Untapped: Understanding the Consumer in Circular Economy Activities

Empirical Case Studies on Consumer Behavior and Motivation in the Context of Circular Economy

Dissertation submitted to The Schumpeter School of Business and Economics (University of Wuppertal) for obtaining the degree of Doctor of Economics (Doctor rer. oec)

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List of Abbreviations

ATT Attitude
B2C Business-to-Customer
BWS Best-Worst-Scaling
B-W score Best minus Worst score
BIBD Balanced incomplete block design
C2C Cradle-to-Cradle
CC Collaborative Consumption
CE Circular Economy
CEO Chief Executive Officer
CFI Comparative Fit Index
CMO Chief Marketing Officer
CSR Corporate Social Responsibility
CR Composite Reliability
CYN Cynicism
DCM Discrete Choice Model
df Degrees of Freedom
EDDEC Institut d'Environnement, Developement Durable et Economie Circulaire
e.g. exempli gratia
ELOC External Locus of Control
EMF Ellen MacArthur Foundation
etc. et cetera
EUR Euro
f2f Face-to-face
ICCE Implementation Centre for Circular Economy
i.e. id est
ILOC Internal Locus of Control
JIT Just-in-Time, management concept
kg Kilogram
LOC Locus of Control
LV Latent Variable
MBFW Mercedes-Benz Fashion Week
p2p Peer-to-peer
PET Poly-Ethylene-Terephthalate
PT Participation
ROI Return on Investment
RSMEA Root Mean Square Error of Approximation
RTW Ready-to-Wear fashion
SEM Structured Equation Model
SOR Stimulus-Organism-Response Model
SRMR Standardized Root Mean Square Residual

TRS Trust
VK Vinokilo, fashion start-up
WTP Willingness-to-pay

1 Introduction

When founding my first company onbelle GmbH in 2014, Europe's first fashion rental, I was confident to change the (fashion) world for a better. Coming back from my semester abroad in South East Asia and dealing with fashion and its lack of sustainability for the longest time, the panacea for the modern disease of hyper consumption appeared to be sharing fair and sustainably produced fashion in globalized online operations. Explicitly, onbelle focuses on renting out new and pre-worn fashion for a fixed monthly fee. The underlying idea of re-using and redistributing products is based on a new school-of-thought called Circular Economy, adhering to its core principles of shared access and reduction of idle capacities. The success stories of AirBnb and Uber were spreading throughout mainstream media, rendering this idealistic idea a tangible and viable business proposition. Fast forward a few years: While the business is still running, it is a niche-business and not remotely close to the "game-changer" it was supposed be. Besides, lack of political regulations supporting an overall system change as well as a lack of venture capital for sustainable business innovations, the main obstacle remained the consumer. Talking to fellow entrepreneurs and managers, change management in the context of circular economy appeared to be especially difficult to assess, making a successful implementation of business model innovations and/or expansion unlikely. In fact most CE businesses I encounter to this day remain extremely small-scale, i.e. fail to achieve mainstream success. The problem is evident: To drive social change in form of a large scale implementation of CE, information on the specific consumer behavior in CE activities is necessary. It is crucial to identify pelicularities of CE activities and CE consumers and thus, gain knowledge on how to steer new or newly innovated businesses in this context. There is simply not enough information on the consumer in circular activities; not to mention data.

Considering my entrepreneurial experience as preparatory work "on the ground", this dissertation aims to shed light on consumer behavior in CE for entrepreneurs by assessing initial insights on the archetypical CE participant and preferences in off- and online behavior at a micro

level and the associated implications for entrepreneurs and managers. By conducting quantitative research in Germany, prime results in the field of CE consumer behavior and operation management are collected. Focusing on the role of the consumer in CE activities, the aim of this dissertation is to understand drivers for participation in CE activities and furthermore how to leverage the respective effects as an entrepreneur.

This dissertation is structured as follows: First, an overview of the theoretical and methodological framework is provided. The scientific context of CE and consumer research in CE is described, leading to the development of research questions and description of the underlying research approach in consequence.

Second, the empirical studies are presented. In order to maintain a pleasant reading experience specifics of the different research models and associated scientific embeddings are described in detail in each study respectively, two of which have been already published in academic journals. In total three empirical studies based on three different research methodologies have been conducted to achieve the academically most solid approach in respect to the acquired data. Study 1 deals with the claim that personality and motivation influence actual participation in CE business models. The study depicts a structural equation model (SEM) based on an online survey of 604 participants, assessing motivational factors and their impact on participation in selected CE activities. Study 2 illustrates a random allocation field experiment at Berlin Fashion Week A/W 2017 dealing with the claim that face-to-face interaction affects purchase decision in CE, whereas Study 3 deals with online operations in CE, determining a ranking of online attributes via a Discrete Choice Model. The latter study thematizes the claim that CE exposure affects perception of online channels and operations.

Third and last, the empirical outcomes are evaluated. The overall findings and a comprehensive summary of the dissertation are depicted in the final chapter.

Since this dissertation aims to advance knowledge on consumer behavior in CE, while remaining relevant for practitioners, companies adhering to CE principles have been acquired as partners throughout the underlying research. All partners and the extent of the collaboration have been acknowledged appropriately in the affected study.

2 Theoretical Framework

This dissertation touches upon various research topics in order to ensure relevant results with regard to entrepreneurship and to the young academic field of CE. The overarching research question, which is translated in sub-questions in studies introduced in Chapter 3, deals with drivers for consumer participation in CE business models (consult Fig. 2.1 for overview of thematic funnel).

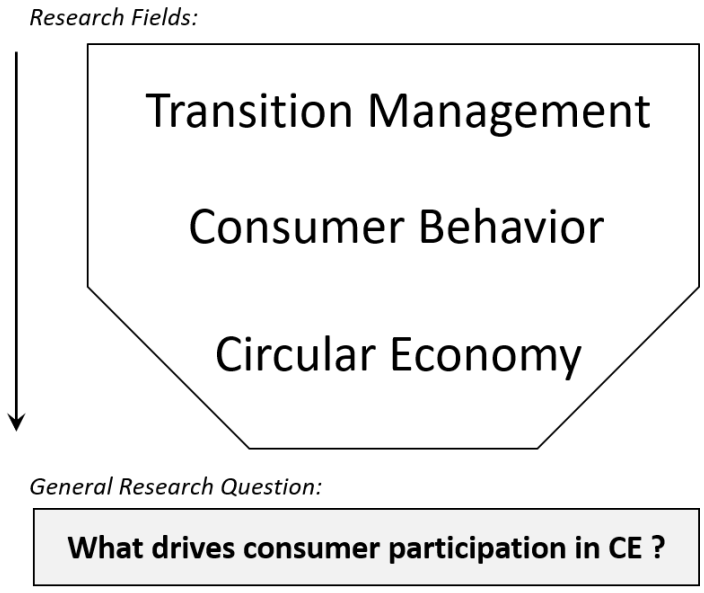

Figure 2.1: Scientific Context - Research Funnel

This chapter introduces the train of thought resulting in the overarching research question as a basis for the sub-questions and associated studies depicted in Chapter 3.

2.1 Overview and Definition Circular Economy

The first dynamic computer model in 1972 revealed the sobering information on how limited the earth's resources are, predicting a collapse of the global system mid of this century in (Meadows et al., 1972, Turner, 2008). With its standard run still holding true, the report was a wake-up call and led to an increased dedication of research to sustainability topics (among others see e.g. WCED, 1987). The emergent concern about climate change resulted in innovation in design, e.g. biomimicry (Benyus, 1997) and processes, Cradle-to-Cradle (C2C) (Braungart & McDonough, 2002), along with innovation in business models. Scholars and practitioners dealt intensively with the question on how to avoid a collapse of our system amidst of trends like hyper-consumption and mass production. While currently our consumption follows a linear approach and waste after the final product life stage is considered an inevitable evil, the legitimate question arose if that was really the case or if maybe the panacea lies in a system change. Maybe waste could not only be significantly reduced but also re-used and thus, play a role in resource efficiency and saving. One particularly strong school-of-thought developed in this process is circular economy (CE) which is the object of study within this dissertation.

CE epitomizes the idea of 'closing the loop' by rethinking linear consumption in terms of resource usage and process design. It comprises activities that are 'closing the loop' to promote a more resource-conscious consumption pattern as compared to linear consumption. Although, singular activities can adhere to CE, CE as a wholesome concept signifies a system, i.e. various connected and synergetic activities, leveraging each other's potential towards the maximum. Knowledge on CE remains largely theoretical, which fits the current notion that CE is a constructed idea and still far from being reality. Up-to-date there are various partly contradicting definitions, implying a young academic field. Addressing this issue, a huge part of current research still deals with definitions of CE and for the foreseeable future a consensus is unlikely. Consulting Kircherr et al.'s analysis of 114 definitions of CE, it can be stated that no single definition can be considered prevalent in terms of simple majority (p.228, 2017). Different institutions theorize about CE, emphasizing particular key aspects in order to reflect respective aspirations. For example, the "Environnement, Developpement durable et Economie Circulaire" (EDDEC) Institute in Montreal, Canada neglects social dimensions but explicitly

incorporates eco-design and collaborative consumption approaches as part of CE (EDDEC, 2014). In consenting appraisal of this extension of the initial definition of the EMF (2013), the Implementation Centre for Circular Economy (ICCE) and the international management consultancy Accenture, further add C2C principles to their respective concept definitions (ICCE, 2015; Accenture, 2014).

This dissertation builds the concept definition of the Ellen MacArthur Foundation (EMF), a think-tank and leading institution in the field of CE research, due to its prevalence and broad scope as a basis. Founded in 2010, the EMF is a think tank that aims to accelerate the transition into a CE. According to its definition, CE is "an industrial economy that is restorative by intention. It aims to enable effective flows of materials, energy, labor and information so that natural and social capital can be rebuilt." (EMF, 2013a, p. 27). As CE fosters a conscious handling of resources in terms of raw material and energy, various contrasts to the current linear economy are obvious and can be summarized in the opposition of disposability in linear and restoration in circular consumption (Nguyen et al., 2014).

Furthermore, the EMF emphasizes that CE is rather eco-effective than efficient, as its value creation is based on developing a full circle and thus, being transformative at its core (2013b). Hence, CE can be regarded as a disruptive long-term model with two main goals: the division of economic growth from finite resource employment and the provision of innovation (EMF, 2013b). It has to be implemented at all levels to have an impact and thus, requires support of governments. While the definition of the EMF is rather technical, it includes the idea of re-thinking product flow, thus also rather "soft" aspects of CE rooted in consumption. This aspect of CE is the focus of this dissertation, given that this is where the consumer as external force comes into play as compared to restorative activities embedded in corporate or institutional processes. In a linear economy consumers purchase, consume/use the product. At the end of a product or consumption cycle, consumers are confronted with waste. Contrary to this process, consumption in a circular economy does not end with waste but re-introduction of material and products in the consumption cycle. Entire products or parts are reused, refurbished or redistributed to ensure efficient resource utilization (Fig.2.2).

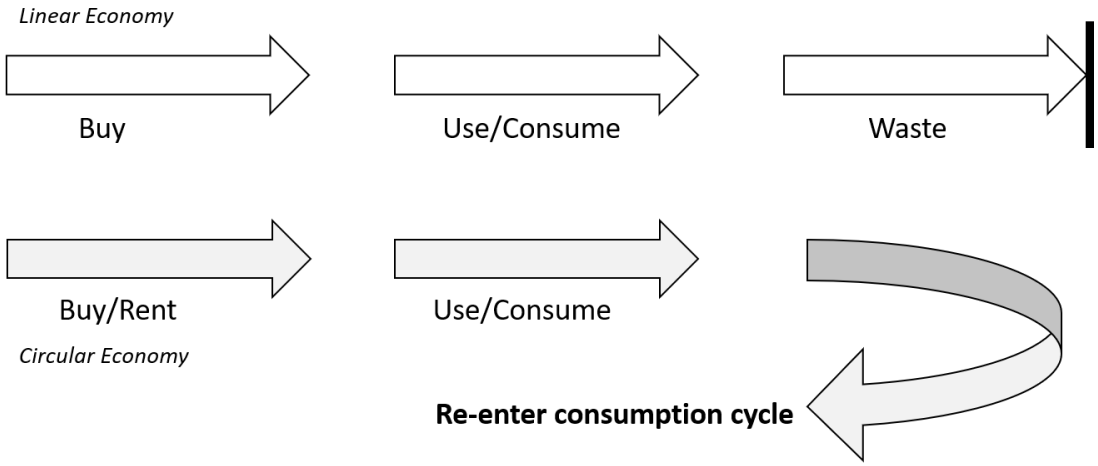

Figure 2.2: Scientific Context - Consumption in CE

However and given the scope of the dissertation, consumer-related activities are focused exclusively. Thus, technical and production aspects, e.g. of recycling and or design-thinking are neglectable and a definition explicitly including and naming the consumer is necessary. The relevance of understanding the consumer and its role in CE related processes has been emphasized by a handful of scholars yet has been largely understudied. In their summary of 155 articles on CE, Ghisellini et al. (2016) consider a "promotion of consumer responsibility [...] crucial for [CE]" (p.19).Still less than a fifth of the 114 analyzed definitions by Kirchherr et al. entail a consumer component. Given the interplay between business model and consumer touch points, the role of business model innovation has to be emphasized in addition to explicitly mentioning the consumer. This relevance of business models in a transition to a CE is emphasized, inter alia by Lewandowski(2016). Although his work has been cited as well in Kirchherr et al (2017), the business models are already mentioned as a dimension in the first EMF report in 2012. Given Kirchherr et al.'s analysis this singular definition is - while not with nominal majority - still the most used definition (p. 226). Thus, my definition builds on this initial work of the EMF. Combining the favorable aspects of the EMF'S definition with an explicit definition focusing on the consumer, a well-fitting CE definition for the underlying research can be deduced. In consequence, my definition of CE is a combination of the initial definition of the EMF in 2012 (see graphic below) and the consumer focused definition of Moreau et al. (2017).

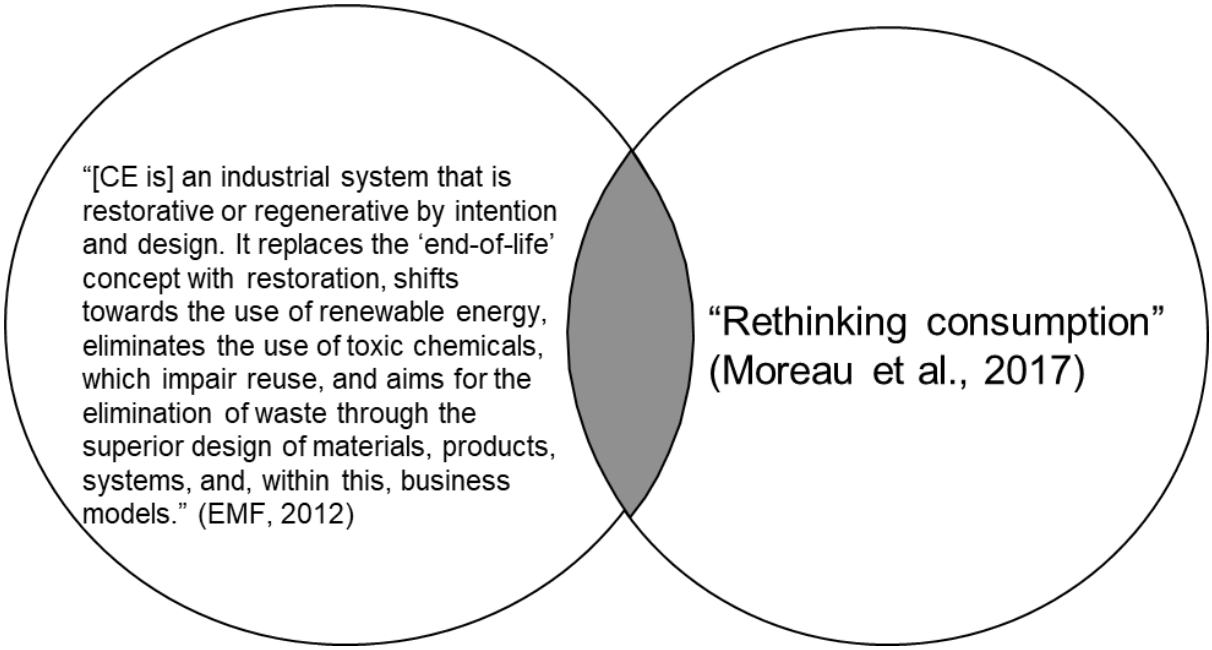

Figure 2.1: Circular Economy - Definition Development

As a result the definition used in this dissertation, states the following:

> CE is a restorative system rethinking consumption through abolishment of end-of-life concept through business model innovation, product and process design as well as resource-effective and efficient consumption patterns

Figure 2.2: Circular Economy - Definition

CE consists of different sub-concepts conjoint in their purpose of 'closing the loop', i.e. there is no linear theory development but rather an independent development of various conceptions playing into the overarching principle of CE. Already in 1947, the possibility of waste reuse is mentioned in by Renner. Guinee et al. (2010) provide a review of research on the environmental impact of consumer products. The importance of sustainable consumption has been increased by the recent progress of information technologies alongside with the evolution of web 2.0, both facilitating alternative consumption patterns (Kaplan & Haenlein, 2010).

Business models like recycling and upcycling (the re-use of a product to create a new one) were complemented by peer-to-peer activities of obtaining or sharing access to goods and services through online communities and summarized under the concept of "collaborative consumption" / "sharing economy" (Belk, 2010; Botsman & Rogers, 2011). Porter and Kramer (2011) argue that redesign of products and markets, redefinition of the value chain and the

creation of local community clusters are primary aspects of CE operations.

Since consumer behavior will be focused hereinafter, four different, consumer-centered CE activities are subject of this dissertation. This research model allows to assess an overall participation as well as participation in four different CE activities being (1) recycling, (2) upcycling, (3) sharing and (4) renting. This specification has been made in order to be able to pin-point differences between CE activities. The EMF refers to four principles of value creation (2013) that serve as basis for this dissertation. First, less cost due to energy and labor cost savings can be achieved through preserving products. Second, prolonged product life cycle and use frequency lead to increased value. These activities can be attained by rental or leasing business models. Thanks to business models like Uber and Airbnb these activities have reached a new mainstream acceptance. The third value circle, describes value creation through reusing of a product or one if its components in a different product (category). Thus, 'cascaded use' comprises activities such as 'upcycling' but also can be full recycling. Fourth and last, value creation can be achieved by 'pure cycles'. 'Pure cycles' ensure a products recyclability and facilitated decomposition intentionally with its design and production.

While there are further activities and concepts playing into CE we will be focusing on four consumption modes throughout this dissertation. These are known to the consumer and thus, make an appropriate research subject as confronting consumers with an partially imaginative task during the upcoming discrete choice model. These four consumption modes are: recycling and upcycling which are both part of the third value cycle. In addition, we will study renting and sharing, that are comprised in value cycle two according to the EMF. The participation modi will be defined in subsequence.

2.1.1 Recycling

Whereas Kim (2014) views Recycling as synonymously to 'downcycling' (reducing value of a product), Recycling commonly describes the re-usage of product components, i.e. material. According to the waste management hierarchy, Recycling is superior to energy recovery, with landfill disposal as the least preferable option (Wang, 2006). Still, majority of Recycling does in fact diminish quality of materials, making them a proper fit only for lower value applications

(Braungart et al., 2007).

Contrasting Recycling to Upcycling it is important to emphasize that Recycling does not deal with the initial product as a whole but breaks it down into its components. The degree of 'breaking down' varies largely. In some cases the original material is reused. This practice is common, e.g. in niche markets of the textile industry (Zamani et al., 2014). Mostly though, even this material is decomposed into its respective raw material and reused afterwards, e.g. PET bottles, aluminium cans.

In the context of this dissertation Recycling is defined as 'Reusing product components'.

2.1.2 Upcycling

Upcycling is a comparatively unknown concept. Although, the terminus appears to be rather new in scholarly research, the reuse of products to prolong product lifecycles and achieve new value has been around for centuries (Szaky, 2014). Braungart and McDononough define Upcycling as a process of preventing waste by reusing existing products and materials (2002).

