Co-creation: a strategy to increase trust in sustainable products

The role of the communicator

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ABSTRACT

Title: Co-creation: a strategy to increase trust in sustainable products. The role of the communicator
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Following society's trend of a more sustainable lifestyle, companies today urge to improve the live cycle of their products. As consumers often perceive this to happen mainly for the companies' own benefit, their trust in green products is put to the test. The innovation strategy consumer co-creation should build and strengthen the trust through greater transparency and a focus on customer interests. In three experimental studies of 194, 139 and 227 participants, this thesis investigated the role of co-creation in a sustainable setting and further how the right communicator influences the effect of co-creation. Using the product category skin-cream direct as well as indirect mediation or moderation effects between the sustainability claim, the innovation method, trust and purchase intention were analyzed. The findings indicate that trust is important when buying a sustainable product. Secondly, results show that co-created products have an effect on trust and purchase intention, especially if consumers feel that the co-creators have a sufficiently high level of expertise. Finally, evidence was found that expertise can also be transmitted through the communicator, who is responsible to disseminate information about the co-created product. These findings provide a valuable contribution to current literature by combining the research topics of sustainability and co-creation and further expand the research on the external factors that can enhance the co-creation effect. In addition, the thesis suggests substantial managerial implications for companies practicing sustainable production and long for a customer-focused innovation strategy.

Keywords: sustainable product, trust, purchase intention, innovation strategy, co-creation, expertise, communicator

SUMÁRIO

Título: Co-criação: uma estratégia para aumentar a confiança em produtos sustentáveis. O papel do comunicador

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Seguindo a tendência da sociedade de um estilo de vida mais sustentável, as empresas exortam actualmente a melhorar o ciclo de vida dos seus produtos. Uma vez que os consumidores percebem frequentemente que isto acontece principalmente em benefício das próprias empresas, a sua confiança em produtos verdes é posta à prova. A co-criação do consumidor na estratégia de inovação deve construir e reforçar a confiança através de uma maior transparência e de um enfoque nos interesses do cliente. Em três estudos experimentais de 194, 139 e 227 participantes, esta tese investigou o papel da co-criação num cenário sustentável e aprofundou a forma como o comunicador certo influencia o efeito da co-criação. Os resultados indicam a importância da confiança quando se compra um produto sustentável. Em segundo lugar, os resultados mostram que os produtos co-criados têm um efeito na confiança e na intenção de compra, especialmente se os consumidores sentirem que os co-criadores têm um nível suficientemente elevado de especialização. Finalmente, foram encontradas provas de que a especialização também pode ser transmitida através do comunicador, que é responsável por divulgar informação sobre o produto co-criado. Estas descobertas fornecem uma contribuição valiosa para a literatura actual, combinando os tópicos de investigação da sustentabilidade e co-criação e expandindo ainda mais a investigação sobre os factores externos que podem aumentar o efeito de co-criação. Além disso, a tese sugere implicações de gestão substanciais para as empresas que praticam a produção sustentável e anseiam por uma estratégia de inovação orientada para o cliente.

Keywords: sustainable product, trust, purchase intention, innovation strategy, co-creation, expertise, communicator

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1 NTRODUCTION

1.1 Attention to research

In recent years, the problem of the climate crisis has moved further into the center of social discussions, calling for debates on sustainability and environmental behaviors. Many people are trying to do their part by leading a more sustainable lifestyle themselves (Paparoidamis et al., 2019) and in most cases also strive for a change in their purchasing behavior. Customers buy more sustainable or "green" products and companies must react to this (Emekci, 2019). Companies therefore have been under additional pressure from regulators and their own competitors - those who do not act sustainably lose a competitive advantage (Bansal and Roth, 2000). Recently, firms have begun to recognize an advantage in acting environmentally friendly. Increasing sales and reputation are economic factors for moving towards sustainability (Dangelico, 2015).

Some companies have been tempted by the sustainability trend to promote more sustainable action than they actually do. The so-called "greenwashing", “the act of misleading consumers regarding the environmental practices of organizations (firm-level greenwashing) or the environmental benefits of a product or service (product-level greenwashing)” (Delmas & Burbano, 2011) is increasingly responsible for the fact that environmentally conscious customers also doubt the credibility of companies that are actually sustainable (Delmas & Burbano, 2011). Companies whose business models are based on the sustainability claim are more vulnerable to greenwashing perceptions (Delmas & Burbano, 2011) ensuring at all times that the environmentally friendly actions will actually take place in the manner in which they are presented to the public, as such companies need to be trusted and credible (Chen & Chang, 2013). A lack of customer trust in environmentally friendly products might therefore lead to competitive disadvantage of sustainable companies compared to their non-sustainable counterparts (Chen & Chang, 2013).

In recent years, another trend in new business development has emerged. While originally ideas for new products and innovations came exclusively from in-house designers, external sources are now increasingly involved (Ramaswamy & Gouillart, 2010). Especially the involvement of customers enables a much more precise development according to the needs of the market. While von Hippel (2005) already used the term "user driven designs", co-creating processes, ‘‘a collaborative new product development (NPD) activity in which consumers actively contribute and select various elements of a new product offering’’ (O’Hern & Rindfleisch,

2009, p.4) are now particularly interesting for companies. These allow customers to become an equal part of the innovation process. Since this type of innovation process reduces the inequalities of power between company and consumer, as participating customers are not motivated by drivers like increased turnovers, but their own needs, co-creation increases trust through transparency and empowerment (Randall et al., 2011).

Including consumers in the design process of sustainable products might therefore be a strategy to reduce the above-mentioned jeopardizing effects of greenwashing. Using consumers as co-creators for sustainable innovations will demonstrate the focus on the customers' interest and transparency. Co-creation might therefore be a strategy to increase consumer trust in sustainable products (Schreier et al. 2012).

1.2 State of literature

Extant literature provides a broad overview of essential aspects in the field of sustainability (Hosseinpour & Nezakati, 2016; Murray et al., 2015). There is a focus on what firms can do to be perceived as sustainable by their customers but also on how sustainability can be used as a corporate advantage. Chen and Chang (2013) further suggest that companies should concentrate on increasing their consumers' green satisfaction to increase their green trust, to increase their credibility. Literature also explains how the concept of "greenwashing" can lead to green skepticism (Delmas & Burbano, 2011).

On the subject of consumer co-creation, current literature concentrates on the questions of who, as a participating consumer, should be involved in the innovation process in which way (Hoyer et al., 2010). Nevertheless, there are also some insightful works about observing consumers, those who are not involved in the innovation process but belong to the target group of co-created products (Dahl et al., 2015). This research deals with the conditions under which this group of consumers are convinced by co-created products. While there is research about how co-created products should be promoted, there are only a few papers about who is the best communicator to convince consumers of these products (Jacobsen et al., 2020).

Taking into account the importance of trust in a sustainable setting, there is a need to further explore the role of the communicator. As consumers tend to be skeptical towards sustainable products the communicator needs to be as trustworthy as the product itself (Chen & Chang, 2013). A gap was also found in the existing literature on the subject of whether companies can use consumer co-creation to strengthen the trust of their customers with regard to their

sustainable behavior. This topic will also be covered. Combining the fields of corporate sustainability and consumer co-creation has great relevance in theory and practice. It can serve as a basis for further research into the extent to which the involvement of customers in the innovation process of sustainable products brings benefits. Since a large part of all companies will have to produce sustainably to a certain degree in the coming years, important managerial implications can also be drawn from this work. If companies understand how to use co-creation correctly, they can increase their credibility with their consumers.

1.3 Research aim and research questions

The aim of this thesis is to create a better understanding of how companies that focus on sustainability in their innovation process can gain the trust of consumers in their products in order to convince them to buy those products. In addition, the project will provide information on how consumer co-creation can be used to achieve this trust.
For this purpose, an overview of the available literature on the relevant topics is given at the beginning. Subsequently, the following research questions will be answered in two conducted studies. Finally, the results of the studies are discussed, and practical implications are suggested. The following questions are being studied:

1. Does consumers' trust in the product's green claim influence purchasing decisions of sustainable product innovations?
2. Can including consumers as co-creators for sustainable products influence how observing consumers perceive sustainable product innovations, namely the level of trust?
3. Provided questions one (1) and three (3) can be validated, who should be the communicator promoting co-created sustainable product innovations to the market?

