainable fashion brand, Camilla sees a tension in this concept:

> "And I think you have a huge dilemma talking fashion and sustainability because fashion is fast moving, but maybe at the moment fashion is bespoke or special and therefore it can be sustainable but on the long term, I don't think it is." (Camilla, p. 7, l. 273-275).

As a result, the two partners at CABM distance the brand from fashion and Pernille uses the term "social luxury" (Pernille, p. 5, l. 205) to describe their brand.

Use and consumption

Throughout our interviews we saw that the employees expressed a need to consider the end-users' consumption of the final product when discussing sustainability. Niels brings the example of the use of a Tesla to point out the importance of considering the final use of the product:

> "The other part is what people do with the buildings and how they can be used. And to me, this has to do with behavior. Because sometimes, if you imagine, let's say you live in your house, and you have to go to your mailbox and pick up the newspaper, if you still get that, every morning. Sometimes what we do is like designing a great like Tesla that runs on happiness. But if you have a Tesla, and you drive all the way out to the mailbox, and you got your newspaper and you leaver your Tesla and take another Tesla back and you put your newspaper back, and then next morning, you take a new Tesla to get to your newspaper, and then put it on a pile of Teslas, I mean, all the Teslas are right and nice and so on. But if you don't use them, right, I don't use them in enough hours." (Niels, p. 3, l. 118-126)

Niels' colleague Katja also relates end-users use to product sustainability with her example presented in the code of 'Certifications are not adequate' of a 250 square meter house for one family (Katja, p. 7, l. 283-285). The same goes for Casper, the architect at GXN:

> "Because the most sustainable thing is that we, if we build our buildings that we love to live in them and we just keep them as they are." (p. 2, l. 47-48)

In fashion, the employees also consider the end-user as playing a role. Adela comments how sustainability is

> "(...) trying to see also how people will buy it because I think it's also a perception of consuming, how you consume the product. (p. 2, l. 42-43).

Her employer Marie agrees:

> "It's also about cherishing your clothes, buying less, choose quality (...)" (p. 10, l. 445-446)

In addition, Marie points out that consumers lack information on what is sustainable to make the right purchasing choices:

> "And also because the customers, one of the big issues is that the customers also lack the information, they don't have the information, they don't know oh viscose that's good quality, hm not really." (p. 8, l. 345-347)

Pernille also indicates a challenge with the end-users' behavior in doing sustainable purchases. A challenge both connected to the end-users behavior and the difficulty of communicating sustainability:

> "(...) how do you put all this social thinking into a scarf. And I mean the end user is very much taught that they touch it and they look at the prices sign, or maybe the other way around, they look at the price and then they see if they want to fall in love, you know. So it's it's a lot of values to put into a product. And it's very difficult to get the message across." (Pernille, p. 2, l. 62-65).

Pernille's partner Camilla is optimistic when it comes the development of consumer's' priorities:

> "And I think more and more people start to realize we don't really need more bad products. I mean, we prefer to have few good products in a good quality" (Camilla, p. 4, l. 125-127)

2.2 How do the sustainability commitments take shape?

When talking to the employees, we noted how the companies' sustainability commitments were both a result of being dedicated to complying with certifications but there were also actions, which were based on the company's own definition of what a sustainable business practice implies. Where company initiatives were meant to comply with certifications, the company's actions would be based on the commitments defined by the respective institution responsible for certifying. On the other hand, where certifications are not involved, the companies have defined their own commitments. In the following, we will analyze how the companies' sustainability commitments take shape in relation to whether they are based on guidelines that are externally defined or a result of the company internal definitions.

2.2.1 Externally formalized commitments

There are sustainability commitments of the company that are not defined within the company, but which are determined and enforced by external stakeholders. This involves certifications as well as consultants hired as third-party involvement. The certifications followed by companies as well as the third-party stakeholder involved will be analyzed in the following.

Certifications

Certification	Assessment area	Level of assessment	Sustainability focus	Case companies	Industry context
B Corp	Throughout the business model	Company	Environmental and social	JJW	All industries
Cradle to cradle	Final product based on the supply and value chain	Project	Primarily environmental	GXN	All industries
GOTS	Manufacturing and processing of raw material	Company/ Project	Environmental and social	CBM, SBC	Textile
DGNB	Material sourcing and construction	Project	Environmental, social, economic	JJW, GXN	Architecture and building industry

Table 4. Overview of certifications used at the case companies

Company-level vs project-level

Whereas CBM and SBC have the GOTS certification, which the companies comply with through all their projects through their material choice of using GOTS-certified cotton in their collections, at JJW and GXN the use of certifications is decided from project to project based on the the client' demand. Though Alexander highlights DGNB, with an international client base, they work with different certifications:

> "Then it's good to have certifications which you can rely on and then the developer comes to the architect saying, we want a DGNB goal certified building. But DGNB is just one out of certifications. And the way that we work with it here is that often we get requests from the developer that they want these certifications - that could be BRIAM or WELL or DGNB." (Alexander, I1, p. 3, l. 97-102)

Notably, JJW is becoming B Corp-certified but also work with project-specific certifications. These depend very much on the client's demand and the private are a lot more likely to demand the certifications than the public clients:

> "There are always compromises. Because not even public projects have sustainability goals always, so often we have to apply the sustainability goals. Or try to be an advocate for them getting into the project. (...) And I am not saying that it doesn't get better, because we have more and more clients in Denmark not necessarily our clients but clients like pension funds who demand DGNB goals for all their buildings. But the public clients are not there yet." (Mette, p. 2, l. 73-86)

Third party involvement to ensure transparency and compliance

To be certified, the certification institutions are involved in doing audits of the company to ensure that their defined commitments are being followed. Notably, besides certifications other third parties are hired to verify the sustainability commitments of the companies. JJW uses the services of the sustainability focussed consulting engineering firm Dominia:

> "Dominia is in charge of making sure that we maintain what we have promised in the sustainability kind of way. And then I have a lot of discussions with them how to get the goals throughout the project." (Peter, p. 3, l. 104-107)

A third-party tool employed by GXN in their product development to heighten transparency with regards to material sourcing is EPD, which is an organization that provides environmental product declaration:

> "(...) when we're looking into the products, the more information there is on the product, the easier it is for us to understand it. So when you are a product developer, and you want to reach into different markets, it's all about, sort of like having information on your product. And the way you do that is, as an example, in Denmark you pay an EPD, an EPD is an environmental product declaration thing it's called. It costs 100,000 Danish kroner. And what it does is that is kind of mapping the whole sort of process of the material. So, when you when you have EPD, you can reach information on how its produced, how far it is traveling from A to B, and what's the total CO2 emission footprint based on these calculations. And when we do that, we, can easily see how sustainable. These materials are, and based on that information we can choose to keep on working with them but to move on to the next material. So, for

> the, for the product developer, it's all about getting information on your materials, so people are able to access and actually working with it." (Alexander, I2, p. 5, l. 194-295)

Marie relies on third party assessments to ensure transparency. Sourcing House helps SBC finding suppliers who comply with standards. The service is customized based on the company's need for certified suppliers:

> "And then we work with this Danish consulting agency called Sourcing House, which helps us find the right factories. So we are sure that they have, we have a very strict code of conduct that they [the factories] have to sign. And they are visiting the factories for us and making sure that these factories are very good and you know treating their employees well and everything. So that's how we kind of control the whole backend, yeah. To make sure that everything is done by the book and more." (Marie, p. 4, l. 168-172)

2.2.2 Internally defined commitments

Based on our interviews, we saw that internally defined commitments were used in relation to dealing with the perceived complexity around sustainability, to set organizational goals and to enable decision-making. Additionally, we saw how the end-user's behavior was an element, which the companies gave great importance, and which went beyond what the externally formalized guidelines address. Consequently, the companies would find their own way of integrating this perspective in their sustainability considerations and initiatives. Finally, companies would use their internally defined commitments as a way of exceeding industry standards and overcoming industry barriers. The findings related to how companies have internally defined sustainability commitments is presented in the following.

To handle complexity

Though certifications are used to provide guidelines, the companies also have their own defined initiatives and goals for sustainability. In the example of Grøn Byskole, the formulation of four circuits were used as a conceptual tool to get the different aspects of sustainability integrated into the project:

> "And you can say in this project, this is kind of the green strategy [pointing towards page in project booklet where the four circuits are listed] and then when you go to this part here, you can see in details what it is that we do. So that's kind of the, so it has a, this is, you could say when you look at these you can see, this is social sustainability [pointing towards the 'social

> circuit' concept in the project booklet]. This is both social and environmental sustainability [pointing towards the 'nature circuit' concept in the project booklet]. This is social sustainability [pointing towards the 'movement circuit' concept in the project booklet]. This is environmental sustainability [pointing towards the 'building circuit' concept in the project booklet] and overall there's the economic sustainability" (Katja, p. 5, l. 201-208)

At GXN, they have developed their own building principles which includes a 'material filter', that is meant to establish requirements from contributions in the bidding round:

> "And the way it works is let's say that we could imagine this facade, in six different materials, which were sort of like living up to our standards, in terms of design for disassembly of cradle to cradle and so on. And then we reached into getting information from these materials and then based on that information, we developed our own filter." (Alexander, Interview 2, p. 3, l. 87-90).

Notably, GXN's material filter is developed based on a mix of certifications (cradle to cradle) and existing principles of circularity (design for disassembly). Similarly to JJW's four circuits, GXN's material filter is a way of setting the frames for the project:

> "It is more like we have made some principles and some concepts for it, what it can be like and what it should be able to do." (Casper, p. 4, l. 139-140)

At CARE BY ME, the internally formalized commitments also creates the possibility of embracing multiple aspects of sustainability without certifications. Their initiatives in Nepal ensure that an environmental aspect is somehow integrated, even though the nation does not provide GOTS-certification or similar initiatives:

> "So the initiatives we took in Nepal was for instance that we collect the water and reuse it. So we don't have too much water just flowing around in the garden and we changed the the dyeing colors, so they're not the organic the ones we use now, but they are approved from the European Union, instead of being very poison (...)" (Camilla, p. 2, l. 67-71)."

This entails that they do not have externally verified commitments in terms of their environmental contributions. Notably Camilla separates the company's self-defined initiatives in Nepal from externally formalized standards:

> "And therefore, I think I couldn't be allowed to say that that's it's a standard or it's a certification because it's not." (Camilla, p. 8, l. 296-301)

Decision-making

The need for establishing a baseline to make decisions is shown at SBC. Here, the founder constantly outweighs initiatives to make decisions in related to which materials are the sustainable choice to use:

> "So I think everytime we make a choice, it's, we know there is pros and cons, and we weigh them. So for us it's important to say ok we work with organic cotton, we work with silk, which is a natural high quality product. It is not organic, it's, in that sense not sustainable, but because it's high quality and natural, we still think it is sustainable. And we use only like 100% materials, because you can't recycle them if they are mixed materials. So instead of using like half silk, half something, we use 100 % silk. So we use 100 % materials, we use organic whenever we can. But for us, we tried to do find some organic silk, or some pea silk, but the quality wasn't good enough. So for us, quality is still the most important thing." (Marie, p. 6, l. 237-239)

The example of SBC shows how the company establishes its own criteria for what materials to use for the product, here being quality as the top priority. At JJW, they also develop their own criteria for making decisions in relation to materials. The company makes Life Cycle Assessments (LCA) of the material they use for their construction. Though LCA is an externally defined method, the criteria for the assessment are set by JJW: Peter presents an example:

> "Well, I have just made one [LCA] on to use old tiles for the facades compared to new tiles. And the conclusion is, for me, that the old times are more expensive than the new tiles to use. But with the old, the sustainability is much better. And in the end, we choose these old tiles to go with, it did get a better grade." (Peter, p. 7, l. 283-285).