Thus, Upcycling can be described as re-purposing products at the end of their lifecycle (Zink et al., 2014). Correspondingly, Braungart et al. (2007) emphasizes a value-adding component to 'upcycling' activities. Other scholars put it even simpler and explain Upcycling as "the process of converting waste materials into something useful and more valuable" (Gong et al., 2014). Contrary to Recycling, where products are broken down into raw materials, Upcycling reuses the product as a whole (Braungart et al., 2007).

Consequently, Upcycling can be viewed as the 'greener' and more sustainable activity because the waste necessary to break down a product into its components, e.g. energy, can be avoided (Braungart et al., 2007). In the context of this dissertation upcycling is defined as "Reusing existing products" and thus, derived from Braungart and McDononough's initial definition (2002).

2.1.3 Sharing

Scholarly definition proposes that sharing is an "act and [a] process of distributing what is ours to others for their use and/or the act and process of receiving or taking something from others

for our use" (Belk, 2007, p. 126). Nowadays, the process of sharing is facilitated by technology (Belk & Llamas, 2012). Contrary to the initial definitions sharing has a different meaning in the context of CC. In CC sharing refers to shared ownership and short-term rental instead of altruistic non-reciprocal behavior (Boesler, 2013). In the underlying survey questionnaire respondents are primed towards sharing economy, thus, implying economic aspects of sharing.

In order to delineate sharing from renting, the peer-to-peer (p2p) aspect is important to be mentioned. In the context of this dissertation sharing is defined as a p2p process, facilitated by technology, e.g. in form of marketplaces.

2.1.4 Renting

Sharing and renting are often used synonymously in a broad variety of academic contexts. Thus, explicit definitions what renting is per se, are not available without the connotation of sharing. Boesler (2013) even defines sharing in the context of CE as short-term rental. Consequently, it is important to differentiate renting and sharing for the mutual exclusiveness. A short informal survey of a sample sub-group on what they consider differences between these two concepts revealed unison that renting is associated with a third- party provider, while sharing is connected to community and interpersonal exchange.

Subsequently, it is assumed that respondents are intuitively aware of slight differences that are neglected in scholarly research. Hence, in the context of this dissertation Renting is defined as a B2C process, neglecting interpersonal ownership. In sharing processes ownership remains with the individual parties, whereas in renting activities the ownership of the rented items is pooled at a third stakeholder.

2.2 Circular Economy and Consumer Behavior (SOR Model)

Due to explicit technicality of CE in some processes, e.g. biodegradability, current research mostly addresses CE at implementation level, comprising technological opportunities for resource usage and legislative issues (e.g. Geng, 2011; Liu & Bai, 2014). The aspect of economic viability is further discussed in Geng and Doberstein (2008). The researchers emphasize the relevance of information facilitating and optimizing CE activities for companies implementing the approach. Firm-specific input paired with macroeconomic and environmental policies is proposed to foster large scale adaptation of CE activities (Geng & Doberstein, 2008). As there are scarcely any incentive programs for small and medium enterprises (SME) to implement CE activities, it is suggested that the high cost and high uncertainty of short-term benefits leads to a lack of interest for SMEs (Shi et al., 2008).

The focus of early research lies on implementation practices and policies and more recently on entrepreneurial opportunities of CE (e.g. Hall et al., 2010). Their work is extremely relevant from a theoretical standpoint but fails to address the importance of real-life applicability at microlevel. Especially, drivers facilitating operations for pioneer companies remain a conundrum for both practitioners and scholars, rendering a transfer from linear to circular consumption easier said than done. Overall, CE is mostly studied from the perspective of implementers. This is an important aspect of CE, especially considering large scale implementation, however the consumer as driver for system change has not yet been investigated in great detail, although, sub concepts as e.g. sharing economy are started to be addressed in research. For example, motivational factors for participation in collaborative consumption have been subject to academic research (i.e. Hamari et al., 2015). However, this research is limited as it does not study the consumption in CE but only in collaborative consumption as one activity associated with CE. This results in a lack of understanding for the overall scope of consumption in CE and hinders effective implementation of measures facilitating change towards a CE.

Various scholars emphasize CE as a system and point out that singular initiatives according to CE principles do not suffice to achieve sustainable results (e.g. Yuan et al., 2006, Su et al., 2013).

Deducing from these scholars, an implementation of CE has to be pursued on all micro, meso and macro level simultaneously, i.e. on consumer/households, corporate and national/global level. Yet, there are various challenges for a successful implementation the most important being lack of reliable data and information, weak technologies, problematic legislation and feeble economic incentives (Su et al., 2013). Tukker (2015) even states relations between businesses and consumers as one of the reasons why a CE system is not implemented by now, illustrating the relevance of consumer research in the context of CE. CE is associated with initial investment be it in form of technology in production or marketing in services and/or at the end consumer stage of the value chain. If SMEs or entrepreneurs are not sure of the return on investment, i.e. how the consumer will react and whether he or she is willing to pay a possible premium for an altered product or service, they will be hesitant to implement measures adhering to CE and rather "play it safe" and according to the widely accepted rules of linear consumption.

Since CE is intertwined with sustainability, ethical consumption behavior comes into play particularly. According to Harrison et al. (2005) ethical consumption is based on "political, religious, spiritual, environmental, social or other motives" affecting consumer preference and choice. While an ethical baseline has arrived in the mainstream consumer's mindset, an ethical attitude does not necessarily translate to participation in sustainable business models or purchase or products with enhanced ethical. In this context especially the so-called attitude-behavior gap is of interest. As a founder I noticed its prevalence in the context of CE at first-hand: While large majority of our target group favored our business model in theory, only a fraction became active paying customers. This observation goes hand in hand with various empirical studies, implying a divergence of intention and actual behavior (e.g. Ajzen et al, 2004) The gap between intended and actual behavior remains understudied in general (Carrington et al., 2014), yet crucially important to assess. Especially, in the context of CE as an innovative and habit-breaking consumption pattern, understanding what 'bridges' this gap, i.e. what operational measures lead to actual participation is highly relevant for front-runners. According to Webb et al. (2009), among others 'reinforcement' allows to form new behavioral patterns. Since participation in CE activities would constitute novel behaviorial patterns in most cases, the puzzle is apparent albeit complex: what drives and reinforces consumer participation in CE

business models?

To summarize, current research directions in the academic field reveal consumer behavior in CE to be a largely understudied aspect. Especially, quantitative insights are missing. Yet, the question how to engage consumer behavior supportive of CE looms over an implementation of CE as a system, allowing for the presumption that there might be peculiarities in consumer behavior and maybe even personality of CE participants that diverge from the linear norm. These differences - how incremental they might be - have to be identified and addressed accordingly to facilitate system adaption at a micro level and thus, support implementation of CE as primary economic system.

In a perfect world all relevant information would be available at hand, allowing for rational decision-making in a transparent market. While technology was and is a facilitator for information transfer and data collection, it still has not enabled universal transparency. Hence, dealing with uncertainty remains one of the main challenges of entrepreneurship and management. Especially with regard to innovation – be it in terms of industry, business model or product – perceived risk influences the decision whether to launch into action or not. This holds even more true for a business in the context of CE: by nature, these projects are aimed to disrupt consumer regimes by introducing alternatives to linear processes. The main challenge remains to hedge risk by anticipating and/or influencing consumer behaviour that leads to active participation in CE related activities.

Several researchers worked on models to explain consumer behaviour and determine factor that play into the processes of decision-making. The rationale for this dissertation roots in the stimulus-organism-response (SOR) theory. Introduced by Woodworth (1929) this model illustrates a simple mediation: There is a stimulus – a situation and or trigger, a processing entity (organism) – an individual and a behaviour (response) (see Fig 2.3).

Figure 2.3: Basic SOR Model - Woodworth (1929)

Contrary to traditional behaviourists, Woodworth acknowledged the relevance of the organism as a mediator between stimulus and response, emphasizing that different people react differently

to the same stimulus. Non-observable processes within the organism affect the impact of the stimulus. His basic model has been extended and adapted by various scholars and continues to be one of the most relevant models on consumer behaviour.

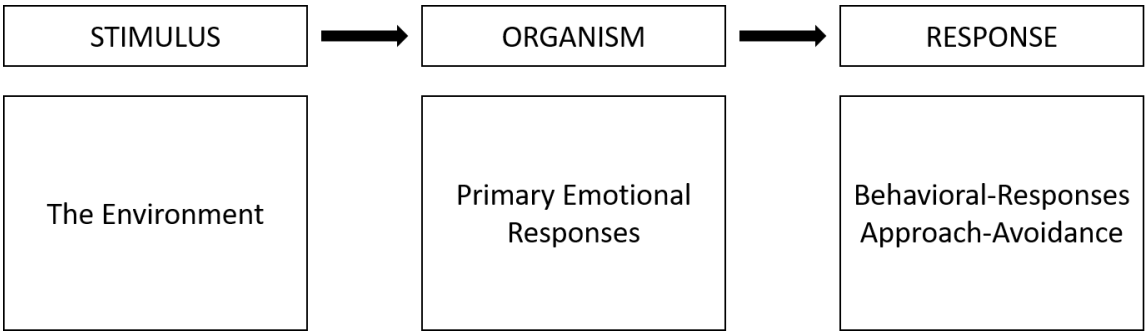

Figure 2.4: SOR Model - Adaption based on Mehrabian and Russell (1974)

The SOR model has largely been attributed to Mehrabian and Russell, who studied environment as a stimulus for consumer behaviour (1974). Their work suggests environmental stimuli (S), e.g. information rate and setting to cause an emotional reaction in the individual (O). This emotional reaction translates in two directions of response (R): either approach or avoidance. Approach-responses include various actions are affirmative, i.e. they signify participation, increase or positive feedback. Avoidance-responses constitute the opposite.

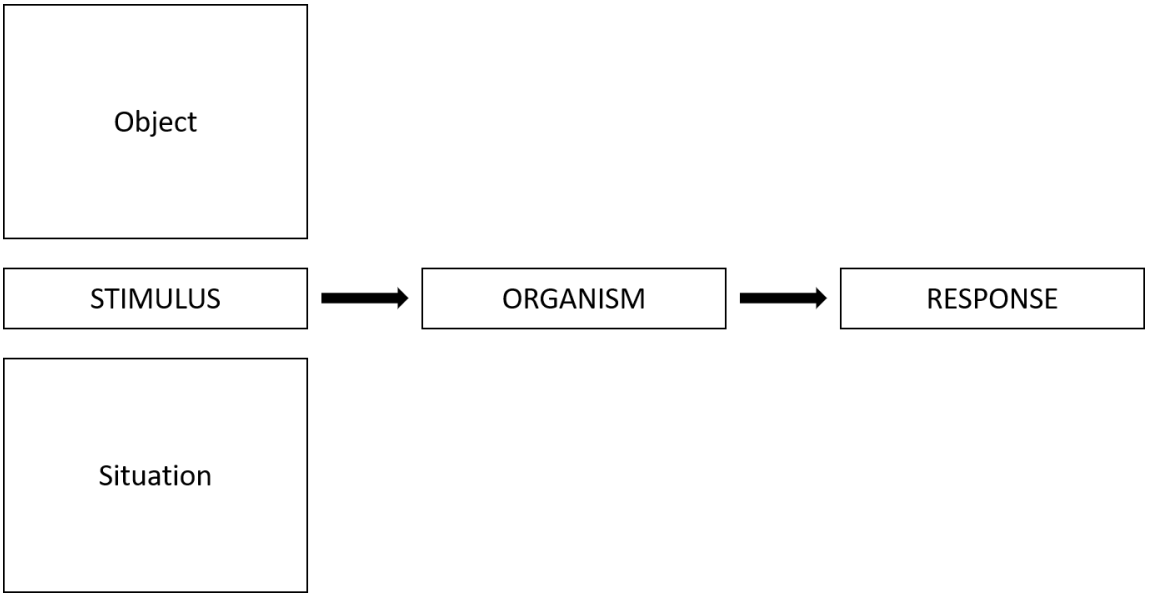

Figure 2.5: SOR Model - Adaption based on Belk (1975)

Belk further detailed the stimulus aspect of the SOR model (1975). In his work stimuli are divided into two sections: object and situation. Stimuli attributed to the object category cover

the product and brand as well as distribution channel, whereas stimuli attributed to the category situation contain determinants that are not specifically attached to the product or service itself. This can be purchase setting, timing but also technological factors like website design. The SOR model has been especially used in recent studies to shed light on technological and/or innovation-related stimuli. Scholars have used it in work dealing with online shopping behaviour (Peng & Kim, 2014), customer engagement in online environments (Chen & Yao, 2018) and in the context of virtual reality (2018). Kim and Lennon emphasize that various scholars employ the SOR model to understand consumer behaviour with regard to communication and technology (2013). One of their examples, is the research of Richard and Chandra (2005) who studied various characteristics of the consumer with regard to website characteristics but also internal states. Given the prevalence of the SOR model in consumer research – both with regard to stimuli as well as the organism, this model has been chosen to serve as basis for this dissertation.

For the underlying research studies based on the SOR model will be conducted. Since behaviour ("participation in CE activities") and object ("CE activities") are fixed, stimuli attributed to situational determinants and the organism itself will be focus of this dissertation.

3 Research Questions and Methodological Framework

Given this status quo and lack of implementation, studies about the consumer's role in CE and associated quantitative effects on operations are vital and opening up new avenues for both academics and practitioners in motivating a transition towards a CE. In addition a proof of applicability of CE as a wholesome concept is lacking. Since the main puzzle on what drives consumer participation in CE is extremely broad, several sub-questions are translated into appropriate sub-studies. The status quo of the concept CE results in following research questions, studied in this dissertation and the associated pre-study (see Table 3.1 below:

Table 3.1: Overview: Research Questions & Methods

Research Questions		Study	Research Method
1	Is CE a wholesome concept?	*Pre-Study*	Structural Equation Model (SEM)
2	Do consumers in CE have personality traits in common?		
3	What drives participation in CE (motivational factors)?	Study 1 - Drivers for Participation in Circular Economy Activities	
4	What leverages participation in CE offline (face-to-face interaction)?	Study 2 - The Effect of Face-to-Face Interaction on Second Hand Fashion Sales (published)	Field Experiment with Random Allocation Experiment
5	What leverages participation in CE online (online attributes)?	Study 3 - Consumer Perception Online Attributes in Circular Economy Activities (published)	Discrete Choice Model with Best-Worst-Scaling

Given that two research questions are addressed via a pre-study, this dissertation aims to close the portrayed knowledge gap and in consumer behavior in CE operations and respective research questions through researching intertwined research directions:(1) the effect of chosen personality traits and motivational factors on participation in CE, (2) offline operations in CE, i.e. the

short-term effect of face-to-face (f2f) interaction on participation and incremental sales and (3) and best-practices in digitization measures of CE businesses. These three aspects translate into three separate data sets and empirical work bodies that each aims to foster knowledge about circular activities and while advancing scholarly work, keeps practical relevance at its core. Their singular findings are overarchingly summarized. Further these three studies are attributed to different aspects of the SOR model of consuemr behavior. The pre-study and study one deal with the organism and its internal processes by studying personality traits and motivation. Study 2 and 3 study situational stimuli: one being face-to-face interaction and the other being website attributes. In order to close current knowledge gaps this dissertation transfers well-studied concepts (i.a. trust, face-to-face interaction, coupon redemption, online credibility) to the new academic field of CE. All three studies are centered around consumer behavior and off- and online operations in CE. However, different research methods are employed to address associated research questions. To avoid interference with the reading flow and leverage understanding of the procedures, argumentation on why and how specific research models have been employed, as well as study industry-specific literature reviews can be found exclusively in the respective study chapter.

The first study "Drivers for Participation in Circular Economy Activities" deciphers drivers for participation in circular activities rooted in the consumer's personality and motivation. In a pre-study three personality traits (trust, cynicism and locus of control) were chosen based on current research directions and are assessed with regard to their effect on participation in CE. The pre-study and its results are integrated in Study 1 to achieve a comprehensive understanding for the reader. Since the overall concept of CE is rather abstract it has been decided to set the scope of this study on to activities close and thus, known to the consumer. These are derived from the EMF four cycles of value creation and will be repeated throughout other parts of this dissertation. Namely, these four activities are recycling, upcycling, renting and sharing. A structural equation model has been calculated, using data of 604 survey respondents. The data has been acquired in autumn 2016 in cooperation with three companies operating according to CE principles. The goal of the pre-study was to identify whether and which personality traits have an effect on participation in CE and whether there is a trait that is significant for all

participation modes, making CE an adequate wholesome concept. As a result, trust is revealed as the only significant driver for participation in CE throughout all participation modes, indicating an overlap in personality traits for different CE activities. In subsequence, CE as a wholesome concept is accepted and to further insights, a modified structural equation model, featuring intrinsic and extrinsic motivational factors has been calculated to study their respective effect on participation in CE. This study suggested a direct effect of extrinsic motivation on participation in CE, depicting strong significance in reputational motivation.

The second study "The Effect of Face-to-Face Interaction on Second Hand Fashion Sales" bases on the findings of study one and examines the effect of face-to-face (f2f) interaction on customer acquisition and associated incremental sales. F2f interaction is suggested to be especially potent in increasing trust. Thus, the hypothesis tested is that offline f2f interaction increases trust and facilitates knowledge transfer as suggested by literature (e.g. Becerra et al., 2008). In cooperation with a second-hand fashion start-up, thus, addressing a sub concept of CE, a random allocation field experiment at Fashion Week Berlin has been conducted in January 2017. Fashion is particularly prone to discard sustainability efforts in favor of trends and only recently picked up on CE (e.g. Call-to-action at Copenhagen Fashion Summit). Subsequently, the research context promised to be particularly insightful for practitioners. At a private event 100 vouchers were randomly distributed among 200 visitors of the private event and tracked at a regular sales event after Fashion Week. The dependent variables observed are the redemption quota and the average basket size in comparison to the sales average. Since based on implications of the study one, one major goal of this study is to confirm results of study one and show practicability in real-life business context. Furthermore, the potential offline operations for CE businesses in knowledge transfer and its short-term impact on revenue have been assessed. Study two confirms increased basket sizes and a leveraging effect on customer acquisition through f2f interaction.

The third study of the underlying dissertation "Consumer Perception of Online Attributes in Circular Economy Activities" builds on a discrete choice model with best-worst scaling. Respondents were asked to indicate which online attributes they consider most or least helpful when dealing with a homepage of a CE business. Furthermore, and based on the participation

modes observed in study one, respondents were asked to indicate whether, in which and how many CE activities they participate. This served the purpose to analyze whether the degree of activity in CE activities affected the ranking. Nine online attributes have been ranked by 99 respondents. The attributes have been divided into three sub-groups: company-issued flexible (chatbot, team presentation, Social Media), company-issued rigid (explanation of business model, effect on sustainability, loud brand) and third-party associated attributes (warranty/guarantee, certification, user reviews). This study aims to pioneer in ranking online attributes for online operations in the context of CE. The findings are primarily targeted to be helpful for managers and entrepreneurs with resource limitations and thus, need for prioritization and optimization. Study three revealed that third-party associated online attributes are considered the most helpful in assessing a website of a CE business. Furthermore, a high exposure to CE decreases the need for business-model related information and leads to a higher interest in community.

Overall this dissertation aims to understand how to boost participation in CE activities focusing on consumer behavior. All questions target a deeper understanding of consumer behavior in the context of CE in order to adapt business operations accordingly and thus, facilitate implementation of CE as a overarching system.

The following chapters introduce all three studies and their findings in detail.