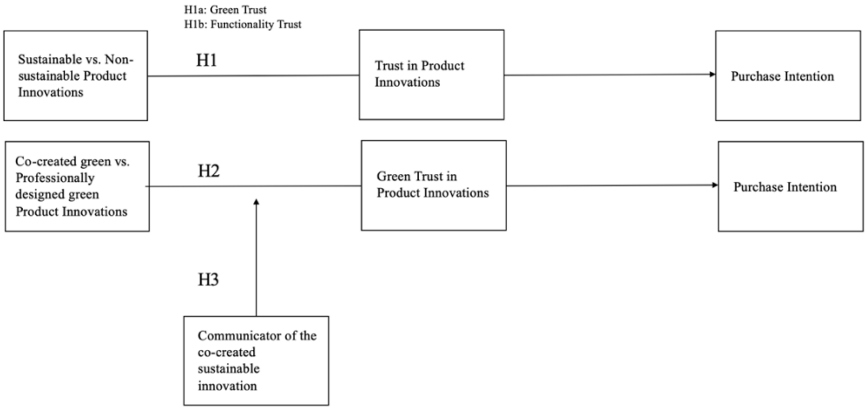

Figure 1: Conceptual model 1

Figure 2: Conceptual model 2

2 LITERATURE REVIEW

2.1 Corporate Sustainability

2.1.1 Sustainability defined

The call for a more sustainable society has become louder in recent years all around the world. A study of National Geographic from the year 2014 found that half of the respondents would consider themselves to be an "environmentalist" (Paparoidamis et al., 2019). However, in practice as well as in theory, the applications and interpretations of sustainability vary to a certain extent (Neumayer, 2003). As a basis for the following research, a common understanding of sustainability has to be created.

The concept of sustainability first occurred at a conference of the United Nations in 1972, where it was defined as "development is the one that can meet the demands of people at present time without affecting the future generation to meet their demands" (Hosseinpour & Nezakati, 2016). More recently, sustainability consists of three main elements – an environmental one, an economic one and a social one, the so-called "Triple Bottom Line (Jackson et al., 2011). Most literature focuses on the environmental element, leading to more terms and definitions in this field to arise. Murray et al. (2015), for example, explain the idea of "Circular Economy" as one where "In opposition to linear economy, economic actors would exert no net effects on the environment (Murray et al., 2015). This goal is mainly pursued by redesigning the life cycle of the "Product", with the aim to have minimal input and minimal production of system waste." Furthermore, products concerning sustainability are often called "green products" or "environmental products" (Hosseinpour and Nezakati, 2015), standing out by being less harmful on the environment, by reducing waste generation and the usage of toxic materials and thereby protect and strengthen the environment (Ottman et al., 2006). In an attempt to provide a clear overview on the above, Luchs et al. (2010) suggest that "sustainable products are for example products that have a positive social and/or environmental impact and positive ethical attributes", partially referring back to the idea of the three elements.
For the sake of this thesis the latter definition will be used for sustainable products, focusing however on the environmental element and therefore the idea of "green and environmental products", as described above will be applied.

2.1.2. Sustainable Consumption

In the beginning of theoretical and practical implementation of corporate sustainability, the concept was mainly considered as an obligation to reply to environmental issues (Bansal & Roth, 2002). In the recent years, however, companies have started to shift away from feeling pressured by decreasing harmful impacts, towards seeing an opportunity in sustainability (Boons & Lüdecke-Freund, 2013). Motivations such as an improved reputation, increased sales, the acquisition of new markets (Dangelico, 2015) and obtaining a competitive advantage make companies jump on the "sustainability train" (Chen, 2010). The reason for the inclusion of sustainability in a firm's strategy to have the beforementioned effects, is the already introduced call for a more sustainable society (D'Amato et al., 2017).

Consumers find themselves confronted to choose between environmentally friendly and not environmentally friendly products on a daily basis (Haws et al., 2014) and the group of environmental aware customers is constantly growing (Luchs et al., 2010). However, the market share for sustainable products still is rather low, which can be explained by several reasons (Luchs et al., 2010). Gleim at al. (2013) observed the consumer side of this issue and found two essential reasons. As, the prices of sustainable products often exceed those of their non-sustainable counterparts, consumers are more reluctant to choose the sustainable version of a products. Also, the expertise that consumers has on a sustainable product influences their purchasing decision. An increased expertise helps potential customers to understand the impact a certain product has in terms of sustainability, why it might be better for environment and society and also why the price of this product is higher (Gleim et al., 2013). Luchs et al. (2010) further consider the often-limited distribution of sustainable products as another barrier for consumers. The type of the sustainable product also plays a role for the consumers' decision-making process (Luchs et al., 2010). Researching on barriers to green consumption. Luchs et al. (2010) found that if consumers are confronted with product categories where they value strength-related attributes, "a cluster of attributes that provide consumers benefits, such as power and durability" (Luchs et al., 2010), sustainability has no positive effect, or even a negative one. On the contrary, if products are characterized mainly by gentleness-related attributes, "those that provide consumers related benefits, such as safety and health", sustainability increases consumer preferences (Luchs et al., 2010).

2.1.3 The role of trust

Given these barriers to sustainable consumption, it is argued that consumers only choose sustainable products over their mainstream counterpart, if they trust the concerned company and the products that are produced by it.

Trust can be defined as " the willingness of a party to be vulnerable to the actions of another party based on the expectations that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party" (Mayer et al., 1995), or simply as "the belief that the trustee will behave in favorable manner" (Morgan & Hunt, 1994). Trust is crucial, though challenging notion in relationships. Extant research shows that trust is a key element in interactions between companies and individuals (Hong & Cha, 2013). This applies among others to seller-buyer transactions and other strategic alliances (Lee & Turban, 2001). In terms of these interactions, trust is central for consumers when they need to reduce perceived insecurity and risk (McKnight et al., 2002), as perceived risk negatively influences customers' decisions on purchase intensions (Pavlou, 2003). Trust can be seen to have a function as "a mediator between risk and transaction intensions" (Hong and Cha, 2013).

Chen & Chang, (2013) therefore advise firms to concentrate on increasing their consumers' green satisfaction to increase their green trust. Where green satisfaction is described as "a pleasurable level of consumption-related fulfillment to satisfy a customer's environmental desires, sustainable expectations and green needs" (Chen, 2010) and green trust to be "the willingness to depend on a product, service or brand based on the belief or expectation resulting from its credibility, benevolence and ability about its environmental performance" (Chen, 2010).

2.1.4 Greenwashing and green skepticism

Recently it became harder for consumers to completely trust sustainable companies. This is caused by the fact that firms consider a sustainable strategy mainly as a business opportunity and follow the environmental trend that leads them to present themselves, as if they reduce every negative aspect that their business might cause (De Jong et al., 2018). Other motifs besides contributing to a more sustainable world, such as improving their own organizational reputation and rising their profits drive companies to forget the purpose of their behavior (Berglind & Nakata, 2005). In the worst case, companies even give in to these motivators, promoting a sustainable behavior without actually performing it, resulting in so-called

"greenwashing". This can be defined as "The act of misleading consumers regarding the environmental practices of organizations (firm-level greenwashing) or the environmental benefits of a product or service (product-level greenwashing)" (Delmas & Burbano, 2011). To better understand companies performing greenwashing, Delmas and Burbano (2011) explored different drivers of greenwashing. The authors found besides the possibility an improved reputation and rising profits, also market drivers, such as competitive pressure or the demand of consumers and investors, as well as regulatory drivers, activists or the media and individual psychological drivers as responsible. Therefore, several factors push companies to claim adherence to sustainability even if in practice such practices are not environmentally friendly (Delmas & Burbano, 2011).