A set of internally defined criteria in relation to sustainability is also present at GXN. Here, the company's developed material filter contributes to the company's decision-making, where its principles works as an evaluation criteria for which solution will win the project.

As criteria for decisions on the company's sustainability practices are defined by the company itself, the company can also get challenged in terms of whether they are appropriate. At CBM the material choice is similarly to SBC based on the criteria of quality, and here Pernille expresses how they get challenged and leaves it to the consumer to decide whether to believe in the brand's choice as sustainable or not:

> "(...) sometimes we'll get challenged on where does the cashmere come from, how is the animals treated. There's a whole vegan society, building up, or maybe better higher in Denmark than in many other countries, and then you will get some aspects on what do people

> think on materials, and there we just need to stay very strong to your core DNA to say, well, this we know and this we can document and this we can tell you and ensure you, but I mean, you're the one to make the decision the other end, if this is a brand that speaks to your to your needs or your demands." (Pernille, p. 8, l. 307-312)

This notion of getting challenged on the company's decisions regarding sustainability can be related to the realization at SBC, where an awareness of the complexity plays in:

> "We use, I think for us, we use the saying that we want to minimize our footprint on the planet. And that could be done in many many ways. So we are very aware of the fact that every time we make a choice, it has pros and cons. It cannot always just be pros. Even though it's a sustainable focus." (Marie, p. 5, l. 207-209)

Setting goals

At SBC, the company establishes goals for their commitments. As a result of the wide and ambiguous area of sustainability, the internal guidelines contributes to providing the company with a direction:

> "Marie: Yes we have put up some sustainability goals (...). And we had a 2020 plan and we reached that and more. But we wanted to only 100% organic cotton and minimize plastic and so we had you know in the beginning we had some polyester, we had plastic buttons, we had some conventional cotton, but everything is out now. So we need to make a new plan, haha. But we haven't done that yet, so we do these, we set up these guidelines for ourselves (...)" (Marie, p. 7, l. 288-299).

At CBM, Camilla plans future initiatives in regards to sustainability as well while pointing to challenges:

> "And I'm working on our next generation of cashmere saying, okay, we get the kashmir from the Nepal, but we should make a second generation made in Italy or made in Norway or Denmark but, but we shouldn't, you know, send cashmere to Europe, use it here and then send it back to the Nepal or India for them to reuse it and then send back to Europe, because then we have too much pollution on the transportation part. So yeah there's still a lot of work to do" (Camilla, p. 10, 426-430)

At JJW, they use internally defined commitments as well to cover the company's vision. This includes making buildings that are made for maximum use, which is not an aspect that is covered by existing

certifications (Katja, p. 7, l. 292-295). On a project-level these goals are set by both client, contractor and JJW:

> "The sustainability goals set for the project are a joint definition of everyone involved in the tender (Peter, p. 3, 111-112).

As a result of this involvement, there is a necessity for the company to set their own goals, as the clients are not ambitious enough according to JJW's CEO:

> "Because not even public projects have sustainability goals always, so often we have to apply the sustainability goals." (Mette, p. 2, l. 73-74).

Similarly at GXN, the project goal, though based on circular thinking, is a result of the company setting its own criteria:

> "We are focusing very much on our own savings which is 90% of the project which should be able to be reused in the future. So that's been our primary goal. And if it is from something that is upcycled that will be nice, but it's not a criteria such." (Casper, p. 4, l. 175-177)

Influencing user behavior

An aspect not covered by certifications nor industry standards is commitments that are set to impact the end-user's behavior. Efforts in relation to the end-user behavior is visible when looking at companies' commitments, which includes examples of impacting the end-user's consumption. Adela expresses that SBC educate the user by making only two collections with few pieces:

> "I think in a way they also try to make them consume, or buy more consciously, what they want. And give more value also to the product, which is quite important, like not buy because you feel like buying it. And of course you should like buying it but also because you think it's a valuable piece that will last also." (Adela, p. 2, l. 50-54)

The choice of having few collections supports Marie's vision behind SBC to design clothes that are not used only once and then thrown away. She also points out how the brand attempts to impact customers:

> "In our care-labels we also, you know the small labels that are there, we say only wash this if necessary and take good care of the garment. So we try to educate them [customers] also in how to treat the clothes when they buy them, because our silk you can throw in the washing machine, which is not normal for silk styles, but we also advise them to only when necessary, hang dry, take care, if it only has a stain then try to remove it. So in that way we try to educate

them. We've also done like a washing guide that we have on our blog, and we have done blogs about sustainability on our webpage." (Marie, pp. 8-9, l. 365-373)

At CBM, they also attempt to use the brand as a voice for educating the consumer:

> "So everything we can do in order to speak up about being social sustain[able], teaching students like you guys or. I mean Camila would very much like to do it and a lot of magazines will often ask, do you know you as a sustainable brand, would you like to make a comment on this, and this." (Pernille, p. 7, l. 293-295)

The company's choice of having few collections can be seen as a statement against the paradoxical understanding of fashion and sustainability:

> "But I mean we try not to launch too many collections a year, we try to have a solid base and then do some add ons throughout the season and really trying to fight the fashion industry's overproduction in this world, and making a produce a lot to order, and not just overproduction and stock items." (Pernille, p. 3, l. 114-117)

For the architectural firms, the user's role in sustainability can also be seen in their commitments. GXN's and JJW's commitments of making the buildings flexible, so they can be used for other purposes than the original without having to tear down everything, is related to what will happen to their products once it is out of the companies' hands.

In addition, one of JJW's circuits "the social circuits" is strongly related to user behavior:

> "(...) it's about how different users of this house use the rooms and the square meters on different times of the day, and how they meet in in social interaction that brings knowledge from the smallest kids to the older from the medium to the, to the old ones." (Katja, p. 3, l. 111-113).

Industry barriers

JJW and GXN's commitments of building flexible buildings are related to the product's longevity, which is very much linked to the understanding of sustainability. The commitments can sometimes bring challenges, when the industry is not fully developed for this. The issue of enforcing the mindset of longevity and circularity thinking appears to not have been fully tackled yet by the building industry, which brings GXN attempting to develop their own technology that can function as an enabler:

> "We have some material passports, this one [*shows us the passport*] we developed together with a company called Consolis and that's the one which is embedded in the casted elements - these elements which has been tightened together and then structure the house - so you would actually be able to read this on your phone or whatever and then you could log on this digital archive and reach information about this statics, the lifetime and how to recycle it and so on. And this is also something that could be implemented in any other industry. But right now, this is super technical. It is really smart, it is almost too smart for the building industry now. But let's say that the lifetime of this element is 100 years, in 100 years this would be like reading a flop disk or something. Because it would be so out-dated that it would be difficult to actually access the knowledge." (Alexander, I1, p. 5, l. 216-225)

Notably, the material passport is described as almost too advanced to the industry at the moment, while at the same time risk being outdated in the future. The current dynamics of the building industry that GXN tries to change through technology, reflects how the industry conventions sometimes hinder the companies in fulfilling their sustainability commitments. This can be related to the fashion industry as well. Here, Marie pointed out how SBC in the beginning had to use conventional cotton, since the organic kind only comes in big quantities, which does not make sense for a small company to purchase, as their sales are limited (Marie, p. 7-8, l. 321-325).

At CBM, the two founders also see big barriers in fashion when it comes to sustainability. One can relate CBM's brand identity as a way of 'overcoming' the industry barrier. As a lifestyle brand, instead of fighting the fashion industry's challenges, the company has chosen to only participate in lifestyle fairs and is mostly sold in lifestyle stores (Camilla, p. 7, l. 268-272; Pernille, p. 5-6, l. 212-232).

Whereas CBM choses to distance the brand from its industry, GXN tries to change it by developing technologies and making educational books and guiding booklets on circular design. At JJW, there is also an identified need for changing the industry. Their CEO refers to current as building regulations as "old-fashioned" (p. 7, l. 303) and explains:

> "We have demands on how much light comes into rooms and accessibility for people with disabilities and other things that might in other countries be sustainability. But in Denmark it's just normal standards. And you should, in my opinion, heighten the normal standards" (Mette, p. 7, l. 305-308).

2.3 What is the role of the designer in designing for sustainability?

By distinguishing the responsibilities of the designer from other stakeholders involved in the design process, the third subquestion of our research question aims to provide a better understanding of the role of the designer in designing for sustainability. After analyzing the impact of different stakeholders on design decisions, this section will investigate the designer's motivations and tasks when it comes to sustainability.

2.3.1 Stakeholders involved in the design process impacting designs

"So we can't change design through just designers, but I believe that the designers and the demand that designers put up for their co-workers is essential to enable sustainability." (Alberte, p. 4, l. 149-152)

Through our interviews we discovered that the design process was not exclusive to a design unit. Different stakeholders were involved in different phases of the design process thereby leaving their mark on the final product.

The beginning of the design process

At SBC, the design brief for each collection takes shape in a Crowd Bible created by the founder, Marie, which Adela explained as a source of inspiration:

> "(...) they send the Crowd Bible like they say, with a mood board basically and pictures of inspiration, of shapes. And they also send a colour report and a theme. But then for the print I think it's more free, somehow, because I did a print for them. So, I took inspiration from that." (Adela, p.2, l. 75-77)

Interestingly, when asking whether the Crowd Bible leaves enough space for her own creative ideas, Adela reflects that sometimes the brief is too open. When asked about whether the Crowd Bible would still leave room for her own creative ideas, she answers: "yeah definitely. I think it's really super open. Yeah, yeah, completely open." (Adela, p. 5, l. 183). This is in line with Marie's perception of her Crowd Bible who describes:

> "We actually had the discussion with the designers, is that you know to much of a limitation for your design freedom to have that we have chosen the fabric? But they actually liked the fact that they had like you know, we had drawn all the field and then this is the field you can be creative within. They didn't see it as restraining they actually saw it as a great assignment." (Marie, p. 4, l. 163-166)

At CBM, Camilla is the founder and the only designer which explains the absence of a design brief. When designing a collection, Camilla explains:

> "(...) we need to find the right combination between what I wants to do as a designer and what Pernille believes in the market wants." (Camilla, p.5, l. 200-201)

Other stakeholders shaping the design process at CBM in a less direct way are the members of Camilla's creative network of sustainable designers based in Denmark with who Camilla shares knowledge and exchanges ideas:

> "And I think we're a group in Denmark now that have been working with sustainability for a while and we share knowledge and talk to each other and help each other and that's actually also a really positive part of being in this part of the game is that, that I don't see them as a competitor, I see them as my fellow partners, trying to do the same, we do good. (...) And then we were a few brand owners starting to say hey let's share knowledge." (Camilla, p. 9-10. l. 360-363, l. 392)

Whereas in CBM and SBC, we see two stakeholders shaping the design process from the very beginning, at the architectural firms the amount of people included is a lot higher. At JJW the design process of Grøn Byskole kicked off with a brief by Copenhagen municipality as part of the public competition, the the company assembled a team consisting of a project core unit and a number of diverse stakeholders with different skill sets to meet the client's requirements. At the outset two people started generating ideas inspired by the brief, growing to six people during the sketching phase. Throughout the process, however, the number of stakeholders involved grew to over 35. Niels recalls:

> "Cos' who knows about fire? There was a guy who could say oh, this truck cannot turn around in this parking lot like that, that was that expert and the fire guy that said, oh, I should do this and you cannot do this" (Niels, p.10, l. 415-417)