4 Empirical Work

4.1 Study One - Drivers for Participation in CE Activities (publication planned in *International Market Research*)

Consumers participating in activites adhering to Circular Economy (CE) principles remain a conundrum for both practioners and scholars. Quantitative insights on what affects consumers to participate in CE activities are at the very beginning. We close a knowledge gap by studying the effect of of selected personality traits (trust, cynicism, Locus of Control)and motivational factors (financial, practical, reputational, social and idealistic motivation) on attitude and participation in CE. CE will be depicted as a compound variable, comprising the activities Recycling, Upcycling, sharing and Renting. Based on a survey with 604 respondents and three cooperating companies two structured equation models have been calculated, revealing a significant effect of the personality trait trust and motivation on attitude and subsequently, participation in CE activities. Furthermore, a direct effect of extrinsic motivational factors on participation in CE is reported. This leads to a new perspective on the role of consumers in the transition from linear to circular consumption, depicting a high need for information and understanding of processes as crucial aspects for a change in consumer behavior towards a CE.

4.1.1 Introduction

The increased relevance of sustainability topics goes hand in hand with innovation in business models leading to a renaissance of sharing activities that led a shadowy existence over the last decades. However, processes behind the scene, aiming at 'closing the loop', are often neglected in communication and thus, remain enigmas for consumers. A lot of customers, although not aware of it, are already participating in circular activities. Business models like carsharing initiatives (e.g. DriveNow), marketplaces for accommodation (e.g. AirBnB) and fashion rental (e.g. Rent-the-Runway), all contribute to a more efficient resource usage by avoiding idle capacity and increasing use frequencies. Their millions of active users show the rise of a new way of consumption, leading away from hyper-consumption and exclusive ownership. The approach of 'closing the loop' by redesigning, reusing and rethinking linear consumption is summarized in the concept of Circular Economy. Several alternative consumption models are comprised in this concept, yet a universal definition on what Circular Economy signifies is not agreed upon.

Drivers for participation in Circular Economy based businesses, have not yet been studied in great detail. Despite the growing importance of Circular Economy quantitative research is rare. This work aimed at closing this knowledge gap by examining the effects of personality traits and motivational factors on participation in Circular Economy. Consumer behavior in Circular Economy has been largely neglected resulting in increased difficulties for practitioners. Generally, consumer behavior describes "activities people undertake when obtaining, consuming, and disposing of products and services" (Blackwell et al., 2001, p. 6). In order to gain a competitive advantage and increase attractiveness of CE business models for entrepreneurs, managers and consumers it is crucial to understand what drives consumer participation. With the goal to achieve the most conclusive overview both chosen personality traits as well as motivational factors have been observed throughout this work.

A pre-study examined three personality traits: Trust, cynicism and locus of control. These constructs are measured as latent variables in a structured equation model (SEM) with Attitude towards Circular economy as a mediator. The outcome measure is participation in Circular Economy. Participation is broken down into four different modi: recycling, upcycling, renting

and sharing in order to test for intra-conceptual differences and peculiarities.

Based on the results of the introduced pre-study, the following section depicts modifications of the research model in order to assess the influence of motivation on participation in CE and test the interplay of personality in form of Trust and motivation. Section 4.1.5 illustrates the results of the studied research model.

To conclude this work, main findings are summarized in Section 4.1.6. By studying the effects of personality traits and motivational factors on participation in CE activities and revealing significant results, a new perspective on the role of consumers in CE activities is achieved. Thus, this study advances knowledge in consumer behavior in the context of CE and lays ground for further investigation of mechanisms facilitating a transition from linear to circular consumption based on consumer insights.

4.1.2 Method and Data

Since the data set is used both in pre- and main study analyzing the effect of personality traits and motivational factors on participation in CE, the data collection and as well as specifics of the collected data are described in detail in the following (based on Stein, 2016).

In order to achieve representative results, partnerships with companies whose business models accord to CE have been entered. In subsequence, three companies supported this research.
(1) Vinokilo - Vinokilo is a vintage fleamarket aiming to bring together vintage lovers in various German and West European cities (Vinokilo, 2016). The team organizes pop-up events at differing mostly underground locations, where they sell vintage clothing per kilogram price. This year, Vinokilo hosted 15 events in both Germany and the Netherlands, attracting more than 30,000 visitors (Vinokilo, 2016). Referring to the four participation modi introduced, Vinokilo can be attributed to recycling as well as upcycling.
(2) Kleiderei - Kleiderei describes itself as a "never ending Clothing-library" (Kleiderei, 2016). For a monthly subscription fee of 34 EUR customers rent a box of four clothing and accessory items. Every month a new box will be composed based on stylist curation and indicated style preferences on Kleiderei.com. By maximizing product usage through both reusing already produced items as well as renting them out and thus, increasing usage frequency while decreasing idle capacity, Kleiderei acts according to CE on different levels. Referring to the four participation modi introduced, Kleiderei can be attributed to recycling as well as renting.
(3) PaulCamper - PaulCamper is the leading individual camper-sharing platform in Germany (PaulCamper, 2016). It connects private camper-van owners with individuals without a camper, building on the trend of personalized travel. The basic idea of this business model is the shared, temporary usage of one resource, i.e. camping vehicles. Referring to the concepts of CE PaulCamper is picture-perfect example of sharing activities. PaulCamper does not own any campers themselves, the platform focuses on resource coordination. The interpersonal exchange is facilitated through technology but also fostered in real-life events.
As can be observed, the three presented companies cover different spheres of CE businesses. While Vinokilo acts mostly offline and sells second-hand clothing items, PaulCamper is a technology-enhanced sharing platform without any assets. This mixture of business models

is expected to shed light on the archetype of CE participant. The final data set is made up of responses acquired from 604 individuals via peer-group, Facebook and co-operations with companies employing CE business models. By addressing registered users of a CE service/product, more informed respondents than acquired by personal network are predicted to participate. Through this balance of inept and savvy individuals, representative results can be expected (see Table 4.1).

Table 4.1: Survey: Demographics

Respondents:	Vinokilo	Kleiderei	PaulCamper	Personal Network	OVERALL
Female	113	38	8	257	416
Male	6	1	10	132	149
Other	11	3	2	23	39
TOTAL	130	42	20	412	604

The responses were collected through September until first week of October 2016. To ensure high questionnaire completion, the software typeform has been used due to its adaptivity to all terminal devices (see: typeform.com). The companies addressed future respondents via (a) newsletter, (b) Facebook and (c) internal forums. There was no incentive for participation intended, nevertheless Kleiderei and Vinokilo offered to implement small 'lotteries' to foster the participation within their user group. Their user groups were informed that they had the chance of winning respectively 2kg free second hand clothing (Vinokilo) or 1 month free subscription (Kleiderei) through company exclusive communication channels. Both companies were fully responsible for communication and execution of the lottery. Other respondents have not been incentivized to participate in the survey.

Demographics of the sample can be consulted in Appendix A1. It can be derived that 68 per cent of survey respondents are of female gender as compared to 25 per cent male respondents. 7 per cent of survey respondents indicated 'Other' as their gender. However, analyzing the interplay of personality traits, motivational factors and participation in CE business models, this bias can be neglected as literature commonly documents null effects of gender (e.g., Ashraf et al., 2003; Croson & Buchan, 1999).

Besides, an analysis of the respondents' age structure (see Appendix A1) reveals a reverse age funnel showing a decreasing number of survey participants at increasing age. The decreasing

affinity towards CE can be explained by a lower exposure to new media and technology, which facilitates CE activities. Furthermore, a lot CE business are exclusively set online, making a minimum of familiarity with web 2.0 necessary to participate in some activities (e.g. PaulCamper).

The questionnaire applied psychometric dimensions (Nunnally, 1978). Each variable was measured with on a 7-point Likert scale. Existing publication served as basis for the item creation (e.g. "Measuring Trust: Experiments and Surveys in Contrast and Combination" by Naef & Schupp, 2009). Further detail is depicted in Appendix A2. The collected data was analyzed in R Studio, where also all of the model testing was conducted by using the lavaan package. The analytical technique selected for the statistical evaluation is structural equation modeling (SEM, Hair et al., 2010). It is considered a conjunction of exploratory factor analysis and multiple regression (Ullman, 2001). In addition, SEM is considered the key method observing latent psychometric variables (LV, Hamari et al., 2015). The sample size of 604 respondents easily satisfied different criteria in SEM, exceeding advocated lower bound measures of SEM (Chin & Newsted, 1999; Anderson & Gerbing, 1984).

4.1.3 Pre-study

Prior to the underlying research model, a pre-study examining the effect of cynicism, trust and locus of control on participation in CE has been conducted (see Stein, 2016). Besides determining in how far personality traits have a significant direct or indirect effect on participation in CE, this study served the purpose to check whether CE as a wholesome principle, i.e. combining the four-beforehand mentioned participation modi into one variable, is an effective and practicable approach. Furthermore, the pre-study addressed the suggestion of other scholars "[future studies] to consider measuring actual use" (Hamari et al., 2015, p. 11).

The calculation of the RMSEA and its confidence interval show an good model fit, revealing a RMSEA of 0.064 with a 90 Percent Confidence Interval (lower bound 0.057, higher bound 0.072). Furthermore, the SRMR has a value of 0.058. Other indices, e.g. incremental fit measures (df = 94, p-value < 0.001, CFI = 0.867), are also above the recommended cut-off values. Overall, it can be concluded that the modified research model has a good fit.

Table 4.2: Results: Overall Model

Regressions:	Estimate	Std.Err	z-value	P(>|z|)
ATT ~				
TRS	1.916	.580	3.301	.001
CYN	.744	.570	1.306	.192
LOC	-0.107	.427	-0.251	.802
PT ~				
ATT	.093	.023	4.132	.000
TRS	.094	.082	1.146	.252
CYN	-0.022	.087	-0.250	.803
LOC	.035	.064	.537	.591

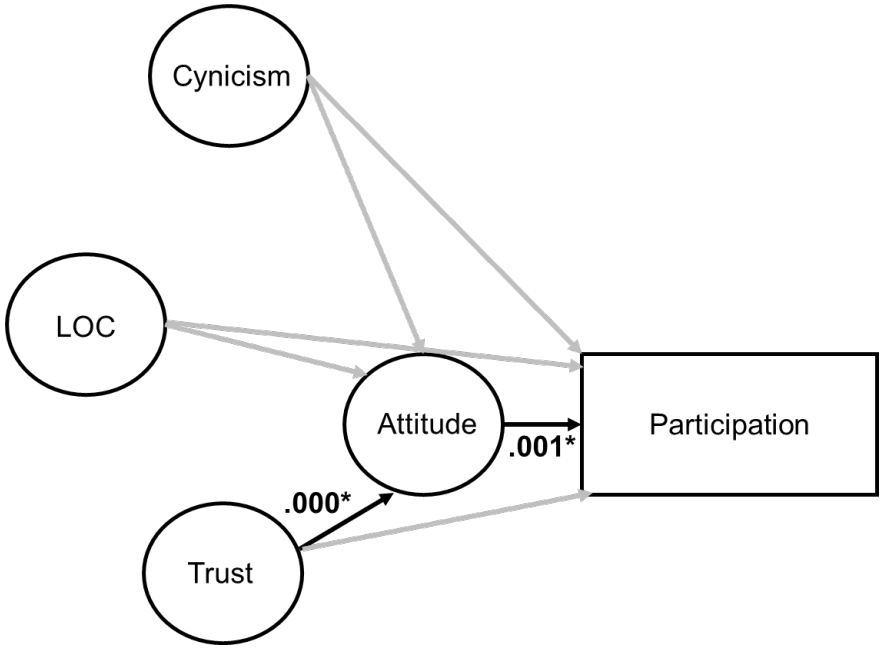

Figure 4.1: Results - Pre-Study Personality Traits

Table 4.2 illustrates the overall model and it results. Calculating the SEM for the research model above, it can be derived that neither LOC nor cynicism have a significant influence on attitude nor participation as all p are above the threshold of .05. In contrast, trust is revealed as significantly influencing attitude and thus, H1 (*Trust is influencing attitude positively.*) can be accepted. Furthermore, an effect of attitude on participation can also be confirmed as p (>|z|) is also below .05.

Besides, measuring participation as a construct consisting out of recycling, upcycling, renting and sharing, the underlying model allows to calculate results for specified participation modi only. Analyzing the model fit following the same procedure as described for the overall model, an even better fit can be assessed for the specified participation modi (see below Table 4.3). The increased fit is likely to root in the broad extent of CE. In the overall model dissimilar activities like recycling and sharing are comprised into one variable, making the variable participation insignificntly less precisely to measure. Yet, the overall results remain the same, allowing for the conclusion, that CE as a composed variable is adequate for future studies. Although trust is a personality trait and thus, to some degree manifested it can be gradually fostered. Trust has different layers and can be divided into initial and gradual trust (Nilsson & Mattes, 2015). That means that a certain inherited 'openness' is vital for the effectiveness of others measures,

Table 4.3: Results: Model Fit

Index	OVERALL	Recycling	Upcycling	Sharing	Renting
RMSEA	.064	.058	.057	.054	.061
SRMR	.058	.042	.042	.039	.056

yet the degree of trust can be steadily increased. According to Nilsson and Mattes (2015), gradual trust is cognition-based; hence, the individual's trust is based on rational considerations about expertise, trustworthiness, and reliability (McAllister, 1995). In this context, Nilsson and Mattes (2015) go as far as implying that face-to-face interaction as compared to solely technological communication is more efficient in creating knowledge-based trust (Bathelt & Turi, 2011; Jarvenpaa & Leidner, 1999; Shapiro et al., 1992; Storper & Venables, 2004). This suggestion is expected to hold true particularly in context with complex and tacit dimensions (Becerra et al., 2008; Powell et al., 2002). Generally, it can be emphasized that by increasing his or her information level, the individual becomes less prone to stereotyping and more likely to show trusting behavior (Bachmann & Inkpen, 2011; Lewicki et al., 2006).

The novel insight that trust is an indirect yet significant driver for participation in CE activities (as defined: recyling, upcycling, renting, sharing), sheds light on the currently widely neglected role of personality and consumer behavior in CE activities.

4.1.4 Research Model and Hypotheses

The pre-study revealed interesting first insights on consumer behavior and the role of trust in boosting conversion of participation. While it becomes apparent that certain personality traits increase the probability of participation in CE, introducing a new perspective on CE operations, real-life decision processes are more complex.

Academic literature found that individuals have difficulties in evaluating isolated options, thus, making comparisons a relevant aspect of the decision-making process (Simonson et al., 2013). In the context of CE individuals are prone to compare CE adhering alternatives to linear options, as they constitute the common status quo. Although overlapping functionalities may exist, the uniqueness and attractiveness of CE alternatives depends on the individual's assessment. Referring to e.g. PaulCamper as a camper sharing platform the functionality remains the same: at the end of the day one has a camper for a trip. The linear alternative would be buying a camper. Whereas both alternatives serve the same goal, some features of the described offer differ, making it a more or a less attractive option based on the individual's underlying utility function and motivation. Depending on how satisfied the individual is with the linear alternative, he or she might fail to recognize increased utility with the CE option and hence, not participate in CE. Using Kleiderei as an example, buying and owning fashion items can be already an established process with favorable features. Given a high level of content and utility with the status quo, the individual will perceive beneficial features of CE, i.e. increased sustainability, not as strong enough to vindicate and trigger a change in consumption behavior.

The question arises which attributes are to have a significant influence on the individual in evaluating CE alternatives. Personal disposition as confirmed by the pre-study plays into the process. Being a significant influence on attitude, trust has been revealed to indirectly influence participation in CE. This emphasizes the relevance of information transfer and transparency for the consumer. Research advocates companies in collaborative consumption, i.e. a well-studied sub-concept of CE, to highlight the most motivating attributes and associated information to foster participation in CE (Bardhi & Eckhardt, 2015). The decision to participate in alternative consumption patterns as defined in CE is affected largely by context, rendering the finding, that trust is a significant driver in CE participation incomplete. Up till now it is not clear what

motivates consumers to participate in CE. Studies on consumer motivation in sub-concepts have inconclusive results. Whereas Albinsson and Perera (2012) find evidence for social and altruistic motivation, other scholars suggest economic and reputational motivation as prevalent (Bardhi & Eckhardt, 2012; Hamari et al., 2015).

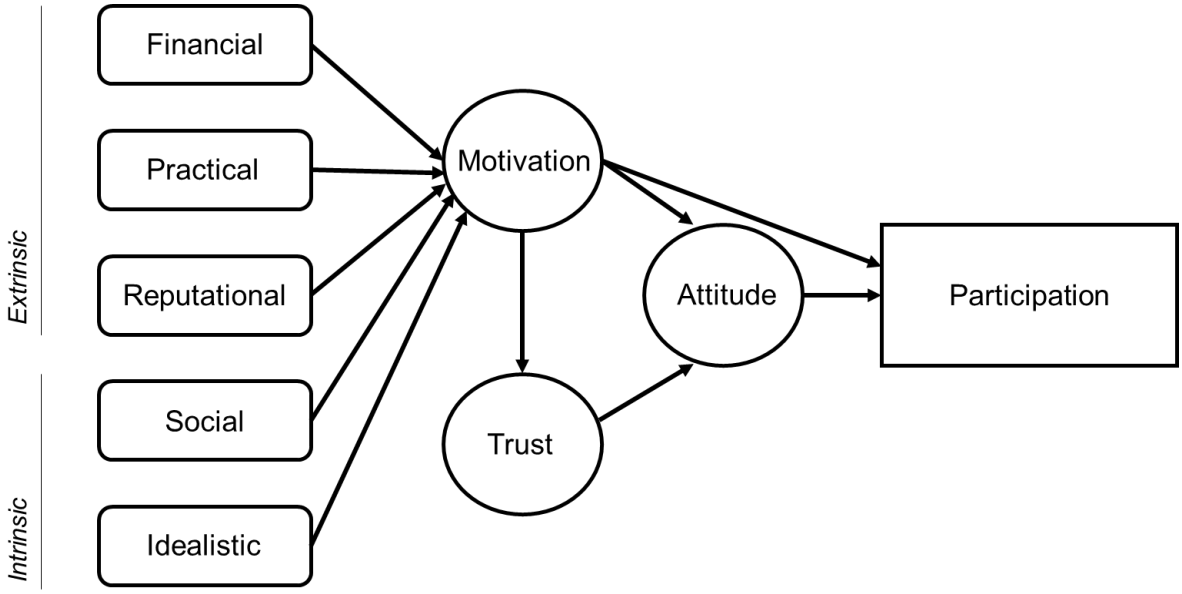

Figure 4.2: Research Model - Motivation and CE

Based on this argumentation, the research model of the pre-study is modified (see Figure 4.2). Cynicism and LOC are omitted due to their insignificance for the initial research model. Instead, the new variable motivation is introduced. Four motivational factors are included in the variable motivation: Financial, Practical, Idealistic and Reputational motivation. These four motivational factors have been chosen since they are consistently focused in previous research (i.a. Bardhi & Eckhardt, 2012).

The work of Ryan and Deci lays theoretical foundation for this study (2000). They argue that motivation can be divided into two groups: intrinsic and extrinsic motivation. Intrinsic motivation describes the motivation through pleasure, satisfaction or because of interest in the activity/topic itself (Ryan & Deci, 2000). If the individual is motivated by other factors than interest or pleasure, extrinsic motivation is observed. Thus, all motivation that is influenced by external factors such as e.g. economic or reputational motives, is considered extrinsic motivation. Reputational motivation although introjected still belongs to extrinsic motivation, since it aims at external validation (Vansteenkiste et al., 2010). Vansteenkiste et al. argue that

an individual without internal motivation rationalizes the behavioral outcome and hence, is motivated extrinsically (2010). Besides the avoidance of negative consequences, the individual can also be extrinsically motivated by being rewarded.

Ryan and Deci emphasized on motivation being leveraged by the environment in their initial work (2000). Their argumentation is in line with the assumption of the decision-making context influencing participation in CE as well as personal disposition. In subsequence the five observed motivational factors will be introduced. They are divided into two categories based on Ryan and Deci (2000). It is hypothesized that all motivations have a significant effect on participation in CE.

H: Motivation as a composed variable is expected to have a significant effect on participation in CE.