Greenwashing also occurs within different types (De Jong et al. 2018). Terra Choice (2009), an environmental marketing firm distinguishes between an intrinsic feature and a communicative feature of greenwashing. The intrinsic feature describes acts that are distant from the truth or even lies about sustainable behavior, including for example behaviors that are only partially green, those which actually do not have a real impact, or those which are only sustainable compared to an even worse behavior (Terra Choice, 2009). Communicative features are those misleading or confusing consumers, such as vague claims, claims that have no proof or claims that use for example questionable certification icons. (Terra Choice, 2009). One of the best-known greenwashing incidents in recent years occurred in the automotive industry. The VW emission scandal started when it was discovered in 2014 that several versions of Volkswagen (VW) diesel cars present different results in terms of pollution in the laboratory tests than they did in actual driving situation, leaving the VW Jetta with a quantity of produced nitrogen oxides over 30 times higher than the legal emissions level. After investigating on this case, it was found that the cars were equipped with a "defeat device" software, enabling to between distinguish testing and on-the-road situations and therefore adapting the level of emission. (Siano et al., 2017). This of course presents an extreme example of greenwashing. However, a survey conducted from terra choice found that 98% of the 2,219 tested products that made environmental claims are committing greenwashing in one or another of the above described ways (Terra Choice, 2009).

When acting green Delmas and Burbano (2011) classified companies in four different groups. First, there are "vocal green" companies, which actually perform in an environmentally friendly way and also communicate that to their communities. "Silent green" companies also do act environmentally friendly, however do not actively promote it, while "silent brown" companies neither act, nor communicate environmental behavior. Finally, the fourth group is called to

perform “greenwashing”. It has been found, however, that greenwashing does not have any positive effect on consumers’ purchasing behavior or the organization’s success. On the contrary, the knowledge of consumers that an environmental promise might not always reflect environmental actions, provoke general skepticism towards sustainably friendly claims and Corporate social responsibility (De Jong et al. 2018). This also bares the risk for firms that in fact act environmentally as consumers might be reluctance to acknowledge their performance (Delmas & Burbano, 2011). Prior research (De Jong et al., 2018; Chen and Chang, 2013) therefore concludes that greenwashing practices have a significant impact on consumer skepticism towards sustainable, CSR and environmentally friendly claims.

Hypothesis 1: Trust positively mediates the effect of sustainability on purchase intentions for a product.

2.2 Consumer co-creation

2.2.1 Co-creation defined

While firms are advised to transparently disclose their sustainable activities (Nguyen et al., 2019), there might be another way to positively affect the impact of sustainable product innovations on the trust to the products, which is co-creation. Originally ideas were solely created by the firm and consumers considered as extractors or recipients of the value created by the firm (Ramaswamy & Goillart, 2010). However, since the processes around new product development have become increasingly important in terms of competitiveness (Roberts & Darler, 2017), firms started to include external parties, namely consumers who started to have the chance to become a source of value (Ramaswamy & Gouillart, 2010).

Focusing on consumers as external sources of value creation, the idea of user-driven designs finds importance. It can be defined as “an innovation approach whereby organizations draw on their user communities (versus their own in-house designers) to generate ideas for new products” (von Hippel, 2005). The idea of co-creation,‘‘a collaborative new product development (NPD) activity in which consumers actively contribute and select various elements of a new product offering’’ (O’Hern & Rindfleisch, 2009), makes the customer an equal party in the innovation process. Co-creation brings consumers to a central role to actively take part when developing new products or pursue innovations (Hoyer et al., 2010). This also

is beneficial for the companies as it supports to better understand their customers' needs and customize their products around these needs (Mahr et al., 2014). Co-creation can happen in all stages of the product development, ideation, development and commercialization process (Hoyer et al., 2010). However, involving consumers in the early stages of NPD, helps to avoid creating products that are not accepted by the customer (Prahalad & Ramaswamy, 2004).
The co-creation approach has a benefit for organizations by helping them to gain a competitive advantage, as their products align more with what consumers need and want and might therefore be perceived as better in the market (Lilien et al., 2002). That, of course, positively affects participating consumers, "those who are actively integrated and empowered" (Fuchs & Schreier, 2011), perceive firms following this design approach, as they appreciate their direct impact on product offerings (Fuchs et al., 2010).

2.2.2 Observing Consumers

Co-creation also leaves a favorable impression on observing consumers – those who do not participate in the development process (Dahl et al., 2015). Prior research found that consumers generally feel companies having too much power over their lives. Instead of actually trying to solve their consumers' problems, companies use their power for their own good (Bernstein et al., 2000) and even abuse their power (Holt, 2002). Companies can encounter this feeling through the involvement of users in co-creation processes. Observing consumers perceive consumer involvement firms as having a higher innovation ability and therefore believe them to generate more useful and novel products (Schreier et al. 2012). Even more important, however, is the fact that firms that use cocreation strategies are perceived as more customer-oriented and therefore more eager in understanding what the user needs (Fuchs & Schreier, 2011). Co-creation generates the perception that the consumers' interests are put in the first place and further enables consumers to better identify with and trust the co-creating firm (Dahl, Fuchs and Schreier, 2015).

2.2.3 Consumer co-creation as a strategy for sustainable innovation

Including consumers in the innovation process might also be an effective measurement against green skepticism. Consumer trust can be strengthened through co-creation. As this design method reduces the inequality of power between companies and consumers (Randall et al., 2011). This also has an impact for observing consumers, as "trust related to the customer's

confidence that the organization will reliably provide satisfactory service in a manner that is competent, honest, fair, responsible, helpful and benevolent" (Morgan and Hunt, 1994). If other consumers participate in the design process, risk and skepticism might be reduced for the observing consumer at the same time as transparency is increased, influencing their purchase intentions (Seiders et al., 2005). Trust can therefore be seen as directly affecting a customer's future intention towards a product (Randall et al., 2011).

2.2.4 The role of expertise for co-created products

One more crucial factor for consumers to trust a company is if they perceive the performing designers to be competent (Delgado-Ballester & Munuera-Aleman, 2001). In the field of innovation, this implies that consumers believe the product designer to have enough skills and expertise to create a certain new product (Sichtman, 2007). This expertise often is believed to be only found with company professionals and not with consumers, even when creating relatively simple designs (Schreier et al., 2012). Researchers even argue that companies relying solely on consumers for their new product ideas will probably not be successful as consumers are less likely to come up with thriving ideas (Schulze & Hoegl, 2008) and further as observing consumers might consider these companies as less professional and experienced (Moreau & Herd, 2010). Considering these factors, companies that wish to engage in consumer co-creation need to somehow reflect their and their co-creators' expertise in creating new products in order to develop trust (Mal et al., 2018).

Hypothesis 2: Expertise moderates the mediating effect of trust between sustainable co-created products on purchase intentions for this product.

2.3 Who should communicate co-creation?

For co-creation to have an effect on consumer trust, observing consumers need to learn that the product was co-created (Hoyer et al., 2010). As for consumers, who are not familiar with the concept, the process might be rather difficult to understand, it is crucial to present them the advantages they would get from a co-created product (van Dijk et al., 2014). As consumers today seek for transparency and openness, it might be important to focus the communication on the impactful collaboration between firms and users, that leads to a creation of ideas that puts the consumers' needs in the middle of the design process (van Dijk et al., 2014). Hoyer et al. (2010) further found that observing consumers will need some proof for the credibility of information about the co-creation and even about the validation of the co-creation claim itself (Darley & Smith, 1993).

Therefore, it is essential to understand who should best communicate that a product was co-created. Modern marketing communication research suggests that direct persuasion via traditional advertisements bears the risk that consumers react reluctant to be told to changing their behavior (Bernritter et al., 2017). The effectiveness of the transmitted information on a product can, on the other hand, be enhanced if consumers perceive the communicator to be trustworthy and reliable (Jacobsen et al., 2020). Especially in situations of uncertainty trust becomes increasingly important (Hajli et al., 2014). Consumers who feel skeptical about certain products or firms have to rely on their trust concerning the provided information as well as the communicator (Jacobsen et al., 2020). Further companies might be less of persuading consumers about some information as they might be influenced by incentives like increased turnover or sales, making them biased and therefore not as trustworthy as independent parties (Jacobsen et al., 2020).