Throughout the process of designing Grøn Byskole, the contractor who represents the client (and who employees refer to as constructor and developer as well) showed to be a very influential stakeholder. Generally, the role of the contractor is especially significant in publicly funded projects which typically prioritize the economic dimension of sustainability: "Economy is always always always when it comes to public projects a part of the task." (Mette, p.2, l. 45-46). The contractor ensures this focus is implemented. When asking her about the role of the contractor in the design process, Mette reflects:

> "(...) their angle will always be economy because they, the more easy the workflows they have, the more money they make. (...) But of course that means that we as architects have to

sort of fight or be creative up against the economy from a very early stage of the design phase." (Mette, p.1, l. 36-40)

At GXN the design brief 'program' is developed in a collaboration with the client Lejerbo:

"Also, we didn't have a lot program at the beginning, so the client also should find out exactly, like, if he needs 60,000 housing units but yeah what is that? Are they tall, are they wide, is it houses, is it apartments what i it? So we were helping him find out what is the program." (Casper, p. 2, l. 78-82)

The reality check

As we identified in the within-case analysis, not all the ideas that were generated in the initial design phase can be maintained throughout later stages of the project. Additionally, the design processes are not linear and typically characterized by re-sketching of design before entering the implementation phase. When comparing the design process of the two architectural projects, the reality checks at GXN's Circle House project occurred earlier in the process as representatives of the implementation were part of the sketching phase. At JJW, Niels acknowledges the necessity of collaborating with the stakeholders in presenting the scenarios generated by the design team:

"So we had to make the design, we had to understand and present them various scenarios and we had to make our contractor believe in it and take a risk and place them in a place, where they could also win in terms of price. So that was a great part of the whole design process. It became very much a collaboration. It became very much a collaboration. And collaboration wasn't like nice to have, it was do or die." (Niels, p. 5, l. 191-194)

Katja characterizes the contractor's requirements will reflect the clients' demand:

"(...) we bring in the ideas and the contractor will value are they good ideas, are they not good ideas, should we keep them or shouldn't we. And some of them go out and some of them stay in. So, you listen very much of what does the client want and if the client demands sustainable solutions, the contractor will be very keen to try to put in sustainable solutions in the project. If for the client it doesn't matter, (...) the contractor is not very keen on putting sustainability in. (...) we can only convince the contractor, if he knows that there's a demand from the client." (Katja, p.6, l. 215-223)

Similarly to Niels and Katja, Casper points out the need of stakeholder collaboration to find satisfactory sustainable design solutions by bringing up the example of the concrete manufacturer:

> “(..) they were actually very much like "yeah we have this manufacturing system and we don't want to change it, but we want to be circular". We were like okay but you need to change something because otherwise you won't change. Then we went out to see their production site and understood like, okay, it's these and these restrictions that they have and of course you can't change the width because it's like a 200 meter long manufacturing line and you just have this like predetermined shape. Of course you cannot that. Okay. Now I understand why you don't want to change it, okay but what can we change? And then of course, when they were part of the project for a longer time, they also understood, like what is it that we need to change. So like, just this being around the same problem, around the same table with the same goal helped a lot. (...) So also we had a goal for the engineers and contractors and stuff, instead of just working it halfway through, we wanted everybody to be like now we see that this can work. (p. 6, l. 232-246)

Several stakeholders were resistant to the introduction of novel ideas, influencing the design process of Circle House. Casper describes that reluctant attitudes needed to be overcome to allow for change, highlighting the role of time and physical proximity:

> “Generally, it was super good and very helpful to sit around the same table and around the same project with the same aim. Because in the beginning it was a lot of crossed arms and like "We don't want to do anything new, we want to be circular but we don't want to change anything". But being in the same room around the same table, so they also wanted to be there, be part of it and actually do something. So over time, they kind of eased up a bit on their views.” (p. 6, l. 227-231)

Aleksander emphasizes the influence of past experiences and the difficulty to depart from routines as potentially hampering the implementation of novel ideas and designs.

> “When the builder is standing out on the building side, and actually building, then they're using all the sort of like previous knowledge gained from other projects to sort of like get the things done, and they do that because they are super skilled and they know how to build stuff, but often they would proceed, of how they know things are supposed to be. And now that everything is different and everything is, is new (...) things can go wrong, because people relate to what they'd done earlier, because they wanted things to be done, and they want it to be done fast. (...) And it's not because that people are not skilled, it's just because they are they are sort of like so used to the standard that and how other things are built on.” (I2, p. 4, l. 142-159)

Aleksander, architect at GXN, confirms the contractor's influence on the final design of Circle House:

> "(...) when you are going through such a long design process with a lot workshops and you have a lot of stakeholders and other experts involved in designing these, these principles, we sort of want to make sure that all this time is not lost, because some constructor comes up and says you know we can do this a lot cheaper by doing this and this in this." (I2, p. 3, l. 94-97)

Similarly to JJW, for GXN's Circle House the number of stakeholders significantly increased over the project's time period. As the project manager of Circle House, Casper sees the value in having these different inputs in the design process including the contractor's.

> "Okay, now we know why they have their way of seeing things that it's very expensive to build these small elements, okay but then you can take that back and take that into the design and help reshape things with all these inputs. But of course it is a lot of opinions to juggle and keep everybody, not happy but so that everybody can see themselves in the project is quite a struggle, but it is also what strengthens the project so much." (p. 6, l. 263-267).

Although, Marie is outsourcing the designs, she is involved in some parts of the process, thereby influencing the final designs. Beside the brief through the Crowd Bible, Marie reserves the possibility to renegotiate the designs she selects:

> "But maybe they [the designers] have done a dress and we want it just a bit longer and we have the discussion is that okay with you that we have the dress a bit longer and normally it's okay." (p. 3, l. 119-121)

Although Camilla is the one designing the garments, her partner Pernille is part of the evaluation process of the design thereby influencing the final designs of the collection:

> "I suggest these colors and then we go through these things, and Pernille would come with her input, and for instance, she could say oh but I think we miss a very long shirt or, I think we miss a small top or a new scarf or a cheaper product within this product range, and then she would give her input of course. And then I will try to meet her request." (p. 5, l. 204-207)

Pernille brings up a specific example, which exemplifies their different roles in the company. Her comercial input led to the design not being produced for sale:

> "For instance Camilla brought the most gorgeous throw this time to the table and said this, I mean this is such a unique piece we need to do this and I mean the quality is extreme and nobody can really do this and it's not in the market. But I mean, when we calculate it, it came out to maybe close to intern euros and I mean, there's not many throws being sold to that

value. We don't have that throw today. If it was Camilla's only will and desire, we would have it, but there needs to be some commercial standpoints as well, as it isn't sellable." (Pernille, p. 6, l. 240-245)

2.3.2 Designing for sustainability

The designers point out different responsibilities which are deeply intertwined with their education, individual level of knowledge and skills. Although this section will give prominence to the reflections of designers, the perspectives of other stakeholders impacting the design process will also be considered.

Motivation to engage in sustainable design

While all interviewees showed an interest in the topic of sustainability, there were different motivations for engaging in sustainable design. Camilla, as the founder of Care By Me, is first and foremost intrinsically motivated by the social cause of her work:

> "But after working within this area with my own consultancy business, and I did pretty good, but I decided that I wanted to do something good for other people." (Camilla, p. 1, l. 19-21).

She shares her passion for Nepal: "so I went there and then I fell in love with the people and the country and, yeah, everything" (Camilla, p.2, l. 45) and reveals a very personal bond with her workers:

> "When I was there in the autumn, the best thing I have heard in my whole life is one of the middle-aged women coming to me and saying Camilla CARE BY ME is our father, our mother, our everything." (Camilla, p.8, l. 325-327).

Pernille's motivation for joining CBM is also linked to the social purpose of their company:

> "What you can say also what really won my heart in joining CARE BY ME was really the very much in social part." (Pernille, p. 1, l. 35-36).

Additionally, Camilla and Marie reveal their frustration with the dynamics of the fast fashion industry as another driver to lead a sustainable design business. For Marie, it appears as the key driver for starting her own business:

> "When choosing to work with clothes, it was also because I was as myself, as a consumer, very frustrated that a Malene Birger dress should cost 4.000 crowns when it was 100 % polyester. (...) So it was also maybe a frustration for me as a consumer that started this

company and then also you know because I missed working with clothes and I liked the idea of working with creative people and have the business model that I have." (Marie, p. 8, l. 332-340)

Niels explains how he is personally interested in the issue of designing for sustainability:

> "I try on a personal level, and of course, also as part of this business [JJW], to point out certain ways that are more important, certain ways where we as architects can have a larger impact than said otherwise. (...) and I try to find these places, where can we be clever and not like compete with the others, and also run a little bit away and say like oh, because we can do this." (Niels, p. 10, l. 424-432)

When talking about the ambition to design sustainably, Niels reflects:

> "I felt sort of comfortable, but I still wanted to do more. And you start getting this feeling of never getting it right. Again, if you feel like you got it right, then you lost." (Niels, p.11, l. 447-448)

Adela unfolds an engagement for sustainable design on a personal level as well, as she dedicates time to other projects that focus on sustainability in addition to her work as a textile designer for fashion companies:

> "I've been also working on some personal projects, and I worked with a friend who's making a bioplastic. So she has an entire process around that. And, yeah, so I think I tried also to take bit sustainable path. On that I worked on some embroidery, it was nice. So yeah, I think I'm trying to also think of what I'm using in the textile things. And also, at the school where I work. I also try to make the kids think what they are doing. It's tough, but we are getting here. So I've been trying to think more of what I'm doing. And it's nice." (Adela, p.9, l. 356-361)

The designer's impact on the sustainability of the end-product

The impact the designers feel they have on the end-product will not only impact their motivation but also shape the scope of their perceived responsibilities. Adela's work as a textile designer depends on the work of the fashion designer. As her responsibility is limited to designing the surface of the garment, her impact on the sustainability of the end-product at SBC is perceived as minimal:

> "They [SBC] are doing all the work with sustainability, with choosing the fabric and probably the ink, how they print it. So, I don't have so much impact I feel." (Adela, p. 5, l. 198-199)

Contrarily, Katja at JJW reflects on the potential impact linked to her profession of designing buildings, saying:

> “I think when you are an architect, sustainability also has a lot to do with making sure that, what you what you built, because it has such a long mark on the earth.” (Katja, p.1, l. 17-18)

Niels also highlights the particular role of architects in designing for sustainability as they have great potential to have an impact:

> “But I think the good thing is that we can do a lot of stuff about this as architects, because there's a lot of stuff we define, and only redefine that, that has a great impact on these things. So if we sort of step up and grab these things and, and stop being afraid of the tools and calculations, we have a great, great possibility.” (Niels, p.2, l. 51-54)

On a project-level however, Peter views the scope of action of the designers of Grøn Byskole to increase the level of sustainability as rather limited:

> "(...) when I look into this project, I will say, 80% of the construction everything in all the money we're using its more or less the traditional way to build. And then we have the 20% of the rest of the constructions, where we can go into and put some extra effort into raise the sustainability demands" (Peter, p. 6, l. 224-226)

Casper also comments on the impact of architects:

> “Because we are architect, we're not scientists. So, a lot of the innovation we do, it’s not core research, it’s putting the research into practice. So we take other people's knowledge, basically, and we read up on it and get to it very well, so we can understand it enough to put it into a project. Then we use our skills as architects to, you can say, integrate it into a building” (Casper, p. 8, l. 333-336)

Camilla explains how the practice of designing is a tool that contributes to the social purpose of her work which always remains first priority:

> “In the end of the day, when you do a business like me at the moment, it's not because I think I'm the world's biggest designer, that's actually not my intention. My intention is to make long lasting design that is really good, that can help some women in Nepal and the more I can sell these products, the better, because we started having five women working for us and now we have 65 women working for us and I want them to be there tomorrow as well. So of course the balance between being creative and being able to sell your products is a huge important balance for me.” (Camilla, p. 5, l. 207-214)

Acquiring knowledge of sustainability

> *"I mean, I think we are always in the need of more knowledge, absolutely. I think it's interesting when we talk about sustainability because so much of the discussion, and it's about innovations, (...) but the other thing is what can we do right here, right now, tomorrow. And there is a bit of a gap between you know everyday practice and research."* (Alberte, p. 4, l. 162-169)

The importance of acquiring knowledge on a continuous basis is highlighted by Katja:

> "(...) it's an ongoing development, so you have to be informed and get new knowledge all the time." (p. 6, l. 231-232)

Whereas Katja regards this need of staying on top when it comes to the current knowledge, the textile designer Adela thinks she is "definitely lacking things", particularly with regards to being able to find and select sustainable materials (p. 12, l. 479). Notably, as a result of the business model SBC it's not required of Adela to have knowledge on sustainability, as the commitments are defined by Marie. When asked on her knowledge source, she reflects:

> "It is mostly our own research and also just you know talk, you know the talk of the industry like we talked with both our customers but also our competitors." (Marie, p. 6, l. 280-281)

Adela's perception of lacking knowledge stands in contrast to Aleksander, who claims: "often we are quite far ahead with a lot of knowledge" (p. 4, l. 155-156).