Extrinsic Motivation

Financial and Practival Motivation Financial and practical motivation play into the overarching concept of economic motivation. Academic literature employs the terminus 'economic motivation' synonymously with 'motivation for economic success' (Winter-Ebmer, 1994). Consumers tend to consider rational aspects such as cost savings in terms of money (financial) and time (practical) and aim 'to make savvy purchases' first (Bardhi & Eckhardt, 2015). In this study two kinds of economic motivation are observed: financial and practical motivation. Financial motivation aims at cost-saving and other short, medium or long-term monetary benefits. This can also be the case if the cost-saving is only perceived as such, i.e. the absolute costs are higher than for other alternatives, but the value is estimated disproportionally higher. Practical motivation comprises time and convenience motives. Referring to economic principles this aspect of economic motivation takes time as currency and thus, is motivated by its most efficient but at the same time effective use. In this study we observe financial and practical motivation as potential driver for participation in CE.

H1: Financial motivation is expected to have a significant positive effect on participation in CE.

H2: Practical motivation is expected to have a significant positive effect on participation in CE.

Reputational Motivation Besides, reputation is a motive for participation in CE. Since the individual is a social identity, external rewards or punishments can also include social acceptance or the lack of it. Extrinsic motivation is not necessarily tangible. Hamari et al. (2015) revealed that consumers are motivated by reputation among peers. Although this motivation was not as strong as economic motivation, the scholars argued that participation in collaborative consumption as a sub-concept of CE might result in a perceived higher lifestyle status among "like-minded people" (2013, p. 15). Derived of these findings, it can be argued that a lifestyle is a reputational driver for CE. In this study reputational motivation is used interchangeable with lifestyle motivation.

H3: Reputational motivation is expected to have a significant positive effect on participation in CE.

Intrinsic Motivation

Social Motivation While reputational motivation is part of extrinsic motivation, social motivation addresses the internal perspective of the individual as a social being. Being in a community is a way of sharing a social identity. Various scholars argue that a relatedness to the values of the community or the pleasure of social interaction motivates prosocial behavior (i.a. Paulus, 2014). Considering the community aspect of CE business models (e.g. PaulCamper), social motivation is expected to be a powerful driver for participation in CE.

H4: Social motivation is expected to have a significant positive effect on participation in CE.

Idealistic Motivation Last, idealistic motivation is included in this study. Idealistic motives are considered to be an important driver for CE in theory (i.a. Sacks, 2011). In this study significance of idealistic motivation is challenged and tested. The survey item addresses the idealistic aspect of increased sustainability through participation in CE. Since this is one of the most vocal and strongly communicated aspects in business practice (see e.g. Kleiderei and all communication during Fashion Summit Copenhagen), it is excepted that idealistic motivation has strong influence on customer conversion.

H5: Idealistic motivation is expected to have a significant positive effect on participation in CE.

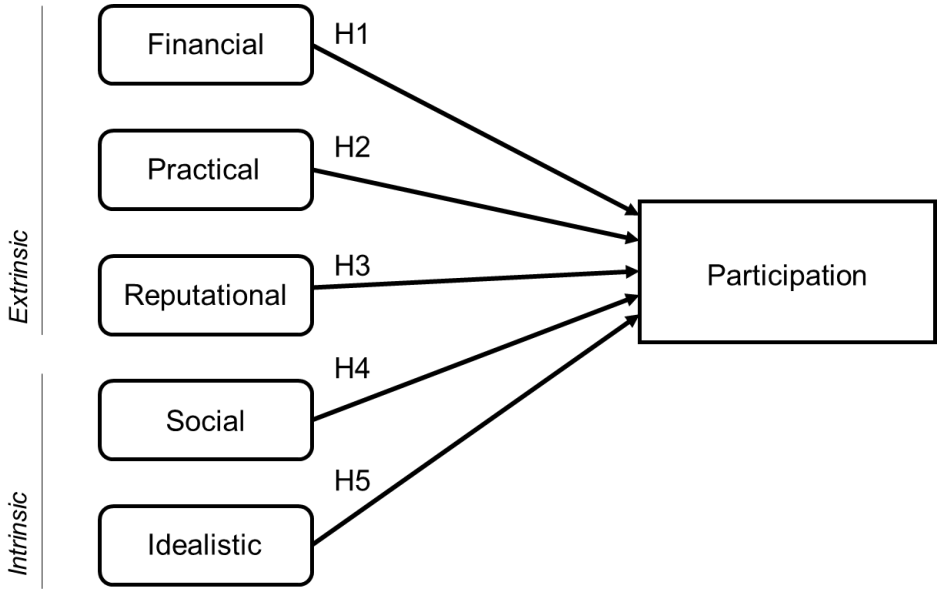

Figure 4.3:]

Research Model - Motivation and CE [Individual]

The introduced research set-up allows to test for on overarching significance of motivation on attitude and participation in CE in a SEM - similar to the set-up of the pre-study. Given the result that trust is influencing participation in CE with attitude as a mediator, it is of interest whether motivation itself is significant enough to influence participation enough or also influences the outcome variable participation indirectly through attitude. In case, any significant effect, i.e. hypothesis H can be confirmed, the four motivational factors will be tested individually to assess whether all motivational factors have the same significance for participation in CE or not (H1-H5). Moreover, the successful pre-study confirmed an applicability of CE as a composed variable. Hence, in this study we are confident to use the composed variable as outcome measurement.

The data set illustrated in chapter 4.3 is used again. The initial survey included items specifically asking for motivation in terms of (1) financial, (2) practical (3) idealistic and (4) reputational factors. These abstract terms have been translated into (1) monetary, (2) time, (3) sustainability and (4) lifestyle benefits. Similar to the pre-study these items have been assessed via a 7-point Likert scale. For the pre-study an adaption of the data set in accord to gender demographics has been redundant due to reported null-effect of gender (Ashraf et al., 2003).

Whereas gender differences are sometimes observed when studying motivation, they tend to be neglectable in the context of motivation as well (Marsh, 1989). More recent studies confirmed that there is no significant gender difference in motivation (i.a. Sood, 2006; Pandey & Ahmad, 2007). In consequence, gender effect is assumed to be neglectable in this study as well.

4.1.5 Results and Discussion

The overall model fit has been assessed firstly. One of the most crucial aspects of structural equation modelling is the assessment of the model fit, indicating whether the specified model is appropriate for the data (Yuan, 2005). Absolute fit indices deliver the most central indication of model fit. As compared to incremental fit measures, the calculation of absolute fit indices does not bank on comparison with a baseline model but rather measures how well the model performs as compared to no model at all (Joereskog & Soerbom, 1993). The Chi-Square value is one traditional measure for overall model fit. However, it is sensitive to sample size and thus, highly probable to reject any model working with a large sample size (Joereskog & Soerbom, 1993). Instead the root mean square error of approximation (RMSEA) was assessed in order to test the research model. This index depicts the model fit with optimally chosen parameter estimates in reference to populations covariance matrix (Byrne, 1998). One major advantage of RMSEA is the possibility to calculate a confidence interval around its value (MacCallum et al, 1996). In subsequence the fit can be assessed more precisely (McQuitty, 2004). In a well-fitting model the confidence interval is between 0.05 and 0.08. The standardized root mean square residual (SRMR) shows the square root of the variance between the sample covariance matrix and a hypothesized covariance model. A model with a good fit requires SRMR values of less than .05 (Byrne, 1998; Diamantopoulos & Siguaw, 2000), yet values as high as 0.08 are acceptable (Hu & Bentler, 1999).

The calculation of the RMSEA and its confidence interval as well as the SRMR show an good model fit, revealing a RMSEA of 0.076 with a 90 Percent Confidence Interval (lower bound 0.069, higher bound 0.082) and a SRMR of 0.065. Further measures also confirm the appropriateness of the research model (df = 113, p-value < .001, CFI = 0.823)

Since the model fit is established, the results of the SEM can be confidently analyzed. An overview of the paths with indication of significance is provided below (Figure 4.4). Table 4.4 depicts the regressions illustrated in Figure 4.4.

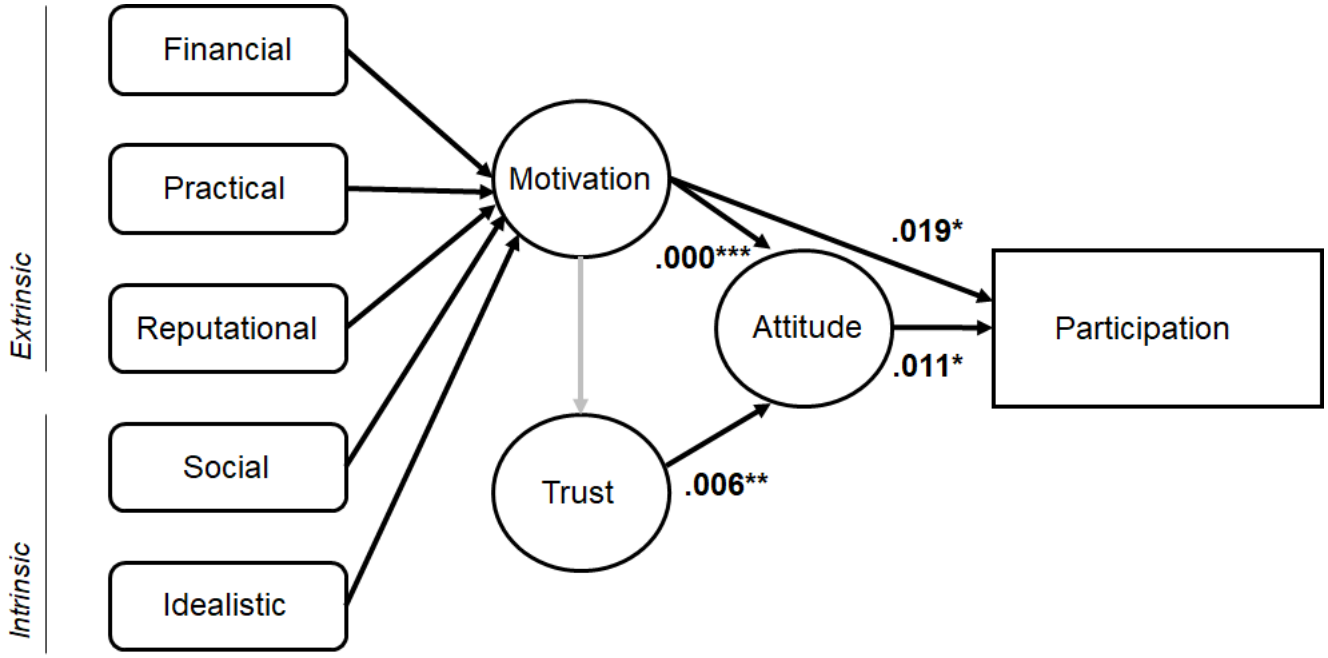

Figure 4.4: Results - Overall Model

Table 4.4: Results: Overall Model

Regressions:	Estimate	Std.Err	z-value	P(>|z|)
ATT ~				
TRS	.958	.351	2.727	.006
MOT	1.552	.235	6.608	.000
PT ~				
ATT	.040	.016	2.548	.011
TRS	.069	.047	1.464	.143
MOT	.090	.038	2.353	.019

It can be derived that motivation has a significant positive influence on participation with a p of .02. However, this effect is direct and does not work over attitude as a mediating variable. In contrast to the pre-study which revealed trust indirectly influencing participation via magnified positive attitude, motivation is a direct lever for participation in CE.

In a next step, the variable motivation is broken down into its five components: (1) financial, (2) practical, (3) idealistic, (4) reputational and (5) social motivation. A linear regression model with regard to the individual influence of motivation on participation in CE is calculated. The results are depicted in Table 4.5 and Figure 4.5.

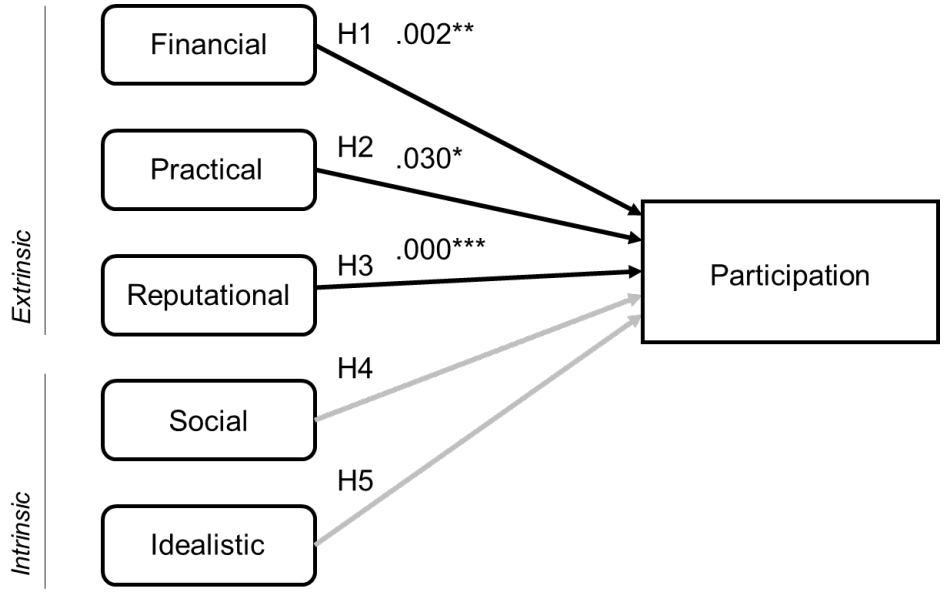

Figure 4.5: Results - Individual Motivation

Table 4.5: Results: Overall Model

Coefficients:	Estimate	Std.Err	t-value	P(>|t|)
(Intercept)	-0.54459	.281	-1.937	0.05324
MotiMoney	.132	.042	3.112	.002 **
MotiTime	.093	.043	2.165	.03 *
MotiCommunity -0.026	.037	-0.697	.486	
MotiSust	.095	.050	1.902	.058
MotiLifestyle	.362	.052	6.944	.000 ***
Signif. codes: 0 '***' .001 '**' 0.01 '*'				

It can be deducted that extrinsic motivation has a significant positive effect on participation in CE. All three observed extrinsic motivations, i.e. financial, practical and reputational have significant influence on participation in CE. Social and idealistic motivation cannot be confirmed to have any effect on the outcome variable. In consequence, only H1-H3 can be accepted, while H4 and H5 have to be rejected due to insignificance. Overall the study revealed leveraging effect of both specific personality traits (Trust) and extrinsic motivational factors (financial, practical and reputational) on participation in CE. Both these findings are novel in the field of CE and offer broad potential for managerial actions. While trust can be gradually fostered through increased transparency and enhanced information transfer, motivational factors are advised to be targeted directly in communication. Consumers have to be actively aware of the beneficial aspects with explicit regard to their motivation. The currently majorly communicated

feature of CE business models, i.e. increased sustainability, shows to be insignificant in affecting participation directly. Contrary, and with the highest significance of all observed motivations, reputational motivation is suggested to be addressed in consumer communication. Reputational motivation is defined as lifestyle motivation. Consumers focusing on lifestyle are concerned with their express self-identity, external perception and want to "fit" into a certain image as opposed to consumers with social motivation who are driven by pleasure or interest.

It is advised to further investigate what lifestyle associations are evoked by participating in CE, since knowledge on what constitutes a CE lifestyle is untapped. In this context it would be of particular interest to compare self-assessment of consumers participating in CE with the perspective of non-CE consumers to reveal common values and be able to define a CE lifestyle for purposes of marketing and operations research. Given the importance of reputational motivation, the importance of branding CE comes into focus.

Moreover it is to be pointed out that extrinsic motivation has a direct positive effect on participation, whereas the personality trait Trust and the combined variable Motivation, i.e. the one comprising intrinsic as well as extrinsic motivation, both affect participation indirectly through Attitude.

In this context further research on how participation triggered through mainly intrinsic motivation and personality traits differs as compared to participation in CE mainly extrinsically motivated, is strongly suggested. Especially, considering customer retention and customer lifetime value these investigations are expected to hold important information for practitioners in CE.

4.1.6 Summary

The aim of this study was to provide new insights to consumer research in the young academic field of CE by studying whether and how personality traits and motivational factors affect participation in circular activities. Findings from a comprehensive literature review were complemented with an empirical study in form of a survey. In cooperation with three companies (Vinokilo, Kleiderei, PaulCamper) a sample size of 604 respondents has been acquired. By observing factual active participation instead of behavioral intention as the outcome variable and acquiring a significantly larger sample than any study on consumer behavior in circular economy, this study advances academic research and addresses limitations of prior work (see Hamari et al., 2015). Four participation modi of CE have been observed throughout the study: (1) recycling, (2) upcycling, (3) sharing and (4) renting. The empirical study was conducted in form of an online survey developed with the software typeform. 604 respondents were acquired by cooperation with three companies as well as personal network. The collected data has been analyzed using the statistical software R. One overall model, comprising all participation modi in one have been major focus of the subsequent analysis. All results and indices are also provided for every participation modus observed.

The pre-study dealt with the effect of personality on participation in CE. Three personality traits have been chosen: Trust, Cynicism and LOC. Besides, the observation of these three latent variables the validity of the composed outcome variable participation was in focus, as meant to be applied in further research.

Although, it has been expected that all three personality traits to have significant effect on participation not all hypotheses could be empirically confirmed. Trust has been the only personality trait to be revealed having significant effect on Attitude as a mediator. Further, Attitude has significant effect on Participation, leading to the conclusion that trust is one main personality trait promoting CE participation. Furthermore, the consistency of results, for the overall as well as sub-models, confirmed the validity of the composed variable participation. Although these initial findings are of relevance, context does play a role in decision making and while motivational factors fluctuate as compared to personality traits, they affect participation in CE. In order to achieve a more complete result on what drives participation in CE a second-study

has been conducted. Since context in decision making has proven effect, five motivational factors have been chosen for study. These have been widely featured in prior literature and namely are: (1) financial, (2) practical, (3) reputational, (4) social and (5) idealistic motivation. Based on Ryan and Deci (2000) these motivations have been attached to intrinsic and extrinsic motivation. Moreover, all five motivations have been combined into the new variable Motivation.

By adapting the initial research model and addressing the illustrated argumentation, a new SEM model have been derived, illustrating this thought process. Based on the same data set and aimed at increased comprehensiveness of results, the interplay of trust, attitude with motivation has been studied. Similar to the context of personality traits in the pre-study, there has been no significance of gender-effect have been confirmed in the context of motivation, making the re-use of the data set particularly appropriate. Calculating the new SEM, a significant effect of motivation on attitude and participation is confirmed. In consequence, motivation has an indirect as well as direct effect on participation in CE, making it a potent tool in fostering a large-scale transition of CE. In order to assess whether all of the five motivations are significant, a linear regression model of all individual motivations have been consulted. This calculation depicted that all three motivations attributed to extrinsic motivation (financial, practical, reputational) have a significant direct effect on participation in CE, whereas both motivations attributed to intrinsic motivation have no significant effect (idealistic, social).

Altogether, this study revealed trust as a significant personality trait and motivation as driver for participation in CE activities. There are different levers to increase trust and promote participation in CE that shall be subject to future research. With regard to motivation managerial actions targeting financial, practical and reputational benefits are strongly advised. Since these three motivations have a direct effect, their effect on conversion is expected to be achieved short and medium term. Nevertheless, this work has limitations that have to be taken into account. First, the survey sample strongly deviated towards female population. Although literature suggests a null effect of gender for personality traits and insignificance for motivations, this has to be considered using the data collection for other research purposes. Initial results should be researched in further depth, e.g. by only conducting a study focusing on reputational motivation with a large number of survey items. Besides, customer behavior is advised to be

studied more extensively, e.g. researching other personality traits affecting and mechanisms (e.g. f2f interactions) leveraging participation in CE. The underlying findings imply great potential in consumer research in CE and serve as first steps in closing the current knowledge gap in academic literature and practice.

4.2 Study Two - The Effect of Face-to-Face Interaction on Second-Hand Fashion Sales (published as Stein et al.(2020) "Face-to-Face Communication as A Tool to Support Second-Hand Fashion Sales: A Field Experiment at Fashion Week in Berlin". *Sustainability*, 12, 1758)

We conducted a random allocation experiment at fashion week in Berlin in 2017, testing how face-to-face (f2f) communication affects sales of a fashion start-up focusing on second-hand. The experiment revealed that 11 per cent of guests of an f2f event afterwards turned paying customers with an average basket size 11.8 per cent higher than the overall sales event average. We add insights to research on entrepreneurial practice as well as on offline operations in the context of circular consumption in fashion, exposing the leveraging effect of f2f communication for customer acquisition and revenue of start-ups in the field of sustainable fashion.