Bearing the above in mind, it can be argued, in alignment with prior research, that co-creating consumers in fact are more persuasive to communicate a consumer co-created product to other consumers (Jacobsen et al., 2020).

> **Hypothesis 3:** Trust in a sustainable co-created product is enhanced by the perceived expertise of the communication source. Higher perceived source expertise leads to higher trust.

3 METHODOLOGY

3.1 Objectives and methodological approach

The above presented hypotheses were tested in three studies. Before, a pilot study was conducted to choose the product category best suited for the main studies. To test the hypotheses, an experimental approach was chosen. For the experiments to provide valid results, various scenarios were manipulated and randomly presented to the participants.

In study one, the aim was first to investigate on consumers' perception towards sustainable products, by establishing the effect of sustainability on consumer trust and further how a consumer's trust in a product influences this consumer's purchase intention towards the product (H1). Then, study 2 investigated whether consumer co-creation is a strategic measure to increase consumer trust in a sustainable product (H2). Building up on the results of these two studies, a third study was conducted, aiming to understand who should best communicate the fact that a product was co-created to potential customers (H3).

3.2 Pilot Study

The purpose of the pilot study was to find the most suitable product category to be tested in the main studies. Four different product categories were tested in the pilot study: personal hygiene products (e.g. deodorant), personal care products (e.g. shampoo), household cleaning products (e.g. detergent) and personal care products (e.g. skincare). Within these categories there have already been considerable attempts in co-creation and sustainable innovation (Unilever, 2020). The aim was to identify a product category not too complex, so consumers without expertise in this category could become involved in the co-creation process, as well as not too expensive, so potential customers are not biased in their buying decision (Dodds et al., 1991).

3.2.1 Procedures and Findings

The study was conducted in English, using the software Qualtrics. It was shared around students as well as people from different professional groups to ensure diversity. The participants (N=31; 54% female) mostly are between the age of 25 and 32 (41%) followed by those between 18 and 24 (26%). In the age group between 45 to 54, there were 11% and in the age groups of under

18, 55-64 and 65-74 4% each. The participants were requested to compare the above listed product categories in terms of their perceived complexity, perceived level of price and perceived level of sustainability – when sustainability is defined as doing harm or doing good to the environment, as well as how credible they believe it to be that consumers have co-created one of the products. Participants were requested to rate the product categories on a 7-point scale (e.g. 1 – not at all complex; 7 – extremely complex).

In terms of perceived complexity personal care products such as skincare are perceived as most complex (M=3.64), followed by personal care products like shampoos (M=3.18), household cleaning products (M=3.26) and personal hygiene products (M= 2.97). Also, in terms of price, participants perceived personal care products such as skincare (M= 3.71) as well as household cleaning products (M=3.64) to be most expensive and personal hygiene products (M=2.45) to be least expensive. However, given that personal hygiene products were presented first and customer care products like skincare last in the study, this can partially be explained by the anchor effect, claiming that a numerical judgement is influenced by a prior presented comparison (Kahneman, Amos, 1973). Further, participants rated personal care products to be not highly sustainable (Mean = 2.15), which also was considered as a requirement for the chosen product category. Most importantly, participants perceive the personal care products such as skincare to be the most credible to be co-created by consumers (Mean = 4.24), followed by personal care products such as shampoo (M=3.27). A t-test was conducted to compare the means of the two most credible product categories and revealed significance (p-value = 0.01). Considering sustainability and co-creation as the focus of the main study and the product category personal care products like skincare is rated most appropriate in terms of these attributes, this product category was chosen for the main study.

3.3 Study 1

3.3.1 Methodology and sample

The aim of the study was to identify whether consumers trust sustainable products more than non-sustainable products and further whether this trust leads to a purchase intention for the product (H1). The hypothesis was therefore examined for Green Trust (H1a) and Functionality Trust (H1b). It was an online survey, created via the software Qualtrics distributed to 220 participants (46,19% females). The survey was shared both in MTurk (Amazon Mechanical

Turk) as well as among the author's network. The attention check integrated in the survey was failed by 26 participants, resulting in a final number of 194 valid responses (M_{Age} = 33 years, 46.39% females)[1]. The results were presented as quantitative data, using an interval scale. The survey was conducted as an experiment, testing two different causal relationships, as it was assumed that the independent variables "Sustainable vs. Non-sustainable product innovations" has a causal effect on the dependent variable "Purchase intention" (Holland, 1986). A 2x2 between subject design was used, assigning each participant to first either the sustainable or non-sustainable scenario and then either the co-creation or the professionals scenario (Schreier et al., 2012). The table below presents the participants' allocation of each scenario.

	Sustainable	Non-Sustainable	Co-Creation	Professionals	Allocation
Scenario 1	X		X		48
Scenario 2	X			X	42
Scenario 3		X	X		49
Scenario 4		X		X	55

Table 1 – Scenarios' Allocation Study 1

3.3.2 Procedure

The survey started with presenting the goal, that is to understand consumers' perceptions and behavioral intentions towards a certain product. Next, the product category "personal care products" was introduced and the picture of the product category of interest "skin care" was presented to the participants, followed by a question about the respondents' involvement with this product category. The participants then for the first time were randomly selected to one of two different scenarios[2]. Those, selected to the treatment group, were introduced to a new skin cream, created by Firm A, that is characterized by ingredients, that are all "organic and the packaging is reusable and partly recyclable". Participants in the control group were introduced to the same product, however without the additional information on the sustainable features. These introductions were followed by a manipulation check, asking for the eco-friendliness/ eco-deconstructiveness of the skin-cream. Participants were then introduced to the second scenario. Those randomly assigned to the co-creation scenario, received the information that "Our own product developers have developed this new product in collaboration with our consumer community - consumers like you", while those randomly assigned to the professional

[1] Cp. Appendix A for Demographics study 1
[2] Cp. Appendix B for complete scenarios

scenario, were informed that "A wisely selected team of our own product developers has developed this new product - for consumers like you". A further manipulation check tested the perceived level of co-creation concerning the skin-cream's production process. Participants were then in five items asked for their perceived Green Trust and in three items for their perceived Functionality Trust towards the skin cream. Two further items finally asked for the participants' purchase intention. The testing of these dependent variables was followed by four control questions asking for the participants' perceived similarity with the consumer community of Firm A, their environmental attitude, their familiarity with the concept of co-creation and the expertise, they believe the creators of the skin care have. Lastly, the respondents were asked to fill out socio-demographics about themselves such as gender, age, country of origin and highest perceived level of education.

3.3.3 Measures and Manipulation Checks

Table 2 illustrates the constructs and items[3] used for the development of Study 1. Items are based on well-founded academic research and partly adapted to the meaning of this study. The reliability and internal consistency of the items was tested, calculating Cronbach's Alpha for all constructs with at least three items. For all these constructs Cronbach's Alpha was higher than 0.7, indicating an acceptable result (George & Mallery, 2003). For the construct Product Category Involvement with only two items, the Spearman-Brown coefficient was conducted, as this is a more appropriate measure (Eisinga et al., 2013).