When talking with Camilla about knowledge on sustainability, she says: "I'm not so theoretically. For me it's really you know hands-on, do the work, and do the thing." (p. 9, l. 355-356)

Nudging sustainable behavior through design decisions

> *"The designers are the one that empathize with the users. They are creating the product to be used in the end."* (Alberte, p. 4, l. 153-154)

The employees' understanding that user behavior influences the product's final level of sustainability was reflected in some of the companies' practices. Considering the end-user's behavior throughout the design process adds another layer to the sustainable design. Just like Alberte, both Katja and Niels (JJW) highlight the importance of understanding the users, their needs and behavior patterns to design for sustainability. Niels says:

"If we can understand their behavior and why they do what they do, we can get back to making a more clever design. (p. 4, l. 148)

Niels expresses his discontent with the rules of public bid rounds which does not allow for interaction between the designer and the user during the design process:

"It's a really bad decision. Because you would think that understanding the people that have to use the building would be a clever thing when you design it, right." (p. 6, l. 256- 261)

Katja adds another layer to the user focus in design by adopting a long-term perspective:

"So, when we work with sustainability, we have to think that what we build is useful, and many generations ahead, which we don't know what they will need. But when we look back in time, we can see that a lot of buildings were built hundred, two-hundred years ago, and they are still very valuable. That's very sustainable." (Katja, p. 1, l. 19-23)

Adela, the textile designer, emphasizes the need to observe consumption patterns in order to be able to adopt sustainable practices in the context of the fashion industry (Adela, p. 2, l. 40-43). She points toward the consumer mindset as a potential driver for change in the fashion industry:

"Maybe if the consumers also would see it in a different way. But I don't know, it's tough industry." (Adela, p. 12, l. 511).

Though Adela points out the need of the consumer mindset to change, she does not connect it to her role as a designer.

In connection with the project, Niels reflects on how he as an architect through the design of buildings can potentially influence the user behavior:

"And there was this survey saying that in the public schools of Denmark, and public schools in Denmark has a great focus on sustainability, in the opening hours, that means within I think 8AM to 2 or 3PM, 50 percent of the square meters are not used during the opening hours.(...) And we're looking into that, but that has to do with how can we design these things so they can be used differently? How can we design them, so other groups can use them? How can we make people use it at night? Can we make a language school at night in certain rooms? Can we design them in a way that it is not a problem for people to share rooms? (...) can we help people, can we understand the barriers people have for sharing and can we overcome them in a way that it's not disturbing?" (p. 4, l. 131-136)

He concludes that:

"if we can make buildings that can perform well, and that can contain and nudge in terms of a certain or take away certain problems in terms of behavior, and also make buildings that can

be corrected and learn along with the behavior, then we can act truly sustainable." (Niels, p. 3, l. 166-169)

Whereas this comment is about how designers can act sustainably, by using the Tesla example presented in section 2.1 of this chapter, he points out the limitations of their impact on the product's level of sustainability, as this will be determined by the user's behavior.

The social circuit of Grøn Byskole is entirely dedicated to these considerations and reflect JJW's devotion to the social dimension of sustainability:

"We defined that as the social circuit, how do people move, how do they behave, which possibilities can we give to which people?" (Niels, p.8, l. 352-354).

One example of how the designers at JJW aimed at animating towards a certain behavior is the sports hall of Grøn Byskole:

"By placing the sports hall very far away basically, that was bit of a risk because some people could say oh, that's too far away. But we have to make everyone run, climb, jump, whatever up through the roof terraces up through the school to go there. So we animate people to move and give them a possibility to make like an everyday movement into like, not a sporting activity but still getting up and doing something. " (Niels, p.9, l. 374-376)

At GXN's Circle House the design focus was linked to circular thinking, where the user behavior was not included, as the primary focus was prioritized:

"(...) we haven't worked too much with like the one we call the behavior part in social in this project. It is primarily the circular thing. (...) We are focusing very much on our own saying which is 90% of the project which should be able to be reused in the future. So that's been our primary goal. (...) It was difficult enough to design the entire thing for disassembly." (Casper, p. 4, l. 173-179)

Camilla at CBM also considers user behavior when designing garments:

"We also do really basic new styles, but but we try to do, you know, try to make sure that that it's not styles that you wouldn't wear in one year. You will not see a neon pink t-shirt from Care By Me ever. It will not happen. Or a huge print or a huge logo or I mean, that's not the kind of brand we are. We really want, you know, products to be something that maybe, all, all women want new stuff sometimes, but then maybe you put it away for a year or two and then you take it out again and wow I have this nice sweater you know what I mean. Or you swap them to with your girlfriend so whatever." (p. 4, l. 150-156).

The need for feasibility

The final step we identified in the companies' design process was 'the handover'. Here, the designer must let go of their designs for the implementation. In the context of fashion, implementation relates to the the production of garments and in architecture it covers the construction phase of a building. The implementation phase uncovers the value of the ideas generated throughout the design process. This also holds true for sustainability solutions. Our data reveals feasibility and usefulness as an important criteria here, which show to have an impact on the designer's work from the very beginning of the design process. When asking Alberte about challenges that companies experience when working with sustainable design, she comments:

> *"(...) how to apply that to their product level and then I feel that the next step from that, you know the next area is how they will then implement this in their company. So how do you take this knowledge from a theoretical level to implementing it into your design process and into your business plan as well."* (Alberte, p. 3, l. 105-108)

At GXN Aleksander describes how the value of innovative ideas is determined by their feasibility.:

> "(...) we can come up with a lot of great ideas but if they are no people or like hands to actually do it - then it doesn't matter. (...) So that's a super important one that you're not just, you know, putting out great ideas but you don't know how to execute them." (I1, p. 4, l. 170-174)

His perspective is in line with what Camilla says:

> "Because you can make a lot of really nice plans, (...) and you can do a lot of very nice strategies and very nice plans, but when it comes to social sustainability it's worth nothing, if you don't implement it." (Camilla, p. 9, l. 356-359)

The importance of feasibility is also shaping CBM's design and business practices. She emphasizes the need for her designs to be simple so that they are easy to execute by her workers in Nepal.

> "In the beginning we did only pillows and throws because it's straight or scarves, because it's straight, so it's really easy for them to knit. And when I was in Kathmandu in October, I made some education with some of the women, where started to do some hand knitted sweater, that we are introducing now. And then I do the sampling here and make sure it's not too difficult" (Camilla, p. 4, l. 143-147)

The need of mediating for implementation and taking into consideration who is on the other end is also shared by Alexander. He shows awareness for the challenges that may arise when handing over sustainable designs for implementation:

> “But it's also a fine line, because if we do too sharp and too controlled, then the constructors have very difficulties of basically reaching these principles, these goals. So it's a super fine line of, sort of like keeping it open but still make making sure that all our design principles are sort of like being executed in the building process. (...) after developing all these design principles, which enables design for disassembly and so on, we had to make sure that this was something that would be readable for the constructor.” (Aleksander, I2, p. 1, l00-115)

At JJW, Peter is in charge of the implementation of the design. He also points out the importance for feasibility in the context of Grøn Byskole:

> “(...) in the tender it is like some ideas, some main ideas how we want to have this one. And now we have to go into the detail and make sure we can do it like this, for example, all the facades on this house is wooden facades, and we have some new rules about the the fire protection of the facade.” (Peter, p. 4, l. 155-158)

At SBC, Marie shares how the implementation of novel solutions is not always successful as attempts of implementing sustainable fabrics do not always live up the quality criteria: “(...) we tried to do find some organic silk, or some pea silk, but the quality wasn't wasn't good enough (p. 5, l. 222-223). She had a similar experience when implementing the use of fabric made of milk leftovers, which she puts in connection to the fabric’s stage of development:

> “(...) but it's still in the very early stages, it's very difficult to find fabrics and again the quality question comes in, because you can maybe find something, we found the milk fabric, but the quality wasn't that good, so half of the fabric that we received couldn't be used.” (p. 6 l. 240-241).

Another elements of making the solutions feasible is also linked to scalability. At CBM, this hindered Camilla’s idea of having a throw, as the technique and equipment of their factory only allows hand-made production. At GXN, Alexander points out the importance of scalability:

> “And as I said before, like there's a lot of super super amazing products out there. From small companies doing innovative stuff and so on. But when you have to build 60 units of it, then you have to make sure that it's a product which can be scaled up and actually meeting the market. So we can not just, you know, choose, as an example, that plastic shingle which you saw the facade out there, even though that it's a good story, we can’t do 60 units of it because it's not a system, which is put into production so it's able to reach the scale of a building process. So we need to choose sustainable solutions or solutions which are designed for

disassembling, but in a certain scale, and often that's larger companies being able to basically meet at scale and that standards." (p. 5, l. 174-182)

3. Sum up of empirical findings

In answering our overall research question we set out to investigate three sub questions through a cross-case analysis. The following is a sum up of our findings based on the presented analysis.

1. *How do employees understand of the concept of sustainability?*

The employees experience sustainability as a dynamic concept, which includes a wide set of aspects that are connected to social, environmental efforts. Additionally, they regard the financial aspect of sustainability as a premise for pursuing their environmental and social initiatives. The environmental aspect is connected to the use of materials, which are characterized as sustainable relating to the quality and durability of the product. The social aspect covers the treatment of factory workers in fashion, and in architecture it is connected to improving the living conditions of the local community. In JJW's case the social aspects include how the architectural solution is being used. Considering and impacting user behavior is also pointed out as an important factor by the other companies, though it is regarded as an additional scope which goes beyond the social and environmental efforts considered by certifications.

Certifications are regarded as reducing the complexity associated with sustainability and contributing in defining and setting legitimate guidelines and common goals. Nevertheless, the certifications do not cover all areas of sustainability commitments, such as the consumers' behavior: are all square meters in a house being used or is it just an unnecessarily big house? Are the clothes being cherished or thrown out after first use?