4.2.1 Introduction

There are many perceptions of sustainable fashion among consumers, such as green, fair trade and slow fashion (Lundblad & Davies, 2016). Some consumers also include lifecycle stages such as laundering, use, re-use and disposal in their decision-making processes (Cervellon& Wernerfelt, 2012). In light of this, second-hand fashion has come to be regarded as a means to mitigate linear consumption and hence raise the level of sustainability in consuming fashion. However, customer acquisition remains a challenge for most businesses with sustainable business models such as rental and second-hand fashion.

In fashion, face-to-face (f2f) communication has become widespread, even the industry standard, to support information transfer. The increased standardization in fashion retail across regions and new technologies, facilitating replication of competitors' design offers have challenged the fashion industry strongly in the last decades (Fernie& Sparks, 1998). The goal of differentiation is mostly met by a strong brand, community orientation and focus on communication with target customers to create and maintain competitive advantages (Urde, 1999). Given the need to remedy negative environmental and social impacts of current fashion business models (Henninger et al., 2016), our research examines whether f2f communication has a leveraging effect in sustainable fashion: How does f2f communication support the sales of second-hand fashion even if new and unworn options are available at the same time and in the same context? In order to examine how f2f communication affects second-hand fashion, Vinokilo (VK), a German fashion start-up, agreed to participate in a field experiment at fashion week in Berlin in 2017. By providing historical data of former events and randomly distributing a tracking coupon at its invitation-only f2f event at fashion week in Berlin, VK allowed for a unique opportunity to collect consumption data. With the help of the acquired data, we analyzed how f2f communication, in the form of an event, results in incremental sales and how it affects average basket size.

Consequently, this paper contributes to the area of sustainable fashion by conducting a field experiment in the form of an f2f event at fashion week in Berlin. While the leveraging effect of f2f communication in sales of linear and first-hand offers has been widely demonstrated in prior research, second-hand offers comprise different product characteristics, making the effect of f2f

communication questionable. Second-hand fashion fails to have the newness and up-to-dateness that makes regular first-hand fashion trendy from the get-go, relevant for the current zeitgeist and attractive to consumers. In line with the findings of Guiot and Roux (2010), Cervellon et al. identify price sensitivity and frugality as the main drivers to purchasing second-hand fashion (2012). Further, these scholars reveal that ecological drivers rarely influence second-hand purchase behavior, supporting Morgan and Birtwistle's claim that while eco-conscious mindsets are prevalent, corresponding behavior is not (2009). Since prices are not subject to change as compared to, e.g., emotional drivers for purchases, it could be assumed that f2f communication is less likely to make a difference in second-hand fashion sales. Currently, there is no research on f2f communication and its effect on second-hand fashion sales specifically. We close this knowledge gap by conducting a field experiment studying f2f communication in relation to second-hand fashion sales. The insights thus derived allow us to determine the impact of f2f communication on incremental sales on a short-term basis, making this experiment beneficial also for practitioners in small and medium sized companies toying with the idea of an f2f event.

4.2.2 Overview: Face-to-face Communication in Fashion

Sustainability is a complex topic, also in fashion. While a consensus about a need for change "for the better" exists, measures across industry vary immensely. Moreover, with companies like HM burning overstock (NYT, 2018) while promoting an image as a sustainability pioneer, consumers are left confused and sceptic about sustainable fashion offers. This state of the industry is one major reason why communication about sustainability is fundamental to driving sustainable fashion. An open discourse legitimates sustainable offers (Newig et al., 2013). Face-to-face (f2f) communication is largely considered the most beneficial method of communication (MacDonnell et al., 2009); f2f communication adds to verbal information involving nonverbal visual cues through kinetic and mimic (Knapp & Hall, 2009). Since communication on this level is usually unconscious, it provides further information in interpersonal exchange (Horgan et al., 2014). Another benefit of f2f communication is the development of an instant discourse where ideas and opinions can be exchanged, and disjointed discussions can be avoided.

In the context of sustainable fashion, f2f communication is relevant at various stages. The importance of f2f for the fashion industry becomes evident when considering current business practices. Fashion retailers turned from product to buyer driven supply chains and initiated co-operations in diverse market environments (Tyler et al., 2006). Although outsourcing production has become common practice, it initially resulted in considerably longer lead times and convoluted supply chains due to geographic distances, because of complex import/export processes (Birtwistle et al., 2003; Bruce & Daly, 2006). The theory that manufacturing in low wage countries would automatically result in significant cost savings had to be questioned. Scholars highlighted that by interrupting the intermingled creation processes, information transfer was complicated. The lack of effective communication resulted in inaccurate deliverables and thus, led to cost intensive reworks (Tyler et al., 2006).

These problems illustrate the necessity to preserve tacit information beyond local milieus and emphasize the high relevance of interpersonal communication (Humphrey & Schmitz, 2002). Similar to other forms of expert knowledge, fashion knowledge centers itself in certain places—most famously the fashion metropoles of Paris, Milan, London and New York (Lash & Urry, 1994; Zukin, 1991). Not only during the fashion weeks are these key locations the cradle

of new trends. In these cities, a tacit understanding of ideas is promoted by factual proximity. According to various scholars, the transfer of knowledge in fashion is fostered by proximity in local knowledge hot-spots and through the initiation of knowledge communities (Gertler, 2002; Storper & Venables, 2004). Consequently, f2f communication is of crucial importance in the context of fashion and already embedded in the core structure of the industry. Fashion knowledge is bundled in cities, allowing designers to maintain a tacit information flow with regard to trends and style movements. In Germany, this location is usually considered to be the capital Berlin with its respective bi-seasonal fashion week equal to the more prominent and influencing fashion weeks in Milan, London, New York and Paris.

Finally, the relevance of f2f communication in fashion comes down to the consumer. Prior research indicates that sustainable fashion consumption is hampered by an attitude–behavior gap (McNeill & Moore, 2015), which may partly be attributed to a gap in knowledge of sustainability pertaining to fashion (McKeown & Shearer, 2019). Lundblad and Davies (2016) report that sustainable fashion consumers intend to be perceived as not following the herd and appearing as individuals in their consumption choices. Thus, f2f communication may play a major role in closing the sustainability knowledge gap and corroborating the individualistic nature of second-hand fashion. We hypothesize that f2f communication is especially valuable when transferring tacit knowledge related to benefits of second-hand fashion as compared to new fashion. Referring to the advantages of f2f communication in communicating sustainability, the instant and open discourse can help consumers to overcome doubts and foster purchase behavior. We hypothesize that f2f communication supports second-hand fashion sales as supporting open exchange. In order to study the effect of f2f communication on second-hand fashion sales, fashion week in Berlin was chosen as the site of study allowing for a compressed look at the fashion industry and its stakeholders (Skov & Meier, 2011).

4.2.3 Overview: Fashion Life Cycles

Bourdieu (1993) acknowledged a hierarchy within fashion, with haute couture at the top followed by ready-to-wear (RTW). It depicts the stringent top-down development from runway collections to streetwear. Nowadays, haute couture as the classic catwalk show is less common and only presented in Paris. Retailers increase their receptiveness to the "newness" of fashion trends, trying to provide ever-new product palettes (Hines, 2001; Hoffman, 2007), leading to a presentation of RTW fashion at most fashion weeks, e.g., Berlin. A typical fashion life cycle comprises four stages, as delineated in Figure 4.6 (modified from Bhardwaj (2010)). A new trend is introduced and adopted by fashion leaders usually via fashion shows. Comprehensively, the experiment in Berlin took place at the first stage.

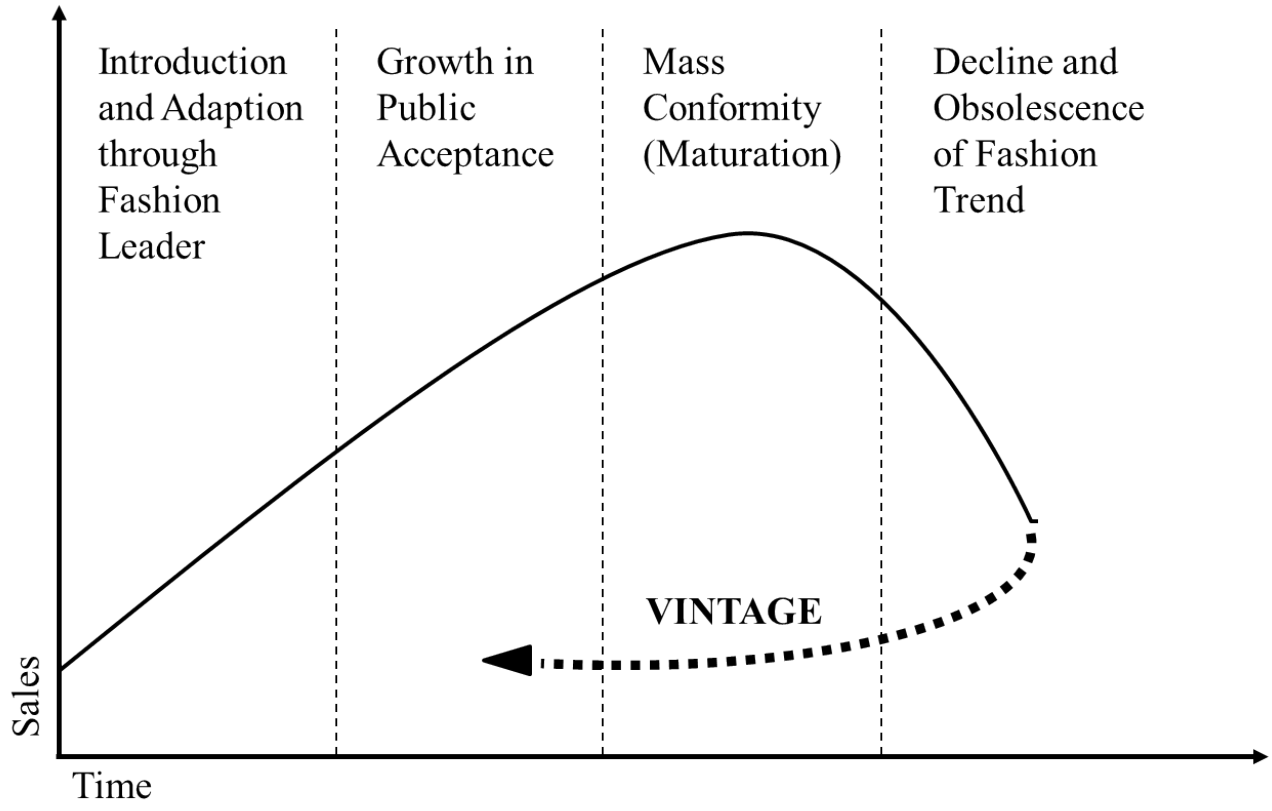

Figure 4.6: Overview of fashion life cycle (modified from Bhardwaj, 2010)

Instead of ending its life cycle by becoming “out” and making space for new fashion trends issued at another fashion week, second-hand fashion defies the regular fashion life cycle. Fashion leaders in terms of fashionable individuals re-introduce already produced and known fashion pieces into the trend life cycle. Bourdieu explicitly refers to vintage fashion as a subcategory

of second-hand, challenging fashion hierarchy (1993). It is usually promoted as special and authentic, substituting contemporary fashion, as "a sign of individuality and connoisseurship" (Hines, 2001). Though consumed nowadays, these items are not newly produced, proposing value of clothing items is maintained after the original production (Palmer, 2005). Second-hand fashion is part of streetwear and defies planned obsolescence of trends. Second-hand fashion is a sustainable offer since product life cycles are maximized and the need for new products diminished. In consequence, an increase in second-hand fashion sales can lead to a decreasing demand of newly produced fashion goods and thus, less resource usage in production. In its denunciation of mass-design, second-hand clothing represents authenticity (Gregson & Crewe, 2003). Yet, this inclination for authenticity, expressed through second-hand, has become a broader penchant, resulting in an upgrade from shabby second-hand stores to trendy ones (DeLong et al., 2005).

Originally negligible, the idea of reinventing fashion through second-hand clothing developed into a mainstream phenomenon (Baker, 2012). Nevertheless, original second-hand fashion, thus not recently produced items, is not represented at fashion weeks. This holds true also for the research environment at fashion week in Berlin. Fashion week in Berlin is a three-day event in January and July, presenting new designer collections and product lines via fairs, runway shows and showrooms/installations. Although specific events during fashion week in Berlin, such as the Green Showroom, address sustainability issues, no events for alternative consumption patterns occur. This observation of the Berlin agenda is confirmed by other scholars who agree that various issues covering, e.g., labor conditions, environmental impact and other socio-economic topics, are addressed during fashion weeks but there is a lack of general understanding of the interrelation of these challenges (Skov & Meier, 2011). According to Skov (2004) the problem lies in the logical discrepancy between the need for prolonged use of fashion items with respect to circular consumption and the fashion logic of always new trends.

Fashion companies dealing with second-hand fashion need to shoulder this double burden. This commercial challenge is often compounded by the sourcing and logistics barriers faced by many companies in sectors of the circular economy that depend on reverse logistics. Against that backdrop, any measure that can alleviate or overcome the commercial double challenge

could be relevant to the survival of these companies, including new insights into the applicability of standard business tools such as f2f. As second-hand fashion at fashion weeks addresses a relevant paradox of the fashion industry, VK, the company participating in the underlying experiment, was chosen due to its modern approach to second-hand fashion. This helped ensure that some other typical commercial challenges for circular businesses, such as a diminished consumer experience (e.g., in conventional charity stores or on conventional flea markets), were already addressed. A detailed introduction of the research object, VK, and its historical data follow in the subsequent section.

4.2.4 Data and Methods

This paper bears data from a randomized field experiment in the form of a random coupon allocation at an f2f event. While random allocation is largely used in medical contexts, it achieved its stand in social sciences, also known as A/B testing. Random allocation is considered "the best method to prove causality in spite of various limitations" (Kim & Shin, 2014). The overall sample is divided into a treatment and control group. This happens by chance, neglecting preferences or the will of both researcher and participants of the study. The easiest method of random allocation is simple randomization, where two entirely random groups within a sample are assigned a treatment or not (Kim & Shin, 2014; Dettori, 2010). Usually, the allocation sequence is generated using software to ensure randomization. However, manual methods such as tossing a coin are also possible (Dettori, 2010). Kim and Shin emphasize the importance of a minimum sample size of 100 to avoid unequal assignments and to achieve significant results (2014). Vinokilo (VK) is a second-hand clothing market that operates primarily offline. They acquire their supply from sorting companies all over the world, allowing for attractive prices and original second-hand fashion. VK faces challenges in branding and is to date unaware of what drives customers to participate in its offline model.

VK organizes pop-up events in different cities where they sell second-hand clothing by weight. The clothes are leftovers acquired from sorting companies, allowing for attractive prices while maintaining a certain level of quality. Although VK could be considered a flea market, they differ from the common perception of shabbiness due to a modified business concept. Besides second-hand clothing, VK comprises cultural aspects in the form of regional artists and designers who use the events as a launch platform. Accompanied by music, wine and street food, VK sale events bear a resemblance to small parties rather than stereotypical flea markets. As a consequence, not only individuals subscribing to more sustainable fashion—especially the upcycling and recycling mechanisms comprised in circular consumption principles—but also individuals interested in one of the various other aspects of VK's product portfolio and shopping experience are targeted successfully. In order to be able to benchmark the observed Berlin flea market of VK, historical data was consulted (see Table 4.6).

In 2016, VK hosted 15 events in both Germany and the Netherlands, attracting more than

Table 4.6: Overview - Historical Data Vinokilo

X	Attribute	Min	Base (Median)	Max
X1	Number of Visitors	850	1,765	2,750
X2	Total Revenue (in)	12,854	27,031	40,862
X3	Basket Size (in kg)	0.63	0.77	1.3
X4	Number of Habitants (in K)	122	560	1,790
X5	Location Size (in sqm)	400	600	1,000
X6	Event Duration (in hrs)	12	12.5	16

30,000 visitors. VK achieved six-digit revenue and profitability in its first operational year. Events that differed significantly from the usual concept were omitted in order to achieve a realistic perspective on VK and its performance and a solid data set for further calculations. As especially revenue and average basket size were observed during the experiment, these variables were studied more extensively. A Shapiro–Wilk test (1965) was conducted to confirm normal distribution of these variables. The p-values of respective Shapiro–Wilk tests were larger than 0.05 (p = 0.24 for Revenue; p = 0.1 for Average Basket Size). Thus, the null hypothesis that these two data sets are normally distributed could be accepted. In order to develop a formula to quantify the effect of f2f communication on the overall revenue a multi-linear regression was calculated with R.

$$\text{Revenue}_t = \alpha + \beta_1 \text{X1}_t + \beta_2 \text{X3}_t + \beta_3 \text{X4}_t + \beta_4 \text{X5}_t + \beta_5 \text{X6}_t \epsilon$$

The initial formula suggested that five attributes influenced overall revenue. Although this formula accounted for a good fit (Adj. R-sq. = 0.95) only two variables were significant (see Table 4.7).

X4, X5 and X6 were omitted due to lack of significance. The adapted regression formula explained 96 per cent of variation of revenue (see Table 4.8).

$$\text{Revenue}_t = (-2.158e + 04) + (1.154e + 01) \times X1 + (3.119e + 04) \times X3$$

Table 4.7: Results - Multi-regression (1/2)

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	-2.097e+04	5.771e+03	-3.634	0.00836 **
X1 (Number of Visitors)	1.200e+01	1.366e+00	8.788	4.98e-05 ***
X3 (Basket Size in kg)	3.219e+04	3.181e+03	10.118	1.98e-05 ***
X4 (Number of Habitants (in K))	-8.968e-01	1.691e+00	-0.530	0.61228
X5 (Location Size (in sqm))	1.234e+00	3.981e+00	0.310	0.76561
X6 (Event Duration (in hrs))	-1.859e+02	4.498e+02	-0.413	0.69185

*Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05*

Table 4.8: Results - Multi-regression (2/2)

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	-2.158e+04	2.674e+03	-8.07	1.09e-05 ***
X1	1.154e+01	8.039e-01	14.36	5.32e-08 ***
X3	3.119e+04	2.501e+03	12.47	2.04e-07 ***

For the regression to hold true, data was required to be random and independent and residuals had to be normally distributed, with constant variance. The regression formula was then used to quantify the impact of f2f communication. The underlying field experiment observed basket sizes of coupon users after a private event at fashion week in Berlin. If the average basket size of the coupon users differed from the average basket size, the formula would serve to determine what overall impact such an f2f communication with all customers would have on overall revenue of all historical events. Following the fashion event, a regular flea market sale a few days later was used to test the outcome of the f2f event. The hypothesis of the subsequent experiment was that f2f communication results in incremental sales, i.e., people from the fashion week will become actual new customers of VK and will participate in the following flea market sale. The main goal was to observe how f2f communication during an event at fashion week in Berlin affects the regular sale and how visitors from the f2f event differ in purchasing behavior. Visitors of the f2f event were "tracked" for the following behavior. Coupons adhering to the common company practice of "one free kg" were distributed in a randomized manner. The random sequence was generated manually by assigning coupons to a goodie bag. At the f2f event, every second goodie bag contained a white coupon of credit card size and the wording, "Gift Card for 1 Kilo". The number of coupons required was fixed to 100, adhering to the

suggested significance level. In consequence, it was unambiguous that a person using a white coupon had visited the installation at the f2f event before or at least was connected to someone who had. Randomization in this experiment was correctly implemented, as the probability of getting allocated to the treatment group; thus, receiving a coupon was not correlated with individual characteristics nor non-indicated past transactions. There were no seating orders and all goodie bags looked exactly the same (a) from the outside and (b) through the credit card size of the coupon also at the first look on the inside. Other field experiments of scholars supported the assumption of a low redemption quota of both on- and offline coupons (e.g., 3 per cent online coupon redemption in (Sahni et al., 2014); the effect of the coupon was assumed to be neglectable. In their study, Jung and Lee (2010) compared redemption rates of printed and electronic coupons. They found that e-coupons had higher redemption rates as compared to offline coupons as well as that absolute discounts led to increased redemption as compared to relative discounts. Thus, in order to decrease the effect of the coupon itself, VK issued the lower performing offline coupon with a relative face-value ("one kilo for free"). These findings are supported by reports for the United States, stating an average redemption rate of coupons delivered in a free standing insert (which constitutes the most common distribution form and the one we employed in the experiment with VK) of only 0.6 per cent (NCH, 2014). Furthermore, the redemption rate in the non-food segment, the corresponding sector to fashion, was even lower, yielding an average of 0.5 per cent redemption. For this reason, we can causally link the f2f communication with observed differences in consumer behavior between treated and control groups. Consult 4.7 for an overview of the field experiment.