Construct	Items[4]	Ca
Green Trust	(…) environmental functions are generally reliable. (…) environmental performance is generally dependable. (…) environmental argument is generally trustworthy. (…) environmental concern meets my expectations. (…) keeps promises and commitments for environmental protection.	**0.844**
Functionality Trust	(…) is likely to perform well. (…) seems capable of doing its job. (…) to be functional.	**0.765**
Purchase Intention	I would buy this newly developed product as soon as it becomes available. I would recommend this newly developed product to others. I will make an effort to buy this newly developed product. I might buy this product more than one time. It is likely that I will tell my friends about this product.	**0.794**
Product Category Involvement	I feel attached to the products mentioned above. I have sufficient knowledge about the products mentioned above.	**0.644**[5]

[3] Cp. Appendix C for complete items and sources
[4] Likert Scale from 1 (Strongly Disagree) to 7 (Strongly Agree)
[5] Spearman-Brown coefficient for two items instead of Cronbach's Alpha

Environmental Attitude	I would describe myself as environmentally responsible. I consider the potential environmental or social impact of my actions when making many of my decisions. I am willing to be inconvenienced in order to take actions that are more sustainable. My purchase habits are affected by my concern for our environment.	**0.763**

Table 2 – Reliability Analysis Study 1

As the survey included four different manipulated scenarios, the experimental manipulations of these scenarios needed to be checked for success. Therefore a manipulation check for each of the variations – sustainable versus non-sustainable product and co-created versus professionally created product – was implemented to test for the effectiveness of the induced independent variable (Hauser et al., 2018). Therefore, an analysis of the means (t-test) was conducted. For the sustainability scenario, it revealed that those participants who received the information on the sustainable product ($M_{sust} = 5.326923$) perceived the skin cream be eco-friendlier than those, who did not receive this information ($M_{non\text{-}sust} = 5.326923$, $p < 0.05$). Also, the manipulation check for the design mode scenarios revealed a p-value < 0.05.

3.3.4 Results

Hypothesis 1 claims that Green Trust (H1a) and Functionality Trust (H1b) positively mediate the effect of sustainability on purchase intentions for a product. In order to test for this mediating effect, a bootstrapping analysis by Preacher and Hays, using PROCESS Model 4, was conducted (Preacher & Hayes, 2004). Independent variable is the Sustainability Scenario, dependent variable Purchase Intention. The variables Green Trust and Functionality Trust function as mediators.

	Variable	**Coefficient**	**P-Value**	**Result**
Direct Effects on Purchase intention	Scenario Sustainability	- 0.0728	0.5803	Not Significant
	Green Trust	0.7597	0	Significant
	Functionality Trust	0.8202	0	Significant
	Variable	**BootLLCI**	**BootULCI**	**Result**
Indirect Effect X on Y	Green Trust	0.1214	0.5047	Mediation Effect
	Functionality Trust	-0.0715	0.3183	No Mediation Effect

Table 3 – Bootstrapping Analysis Study 1

As presented in the table above, both Green Trust and Functionality Trust have significant impact on Purchase Intention ($p < 0.05$). The model shows that with increased trust, also the Purchase Intention increases ($\beta_{Green\_Trust} = 0.7597$; $\beta_{Functional\_Trust} = 0.8202$). The Sustainability

Scenario has no significant direct effect on Purchase Intention, however including mediation, an effect can be recognized. While Functionality Trust is not showing any mediation effect [-0.0715, 0.3183], Green Trust is presented as a mediator for Sustainability on Purchase Intention [0.1214, 0.5047].

Mediator	Covariates	P-value Covariate	BootLLCI Mediator	BootULCI Mediator
Green Trust	Age	0	0.1164	0.5082
	Product Involvement	0.001	0.0293	0.2775
	Environmental Attitude	0	0.0677	0.3525
Functionality Trust	Age	0.001	-0.0758	0.3157
	Product Involvement	0	-0.0849	0.1437
	Environmental Attitude	0.005	-0.0329	0.1814

Table 4 – Covariates Study 1

To get a deeper understanding of the mediation effect of trust, three covariates Age, Product Involvement and Environmental Attitude were included in the model and their effect on the mediators was investigated. However, including the covariates did not change the results, as Green Trust still is significant as a moderator, while Functionality Trust is not.

3.3.5 Conclusion

A bootstrapping analysis by Preacher and Hays revealed a significantly mediating effect of Green Trust between the sustainability claim and Purchase Intention. The same effect was tested for Functionality Trust however no significance could be found. Including covariates in the model did not change these results.

Therefore, the findings support H1a, while H1b needs to be rejected.

3.4 Study 2

3.4.1 Methodology and sample

As Study 1 already provided significant results about the importance of trust for purchase intention and sustainable products, a second study was conducted to understand more about this

role of trust in a sustainability setting. The aim was to identify how co-creation influences trust and which other variables having an impact on trust can be recognized. A between subject design (co-creation vs. professionals) was followed. The online survey was distributed via Qualtrics to 155 participants (41.94% female), both acquired from MTurk and the author's network. 16 participants failed the attention check, the answers of 139 participants ($M_{Age} = 34$, 43.88% female) were used for the analysis[6]. Study 2 used the same constructs and items as in study 1 were used, however participants were randomly assigned to one of two scenarios only once as all participants were introduced to the sustainable version of the skin cream. Table 5 presents the allocation of the two scenarios "Co-Creation" and "Professionals".

	Co-Creation	Professionals	Allocation
Scenario 1	X		67
Scenario 2		X	72

Table 5 – Scenarios' Allocation Study 2

3.4.2 Procedure

Participants in the Co-Creation Scenario were informed that "Consumers identified and selected the natural ingredients, e.g. plant-based oils and butters from local organic pharmacies. Natural based scents for the cream come from consumers' discovery in botanical gardens."[7], while those in the control group received the information that Internal product developers identified and selected the natural ingredients, e.g. plant-based oils and butters from local organic pharmacies. Natural based scents for the cream come from internal developers' discovery in botanical gardens."

3.4.3 Measures and Manipulation Checks

Table 5 presents the constructs and items used in study 1 and study 2 and the results from the reliability analysis of study 2. As there were no significant results for "Functionality Trust" in Study 1, this variable was not included in this analysis. Again, Cronbach's Alpha was conducted.

[6] Cp. Appendix D for demographics study 2
[7] Cp. Appendix E for complete scenarios

Construct	Items[8]	Ca
Green Trust	(…) environmental functions are generally reliable. (…) environmental performance is generally dependable. (…) environmental argument is generally trustworthy. (…) environmental concern meets my expectations. (…) keeps promises and commitments for environmental protection.	**0.772**
Purchase Intention	I would buy this newly developed product as soon as it becomes available. I would recommend this newly developed product to others. I will make an effort to buy this newly developed product. I might buy this product more than one time. It is likely that I will tell my friends about this product.	**0.896**
Expertise Designers	I believe that the people designing this product have the necessary skills (know-how) and competence to design new products." I believe that the people designing this product are qualified to design new products. I believe that the people designing this product positively contribute to the quality of the product.	**0.744**

Table 6 – Reliability Analysis Study 2

The experimental manipulation of the design mode scenario was tested for effectiveness through a manipulation check. A t-test was conducted as a method of comparison of means and revealed a p-value < 0.05. Even if there was no manipulation for the sustainability scenario, participants were asked to assess the product in terms of eco-friendliness, to check if the sustainability claim was understood. On a scale from 1 (Very Eco-deconstructive) to 7 (Very Eco-friendly). 97.12% of the participants rated the sustainability level of the product higher or equal to the self-determined threshold of 5. The manipulation check was therefore considered as successful ($p < 0.05$).

3.4.4 Results

As especially the impact of Design Mode on Trust is of interest, a direct influence of Design Mode on Green Trust and Functionality Trust was tested, was however not significant. Further it was investigated whether trust is a mediator in the purchase decision of buying co-created sustainable products. A bootstrap analysis by Preacher and Hays showed, however no significance, as displayed in table 7 (Preacher & Hays, 2004).

	Variable	BootLLCI	BootULCI	Result
Indirect Effect X on Y	Green Trust	-0.0608	0.4467	No Mediation Effect

Table 7 – Bootstrapping Analysis Study 2

[8] Likert Scale from 1 (Strongly Disagree) to 7 (Strongly Agree)

As the above presented analysis did not show a significant effect of Design Mode on Green Trust, the control variable Expertise was included in the model. Previous literature dealt with the role of the communicator of a co-created product, referring to the role of expertise for the communicator (Jacobsen et al., 2020). Co-creation as a design mode can only show an effect on consumer trust or purchase intention, if potential customers realize that a product is co-created (Hoyer et al., 2010). This analysis therefore sought to understand if expertise can be transmitted by the communicator who is also informing about the co-creation.