2. *How do the sustainability commitments take shape?*

The case companies use both certifications and standard that are internally defined by the company to shape their sustainability commitments. As certifications are not covering all areas nor defining all decisions, companies develop their own set of sustainability requirements. Thereby, the commitments internally agreed on and not posed by certifications are useful in enabling decision-making and overcoming limitations of industry standards and certifications.

Certifications will be used on a company level (CBM, SBC) and project-specific level (JJW, GXN). The internally defined commitments are usually on a company level to define general efforts.

3. *What is the role of the designer in designing for sustainability?*

The role of the designer in designing for sustainability is characterized by either being an area where the designer has no impact (SBC) or where the designer is defining it (JJW, GXN, CBM). Notably, in the cases where the designer is involved, the designer needs help in defining the criteria for sustainability as well as evaluating it. Although the collaboration with different stakeholders can satisfy this need and contribute with relevant knowledge, it also entails several tensions which call for compromises.

Except Adela (SBC), all designers shared the perception that their knowledge and skill set allows them to impact the level of sustainability of the end-product, directly impacting their sense of responsibility as well as their motivation. Linked to the employee's understanding that considering and impacting user behavior of the final product is essential when designing for sustainability is their perception of knowledge. In order to educate users, help them making sustainable decisions and nudge a certain behavior, designers need to acquire the relevant knowledge and skills. Despite this assumed responsibility, the designer's scope of action is limited to designing making it evident that their true impact is dependent on the users' will to change their behavior.

The need for sustainable design solutions to be feasible and useful show to have an impact on designer's work from the very beginning of the creative process. In which ways this impact takes shape and where in the design process the sustainability commitments take effect will be discussed in the following chapter.

Chapter 5: Discussion

We have now presented our empirical findings, which gave us insights into our three subquestions. What follows is a discussion, where we have put our findings in relation to theory to address what confirms existing knowledge and what is providing novel insight. Deviations between existing theory and our findings were of particular interest to us and investigated further. This was due to the aim of exploratory case studies which is to generate new knowledge from real-life settings. We will be discussing our empirical findings in relation to existing theory on constraints and the creative process to get a deeper understanding of how the sustainability commitments impact the design process and why.

1. Constraints arising from sustainability commitments

In our empirical study, we identified various constraints on the design process stemming from sustainability commitments. In the following we will analyze what these constraints imply to discuss their impact.

All case companies make use of existing certifications to formalize their commitment of working sustainably. The certifications in use assess efforts both within the environmental and the social dimension of sustainability. However, their scope to address the complexity of sustainability, an understanding shared across case companies, is limited. This gives rise to a need for internally defined guidelines and commitments. In combining externally formalized and internally defined sustainability commitments, the companies find guidance to live up to the high expectations they raise by communicating sustainability as a core value of their brands, internally and externally. The brand's sustainability commitments are reflected in the declared goals of the projects under investigation:

GXN – 90% reuse, educate the entire built industry on circular processes

JJW – Green lung of the neighborhood

SBC - High quality clothes made of natural fabrics that last long in durability and style

CBM – Providing luxury goods made of natural fabrics while educating and empowering women in Nepal.

1.1 Classifying externally formalized commitments as constraints

The GOTS certification used by CBM and SBC as well as the DGNB certification employed by JJW and GXN both assess the environmental and social dimension of sustainability. SBC and CBM implement the GOTS standard on a company-level, whereas for GXN and JJW the commitment to the DGNB criteria is decided on a project-level depending on the client's demand. By limiting the selection of building materials and their use, the two certifications represent *material constraints* (Moeran & Christensen, 2013). In relation to the social aspects, the use of the certifications also results in *economic constraints* (Moeran & Christensen, 2013) by adding costs through heightened standards for workers (GOTS) and clients (DGNB).

In addition to employing the DGNB on a project-level, JJW is in the process of becoming BCORP certified. As BCORP assesses how the company's business model impact workers, community and environment, it also evaluates environmental and social aspects sustainability commitments. However, as JJW is not certified yet, the effect of BCORP on JJW's design process could not be investigated. The architect Niels presumes that it will positively impact their working processes by providing a common language for sustainability and thereby allowing for more action.

Just like JJW, GXN makes use of a second certification as well: cradle-to-cradle. The main goal of this certification is to eliminate waste. Other criteria areas include material health, recycling and reuse, renewable energy and carbon management, water resource management and social justice, mainly representing *material* and *economic constraints* (Moeran & Christensen, 2013).

1.2 Classifying internally defined commitments as constraints

As mentioned above, certifications are perceived as ensuring insufficient levels of guidance for environmental and social sustainability in the projects across case companies. The purpose of defining internal commitments is therefore to outline sustainability goals on both a project and a company level. Their aim is to establish heightened company standards, which go beyond what the externally formalized guidelines address, thereby exceeding industry standards and changing existing conventions present in the two industrial setting.

1.2.1 Environmental sustainability – internally defined

The case companies share the ambition to push the environmental sustainability in their work beyond what is covered by their certifications in use. All case companies work with internally defined commitments,

Both CBM and SBC exclusively work with high-quality materials including silk, wool, cashmere and organic cotton. In opposition to what is considered typical in the context of the fashion industry, the companies both commit to simplistic, timeless styles with the intent to prolong the product's lifecycle. SBC further decided to only process non-mixed materials making them easier to re-use. Additionally, SBC was experimenting with using fabrics made of milk leftovers as a new source of material and CBM works on a second generation of cashmere made in Europe.

With their R&D project Circle House, GXN sets the vigorous goal to design a house of which 90% of materials can be re-used without significant loss of value. By designing a building system that provides guidance on how to build for disassembly, GXN aims to equip the built industry with new knowledge about circular construction. Circle House' ambitions reflect Aleksander's perception of the built industry as a slow-moving industry in need for change.

At JJW the conceptualization of the four circuits represents an internal tool to integrate different aspects of sustainability into Grøn Byskole. The Building Circuit is related to the building's sustainable material selection and intended to ensure long-lasting construction. Although, the design solution for the school did not represent the cheapest bid, JJW's sustainability-focused proposal convinced the judges of the municipality.

When applying Moeran and Christensen's (2013) typology, the above-mentioned internally defined commitments represent *material constraints*. The importance of materials is evident with regards to environmental sustainability and was also highlighted by the authors (2013) for work processes within the creative industries. According to Becker (1982), conventions dictate what materials are used and the form in which they are combined. Notably, at SBC their choice of using only natural materials is considered by the founder as opposing to traditional conventions of the fashion industry, where polyester and viscose is common.

Moeran and Christensen (2013) emphasize how products and services in the creative industries tend to adhere to established aesthetic tastes: "the main *representational constraints* in cultural production" (Moeran & Christensen, 2013, p.21). *Representational constraints* interact with *temporal constraints* through the imperative of historical continuity. Creative products are conceived, produced and received in a socio-historical context of all similar, preceding products (Moeran & Christensen, 2013)

Material, *representational* and *temporal* constraints often go hand in hand. When comparing

the industries of architecture and fashion, the degree of standardization with regards to materials and forms significantly differs. While the context of fashion represents a setting of little standardization, architecture accommodates abundant laws, directives and regulations due to its embeddedness into socio-institutional and political settings (Imrie and Street, 2011). Moeran and Christiansen's (2013) suggestion that the tighter the aesthetic constraints the harder it is to innovate, finds illustration in Circle House's design process. The resistance to novel ideas displayed by the manufacturer involved reflects the rigidity of the built industry. Although digital technology establishes new conventions and ways of working among the creative industries (Moeran, 2009), the example of GXN's material passports which Alexander rates as too advanced for the industry, illustrates how industries can represent a barrier to implementing creative ideas.

The companies share the perception of the area of sustainability as a dynamic concept in on-going development. The fact that sustainable practice accommodated a number of trends throughout the last years appears to reflect that changes in industry conventions are attainable. However, change in the creative industries appear to happen gradually rather than ad-hoc as creative professionals need to find the right balance between something that is recognizable but not quite recognizable within the socio-cultural context (Moeran & Christensen, 2013). Through their internally set commitments, all companies engage in heightening the sustainability standards of their respective industries within their scope of action. Though the barriers identified in both architecture and fashion pose obstacles in overcoming conventional patterns of production and use, the companies confront existing conventions in different ways, advocating for change in their respective industry.

1.2.2. Social sustainability – internally defined

The case companies understand social responsibility as a part of sustainability. Based on the shared interpretation that the way in which a design solution is used/consumed determines the level of sustainability of the final creative product, all case companies implemented internal sustainability commitments addressing this dimension.

The understanding of sustainability shared by JJW's employees reveals a direct connection between the use of the building and the social sustainability of their architectural designs. For the project of Grøn Byskole, this can be seen reflected in the four Circuits the architects developed to educate school children and other users of the building. Through design decisions, they aim to impact the users' behavior in different ways:

1. Nature Circuit - educating about nature

2. Social Circuit - the use of the building

3. Movement Circuit - nudging for movement

4. Building Circuit - flexible design with inner elements that can be used for a long time

Although, Marie recognizes the GOTS certification as a holistic tool considering both social and environmental factors, she perceives the criteria applied as inadequate to cover the wideness of sustainability. Pernille and Camilla express similar evaluations of GOTS while highlighting the difficulty for smaller companies like CBM to get certified for taking social responsibility. To illustrate this claim, Camilla brings up their initiative of collecting water for re-use in Nepal. In the hope of changing the consumption patterns of their customers, both CBM and SBC commit to the production of only two collections a year of small volumes, deviating from the industry standard of four. This decision is also likely to be a result of different *process constraints* linked to the small size of these two founder-run brands such as human resources and equipment (Rosso, 2014). However, SBC's provision of care-labels, washing guidance and SoMe education as well as CBM's engagement in public talks reveal an authentic engagement to nudge their customers into a more sustainable behavior. By committing to the design of timeless styles in long-lasting materials, both companies urge for the production of high quality garments, reduced consumption and a more conscious treatment of clothes. The two brands understand sustainability as going beyond concerns over environmental issues. The initiatives just mentioned show how CBM and SBC integrate social considerations into their designs. While only CBM engages in direct contact with their workers in Nepal regarding to their socially responsible initiatives, both CBM and SBC, similarly to JJW, consider the use and consumption of their products when designing.

Although, GXN emphasizes the project's environmental focus, Circle House illustrates the interrelation of environmental and social factors in relation to sustainability. The circular building system GXN developed puts the used materials into a loop. While the environmental benefits are obvious, the circular principle design-for-disassembly also affects the use of the building when adopting a long-term perspective. Circle House's building system consisting of fifteen circular design principles allows for high levels of flexibility that result in an extended lifetime of buildings and thus their (re-)use. By sharing their design solutions with the industry, both through building a demonstrator and publishing free information material of different kinds (mini guide, book), GXN advocates for more circularity in the built sector.

The examples above illustrate how the companies incorporate social responsibility into their designs. While the context of fashion accents both *consumption* (in terms of purchase behavior) and

use (of the product) as critical factors, only the latter seems to be applicable within the setting of architecture. The two dimensions can be united under *behavior*. Considering the user's behavior throughout the design process can be linked to the concept of circular economy, which was brought up by all case companies in relation to their understanding of sustainability and that implies linear consumption patterns are eliminated and waste does not exist (Ellen MacArthur Foundation, 2013). Principle eight of the Rio Declaration (1992) puts pressure on States to make a stand against unsustainable patterns of production and consumption. Though not addressed by the Declaration, the companies under investigation assume responsibility to adopt practices advancing both the social and environmental conditions of the context in which they operate similar to Porter and Kramer's (2011) concept of creating shared value. The companies' assumption of responsibility combined with their ambition to change the conventional mindset of linear *behavior* of their respective industries impacts their design processes in different ways. As Moeran and Christensen's (2013) typology of constraints appear not to cover this aspect of considering the creative product's impact in a behavioral context, we suggest an additional constraints by labeling it: *sustainable behavior constraints*.