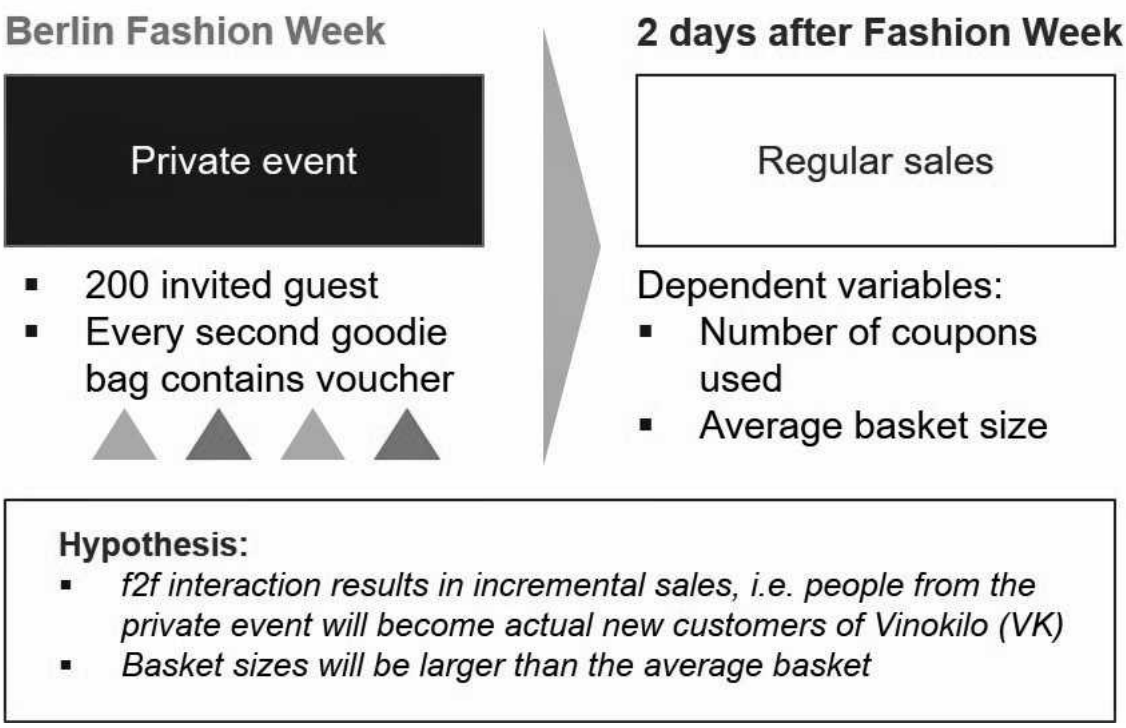

Figure 4.7: Overview of field experiment in Berlin, 2017

Two days after the f2f event, the regular sales took place in Berlin. This proximity to the fashion week both in terms of time and location aimed to avoid the coupons falling into oblivion and to test for immediate effects of f2f communication. After the regular VK sale, the number of white coupons and respective basket sizes were analyzed in relation to basket sizes of prior events.

4.2.5 Results

The general outcome of the Berlin event was above average as benchmarked to historical data of prior events yet failed to be a significantly positive outlier. Referring to the research question whether f2f communication results in incremental sales and how it affects average basket size, Table 4.9 can be consulted. The coupon redemption quota was calculated by dividing the number of coupons used at the regular sales event with the number of distributed coupons at the private event. As stated in Figure 4.8, 11 coupons were redeemed at the sales event. This equals a redemption rate of 11 per cent. Basket sizes of coupon users ranged from 3.5 to 37.8 Euros. Basket size (in) of the overall event was 17.68 as compared to 19.75 for coupon users. This result represents an average basket size increase of 11.8 per cent as compared to the average of all visitors of the Berlin event.

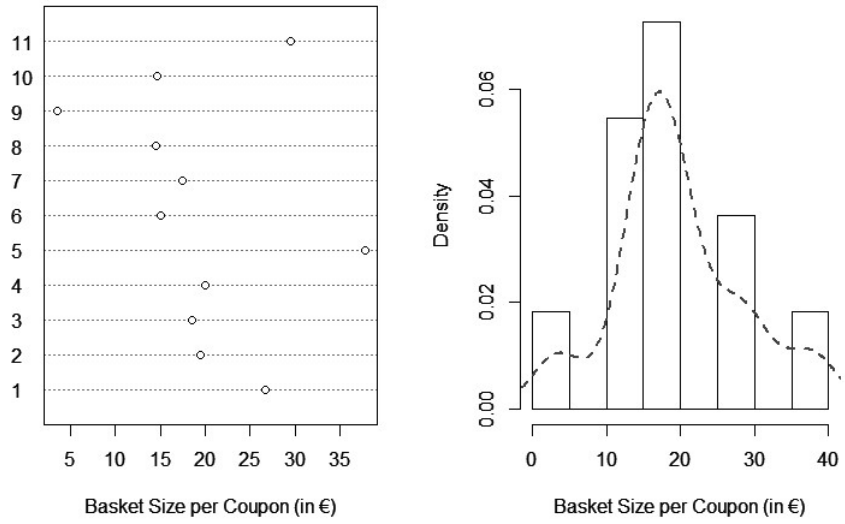

Figure 4.8: Results: Number of coupons and basket size per coupons and distribution basket sizes.

Table 4.9: Results of Berlin event

X	Attribute	Event: Fashion Week in Berlin
X1	Number of visitors	2006
X2	Total revenue (in)	42,854
X3	Basket size (in kg)	1.18
X4	Number of habitants (in K)	3520
X5	Location size (in sqm)	400
X6	Event duration (in h)	12

Employing the regression formula deducted above, the difference in revenue as associated with increased basket sizes through f2f activity is displayed in Figure 3b. It was applied both for the Berlin event and the historical event data provided for the business year 2016. While for the Berlin event 1 per cent revenue increases could have been achieved if all visitors had an f2f experience with the brand, the impact of f2f communication considering all events in 2016 was significantly higher. The respective analysis reveals a possible revenue increase by 60.8 per cent through f2f communication (Table 4.10).

Table 4.10: Results actual revenue and f2f approximation

	X1	X3	X2	F2f-Impact
Event (Historical Data 2016)	Number of Visitors	Average Basket Size (in kg)	Revenue (in)	Revenue_t (in)
1	2322	0.74	27,031	46,386
2	2750	0.68	29,751	51,325
3	2150	0.77	27,365	44,401
4	1300	0.76	18,039	34,592
5	850	0.84	12,854	29,399
6	1950	0.63	21,706	42,093
7	1100	0.64	13,271	32,284
8	950	0.75	12,965	30,553
9	2250	0.83	30,851	45,555
10	990	0.99	17,413	31,015
11	1928	0.98	31,900	41,839
12	1765	1.3	40,862	39,958
SUM			315,875	507,925

Consequently, incremental sales as well as increased basket sizes were observed at the regular sales event of VK. This allowed a confirmation of short-term effects of f2f communication on participation and basket sizes in second-hand fashion sales. The main hypothesis of this study was that f2f communication with customers in form of an f2f event at fashion week, representing the brand and its core values, will result in incremental second-hand sales. This hypothesis can be tentatively confirmed, given that the average coupon redemption rate of 0.5 per cent for non-food products (NCH, 2014) was surpassed by 22 times. Furthermore, the guests at the f2f event were not connected to VK before the event. Although the experiment was conducted at a small scale due to the complex and special setting, these results can be confidentially considered potent tendencies for the success of f2f activities for second-hand businesses.

4.2.6 Discussion

Our study confirms premises of f2f communication in regular "linear" sales processes to hold true for second-hand fashion sales. While second-hand purchases are mostly made based on monetary considerations, f2f communication appears to strengthen eco-conscious attitudes. This finding establishes f2f communication as a powerful tool to potentially bridge attitude–behavior gaps in second-hand fashion sales. As the epitome of f2f communication—one-on-one interactions—is frequently not possible in commercial settings for reasons of time and cost, best practices for addressing larger target groups have developed over time. First, roadshows are considered popular as they can achieve representative insights by enabling a company to cluster f2f communications (e.g., via city) and develop best practices.

Second, and often considered the most efficient measure in terms of effort/value ratio, is participation in fairs. Major uncertainties are outsourced to a third party and costs are clear and predictable. Different target groups can therefore be accessed and their compatibility with the business tested without high financial risk. Third, f2f activities with customers can take place in the form of organized public or private events. An own event is connected with the most planning effort and uncertainty. The company will be responsible for ensuring enough visitors as well as planning and execution of a program. This can be too resource intense for a young company in terms of money, time and people. Still, an own event offers great opportunity to advance trust in f2f communication and can aid brand development significantly. It allows a company to shape its brand perception and simulate a social interaction with the brand via employees and atmosphere without requiring one-on-one f2f communication. This form of f2f communication was chosen by VK due to the industry standard and the high control over brand and customer experience (Balser, 2017).

All of these formats are fast to implement and easy to follow-up if connected to a trackable campaign, e.g., via coupon codes or direct on-site registration. Chosen employees of the relevant company will have to be trained in order to portray information adequately and represent the company in a credible manner. This can be done informally or via a small internal task force. Referring to the introductory comment, f2f activities can have high relevance, particularly for startups, in assessing customer feedback directly, sometimes indicating the need for product

or service improvements at the same time as fostering customer acquisition in complex business models. As noted above, sustainable fashion consumption may be fostered by informed customers where information may relate to core values of the company and about benefits of participation. By including participants in the art installation and making them part of a social interaction with the brand and its employees, visitors of the f2f event were able to assess VK also in terms of associated sustainability dimensions and, consequently, become active customers.

Another opportunity while considering f2f communication is to have events partially sponsored by other brand-supporting companies. The higher the resource efficiency the lower the risk and, thus, the higher the viability of an event that is entirely under the company's control. For small to medium sized companies, this aspect is especially important and has to be taken into consideration adequately. Large fashion corporations are also changing their business operations. One intriguing example is the sports brand Nike. Nike is refocusing its activities from product towards collaborative communities, e.g., reducing their traditional celebrity-starred advertising for about 55 per cent and investing in (virtual) communities like Nike+. An estimated 40 per cent of community members were motivated for their first-time Nike purchase through the shared brand experience at Nike+ (Botsman & Rogers, 2011). Hence, it can be stated that by interacting, users of Nike+ were more likely to buy Nike products, suggesting future research comparing f2f and virtual interaction in the context of CE and sustainable fashion to devise more scalable solutions. In summary, f2f communication was a successful measure for second-hand sales at fashion week in Berlin. Eleven percent of coupons were used, resulting in approximately 20 new customers, taking all 200 attendees into account. The increased average basket sizes show the value enhancing in purchase behavior. Particularly in fashion, where f2f communication is indispensable, private events to get in touch with the respective brand and values appear to be very effective in second-hand contexts as well, surpassing expectations and industry standards, i.e., 0.5 per cent coupon redemption.

For practitioners, this experiment shows the potential of offline operations in the context of second-hand fashion and reveals a powerful tool to achieve the relevant shift from purchase intention to action. Considering the often-short-term planning horizon of SMEs, these findings show attractive short-term conversion of customers and respectively incremental sales. Moreover,

this study emphasizes the importance of adequate knowledge transfer to the consumer and to support target customers in overcoming entry barriers. While the literature suggests that f2f communication is currently one of the most effective measures to increase trust and facilitate knowledge transfer, the cost factor of f2f activities is an important aspect for its large-scale applicability. Alternatives to own events vary from less expensive tradeshows to roadshows and allow specific regional clustering of customers. Digital solutions such as celebrities on social networks or sustainable fashion bloggers could offer similar benefits at lower expenses (Bly et al., 2015). Practitioners as well as scholars are advised to keep an eye on technological development in order to test how digital opportunities can (a) leverage participation in combination with f2f operations and (b) become a viable alternative to f2f communication overall due to ameliorated capacities in knowledge transfer, especially with respect to sustainability-related product characteristics.

4.2.7 Conclusions and Future Research

Face-to-face communication can be beneficial for businesses with a circular business model, as demonstrated in this paper. VK, the study object, was not only characterized by its circular character, but also by its unique shopping experience. Further study could indicate the extent to which the character of the shopping experience determines the potential impact of f2f interventions. Similarly, future research could seek to demonstrate how much other types of fashion sustainability (e.g., based on fair labor or a toxics-free production chain) could benefit from f2f communication. Given the characteristics of the purchasers of sustainable fashion, not all forms of f2f may be equally appropriate. Big-budget, lavish events, for example, may not resonate with the lifestyle and buying psychology of sustainable fashion buyers. Further research could aim to find out what type of f2f interventions are most appropriate for second-hand fashion audiences.

Another intriguing aspect is the overall interest in second-hand clothing. While being introduced to Berlin in the contrasting context of fashion week, the Berlin sales event of VK was profitable. This indicates market interest in used and left-over clothing items. Second-hand fashion, if properly communicated, can be a viable and more sustainable alternative to newly produced fashion. However, and this is another avenue for future research, it should be studied if an increase of second-hand fashion sales does in fact have a reducing effect on linear fashion sales or if they are complementary and thus, might even amount to an increase of overall fashion consumption, satirizing the idea of increased sustainability by consuming second-hand fashion.

4.3 Study Three - Consumer Perception of Online Attributes in CE Activities (published as Stein et al. (2020) "Consumer Perception of Online Attributes in Circular Economy Activities. *Sustainability*, 12, 1914)

Businesses like Airbnb have shown that a successful circular economy (CE) business can operate exclusively online. Although online communication and web appearance attributes have been subject to academic research given accelerated digitization, there is still a lack of knowledge about online attributes and their role in facilitating CE. We close the portrayed knowledge gap by conducting a discrete-choice experiment with best to worst scaling and focusing on the effect of CE experience on the perception of a CE website by ranking nine online attributes, grouped in three subsets. We therefore contribute by identifying online attributes that are perceived as favorable for CE businesses and detect how participation in CE activities affects the perception of these attributes. We find that third-party associated online attributes (e.g., user reviews or third-party guarantees) rank significantly higher throughout CE consumption patterns of the sample, being always amongst the top three attributes. This novel finding on online preferences opens a new direction for further research, as well as allows practitioners to optimize online operations accordingly. Furthermore, we find that users without prior touchpoints with CE have a higher need for information about the business model as compared to CE active users who are more interested in community related attributes.

4.3.1 Introduction

The growing field of circular economy is expanding to new research directions. Studies focused on the policy, business, economic and environmental aspects of such transitions and giving an overview of the state of art on a macro, meso and micro level (Ghisellini et al, 2016). Today, as a growing number of businesses adopt CE and circular systems approach, there is a need to further study the micromanagement aspects of such a transition. In their review on CE, Ghiselli et al. reveal that implementation at the micro level (single company or consumer) is particularly understudied in the fields of green consumption and recycle and reuse (2016). Referring to Ramani et al. (2011), the scholars identify a need for future research addressing consumer choices to support stakeholders in matching consumer needs. In this context, the evolution of information technologies and the internet as a major communication channel appear as a game changer, allowing for new ways of information exchange with customers (Rowbottom & Lymer, 2009). This includes opportunities significantly simplifying processes, e.g., the order process where previously one had to call companies and recite incredibly long product numbers to place an order. In addition to facilitated order processes, information transfer has been affected by digitization as well. With the aid of the internet, companies can find ways to address heterogeneous customers' needs for information on different levels. They can precisely adjust the amount and kind of information, as well as determine how interactive the communication with customers shall be. Furthermore, the internet facilitates the management of information accessibility, timeliness and display at comparatively low cost (Rowbottom / Lymer, 2009; Lodhia, 2006). Yet, as in every relationship as time passes, we have reached a point where digitization may have rendered the relationship between customers and company more complex. Customers are more aware and interested in processes than ever before. In particular, data on social and ecological responsibility are increasingly of interest and might affect customer behavior. While positive information leverages customer attitude towards the company, an absence of it might have the opposite effect (Sheikh & Beise-Zee, 2011). The new and enhanced role of customers presents substantial challenges for companies (Gabriel & Lang, 2006). The high degree of customer involvement may complicate operations and, yet, seems to be necessary to maintain competitiveness.

Various studies researched the impact of online store attributes and website characteristics on customer satisfaction and overall financial performance. Inter alia, website attributes, like quality of system architecture and quality of content, are shown to have an impact on consumer online satisfaction (see, for example, Cheung & Lee, 2005). Although these studies revealed the influence of certain online attributes on a company's web presence, they fail to acknowledge a ranking of these factors and, thus, fail to uncover potential for optimization. Jin et al. (2010) have been among the first aiming to close this apparent knowledge gap by studying marketing and basic online attributes and assuming different levels of impact. One of their findings is that marketing-related online attributes have significant influence on online satisfaction, while other attributes do not. Furthermore, their work emphasizes the difficulty of achieving loyalty online, since no transfer of offline to online loyalty occurs. However, further insights on an actual ranking of online attributes remain untapped. To the best of our knowledge, neither are these questions studied in the context of sustainability and, specifically, circular economy-related businesses. We know consumers have preferences in online attributes, with first, scholars, to study a ranking of these. However, we do not know if these preferences remain the same, switching from linear offers to circular alternatives. The ensuing research questions are apparent: What are consumer online preferences in the context of CE businesses? Do they change? If so, how can managers and entrepreneurs make use of this knowledge to grow their CE-related business?

Considering the recent interest in business models adhering to circular economy (CE) principles which aim to foster a more resource-efficient consumption pattern at a larger scale, indications in which online attributes can foster participation are missing and would be extremely valuable. CE comprises several sustainability-focused activities under one roof and often goes hand in hand with the innovation of a business model. If reaching critical mass, a consequent disruption of an industry can happen, as in the example of Airbnb and the travel/hotel industry. Sticking with this example, Airbnb does not have assets but is mediating supply and demand via their online platform. A lot of CE-based businesses are operating in this manner and, in consequence, are operating solely online. Hence, knowledge about most helpful online attributes of a website based on CE principles can be a crucial drive for their success. In order to

close this knowledge gap, we are studying online attributes in relation to participation in four CE activities, namely: recycling, upcycling, renting and sharing. These activities will be viewed from the perspective of their consumer-centered aspects and not technical features. This means, for example, that technical features of recycling will be neglected. Thus, our research is focused on consumer-centered activities and sectors, making it applicable to a multitude of companies and industries. This study assesses which online attributes have the biggest importance by ranking the nine chosen online attributes and clusters based on participation in CE. The aim is to reveal attributes of relevance in evaluating the website of a CE business with regard to prior experience with consumer-centered CE activities. Our goal is to identify online attributes that are perceived as favorable for CE businesses and to detect how participation in CE activities affects the perception of these attributes.

The remainder of this paper is structured as follows: in section two, we review the pertinent literature. In section three, we describe our method and data. In section four, we present our results, with following discussion in section five. We end with conclusions and future research outlook in section six.