Table 8 displays the significant direct effect of Expertise on Purchase Intention. This result indicates that the higher the respondents perceive the product designer's expertise to be, the higher their purchase intentions for this product.

	Variable	Coefficient	P-Value	Result
Purchase Intention	Expertise	0.741	0	Significant

Table 8 – Linear regression Expertise – Purchase intention

Further it was investigated if Expertise acts as a moderator on the impact of Design Mode on Green Trust and Functionality Trust. Using PROCESS Model 1 of Preacher and Hays, the moderating effect of Expertise was tested (Preacher & Hays, 2004). While there is no significance for Functionality Trust, the results for Green Trust show a significance in the 90% confidence interval ($p < 0.1$), indicating a significant moderating effect of Expertise on the impact of Design Mode on Green Trust.

3.4.5 Conclusion

The aim of study 2 was to understand the how co-creation impacts trust and purchase intentions in sustainable products. Based on the research of Jacobsen et al. (2020) the variable Expertise was included in the model, revealing that co-creation does have an effect on trust, however only if consumers perceive expertise.

These results support H2.

3.5 Study 3

3.5.1 Methodology and sample

The results from Study 2 provided enough reasons to further investigate. As Expertise is significantly important in these studies, a third survey was conducted, manipulating expertise in the context of co-creation in order to better understand the impact of expertise on trust and further on purchase intentions. Expertise is therefore transmitted through communication, as communication is crucial in the implementation of new design modes, so customers that a product was co-created by other consumers (Hoyer et al., 2010). Based on the studies of Jacobsen et al. (2020) the variable Expertise was here manipulated through the communicator of the Design Mode of a product.

Study 3 was again conducted via the software Qualtrics and distributed to 242 participants (36.36% female) both acquired from MTurk and the author's network. The attention check was failed by 15 participants, resulting in 227 final answers (M_{Age} = 32, 36.12% female)[9].

3.5.2 Procedure

As in Study 2, all participants received information on a sustainable product. In order to manipulate the design mode of the skin cream, respondents were randomly selected to a Co-Creation scenario and a Professionals scenario. This was followed by an allocation to one of the three Communicator scenarios. Participants, that were selected to the "Dermatologist scenario", received the information that "We are proud to announce that our cream was tested for quality by a dermatology association and received excellent reviews on the association's blog." Those, who were allocated to the "Consumer scenario" received the information that "We are proud to announce that our cream was tested for quality by a number of voluntary consumers and received excellent reviews on the consumer association's blog.", and those in the "Company scenario" received the information that "We are proud to announce that our cream was tested for quality by a number of voluntary consumers, who reported excellent reviews back to us." The Dermatologist Scenario was considered to demonstrate the highest level of expertise, followed by the Consumer Scenario and the Company Scenario. Table 9

[9] Cp. Appendix F for demographics study 3

presents the allocation to the various scenarios. The same constructs and items as in Survey 1 and 2 were used. Only for the variable "Expertise" new items were used, based on the study by Jacobsen et al. (Jacobsen et al., 2020).[10]

	Co-Creation	Professionals	Dermatologist	Consumer	Company	Allocation
Scenario 1	X		X			38
Scenario 2	X			X		44
Scenario 3	X				X	35
Scenario 4		X	X			37
Scenario 5		X		X		34
Scenario 6		X			X	39

Table 9 – Scenarios' Allocation Study 3

3.5.3 Measures and Manipulation Checks

Table 10 presents the constructs and items used in the surveys and the results from the reliability analysis of study 3. Cronbach's Alpha was conducted.

Construct	Items[11]	Ca
Green Trust	(…) environmental functions are generally reliable. (…) environmental performance is generally dependable. (…) environmental argument is generally trustworthy. (…) environmental concern meets my expectations. (…) keeps promises and commitments for environmental protection.	**0.886**
Purchase Intention	I would buy this newly developed product as soon as it becomes available. I would recommend this newly developed product to others. I will make an effort to buy this newly developed product. I might buy this product more than one time. It is likely that I will tell my friends about this product.	**0.916**
Expertise Designers	I believe that the people designing this product have the necessary skills (know-how) and competence to design new products. I believe that the people designing this product are qualified to design new products. I believe that the people designing this product positively contribute to the quality of the product. I believe that the people designing this product know the needs of the general consumers in order to offer them the products that are demanded. I believe that the people designing this product have the resources to design this product.	**0.866**
Environmental Attitude	I would describe myself as environmentally responsible. I consider the potential environmental or social impact of my actions when making many of my decisions. I am willing to be inconvenienced in order to take actions that are more sustainable. My purchase habits are affected by my concern for our environment.	**0.816**

Table 10 – Reliability Analysis Study 3

[10] Cp. Appendix G for complete items
[11] Likert Scale from 1 (Strongly Disagree) to 7 (Strongly Agree)

To test if participants understood the sustainability claim of the product, participants assessed the skin cream in terms of eco-friendliness on a scale from 1 (Very Eco-deconstructive) to 7 (Very Eco-friendly). 92.1% of the participants rated the sustainability level of the product higher or equal to the self-determined threshold of 5. The manipulation check was therefore considered as successful in a 90% confidence interval ($p < 0.1$). The t-test, checking for effectiveness in the Design Mode scenario also is significant ($M_{Co\text{-}creation} = 1.97$, $M_{Professional} = 2.84$, p-value < 0.05). The items to test the manipulation of Expertise was already successfully used in a study of Schreier et al. (2012) and therefore not again tested in a manipulation check.

3.5.4 Results

Before testing the effect of expertise in this study, another bootstrapping analysis using PROCESS Model 4 by Preacher and Hays was conducted (Preacher and Hays, 2004). Independent variable was the Design Mode scenario, dependent variable Purchase Intention and Green Trust functions as a mediator.

	Variable	Coefficient	P-Value	Result
Direct Effects on Purchase intention	Scenario Design Mode	0.0608	0.5667	Not Significant
	Green Trust	0.8983	0	Significant
	Variable	**BootLLCI**	**BootULCI**	**Result**
Indirect Effect X on Y	Green Trust	0.3089	0.7489	Mediation Effect

Table 11 – Bootstrapping Analysis Study 3

Table 11 shows that Green Trust has significant direct impact on Purchase Intention ($p < 0.05$). Aligning with the results from the prior studies increased trust, leads to an increase in purchase intentions ($\beta_{Green\_Trust} = 0.8983$; $\beta_{Functional\_Trust} = 0.7928$). The Design Mode scenario has no significant direct effect on Purchase Intention, however there is an effect, if trust is introduced as a mediator. Green Trust [0.3089, 0.3183] shows a mediation effect [0.1814, 0.5816].

Next, the effect of expertise was tested through the Communicator scenarios. Aligning with H3, it was tested whether trust in a sustainable co-created product is enhanced by the perceived expertise of the communication source. Therefore, PROCESS Model 7 by Preacher and Hays was conducted, testing moderated mediation (Preacher and Hays, 2004). Independent variable

was the Design Mode scenario, dependent variable Purchase Intention, Green Trust operates as a mediator and the Communicator scenario as the moderator.

	Variable	BootLLCI	BootULCI	Result
Index of moderated mediation	Communicator Scenario	-0.3088	0.1848	No Moderated Mediation

Table 12 – Bootstrapping Analysis Study 3

As presented in the table above, no moderated mediation could be observed, indicating that the communicator does not necessarily enhances the effect of the design mode on trust.

3.5.5 Conclusion

Study 3 built up on the results of study 2, manipulating Expertise through the communicator of co-created sustainable products. The results reveal that even if Green Trust mediates the design mode scenario and Purchase Intention, the expected moderating effect of the communicator scenario did not occur. These results show that if expertise is only transmitted through the communicator, trust towards sustainable co-created products is not enhanced.