1.3 Constraints linked to stakeholder collaboration for sustainable design

The list of constraints for creative companies with a focus on sustainability who work project-based is long. In addition to the ones addressed section 1.1 and 1.2, the data showed further constraints within the collaborative setting of designing for sustainability.

Stakeholder collaboration throughout the design process was a clear pattern observed across all case-companies. However, in which phases of the creative process stakeholders were present, to which degree they were involved as well as their impact on the final design solutions varied from case to case.

In the context of architecture, sustainability was part of the client's project vision. While the contractor's presence was externally imposed, the shared understanding of sustainability as a complexity led GXN and JJW to choose to work with additional stakeholders, mainly as sources of specialized knowledge. For both architectural projects the growing number of stakeholders involved throughout the process portrays the motley crew property of the creative industries implying that some creative products require diverse skills (Caves, 2000). While for JJW's school project the contractor was the most influential stakeholder throughout the entire design process, GXN additionally collaborated with architects from Vandkunsten and Lendager Group, manufacturers and engineers from the very beginning. The project's goal to contribute with novel, circular design solutions relevant to the whole built industry gave rise to the need to involve a wide range of perspectives in the creative process. The demand for sustainability of the design solutions appears to make the crew even

'motlier' as the need for knowledge and skills to handle the manifold tasks arising from the aim of designing for sustainability increases. In the context of the case companies commercial viability seem to be a premise for both: designing for sustainability and designing creative products.

Caves (2000) emphasizes the necessity of coupling creative efforts with humdrum commerce for the commercial success of creative products (Caves, 2000). This necessity is reflected in the role of the contractor who ensures the creatives' ideas move within the economic scope of the publicly funded projects. The tension between architects and contractor consistently reported by GXN and JJW represents a common humdrums-creatives dynamic while revealing their interdependency in order for creative tasks to come to completion (Caves, 2000).

A similar humdrum-creative dynamic can be observed in the design process at CBM where Camilla's creative visions depend on the mercantile input by Pernille in order to become commercially successful. In addition to considering Pernille's ideas, Camilla is very aware of the technical limitations of her production in Nepal during her creative process of designing. A third input for Camilla's design practice stems from her activity as part of a Danish sustainability network in which she exchanges knowledge and ideas with industry peers. The network supports her on how to tackle sustainability-related challenges, broadening her perspectives on how to design appropriate design solutions.

The fact that SBC outsources the design of their products differentiates their processes significantly from the other cases. The Crowd Bible represents a tool for Marie to lay out design requirements for the designers which are framed by SBC's sustainability commitments with regards to materials. The brief tool significantly limits the autonomy of the SBC's designers to bring in their own ideas on how to incorporate sustainability into their designs. The final product will be affected by the Crowd Bible which impacts the creative process from the start as well as by Marie's feedback after receiving the designs by the Crowd.

In relation to Moerean and Christensen (2013), the above described dynamics can be linked to their first type of *social constraints* which stem from the fact the creative processes are complex and require close contact and communication among cooperating personnel. The contractor in a publicly funded project like Grøn Byskole and Circle House clearly represents an *economic constraint* which is often an outcome of *material*, organizational, and *representational constraints* (Moeran & Christensen, 2013).

At CBM, Pernille's position resembles the function of the contractor in the architectural context, constraining Camilla's design decisions to what is commercially viable. However, CBM represents a special case as Camilla when comparing to Caves' (2000) notion that creatives are highly passionate in getting originality of the product they create. With Camilla, she prioritizes the social responsibility of her designs over design aspirations. Predominantly, her design practice seems to be a

tool for Camilla to improve the lives of her female workers in Nepal and is consequently impacted by this ambition. The setting in which CBM's commissions the implementation of her creative ideas to their production facility in Nepal represents a mix of *social* and *spatial constraints*.

We have discussed the constraints arising from sustainability commitments in relation to Moeran & Christensen's (2013) typology in the creative industries. We are now curious to discuss what is the outcome of the constraints arising from sustainability on the design process. Constraints have been pointed out by theorists as having both a positive and negative impact on creativity (Amabile, 1983, 1993; Moeran & Christensen, 2013; Rosso, 2014). Whereas Rosso (2014) places the character of the constraints' impact on team creativity in relation to a product or process, Amabile (1983) puts it into connection with how they will be perceived by individuals and their motivations. In relation to the constraints arising from sustainability commitments, we will put these constraints in relation to the design process of the companies to discuss their impact.

2. Sustainability constraints in the design process

As argued by Lawson (2005) the design process is difficult to map out empirically, as a large part of the process will take place in the mind of the designers. Though he establishes that the 'phases' of the design process are complex to outline, based on our within-case analysis, we were able to draft out a design process. Though the companies' design processes differ in context and timing, they still share an overall framework similar to the creative process. Here, we use Amabile's (1983) componential framework of the creative process to see where the sustainability commitments in their form can pose a constraint on the designer's creativity. Besides task motivation, Amabile proposes domain-relevant skills and creativity-relevant skills as shaping creative performance. This can be seen in relation to the need for a designer to have both technical skills that makes the final product useful as well as abilities connected to aesthetics (Lawson, 2005). In the following, we go more into depth with the different components of creativity in relation to the design process.

Problem or task presentation

In the initial stage of the creative process, the problem or task is presented based on either internal or external stimulus (Amabile, 1983). In our analysis, we see how in the design process a brief would be presented to designers, but their role in the brief in relation to sustainability commitments would vary. In the case of SBC, Marie presents the Crowd Bible to her designers, thereby from the designer's perspective, the stimuli would be external. This is linked to *material constraints* (Moeran and Christensen, 2013) as identified above, which are here imposed on the designer. At the architect

companies we see the external stimuli in the form of a brief from the client which would typically entail economic constraints in terms of budget along with *social constraints* intensified by sustainability ambitions. Though in the case of GXN's project of Circle House resulting from a co-collaborative project brief with Lejerbo, these requirements are also set by GXN. Additionally, in CBM's case, with Camilla being both founder and designer, the project requirements would be internally stimulated, but her creative network would contribute with external stimuli through providing her with new knowledge and ideas. Notably, at CBM, GXN, and JJW we see a mixture of internal and external stimuli, whereas as SBC it appears all external. According to Amabile an externally posed problem is likely to appear less interesting to the individual and decrease the intrinsic motivation. However, Adela's attitude towards the Crowd Bible challenges this assumption, as identified in the analysis she refers to it as inspirational and providing sufficient space for her own creativity.

Preparation

At the second stage, the individual will prepare for a generation of responses by collecting relevant information to generate cognitive pathways for possible solutions. In the case of the companies' design process, we see a phase of idea generation. At JJW this is a moment of problem-solving brainstorm and at GXN there is a 8-weeks sprint. The project goals for sustainability are determined in this initial phase. While in the case of the fashion companies these are pre-set on a company-level, at GXN and JJW these would vary from project to project. This calls for a specific knowledge on sustainability at GXN and JJW to establish these criteria, which according to Amabile (1983) could be labelled as the domain-relevant skills. The ambition to have sustainability commitments in the project thereby adds another domain to this phase of the process. Furthermore, at CBM, we see relevant information in the form of technical limitations connected to sustainability commitments with the limited resources in Nepal. Additionally, the general pattern we saw of considering the use of product adds another layer of knowledge, which will contribute in generating design solutions. At CBM and SBC the user considerations were linked to the pre-set company-level criteria and therefore established earlier on in the process.

At JJW, CBM and SBC it is only the designers, who are part of this stage in the design process. However, at GXN's project this phase was characterized by an involvement of other stakeholders such as the client, manufacturers, engineers, constructors and other architectural studios. Though the domain-relevant skills are considered on an individual level by Amabile (1983), one might consider GXN's choice of involving stakeholders at an early phase is a tool contributing in enhancing these.

Response generation

In this stage of the creative process, the novelty of the product is determined as the individual will generate responses by exploring possible pathways as well as features in the environment that might be relevant to the task (Amabile, 1983). In the design process, we see the designers will develop and sketch a design solution based on their previous idea generation. Notably their criteria set for sustainability in the earlier stages will have an impact on the proposed design solution.

Response validation

Similarly to the framework of the creative process, we identified the stage of "reality check", in the design process, where designs are tested and evaluated. In the fourth stage of the creative process, the responses are evaluated in relation to established criteria, which thereby determines the usefulness of the product (Amabile, 1983). Amabile's model does not specify where this validation comes from besides the individual but notes that the domain-relevant skills are important in this stage as related techniques will be used to assess the appropriateness against the knowledge and relevant criteria within the area. In the context of the design process of the case companies, we see that the designers are not only making this validation on their own but are constrained by others' criteria. In the case of JJW and GXN, the contractor or developer will evaluate whether the design solution lives up to their criteria, which is influenced by the demand of the client. Here, a clash can happen if the designer's established sustainability commitments in the design include higher costs, which was expressed in the interviews as highly likely. This indicates the economic constraints inhibit the designer to move forward with the proposed design solution. For CBM and SBC this evaluation is not related to the social and environmental efforts, as these are fixed from the beginning through company-wide commitments. However, as noted the commercial partner at CBM and the founder of SBC will contribute with *social constraints* when posing the mercantile criteria, thereby coming back to another aspect, which we saw in the analysis as an integrated part of sustainability: the financial aspect. Additionally, the usefulness of the product is assessed in terms of whether it is a feasible solution: can it be economically scalable in the implementation? Here we also saw challenges connected to the sustainability requirements. Alexander talked about this in the context of finding sustainable solutions for the Circle House that can be scaled to 60.000 housing units. CBM's handmade workers in Nepal pose high costs to the handcraft, which makes the example of the highly expensive throw of 1,000 Euro not a sustainable solution from a financial point of view.

Outcome

In our design process we identified a re-sketching process as a result of the stakeholder's feedback. This corresponds with the creative process, where in cases in which the task is not regarded as solved,

there will be a loop to response generation (Amabile, 1983). Notably, the perceived character of feedback will impact the individual's task motivation, thereby impacting the creative level going forward. If we relate our cases to Amabile's theory (1983), it would entail that if the designer would feel they reached progress, thereby being closer to the final design solution, the intrinsic motivation would increase. On the other hand, the intrinsic motivation would decrease, if the designer felt not any closer to the goal. This evaluation by stakeholders has been discussed above in the context of being a constraining factor. Thus, we can argue that depending on the character of this evaluation, it can have a negative impact on the designer's intrinsic motivation when re-sketching, thereby impacting the creative performance. With GXN we see the example mentioned by Casper regarding feedback from the manufacturer on using small concrete elements appropriate for designing for disassembly, which would be highly costly for the manufacturer. Notably, this example ended in a compromising solution, causing Casper to react positively in regards to this part of the process.

Notably, though the creative process is described above in a sequential order, the process should be understood as possibly reciprocal in reality as noted by Lawson (2005), where the 4th stage might not be the only one creating loops in the process to reaching a final design solution. We also saw this in relation to GXN's process which with the stakeholders' constant collaboration through workshops, which in theoretical terms can be explained by a loop between analysis and synthesis (Lawson, 2005).