4.3.2 Literature Review

As described in the introduction, there are online attributes consumers prefer, while others remain irrelevant. Taking a step back, this assessment of different attributes roots in the two-factor theory of Herzberg (1966). While various scholars have advanced the initial model—ranging from the KANO model offering four classes of factors (Kano et al., 1984) to the Chitari et al. hedonic versus utilitarian perspective (2008) —the main premise remains as in the original work. Herzberg states that hygiene factors are attributes whose absence can result in dissatisfaction but whose presence does not add to the overall satisfaction (Herzberg, 1966). However, there are motivational factors that do increase satisfaction while their absence does not result in immediate dissatisfaction. Referring to our study setup in the context of digital operations, scholars revealed that convenience of website handling, overall usability, data and privacy confidentiality and credibility can be considered hygiene factors in online environments (Zhang et al., 1999). By contrast, they find motivation factors, i.e., factors whose presence adds to overall satisfaction, to be quality of content and user experience on the website. Jin et al. (2010) based their study also around Herzberg‘s two-factor theory, demonstrating a different level of impact of different online attributes.

Different aspects play into consumer satisfaction and are currently transferred to a digital context. Another study supported these initial findings and emphasized the reliability of information as an important hygiene factor (Cheung & Lee, 2005). Especially communication has been found to be a driver for customer satisfaction (Wagner & Rydstrom, 2001). One particularly important aspect in customer communication is the portraying of the corporate's current position and activities on ethics, environmental and social issues (Kolk, 2008). Furthermore, literature observed that, in some cases, digital communication can lead to even more intimate exchanges (e.g., Whitty, 2008). A study on Airbnb users revealed that users tend to convey a personal touch by using personal names in the comment section (Cheng & Jin, 2019). Instant messengers and/or chatbots have been established as an industry-overarching trend to ensure timely communication with the user and, thus, can be considered a digital mechanism covering aspects of f2f interaction, immediacy of communication and reaction (Bavelas & Chovil, 2000). With regard to communication being a driver for customer satisfaction, channels allowing for exchange

between the company and its consumers can be considered motivational factors. A high activity on social media channels (SM) addresses another aspect of f2f interaction. Depending on the published content, a perceived proximity between the company and users/potential customers can be established. Recent studies indicate that users can even improve their perception of a company‘s reputation when reading comments online as compared to the news, making a comment section a valuable interaction tool for practitioners (Hong & Cameron, 2018).

The relevance of SM can be particularly well-observed in cases of personal branding (e.g., celebrities and influencers) where users feel "close" and "as if they know" the individual they are following. This supports matching the online celebrity with products fitting their personality and perceived values (Santos et al., 2019). Another level of identification is achieved through presentation of the team. This online attribute shows the people behind a specific product and/or service and illustrates their motives to work for the company. This gives users the perception of having and recognizing a contact person in case of questions or the like. The display of "impact on sustainability" usually aims at an emotional attachment with the company brand and offering as basing on pleasing three features of the self: self-gratification, self-enrichment and self-enabling (see Park & Priester, 2008). Thus, users are prone to improve their self-image through using offerings of a company communicating their sustainability impact and feel as more integral individuals (Berger, 2006). Sen and Bhattacharya support the notion that corporate social responsibility (CSR) activities can reinforce an individual’s desire for self-enhancement (Sen & Bhattacharya, 2001). Although consumers might not donate to charity or be particularly interested in sustainable consumption, they can easily address a subconscious desire to support a good cause by purchasing products/services of a company active in CSR (Bhattacharya et al., 2009).

Literature suggests that user reviews have become increasingly powerful in a variety of product and service categories (e.g., Ye et al., 2009). The average rating provides consumers with quick information on a product/service quality, as well as influences their expectation and purchase decision (Zhu & Zhang, 2010; Cui et al., 2012). Next to user reviews, the offer of a guarantee or warranty can influence purchase decision behavior by indicating not only a certain quality standard but also leveraging the relationship between consumers and company (Gupta

et al., 2008; Sahadev, 2008; Peysakhovich, 2014). Although sometimes guarantees such as "service quality promises" are voluntarily communicated, they tend to be regulated by policies and laws (Quadrini, 2005). In consequence, the users can be sure that the information of a guarantee or warranty is linked to a third-party approval and control. Third-party certification initiatives in e-commerce have enhanced consumer confidence and boosted sales (Miyazaki & Krishnamurthy, 2002). Third-party certifiers are private or public committees who evaluate and certify assertions based on a specified set of standards (Deaton, 2004). As providing assurance about the product and/or service, certification can reduce uncertainties and even decrease overall transaction costs that arise from information asymmetries (Deaton, 2004; Tanner, 2000). Similar to guarantees or warranties, third-party certification is one method to display a firm's compliance with standards, values and sometimes also legal requirements, especially when certification is a voluntary evaluation (Meuwissen et al., 2003).

In the context of e-commerce purchases, certifications also significantly increase purchasing prospects due to reduced perceived risk (Kimery & McCord, 2002). These findings are supported by various scholars, suggesting that third-party certification is an effective tool in trust creation. Luo (2002) suggested that third-party certification serves as the creation of trust between the e-vendor and consumers. Although a potential customer may possibly lack their own experience with a company, a third-party logo symbolizes relevant and positive information about a company. Miyazaki and Krishnamurthy (2002) state that these logos denote "values, behavioral intentions, adherence to specific policies or certification standards, technical capabilities, or even satisfaction of prior customers". Sønderskov and Daugbjerg go one step further, implying governmental involvement in certification as a relevant aspect to increase consumer trust towards these tools (Sonderskov & Daugbjerg, 2011). This overview shows that there are already tools and measures in place that can be divided into hygiene and motivational factors and placed into a digital context. While most information in our current economic setup have trickled down to the consumer, making him/her aware of potential pitfalls of linear consumption processes, this is not yet the case for CE offerings. Consumers are in need of information to assess benefits and potential risks of CE offers, making close communication between the company and consumer crucial for a successful practice (Petersen & Riisberg, 2017).

However, we do not make our choices in a vacuum. They are based—consciously or subconsciously—on an assessment of the alternatives, expected risks and rewards (Kahnemann & Tversky, 2013). These factors can be especially relevant when considering participation in a different kind of business model or innovation. Since our choices and preferences are relative to other options, an individual assessment of a singular online attribute with regard to CE is flawed. Alternatives are needed to determine the most helpful attributes, i.e., the ones resources should be allocated to first. Based on these insights and in order to assess the most beneficial online attributes in CE activities, we conduct a discrete choice experiment with best-worst scaling. In accordance with the Ellen MacArthur Foundation (EMF, 2013), the underlying study focuses on consumer-centric CE activities. Our methodology is elaborated in detail in the following section.

4.3.3 Method and Data

Discrete choice model (DCM) is a research method that derives information about the decision-maker via hypothetical situations. Contrary to revealed preferences, i.e., in the form of company data or real-life market tests, participants of a DCM have to make decisions amongst alternatives in a theoretical context. In particular, DCMs with best-worst scaling (BWS) have been featured more and more in academic research due to their high flexibility. Inter alia, BWS has been featured studying marketing activities (e.g., Cohen, 2009), health care topics (e.g., Flynn et al., 2007) and willingness-to-pay (e.g., Louviere & Islam, 2008), as well as evaluating hypothetical attributes of advertisement (e.g., Laczniak & Teas, 2002). The latter served as a conceptual analogy for the underlying research design, as we are also studying attributes of a hypothetical website. Finn and Louviere introduced in 1992 BWS as a subcategory of DCM by (Finn & Louviere, 1992). The scholars establish BWS as modeling "the cognitive process by which respondents repeatedly choose the two objects in varying sets of three or more objects that they feel exhibit the largest perceptual difference on an underlying continuum of interest" (Finn & Louviere, 1992). In other words, respondents were confronted with a set of attributes and chose their least and most preferred answer. While there have been conjoint analyses in the context of consumer behavior and preference in CE (e.g., Borrello et al., 2017), to

the best of our knowledge, the above methods were not used before in the context of online studies to better understand consumer preferences in circular economy-related activities. In the underlying study, the hypothetical context is the website of a CE business, i.e., a business either associated with recycling, upcycling, sharing or renting activities. There was no explicit priming on what kind of CE activity has to be chosen in the imaginative context. In this study, we used DCM and BWS methods, considering that we aim to reveal factors influencing the final ranking, e.g., educational background, general attitude towards off- and online purchasing and demographic situation. Another perk of this research method is the possibility to apply BWS to more than seven attributes as compared to other preference measures, e.g., ranking methods where more than seven attributes affect accuracy and consistency of results (Bettman, 1990). Results of a BWS offer a higher degree of discrimination (Lee et al., 2008). Indirect comparison BWS out-classed other methods, displaying not only the highest discrimination but, also, predictive power. Furthermore, Hinz et al. (2015) promote BWS as a fit for studies with heterogeneous backgrounds in terms of, e.g., education or even culture, due to the high consistency of interpretation across respondents. This is expected to achieve more realistic results than verbal scales (e.g., Likert), because there is no need for a transfer of their preferences into an artificial concept. The binary assessment is intuitive and comparable to real-life purchase decisions, which renders the BWS an indicator for actual customer behavior (Swait & Andrews, 2003).

We use the balanced incomplete block design (BIBD). BIBD allows for each comparison to comprise the same number of items and for it to appear equally often with other items. Yet, only a few BIBDs have maximized symmetry—a BIBD of 9 items is one of these best practices (Street & Street, 1987). Given the limited attention span of consumers, we decided to study not more than 10 items to keep complexity at bay. The only other favorable BIBD below 10 would be 7, making an equal distribution of three subcategories impossible; i.e., the underrepresentation of one category could lead to biased results. Since we rank nine attributes, other ranking methods would not lead to similar methodologically solid results as BWS. Given the state of literature, our experiment focuses on online attributes that are currently in vogue (e.g., chatbots, social media integration, etc.). We also used credibility-enhancing factors such

as third-party certification in order to assess their overall importance for users in the context of CE. We observe whether differences in ranking occur if focusing on different demographic subclusters and different states of participation in CE activities. The observed online attributes were divided into three subgroups. The first subgroup tries to simulate face-to-face interaction digitally. This kind of information is company-issued but adaptive and flexible; i.e., it does react to individual users or, in terms of social media, gives individual users the impression to be part of live events (e.g., Instastories and Snapchat). The second subgroup of attributes is company-issued rigid information, i.e., fixed information pieces/categories on the company website. This cluster comprises an explanation of the business model and its specific perks in order for the user to gain an understanding of the product and/or service and its advantages over linear alternatives. Besides, a "loud brand" has been included into the choice set. While brand prominence generally depends on the degree to which a product has visible markings that help ensure observers recognize the brand" (Han et al., 2010), a loud product is directly recognizable due to its noticeable branding, e.g., logo, design theme or color. This way a company can decide how openly and prominently it wants to display its brand, both on as well as offline. In terms of a loud brand online, the prominence of a logo, overall coherence of design and high recognition value are assumed to show professionalism and a high quality of the respective company offerings. Last, the company can decide to which degree it displays its impact on sustainability. The third subgroup of online attributes introduces third-party information. While the company develops and decides on how far corporate social responsibility (CSR), brand and business model are depicted on the website, the following features are externally issued. The first attribute are user reviews with the common star and text rating.

Table 4.11 depicts an overview of all nine online attributes. These short explanations were displayed throughout the discrete choice experiment, given that the respective attribute was part of the current choice set. This aimed at a consistent understanding of the attributes and, thus, a minimization of survey errors.

Table 4.11: Overview - Observed Attributes

Online Attribute	Explanation
Company-issued flexible attributes	
Instant Chat/Chatbot	Instant communication tool for communication with company. Possibility to reach company representatives in case questions or problems with product/service occur
Team Presentation	Meet the team. This section of the website describes motivation, philosophy and shows the people behind the curtain
Community on Social Media	Social media channels are linked to the webpage, e.g. in form of the last 5 Instagram mentions of the company or number of Facebook-likes. The community implies engagement through a high number of likes and comments.
Company-issued rigid attributes	
Loud Brand	Recognizable branding (logo, font, design). Branding is prominent on website
Explanation of Business Model	A dedicated category on the website that explains what is special about the business and how it adheres to Circular Economy principles. Processes are illustrated to facilitate understanding and delineation from linear alternatives
Impact on Sustainability	Part of website that explains how Circular Economy has an effect on overall sustainability. Shows explicitly, e.g. in form of data, how much waste has been avoided or how much parts have been successfully re-used
Third-party associated attributes	
Guarantee/Warranty	A certain level of service/product quality is promised by explicit company claim. If the product is newly yet sustainably produced warranty is offered. The promises are backed through legislation
User Reviews	Reviews of prior customers with the common "test and star" layout under all products
Third-party Certification	A third-party certification assesses the company and its processes. It tells youclaims of the Circular Economy aspect are true and approved

In order to achieve the optimal experimental design, several premises have to be fulfilled, according to Lee et al. (2008). First, each studied attribute has to appear an equal number of times within the survey questionnaire in order to avoid overrepresentation and, thus, biased results. Second, the combination of items has to be balanced to avoid contextual effects. Third, each choice set has to have an equal number of attributes, with the minimum being three. This structure prevents bias through interpretation by and confusion of the survey respondent. Our experiment was implemented using the online platform DISE (Schlereth & Skiera, 2012). DISE allows for using a balanced incomplete block design (BIBD). A BIBD fulfills all beforementioned criteria for ideal experimental design, resulting in each of the nine online attributes appearing four times with a pair frequency of one, resulting in, overall, twelve choice sets with three attributes in our BWS. A randomizer has been integrated in the DISE questionnaire in order to control for possible order effects.

Overall, the questionnaire comprised five sections: (1) short introduction with briefing, (2) BWS choice sets with a definition of each displayed attribute, (3) additional attributes to indicate tendencies, (4) questions about online and offline consumption (Likert-scaled) and (5) demographic and socio-economic questions. While the additional questions (section 3 and 4) serve as indications for future research topics, the primary focus of this study lies on the BWS of the nine chosen attributes and the understanding of customers preferences in digital operations (see an example of the screen in Appendix A). The results of the BWS are deducted by subtracting the number an attribute has been worst from the number it has been considered best. According to Marley and Louviere (Marley & Louviere, 2005), this easy calculation results in a close approximation of the respective multinomial logit results. In addition, according to Cheung et al. (2016), this analysis is the most common evaluation method of BWS experiments. To sum up, the beforehand introduced nine attributes of the online shops were ranked via a DCM with BWS in order to prioritize implementation for practitioners. This way, we are able to observe which attributes are more important and whether there are specific overarching topics that foster customer acquisition.

In our study, respondents have received the briefing that recycling is considered a usage of product components, while upcycling is the re-using of the product as a whole. Sharing

was defined as a peer-to-peer interaction, while renting involves a third party, i.e., a company who has ownership of the products or services. Respondents were asked to indicate their participation in these CE-adhering activities. Furthermore, they have to imagine the website they are evaluating to be a CE-based business. A pre-testing showed that respondents were confidently differentiating these participation modes and thinking of possible CE businesses and websites, making the priming sufficient. Since the actual type of CE activity is irrelevant to our analysis, the common method variance is negligible, making further tests redundant. We collected the data via an online survey developed with the software DISE. All incomplete questionnaires, as well as questionnaires answered by minors, have been omitted from the sample. In total, 99 fully answered and adequate best-worst sections have been acquired between May to June 2017. This resulted in, overall, 1188 choices made as each of the respondents has been confronted with 12 choice sets. However, only 97 people agreed to share their CE activities; therefore, the two best-worst sections of these respondents were not included in the compared rankings. The sample size is satisfactory and the best practice, referring to an overview of sample sizes in DCMs in health by De Bekker-Grob et al. (2015). Their research revealed a third of DCMs has a sample size of $n < 100$.

Figure 4.9 illustrates the demographics of the respondents in terms of age and gender. Fifty-four percent of respondents are male and 43 percent are female (remaining 3 percent diverse), thus, almost equal to the balanced gender distribution in Germany (CIA, 2017). Referring to age, an age sand clock similar to the overall German population can be observed. Yet, the majority of respondents are between 18 and 25 years old, amounting to 55 percent of respondents. Only 9 percent of respondents are above 50 years old. This is likely due to limited access to the internet in the older population and, in consequence, the online survey. However, this does not imply that older people do not participate in CE activities. Occupation and the highest level of education suggested that majority of respondents are still students, which explained the sample's slight bias in age structure. Over 70 percent of respondents have an academic degree, which furthermore matches the whole German population (bpb, 2013). Twenty-nine respondents indicated to not participate in any activity affiliated with CE; i.e., they did not participate in any recycling, upcycling, renting or sharing activities. This amounts

to almost a third of respondents. The nonparticipants comprise 59 percent male and respectively 41 percent female respondents. Almost two-third of respondents revealed participation in a minimum of one CE activity. Age and education structures appear to be neglectable factors observing CE activities of this sample, since no distribution pattern can be detected.

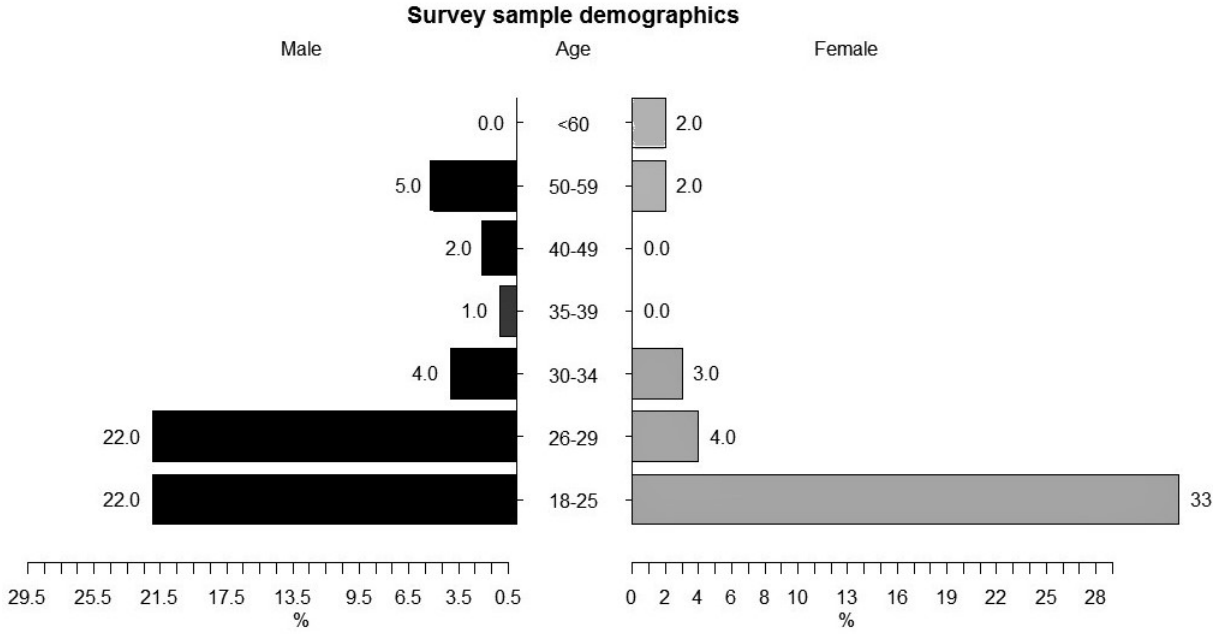

Figure 4.9: Overview survey demographics

Our study is innovative in being the first to conduct a BWS in the context of consumer perception of online attributes in the context of CE business models. Further, we study nine online attributes we divided in three self-developed subsets. These subsets are especially valuable for practitioners, as indicating the scope of action.

4.3.4 Results

The ranking results show that user reviews (100) and guarantee/warranty (88) score both high and are the most and second-most helpful online attributes, respectively. Table 2 shows the absolute score (times named best minus times named worst), as well as standardized and weighted scores. The explanation of the business model (66) third-party certification (63) are important as well. Impact on sustainability (55) was rated moderately high. On the other hand, a high activity on social media (36), instant chat/chatbot (33) and the presentation of the team (32) were rated low. A loud brand is ranked lowest (29), indicating that these attributes have little significance in the evaluation process of a website of a CE-adhering business. Less important attributes are interpreted as the ratio relative to the most important attribute. Consequently, this does not mean that lower ranked attributes are not helpful at all but only in comparison to the other attributes (Loose & Lockshin, 2013).