Therefore, H3 needs to be rejected.

3.6 Final Conclusion

The studies support the importance of Green Trust for sustainable products. Additionally, it was revealed that the effect the design mode has on Green Trust and Purchase Intention in a sustainable setting only is observable if consumers perceive expertise. This expertise, however, cannot be transmitted by the communicator, but has to be transmitted through the co-creator.

3.7 Additional Findings

Even if study 3 did not reveal a moderated mediation effect of the Communicator Scenario, other notable results occurred in the analysis.

In order to better understand the role of the communicator for co-created products, t-tests were conducted, aiming at identifying the most effective communicator for a co-created product.

Communication Scenario	Mean Green Trust	Mean Purchase Intention
Dermatology	6.3946	6.4486
Consumer	5.5647	5.3706
Company	5.4462	5.2256

Table 13 – Means Communication Scenario (Co-Creation)

The table above compares the means for Green Trust and Purchase Intention within the three Communicator scenarios. The analysis only included data of participants from the Co-creation scenario. The t-tests showed that participants from the "Dermatology Scenario" have significantly higher Green Trust and Purchase Intention than those from the "Consumer Scenario" and the "Company Scenario" (p-value < 0.05) and significantly higher Functionality Trust than those from the "Company Scenario" (p-value < 0.05). These results display that, at least for this product category of skin care, the communicator can have an effect on trust, but only if the communicators are perceived as having a high level of expertise as dermatologists. Neither the consumer nor the company represent a communication source that has significant impact on consumer trust towards co-created sustainable products.

4 FINDINGS AND DISCUSSION

It has become increasingly common for companies to include consumers in their innovation and design processes (Ramaswamy & Gouillart, 2010). Prior research (von Hippel, 2005) has focused mainly on the methods how to do so, however less is known about how non-participating consumers react to consumer co-created products. This study sought to understand what role co-creation plays for sustainable products and how the design mode of a product as well as the designers' expertise might affect consumers' trust and purchase intentions towards a sustainable product. To do so three main studies were conducted and their results analyzed. Taking into consideration the previously conducted literature review, the findings will now be discussed.

Following the logic of the danger of greenwashing for sustainable products, the findings of Study 1 prove the importance of trust for sustainable products (De Jong et al., 2018, Delams & Burbano). Green Trust as well as Functionality Trust positively influence the consumers' purchase intentions towards a newly innovated product. The results further suggest the mediating role of Green Trust for a Sustainability claim on Purchase Intentions. This aligns with the knowledge by Chen and Chang (2013), who especially emphasized the importance for Green Trust for sustainable product innovations (Chen & Chang, 2013).

The analysis of Study 2 focused on the role of the design mode and expertise in a sustainable setting, revealing that co-creation does enhance trust, if expertise is involved. These findings strengthen the idea that consumers in general perceive co-created products to be more useful and novel (Schreier et al., 2012) and that transparency of the product creation process increases, reducing the dangers of greenwashing for sustainable products (Seiders et al., 2005), as well as the idea that designers are only trusted by consumers if the latter see expertise in the prior (Sichtman, 2007). A similar idea was transferred by Jacobsen et al. (2020), who see an increasing importance in the trustworthiness and reliability of communicators in the area of co-creation (Jacobsen et al., 2020).

Establishing a relationship between the perceptions of Jacobsen et al. (2020) and the findings of study 2, study 3 aimed to better understand the role of Expertise in the setting of sustainable co-created products, including three different communicators, dermatologists, consumers and the creating company in the study. Not surprisingly, the results show that if the fact that a product was co-created is communicated by dermatologists, who are perceived to have the highest expertise, consumers have increased Green Trust, and Purchase Intention, compared to

a communication by consumers or the creating company.

4.1 Academic Implications

While extensive research in the fields of sustainable production and consumption, as well as co-creation exists, this thesis extends the literature by combining both areas of study. Building on Chen's (2010) research on the importance of trust towards sustainable product innovations (Chen, 2010), this thesis suggests consumer co-creation as a way to increase consumers' trust, however, also emphasizes once again the relevance of trust for purchase intentions. While Jacobsen et al. (2020) made a valuable contribution to this research, by investigating the role of the communicator of co-creation (Jacobsen et al., 2020), this research points to the necessity of distinguishing the communicator and the co-creator when transmitting expertise. The thesis therefore highlights the importance of giving enough credit to the co-creators and not only the co-created product itself in research.

4.2 Managerial Implications

Sustainable production and sustainable consumption are both ubiquitous keywords in modern businesses (Chen, 2010). Consumers demand environmentally friendly products whenever possible, are however not always willing to consume them when provided, as they often do not fully trust the sustainability claim made by a firm. The thesis aimed to find ways to increase this trust and therefore provides valuable suggestions for companies that wish to engage in sustainable production and seek for novel ways of innovation.

The findings once more emphasize the importance of trust towards products. Firms should be cautious on their engagement with their consumers. Especially in terms of sustainable consumption, potential customers long for transparency. In order not to run into danger of radiating wrongful intensions and conveying to practice greenwashing, companies should disclose as much as possible of their product development process, providing proof for their sustainable actions (De Jong et al., 2018).

As the results show, one way to increase the trust and consumers' purchase intentions towards sustainable products is by inviting consumers as co-creators into their innovation process. This innovation procedure has already been adopted by an increasing number of firms. As co-creation puts the consumer in a central role of the product design process this can help

companies to signal that they follow consumer interests and not only concentrate on profit maximization. Findings, however, show that in order for co-creation to have an effect on trust and purchase intentions, it is crucial that potential customers perceive the co-creators to have enough expertise to design a certain product. When choosing a communications strategy for co-created products, firms should best have experts communicate the design mode to observing consumers, rather than communicating it themselves or relying on the communication of the co-creating consumers. Even if the communication by an expert might help in transmitting a certain level of expertise, this cannot be a replacement for the expertise the co-creators themselves need to convey. The insights provided in this thesis lead to relevant managerial guidelines especially for firms that wish to engage in sustainable production and user innovation.

5 LIMITATIONS AND FUTURE RESEARCH

As it was not possible to prevent certain limitations, the study encourages to further investigate. To begin with, only one product category was included in the research. Despite that the product category "skin care" was thoroughly selected through a pilot study, this might lead to difficulties of transferring the results to other product categories. As consumers might associate skin care products with products for their physical health, this category characterizes through a rather high level of complexity and sensitivity.

Further, the study only deals with the topic of consumer co-creation. As consumers were considered as the most feasible co-creators to support companies enhancing the trust of their potential customers, for this study only including consumers still provides valuable results. However, future researchers are invited to extend the studies by introducing other stakeholders as co-creators such as employees or suppliers.

Finally, the number of participants might lead to some constraints. Even if each study was answered by a high enough number of participants to receive significant results, as study 3 introduced six different scenarios, the number of respondents for each scenario was rather low. As for this study time was limited, inviting a higher number of participants was not possible. For future research in this field it is advised to begin with a higher number of responds to as well have higher numbers in each of the scenarios.

Conclusively, this study provides valuable insights in the field of co-creation of sustainable products, however, invites future research to further investigate on the value of co-created products.