As a result of comparing the design process to the creative process, it suggests the need for a higher level of domain-relevant skills. Based on the employees' perceptions, certifications appear to contribute to the domain-relevant skills by proposing a guide on what materials are appropriate to use. Additionally, third party services such as JJW's use of Dominia, SBC's use of Sourcing House and GXN's use of EDP, contribute in setting up criteria as well. This use of other entities external to the designer unit and even the company can be found grounded in Amabile's (1986) notion that poor domain-relevant skills causes the preparation stage to be long. This can also be linked to Robinson's (2004) argument that standards and certifications enable action when it comes to sustainability. The certifications and third parties could all be seen in the context that they contribute to the individual's domain relevant skills, so the designer can build up an appropriate response to the task.

2.1 Effects of constraints on creativity

Different from Amabile's (1983) componential framework of the creative process that looks at the individual, Rosso's (2014) research focuses on how constraints enhance or inhibit the creative performance in relation to teams. The patterns we identified of stakeholder collaborations during the design process of the projects points at the relevance of applying Rosso's theory. Even at the small fashion companies CBM and SBC, we identified more than one person shaping the final outcome making the projects team-based (Rosso, 2014). In the following we will put the identified constraints arising from sustainability commitments in relation to Rosso's categorizations of *product* and *process constraints* placed in the design process to discuss their impact on the teams involved (Figure 5).

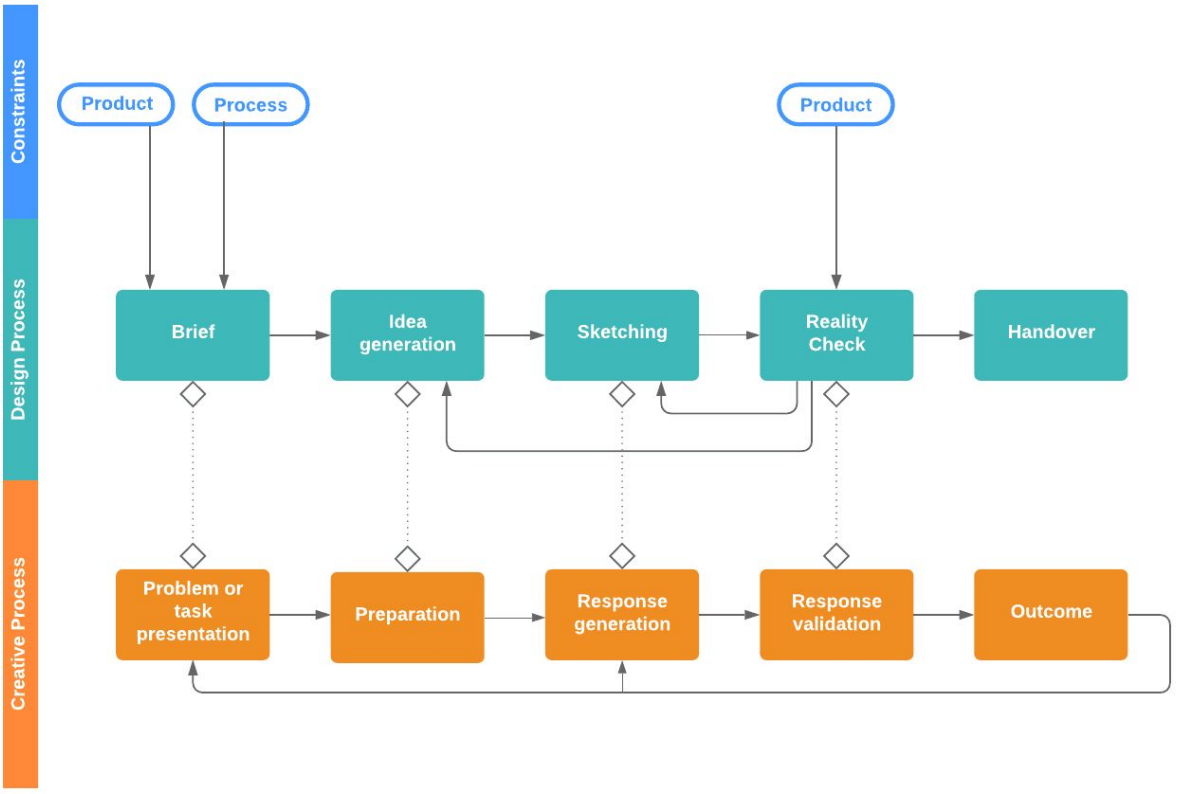

Figure 5. Synthesized framework of constraints in the creative/design process

Material constraints were found to be present in all case settings. As materials as product requirement relate to the outcome of the final product, *material constraints* can be linked to *product constraints* as introduced by Rosso (2014). These are introduced in the beginning of the design process. At SBC and CBM these *product constraints* will have been set before the design process begins, whereas at JJW and GXN, they become project-specific and depend on the client's vision of the project.

Consequently, we look into how the pre-defined *material constraints* at SBC and CBM could impact the design process by comparing to Rosso's implications.

At SBC, the *product constraints* are communicated by Marie through the Crowd Bible to the designers. Although, the brief presents an external stimulus for Adela which is according to Amabile (1983) likely to appear less interesting to the individual impacting their intrinsic motivation, as noted in the cross-case analysis, Marie and Adela agree that the Crowd Bible is an appropriate tool to get inspired and motivated. This can be linked to Rosso (2014), who emphasizes that *product constraints* can function as a well-defined creative challenge; though limiting set of solutions to a given problem, it still bares the freedom of *how* this solution is to be achieved, thereby leaving space for Adela in her phases of idea generation and sketching.

In CBM's case, though the *material constraints* appear to be based on a mixture of internal and external stimuli, as it is Camilla's choice (internal) of using GOTS-certified cotton (external). Additional *product constraints* in CBM's case are connected to a mix of *social* and *spatial constraints* (Moeran & Christensen, 2013) resulting in technical limitations, with Camilla's choice of working with the factory in Nepal. Although both of these *product constraints* are stemming from the external environment, they are the result of constraints arising intrinsically, as Camilla, with her roles of both founder and designer, chose these commitments. This also implies that, although the GOTS-standard with its requirements and Nepal with its technical limitations proposes external stimuli to Camilla on task presentation, the fact that Camilla made the choice to comply with these, would contribute to her sense of empowerment, which is seen as enhancing intrinsic motivation Rosso (2014).

Though *material constraints* determined by certifications was not present at GXN and JJW's case projects, we saw that in general, the employees at the companies perceived certifications as reducing complexity and providing a common set of goals and guidelines. The choice of following certifications by all four companies is suggested to have enhancing effects on creativity when linking to Rosso's (2014) finding that when *product constraints* provide a common goal, they are likely to have a positive impact on intrinsic motivation. Additionally, the internally defined environmental and social commitments as presented in section 1.3.1. and 1.3.2. contribute to establishing project goals that are complementary and additive dynamics to what is set by certifications.

Constraints linked to stakeholder involvement

When looking at the creative process from the designer's perspective, we identify *social* and *economic constraints* posed by stakeholders in the stage of task or problem presentation and later in the phase of response validation. To suggest whether these are enhancing or inhibiting creativity, we look into how these can be characterized when linked to Rosso's (2014) concepts.

As identified, the extrinsic constraints connected to the first phase of the design process, characterized by a task presentation, will differ across companies of whether it is project-specific or on a company level and the level of stakeholder involvement. With the fashion companies they were determined on a company level and their impact as *product constraints* was discussed in the previous section. With GXN's project, though stakeholder involvement was present in this initial phase, as hired consultant the company frame the constraints themselves. The *social* and *economic constraints* imposed by the client at JJW are related to the sustainable vision for the project as well as the budget. Though the budget is not a constraint arising from sustainability commitments, we see how employees regard it as a constraint *on* the sustainability commitments, which thereby implying it as a *process constraint* on the design process. Rosso's (2014) suggests that *process constraints* tend to enhance creativity in situations where they led to a boost in motivation and novel approaches to difficult challenges. However, the author also flags up that *process constraints* are likely to inhibit creativity when perceived as restricting possibilities and harming the intrinsic motivation by reducing a sense of empowerment and autonomy. With JJW's project, the outcome suggests an enhancement of creativity, as they were able to transform the municipality's sustainable vision into the winning solution of the public bidding round.

In the phase of response validation, the stakeholder involvement was identified in the context of social and economic constraints as imposed by contractors in the case of GXN and JJW and as *social constraints* when Marie and Pernille brings in commercial considerations. As noted in the creative process, the feedback would impact the designer's motivation when re-sketching. Both are linked to *product constraints*, as they are directly linked to the clients' and market demands (Rosso, 2014). Additionally, as this is the moment of assessing the product's usefulness in terms of feasibility and scalability of the product, this also links to *product constraints*. Rosso's (2014) research adds an additional dimension that might indicate the impact of the stakeholders' feedback on the creative performance. As the author looks into creative performance on a team level, he identifies the contextual factor of collaboration, which can function as enabling dynamics to enhance creativity. Rosso identified that in teams where individuals were able to set their individual or functional differences aside to obtain a common goal, allowed constraints to have an enhancing effect on creativity. In the analysis, we identified several examples, where designers were willing to compromise to reach the team's shared goal of implementing the design. At CBM, Camilla values Pernille's input though it can imply design compromises, as both acknowledge that their social sustainability goals can only be achieved through commercial success. At GXN, Alexander mentions the fine line of setting sustainable design principles, which if too strict the constructor cannot live up to them, thereby he acknowledges a need for having them on board to achieve a satisfactory outcome with regards to sustainability. At JJW, Niels points out that collaborating with contractors is not a

choice but a necessity. Finally, at SBC we see how Adela does not react negatively to Marie's input, which could also be related to the shared goal of getting the product to market. As Adela is paid in royalties it would also be in her interest to get the product sold in a quantity as large as possible.

The need for involving and collaborating with stakeholders in this stage of the process can be also be seen in relation to the dynamics of the creative industries, where creatives must work with humdrums to reach the completion of the creative product (Caves, 2000). Becker's (1982) need for establishing trust between creative and humdrum could be connected to playing a role in how the feedback will be perceived. Though we have not assessed the level of trust between the stakeholders involved in the design process, the understanding among employees (including designers) that sustainability also includes a financial aspect points out an acceptance of the financial premise for implementing sustainable design. This could indicate an acknowledgement of the value the stakeholders' input provide.

Sustainable behavior constraint

As discussed in section 1.3.2, the companies assume responsibility and aim to change the conventional mindset of linear *behavior* of their respective industries. This results in both product and *process constraints* as it impacts the final outcome of the design process as well as the way in which the work is done. Rosso (2014) suggests that both types of constraints can enhance and inhibit creativity depending on how they affect the team member's intrinsic motivation. The constraints connected with considering sustainable behavior does not appear explored by existing literature on constraints. The projects of GXN and JJW represent examples where considerations of the final use enhance creativity, as these projects have been well-received by the client. When linking back to the creative process of the designer, one might argue that the designers' involvement in defining the sustainable criteria could have played a role in the creative outcome, as this internal presentation is seen in a positive connection with task motivation (Amabile, 1983) providing a sense of empowerment (Rosso, 2014).

However, it should be pointed out that the suggested impacts of sustainability commitments on the creative process and whether creative performance was enhanced or inhibited in the different case contexts should be understood as indications rather than as reliable evaluations, for the following three reasons. First, by adopting Amabile's (1983) perspective that assessing creativity will be based on social judgment similarly to identifying an individual as attractive, we are aware that a product's/person's/process' creativity can never be evaluated objectively and only be positioned on a subjective continuum scale. Second, Salkind's (2008) suggestion that the ideal creative context needs to be identified for each individual and will vary across individuals, time, process, and environment would require an individual creativity assessment of all people involved in the creative process of each case. Finally, understanding the sustainability commitments' ultimate influence on the design

process would not only require the identification of the ideal individual context but also the nuanced analysis of the interplay of these on a team-level.