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APPENDIX

Appendix A – Demographics Study 1

Demographics Study 1			
		Frequency	**Percentage**
Gender	Female	90	46.39%
	Male	104	53.61%
Age	18 – 25	62	31.96%
	26 – 35	80	41.24%
	36 – 45	32	16.49%
	46 – 55	6	3.09%
	> 55	14	7.22%
Country of Origin	United Stated	103	53.09%
	Austria	29	14.95%
	Germany	37	19.02%
	India	14	7.22%
	Portugal	8	4.12%
	Brazil	3	1.54%
Highest Completed Level of Education	Less than high school	1	0.52%
	High school graduate	18	9.28%
	Bachelor's degree	136	70.1%
	Master's degree	37	19.07%
	Doctorate's degree	2	1.03%

Appendix B – Scenarios Study 1

Product	**Scenario**
Green Product	Firm A produces and sells in the personal care market and is now launching its latest new skin care product. The cream moisturizes and smoothers the skin. It repairs and its effects are more intense during your sleep. It is specially formulated to relieve dry skin leaving it feeling moisturized and more comfortable. You note that all the ingredients are organic, and the packaging is reusable and partly recyclable.
Non-Green Product	Firm A produces and sells in the personal care market and is now launching its latest new skin care product. The cream moisturizes and smoothers the skin. It repairs and confirms itself intensively during sleep. It is specially formulated to relieve dry skin leaving it feeling moisturized and more comfortable.
Co-Created	At firm A we value your skin and want to develop the best product for our consumers. Our own product developers have developed this new product in collaboration with our consumer community - consumers like you. After being approved for effectiveness and health, the cream now finally is available on the market.
Professional	At firm A we value your skin and want to develop the best product for our consumers. A wisely selected team of our own product developers has developed this new product - for consumers like you. After being approved for effectiveness and health, the cream now finally is available on the market.

Appendix C – Items and sources

Construct	Items	Source
Green Trust	"I feel that this product's environmental functions are generally reliable." (1) "Strongly disagree/ Strongly agree" [1:7] "I feel that this product's environmental performance is generally dependable." (2) "Strongly disagree/ Strongly agree" [1:7] "This product's environmental argument is generally trustworthy." (3) "Strongly disagree/ Strongly agree" [1:7] "This product's environmental concern meets my expectations." (4) "Strongly disagree/ Strongly agree" [1:7] "This product keeps promises and commitments for environmental protection." (5) "Strongly disagree/ Strongly agree" [1:7]	(Chen, 2013)
Functionality Trust	"I feel that this product is likely to perform well." (1) "Strongly disagree/ Strongly agree" [1:7] "I feel that this product seems capable of doing its job." (2) "Strongly disagree/ Strongly agree" [1:7] "This product seems to be functional" (3) "Strongly disagree/ Strongly agree" [1:7]	(Homburg et al., 2015)
Purchase Intention	"I would buy this newly developed product as soon as it becomes available." (1) "Strongly disagree/ Strongly agree" [1:7] "I would recommend this newly developed product to others." (2) "Strongly disagree/ Strongly agree" [1:7]	(Darley & Smith, 1993)

Manipulation Check	Items	Source
Manipulation Check Sustainability	"I find this product" (1) "Very eco-deconstructive/ Very eco-friendly" [1:7]	Own Construct
Manipulation Check Co-Creation	"To what extend do you believe, this product was created by Firm A?" (1) "Exclusively by Firm A's consumer community/ Partly by Firm A/ Completely by Firm A" [1:3]	Own Construct

Control Questions	Items	Source
Product Category Involvement	"I feel attached to the products mentioned above." (1) "Strongly disagree/ Strongly agree" [1:7] "I have sufficient knowledge about the products mentioned above." (2) "Strongly disagree/ Strongly agree" [1:7]	(Pavlou, 2003)
Know-How Designers	"I believe that the people designing this product have the necessary skills (know-how) and competence to design new products." (1) "Strongly disagree/ Strongly agree" [1:7]	(Ratneshwar & Chaiken, 1991)
Similarity Consumer Community	"I feel similar to the consumer community of Firm A." (1) "Strongly disagree/ Strongly agree" [1:7]	

Environmental Attitude	"I would describe myself as environmentally responsible." (1) "Strongly disagree/ Strongly agree" [1:7] "I consider the potential environmental or social impact of my actions when making many of my decisions." (2) "Strongly disagree/ Strongly agree" [1:7] "I am willing to be inconvenienced in order to take actions that are more sustainable." (3) "Strongly disagree/ Strongly agree" [1:7] "My purchase habits are affected by my concern for our environment." (4) "Strongly disagree/ Strongly agree" [1:7]	(Haws et al. 2014)
Familiarity with Co-creation	"I am familiar with the concept of consumer co-creation." (1) "Strongly disagree/ Strongly agree" [1:7]	Own Construct

Socio-demographics	**Items**
Gender	(1) "Female/ Male/ Diverse" [1:3]
Age	(1) Open Question
Country of origin	(1) Open Question
Highest completed level of education	(1) "Less than High-School/ High school graduate/ Bachelor's degree/ Master's degree/ Doctorate's degree"

Attention Check	**Item**
"…The statement bellow will ask you for your favorite drink, please make sure you select the answer "Apple Juice", so we know you read this and the other instructions carefully and your answers are honest."	What is your favorite drink? (1) "Coke/ Wine/ Milk/ Coffee/ Apple Juice/ Beer" [1:6]

Appendix D – Demographics Study 2

Demographics Study 2			
		Frequency	**Percentage**
Gender	Female	61	43.88%
	Male	78	56.12%
Age	18 – 25	42	30.22%
	26 – 35	49	35.25%
	36 – 45	32	23.02%
	46 – 55	12	8.63%
	> 55	4	2.88%
Country of Origin	United Stated	87	62.59%
	Austria	13	9.35%
	Germany	25	17.99%
	India	11	7.91%
	Portugal	3	2.16%
Highest Completed Level of Education	High school graduate	11	7.91%
	Bachelor's degree	99	71.22%
	Master's degree	29	20.86%

Appendix E – Scenarios Study 2

Product	Scenario
Co-Created	At firm A we value your skin and want to develop the best product for consumers like you. For the formulation of this skin cream, internal product developers collaborated with our consumer community. Consumers identified and selected the natural ingredients, e.g. plant-based oils and butters from local organic pharmacies. Natural based scents for the cream come from consumers' discovery in botanical gardens. After being approved for effectiveness and health, the cream now finally is available on the market.
Professional	At firm A we value your skin and want to develop the best product for consumers like you. For the formulation of this skin cream, a team of internal product developers was assigned to the task. Internal product developers identified and selected the natural ingredients, e.g. plant-based oils and butters from local organic pharmacies. Natural based scents for the cream come from internal developers' discovery in botanical gardens. After being approved for effectiveness and health, the cream now finally is available on the market."

Appendix F – Demographics Study 3

Demographics Study 3			
		Frequency	**Percentage**
Gender	Female	82	36.12%
	Male	145	63.88%
Age	18 – 25	59	25.99%
	26 – 35	118	51.98%
	36 – 45	28	12.33%
	46 – 55	17	7.49%
	> 55	5	2.2%
Country of Origin	United Stated	156	68.72%
	Austria	12	5.29%
	Germany	28	12.33%
	India	27	11.89%
	Portugal	4	1.76%
Highest Completed Level of Education	Less than high school	1	0.44%
	High school graduate	23	10.13%
	Bachelor’s degree	140	61.67%
	Master’s degree	60	26.43%
	Doctorate’s degree	3	1.32%

Appendix G – Scenarios Study 3

Product	Scenario
Co-Created	At firm A we value your skin and want to develop the best product for consumers like you. For the formulation of this skin cream, internal product developers collaborated with our consumer community. Consumers identified and selected the natural ingredients, e.g. plant-based oils and butters from local organic pharmacies. Natural based scents for the cream come from consumers' discovery in botanical gardens. After being approved for effectiveness and health, the cream now finally is available on the market.
Professional	At firm A we value your skin and want to develop the best product for consumers like you. For the formulation of this skin cream, a team of internal product developers was assigned to the task. Internal product developers identified and selected the natural ingredients, e.g. plant-based oils and butters from local organic pharmacies. Natural based scents for the cream come from internal developers' discovery in botanical gardens. After being approved for effectiveness and health, the cream now finally is available on the market."
Dermatology	You now continue reading the information about the cream: "We are proud to announce that our cream was tested for quality by a dermatology association and received excellent reviews on the association's blog."
Consumer	You now continue reading the information about the cream: "We are proud to announce that our cream was tested for quality by a number of voluntary consumers and received excellent reviews on the consumer association's blog."
Company	You now continue reading the information about the cream: "We are proud to announce that our cream was tested for quality by a number of voluntary consumers, who reported excellent reviews back to us."