3. The role of the designer

When looking at the role of the designer in designing for sustainability, the analysis gave us insights into how the designers perceived their ability to impact the sustainability of the final outcome of the design process. In our expert interview, Alberte noted how design cannot become sustainable only through designers, yet their role is essential in enabling it. At the three companies CBM, JJW and GXN, we see the designer as enabling sustainability in the design process by setting the sustainable goals, whereas due to the business model at SBC it is the founder and creative director Marie, who has this role and not the hired designers. When the designers are given the role to define sustainability goals, then as noted this would call for further domain-relevant skills to be added to the designer's repertoire. It could be compared to the concept of the 'thinking designer' (Ollenburg, 2018), which implies that the designer cannot limit their role to ensuring the aesthetics, but must also contribute to solving societal problems. However, as noted by both Alberte, there are aspects, which cannot be solved by the designer and this can be related to the final step in the design process, the handover of the design. The fact that the designer is not the one implementing the creative ideas restricts the designer's impact on the final sustainability of the product. Additionally, the sustainability of the product will ultimately depend on the use of the design solution and thereby the mindset of the consumer.

Another restriction identified on implementing sustainable design was the industry barriers. Notably, Casakin (2007) identifies the designer as facilitators in changing conventions through their position as sources of creative ideas and points out creativity as the enabling factor for designers to do so. Casakin's (2007) notion could in the context of sustainability suggest an ability of designers to transcend industry conventions to embracing more sustainable solutions. Yet, with the dependency on creativity, it highlights the relevance of considering the designer's social environment and its impact on their creativity.

Chapter 6: Conclusion

This thesis had the aim to investigate in the setting of the creative industries, the impact on the design process of companies choosing to integrate sustainability commitments into their business. As we were interested in the relationship between the designer and sustainability, our research investigates what this implies in light of the consequences of sustainability commitments on the design process. This led to our research question:

How do sustainability commitments impact the design process at companies within the creative industries?

Through a multiple case study of four companies in the creative industries, we have conducted an exploratory research by interviewing employees, who worked on the same projects together to get an idea of the design process and how it is impacted by sustainability initiatives. By looking at companies, which all profile themselves as sustainable, it provided us with an ideal setting to understand these dynamics. The use of the following three sub-questions allowed for refinement and helped us explore our research question in a more nuanced way:

1. *How do employees understand the concept of sustainability?*
2. *How do the sustainability commitments take shape?*
3. *What is the role of the designer in designing for sustainability?*

In this chapter, our findings, which are a result of connecting our empirical data with theoretical implications on constraints on creativity will be presented.

6.1 Findings

Finding 1: Constraints arising from sustainability commitments

When analyzing the companies' design process, we identified constraints arising from sustainability commitments. In answering our second subquestion, looking at how the companies' sustainability commitments took shape, we identified a mixture of following certifications and defining the company's own criteria. In this combination, the companies' sustainability commitments implied material constraints on the design process as well as social constraints as the client and/or the company would impose a sustainable vision to be followed. Additionally, when looking at the employees' understanding of sustainability, it includes considerations of the end-use of the product, which was reflected in the companies' defined commitments of nudging the behavior of consumers. When investigating the second subquestion, we saw this in fashion, when through design the nudging became about customers' purchase: to buy 'fewer products of high quality' and 'styles that last more than one season'. In architecture, impacting behavior entailed introducing the idea of optimizing the space, as empty buildings and unnecessary square meters were regarded as unsustainable. Additionally, by designing for disassembly and introducing circular design principles, the nudging also became about the use of the building in the long term, with the aspiration that the building would not be torn down after a short amount of time, and recycled when reaching the end of its first lifecycle. As a result, these add an additional dimension of constraint: nudging for sustainable behavior in relation through the design solution. These were categorized as *sustainable behavior constraints*.

Finding 2: Sustainability adding complexity to the design process

In the answer to our first subquestion, the employees' perceived sustainability as a complex concept, which included several aspects, both environmental, social and financial considerations and stretching from the material use to the product's consumption. With this understanding of requirements to a product's sustainability, it adds another layer to the usefulness of the design: it has to comply with the set sustainability commitments. These become constraints set by either client, company, designer or a combination of the three. Additionally, the feasibility of the product can be seen as challenged by the financial aspect of sustainability, as a tension can occur between targeting environmental and social areas while keeping costs low. Consequently, the sustainability commitments introduce a new domain in terms of criteria for sustainability, which expands the domain-relevant skills necessary when presenting the task and assessing the usefulness of the design solution. The experienced complexity of sustainability is reflected in the need for integrating other professionals than the designer in the design process. Besides economic and social constraints, the *sustainable behavior constraint* presented in

Finding 1 requires additional domain-relevant skills for generating and evaluating design ideas resulting in further enhanced complexity of the process.

Finding 3: Certifications and internally defined commitments enable action

The answer to the first subquestion reveals how certifications are regarded as reducing the complexity of sustainability. As a tool to address the perceived diversity of sustainability, the certifications in their form of product constraints provide employees with common guidelines and goal, thereby enabling action for the company and its employees. Additionally, a perceived need of defining own commitments beyond certifications was identified. The combination of following certifications' guidelines and company set standards contributes to employees' domain-skills and enables action for the companies when it comes to sustainability.

Finding 4: Constraints arising from sustainability are likely to impact creativity:

As concluded, the various sustainability commitments, whether defined by certifications or created by the company, involve extrinsic constraints. Though extrinsic factors are likely to undermine intrinsic motivation, our data indicates that intrinsic motivation is awoken in task presentation by the external stimuli of sustainability criteria. To confirm these indications, further investigation is required. In the later stage of the design process, when the design solutions are evaluated for their usefulness, the impact on motivation will depend on how the individual perceives the constraints imposed in connection to sustainability, notably whether it is perceived as a progress towards the final outcome or not. Nevertheless, the *sustainable behavior constraints*, appear stemming from an intrinsic motivation of being able to do a difference, which suggests its impact on creativity as an enhancement.

Finding 5: The designer has a role but is constrained by several factors:

In answering our third subquestion, we investigated the designer's role in the design process. As designers are part of all phases of the creative process and the main source of creativity, they clearly have an impact on the sustainability of the final design solutions as highlighted by both researchers and practitioners. However, our investigations show that their influence is limited, as the creative process of designing for sustainability was found to represent collaborative dynamics across case companies. The designer's work depends on the inputs of humdrum stakeholders who tend to prioritize financial considerations. Additionally, whether the final product will be sustainable or not is determined by its life after the designer's handover including the customer's use thereof.

However, the special role of designers when developing novel and creative products, calls for the acknowledgement of a certain degree of responsibility. Depending on the organizational context,

designers have the ability to design for sustainability by acting as 'thinking designers' considering more than just the aesthetic features of a product. This can be done through integrating novel elements into the criteria of 'usefulness' for design evaluation. One example found to be relevant in this regard is to reckon with user behavior. Although, designers have no influence on whether users employ their design solutions as they intended them to do, their expertise in designing allows them to nudge behaviour which challenges the existing industry convention of linear consumption, thereby paving the way to a more sustainable future.

6.2 Practical implications and future research

Since our multiple case study looks into companies, which have already integrated sustainability commitments of both environmental and social character into their business practices through several years of experience, the findings could contribute with implications for companies, which are still new to this. Notably, our findings indicate that a combination of the company following official certifications and setting their own sustainability vision can have an enhancing effect on creativity by providing common goals and guidelines, which help the designers navigate in the design process. This approach should be considered by companies new to the field. Certifications provide a legitimate guide for the employees, but they should not stand alone, as they leave space for uncertainties.

Our finding that the designer's role is restricted by many other factors contributes with implications for decision-makers in the industry. Industry organizations, business leaders and policy makers should not only target the designers in their initiatives for promoting sustainability. Other stakeholders involved in the design process are just as relevant to consider when pushing for more sustainable conventions. This also includes a notion that goes beyond the design process and puts targeting behavior as a relevant area of focus for decision-makers. As noted, you can make the most sustainable products, but if they are not treated sustainably, then the value from the design considerations is lost.

Nevertheless, the designers still represent an interesting position when it comes to challenging traditional conventions, as they in their positions as creatives can provide new and creative ideas that might overcome existing industry barriers. They cannot do it by themselves though and managers should consider providing designers with the support when it comes to dealing with the complexities and challenges of designing sustainably. This could be in the form of workshops, cross-departmental or partner collaborations in the early stages of the design phase, where ideas are generated for the final design solution.

Our research is focused on companies in the creative industries and consequently, there were findings, which have been identified in the light of these industry dynamics. Notably, the findings on

the constraints' impact could be applicable to other industries beyond the creative, as they are based on theories not exclusive to the creative industries. The findings rooted in the relation between humdrums and creatives are expected to be applicable for those industries, where an artistic designer will operate. These goes beyond the creative industries, as they include companies, where for example industrial design is part of the business activities.

Notably, our research investigated the impact of sustainability commitments on the artistic design process. Even though other design disciplines are present in the creative industries, such as engineering design used in software, as these are characterized by different dynamics, further research would be needed to address the applicability of the findings of this research in this context.

Throughout our research process, choices that narrowed our research and focused the aim of the study were inevitable. Along the way and due to the exploratory character of our research, we came across several related and relevant fields that future study could address.

First, there were several indications that the way sustainability commitments were defined was determined by the industry context of the company. Different from fashion, architecture is a service-on-demand and operates exclusively in a B2B setting, which makes sustainability goals emerge in coordination with the client. Second, other contextual differences such as company size or management structure could be factors that impact the way sustainability commitments are shaped and consequently influence the final outcome of the creative performance. Especially, studying the differences between companies led by their founders and C-level managed firms engaging in the implementation of sustainability commitments could lead to new perspectives. Additionally, one of the case companies' business model differed, as the design unit was outsourced. Although this caused the designer to not be part of the definition of sustainability goals, our data did not indicate that this organizational construction had a negative effect on the creative performance. Nevertheless, theoretical propositions challenge this and future research should be aimed at a more enriching investigation of whether an outsourced design process with clear constraints can lead to a lack of empowerment among designers, and thereby potentially decreasing the intrinsic motivation, thereby harming the creativity.

Another relevant area identified when analyzing the empirical data but left aside for reasons of research focus was legitimacy. The fact that all case companies in addition to their use of certifications relied on third parties to ensure compliance with their commitments highlighted the role of external control and transparency when engaging in sustainable practices. Additionally, the omnipresence of sustainability as a concern shared across industries points towards the presence of isomorphic pressures. Future studies could investigate the linkage of implementing sustainable initiatives and legitimacy in different industry contexts. As "greenwashing" is a known accusation for

companies engaging in sustainability activities, further research into the field of legitimacy could provide insights into how companies establish legitimacy among their employees and customers. This is presumably especially relevant in fashion, as the companies operate in a B2C context.

The academic field of knowledge management and its connection to how companies work with sustainability appeared as significant to examine by future researchers. As our findings identify domain-relevant skills of the designer as crucial in implementing sustainability commitments, empirical investigation of different approaches of nurturing these could add value for academics and practitioners. Knowledge-sharing practices between companies and between industries with regards to sustainability appear particularly relevant here, as they would potentially accelerate the elimination of unsustainable patterns and allow all stakeholders to live up to their potential in tackling sustainability-related challenges on an environmental and social level.

Finally, research on how technology can enhance the successful implementation of sustainability commitments and an assessment of their potential in overcoming current industry barriers and changing existing conventions in both fashion and architecture could add a valuable perspective to our research.

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