Table 4.12: Results and ranking of discrete choice model with best-worst scaling

Rank	Item	(B-W) Score	SQRT	Std Score	Std Weight (%)
1	User reviews	147	1.97	100	20
2	Guarantee/warranty	137	1.73	88	18
3	Explanation of business model	71	1.29	66	13
4	Third-party certification	57	1.25	63	13
5	Impact on sustainability	20	1.08	55	11
6	Activity on social media	(80)	0.71	36	7
7	Instant chat/chatbot	(102)	0.65	33	7
8	Team presentation	(119)	0.64	32	6
9	Loud brand	(131)	0.57	29	6

Figure 4.10 illustrates the standardized ranking in decreasing order of the three subgroups of attributes: company-issued flexible (grey), company-issued rigid (green) and third-party information (black) and which subgroup of attributes plays a more important role. It can be seen that, in the overall ranking, the online attributes associated with third-party information are especially well-ranked. User reviews (top rank), guarantee/warranty (2nd place) and third-party certification (4th place) are all in the first half of the ranking results, scoring in sum higher than both other subgroups. All online attributes in this group yield a combined best-worst (B-W) score of 341, as compared to 40 and 301 for the combined ranking results for company-issued rigid and flexible attributes, respectively. Comparing the overall ranking with the rankings

focusing on participation intensity, it can be seen that there are differences. Respondents who are participating in all listed CE activities, i.e., in recycling, upcycling, renting and sharing, support the notion that user reviews are the most helpful online feature of a web presence. However, they consider a prominent branding more important than the overall sample, ranking a loud brand moderately high (6th place).

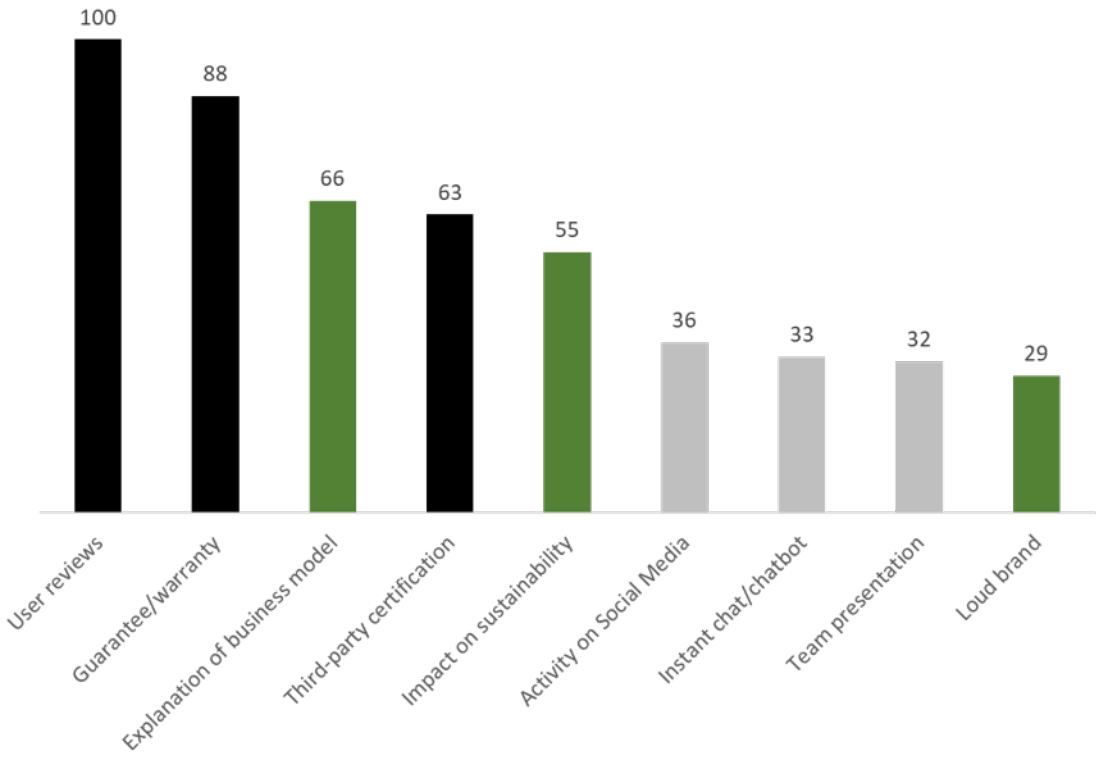

Figure 4.10: Results clustered in company-issued flexible (grey), company-issued rigid (green) and third-party associated (black) attributes. Standardized score.

Table 4.13 compares the overall ranking with the ranking of respondents who participate in (1) all CE activities, (2) at least three CE activities and (3) do not participate in CE activities at all. The ranking illustrates that, although differences in ranking are observable, the three online attributes associated with third-party information consistently score amongst the highest attributes. Thus, it can be concluded that these attributes have the highest importance and are the most helpful for users evaluating a web presence. The results show a high importance of third-party associated online attributes for consumers. Throughout all participation modes in CE activities, at least one of the online attributes user reviews, third-party certification and guarantee/warranty scored amongst the top three. This shows the importance of objective assurance for consumers when confronted with an offering that diverges from standard procedure. The high significance of third-party-associated information leads to the perception that the company by itself has only limited power over the consumers' perception of its trustworthiness and quality standard. Third-party-associated information is necessary to achieve the most helpful website design for purchase evaluations. The high ranking of user reviews shows the importance of social proof and authentic information on product and/or service.

Table 4.13: Results and ranking of discrete choice model with best-worst scaling.

Item	Overall Rank	Participation CE Activities		
		All	At least 3	None
User reviews	1	1	1	2
Guarantee/warranty	2	2	2	1
Explanation of business model	3	8	4	3
Third-party certification	4	3	3	4
Impact on sustainability	5	4	6	7
Activity on social media	6	4	6	7
Instant chat/chatbot	7	7	7	5
Team presentation	8	8	8	8
Loud brand	9	6	8	9
n (number if respondents participating in CE)	3	18	29	

4.3.5 Discussion

Our results offer various managerial and practical implications. Companies can direct existing customers into marketing and sales channels and motivate customers with positive reviews to deliver user-generated content for social media. This would give a more personal and transparent touch to the respective company while indicating social proof through someone's loyalty towards product and/or service for new customers. This measure could probably be used across all social media channels, as well as be a core aspect in commercials and performance marketing (for example, in the form of banners featuring testimonials). Consequently, instead of fabricating content, a company can leverage its existing customers and use their loyalty and engagement to leverage credibility and service perception in addition to featured user reviews. Only satisfied customers would agree to represent a product or service, resulting in an intuitively positive connotation. Hence, the positive result of user reviews is advised to be transferred to company-controlled and low-scoring online features as social media channels. It is advised to actively integrate customers into the social media content generation. This suggestion is supported by Gounaris and Venetis (2002), who suggest that service quality and customer bonding are antecedents of trust. Both of these aspects can be focused and fostered by integrating real consumers and their stories into marketing channels.

While these findings hold true also in a non-CE context, most consumers might not be aware of the advantages of CE business models and, thus, need to be educated even more about CE mechanisms through various marketing channels. Information has to be consistent with company values and, therefore, support the overall credibility of the company. Second, expectations are automatically managed through real customer feedback used in marketing. Third, by remaining true to customer feedback, i.e., in terms of actual user reviews, and using it combined with important information, a social proof is established. This serves an overall decreased risk perception. In the context of CE, trust and decreased risk perception are of particular importance as an integral part of the business model, e.g., renting a room at a stranger's house or driving with a stranger requires a certain level of trust. As a consequence, it is especially vital for CE businesses to integrate the user more into marketing activities and to incentivize more user reviews. Referring to literature, the number and valence of user reviews can positively influence

customer decision processes. A large volume of user reviews results in higher attention for a specific product and/or service and, hence, increases the probability of a purchase (Liu, 2006). Moreover, Ghose et al. (2012) attributed a positive impact on user choice to the valence of user reviews. According to Goes et al. (2014), online interactions with the user can result in an increasing number of reviews as well, supporting the beforehand mentioned cross-channel interaction. Thus, managers are well-advised to encourage users to review their products and services in order to increase the positive effects of the online attribute user reviews.

Another major implication can be derived from the ranking of a third-party certification. According to Busch et al. (2005), credibility of a third-party certification requires a high level of objectiveness and independence of the certifying initiative. Jiang et al. (2008) indicate that the sheer exposure to certification logos is influential in purchase decisions in e-commerce. In the case of CE business, various certifications exist, but no exclusive certification for CE businesses exists to date. Hence, customers connotate approval and high-quality standards with third-party certification. We therefore recommend to consider an industry-overarching certification developed by practitioners and scholars to increase information transfer in and attention for CE businesses, as well as adapt a quality standard. The corresponding committee should comprise CE company representatives, scholars, institutional representatives, etc. to ensure objectivity and, thus, increase the validity of the certification (Busch et al., 2005). In addition, partners like the Ellen MacArthur Foundation, a think tank specializing in CE, can promote the certification and boost credibility and expertise. In order to develop a universal set of evaluation criteria, CE has to be defined more clearly. The development of appropriate evaluation criteria requires intensive work and re-work. Thus, while leveraging user reviews, integrating user content in social media are short and medium-term measures; the development of a third-party certification is suggested as a long-term measure.

Furthermore, the results show that ranking differences between respondents with prior CE experience and respondents without CE experience exist. Respondents without prior CE touch-points rank explanations of business models and respective benefits of CE activities higher than respondents who are highly active in CE and participate in all four activities. The latter are more interested in explicit information on how the company positively impacts sustainability. The

respondents also rank a loud brand and activity on social media as more important, implying an increasing focus on communities with increased activities in CE. Respondents with a high exposure to CE rank the explanation of the business model and its benefits according to CE principles less positively, indicating that this information is less important when the overarching mindset is already established. These findings are especially relevant for practitioners, as they indicate that, for customer acquisition in target groups without CE experience, more information on business models should be displayed as compared to a focus on community and branding with a CE savvy target group. These findings are recommended to be further researched with a larger sample of respondents who participate in all CE participation modes and, preferably, in a supervised experiment with, e.g., simulation or usage of a website.

Overall, it is important to conclude that the results of the experiment show great potential for companies that are considering optimization of their web presence. The ranking helps to prioritize measures and funds. Yet, while online attributes linked to third-party-associated information ranked higher in the experiment, this does not mean that other attributes should be completely neglected. The ranking is relative; thus, all attributes can be important, and the results should be interpreted accordingly. Another key finding is that the higher the respondent's exposure to CE, the less relevant they consider explanations of the business model and benefits in comparison to linear consumption. Hence, managers and entrepreneurs introducing CE products and services are advised to address the CE background of their target audience in order to optimally foster participation and respectively boost revenues. Our study further contributes to the field of study related to CE and consumers. Given we conduct the first BWS for online attributes in the context of CE activities, our results are prime insights into consumer engagement in CE and, in particular, the effect of digital tools on consumer activation. Addressing the knowledge gap other scholars illustrated (Ghisellini et al., 2016), we add knowledge to the understudied field of the implementation of CE activities on a micro level. One limitation of our work is the limited number of attributes studied. While we are confident that our choice of attributes is relevant, it is only a fraction of potential attributes that are used in online operations and, therefore, ranked in relative comparison. Especially, considering the fast pace of technological innovation, it is possible that there are even more relevant attributes to support

a transition to CE. Second, the study was general on several CE activities and not on specific aspects of specific CE activities. It could be that recycling activities online (like applying for a free shipping label to return your old phone) might be very different than reserving a place with Airbnb, and therefore, the attributes rankings might change.

4.3.6 Conclusions and Future Research

Our study demonstrates the importance of different online attributes in order to better engage consumers in online activities related to circular economy activities such as recycling, reuse or sharing of products. Although some of our findings might hold for any product, we think that it is especially important to test such preferences in the context of promoting CE activities, as the use of the internet and IT platforms to promote such behavior is rapidly increasing. Our work contributes to the emerging field of CE by providing a survey setup that researchers and practitioners can adopt to expand knowledge of online preferences and their interplay with participation in CE activities. This tool can be used in different countries in different stages of circular economy policy and practice designs and implementation to better inform industry and policy. Our results show that participation in CE activities influence perceptions and shifts focus, resulting in a different ranking of online attributes. This means that different strategies need to be adopted for different types of consumers, depending on their knowledge and experience with CE activities.

For practitioners, our study offers valuable insights on how to deal with consumer perceptions in order to increase participation in their CE-related businesses. While our results show that third-party related attributes are the best ranked, entrepreneurs and managers are still able and strongly encouraged to navigate all processes around these attributes in order to maximize conversion. Practitioners should also be motivated to apply our study setup to their company-specific context and rank additional/different attributes to determine their specific action plan.

Based on this initial study, we offer several pathways for future research to expand on this topic. While user reviews and guarantee/warranties are already commonly used, one interesting direction for further research would be in how far these mechanisms can be optimized and potentially monetized. Studies revealing how high the willingness-to-pay for additional information in either form are strongly recommended. For example, a study focusing on willingness-to-pay for third-party CE certification should be conducted to foster understanding for the potential of this measure in the context of CE. As our results suggest, it is also important to further study the differences between respondents without prior CE experience and respondents who are highly involved in CE activities, as they have different preferences and expectations.

This leads to the expanding body of literature that supports the need for further segmentation of what we might define as the "green" consumer, given the different aspects and complexity of such behaviors (Tchetchik et al., 2019).

Due to the limited number of attributes we tested, we suggest to apply our study design for a multitude of attributes and compare the best-scoring ones across singular studies. We also suggest breaking down the analysis to specific CE activities, as it might be that the ranking will change in the more specific contexts, as well as expand research from a single location to an international context. A comparison of different countries might also be interesting with regard to cultural differences and levels of acceptance of CE in different geographies. Further, future research is advised with regard to the interplay of personality traits and consumer perceptions of online attributes. The scholars Mulyanegara et al. (2009) and Matzler et al. (2006) illustrated a significant relationship between personality traits and brand preferences of consumers, which might be transferable in the context of consumer perceptions of online attributes in the context of CE.

5 Implications

A transition to CE involves multiple actors, consumers being a particularly crucial and largely understudied one. In order to position CE as a viable alternative to linear consumption, i.e. reach a momentum where CE as a system change can take off, an understanding of consumers in CE is necessary for both academics and practitioners. All three studies portrayed in this dissertation dealt with the overarching research question "what drives consumer participation in CE". Each study examined an aspect of consumer behavior in CE, answering the specific research questions stated in Chapter 3 with empirical analyses and quantitative results (see Chapter 6 for summarized results). While each study comprises managerial implications on a case-specific level, this section aims to summarize business strategies for entrepreneurs and other front-runners, especially in SMEs, and hence, to emphasize factors for an accelerated diffusion of CE principles and engagement of consumers in CE business models.

As mentioned beforehand in Chapter 2, one factor rendering a large scale transition to CE difficult is that most activities according to CE principles remain niche. In order to expand the visibility as well as consumer base of CE activities an understanding of drivers for participation is necessary. Study 1 revealed that besides personality traits, external motivational factors are main factors to achieve conversion from a potential to a paying and active customer. This is especially interesting given that CE comprises different sub-concepts and hence, different activities. Identifying that participants of either CE activity share personality traits and motivation, illustrates a social consensus between participants in CE.

This is supported by results of Study 3, revealing that CE exposure affects evaluation of online attributes in the respective context. Survey participants who encountered CE and are participating in one or multiple CE related activities differ in their perception of websites in

context of CE. While survey participants without prior exposure to CE require social proof and objective assurance in form of third-party certification, participants with prior experience in CE contexts consider these attributes as less relevant. Besides third-party attribution, social proof in form of f2f interaction as suggested by the results of Study 2 is shown to be an effective tool for customer acquisition. The combination of intangible information transfer via kinetics and mimics and the accessibility of additional and informal information about benefits of CE activities, diminishes perceived risk through enhanced transparency, resulting in above-average conversion.

All of these results, illustrate that in order to scale operations customers without prior CE exposure need to be treated differently than CE aware consumers; i.e. potential consumers new to the subject of CE require a specific and adapted approach to ensure successful customer acquisition. Based on the underlying studies these factors can be broken down to (1) additional information on processes, (2) transparent communication of benefits and (3) objective approval of information in form of third-party input. In terms of marketing and communication business strategies are advised to incorporate these three factors in all channels penetrated. Being more explicit, a business is recommended e.g. to incentivize current customers to act as advocates and review the product/service on Social Media and/or sales channels. At the same time external certification for sustainability, trustworthiness and proven sustainability of the offering is advised. The combination of these two activities addresses the consumer's need for social proof and integrates active customers into operations. Therewhile customer retention can be achieved with classic online marketing tools, that proved to be difficult in achieving successful customer acquisition in the context of CE (see Study 2 for details). Especially knowledge on underlying and common personality traits of CE participants and associated motivation allows to build cohorts and adapt customer acquisition and communication accordingly. More explicitly, different marketing campaigns can be targeted specifically at personality and motivation of identified customer persona. This approach can also translate in varied activities at a f2f event in order to cover a broad range of motivation. In this context research on further personality traits would be extremely beneficial, allowing for the development of an archetype CE participant and in best case a delineation of early-adopters from later-stage customers. This plays also into

general transitions research aiming to understand how to engage different actors in transition to enhance their respective contribution to a system change.

Referring to entrepreneurs, SME-owners and front-runners within these businesses, the identification of proven operations to enhance conversion in customer acquisition and retention as well as knowledge about underlying drivers for participation aim to be an incentive to deal more thoroughly with the concept CE. While SMEs including start-ups are known for their capacity to innovate and disrupt, various barriers have been acknowledged by practitioners and academics. Different scholars identified that limited resources in terms of time, capital, expertise and HR remain obstacles for SMEs in implementing measures addressing sustainability (i.a. del Brio, J. & Junquera, B., 2003). Furthermore, Chu and Schroeder state that disrupting the industry regime is also perceived as an obstacle (2010).

Lacking knowledge about sustainability and associated concepts, e.g. CE results in further uncertainty and thus, quite logically in hesitation in implementing actions according to CE principles. Given the resource restriction on different levels, SMEs are more cautious with their movements. Hence, business operations having profitability and customer acquisition at their core are likely to be a helpful motivation in implementing CE measures. Having the situation of SMEs and entrepreneurs in mind, this dissertation serves as an initial impetus for change. By assessing short as well as medium and long-term business strategies, increase confidence of SME managers and entrepreneurs as crucial actors for a bottom-up transition towards a CE. While e.g. f2f interaction proved to have a short-term effect, long-term this tool is also a lever to build a brand identity and active community. The (field) experimentation focuses on effectiveness and contrary to other research (e.g. Hamari et al., 2015) all studies assess actual participation. While this dissertation is not able to address all possible business strategies, it certainly sheds light on the consumer in CE and introduces first proved measures on case-level allowing SMEs to act more confidently and resource-efficient in the field of CE. This new-found knowledge about consumer behavior and exemplification of measures addressing data-based findings aims to encourage actors of SMEs to seize their role in transition to a CE.

6 Conclusion and Avenues for Future Research

Quoting Borrello et al. (2017): "little is known about consumers' willingness to participate in [a CE]". This dissertation addresses this blind spot in CE research and advances findings in consumer behavior and operations in CE to facilitate a system transition. Three empirical studies using different methodical instruments have been conducted in order to identify drivers for participation in CE as well as leveraging measures in operational context. The findings of the three studies complement each other and shed light onto the so far neglected customer side of CE. They further show avenues for future research and have practical implications.

The first study consists out of a pre-study and a modified study based on the respective insights. The pre-study observes three personality traits - trust, cynicism, locus of control - and their effect on participation in CE activities. Four participation modes derived from the EMF's cycles of value creation (recycling, upcycling, renting and sharing) have been summarized in the outcome variable. A data set of 604 respondents has been collected. Based on the data set a structural equation model (SEM) was calculated and revealed that only trust is a significant personality trait for participation in CE. This lead to the rejection of hypotheses 2 and 3, which conjecture that cynicism and locus of control do also have an effect on participation in CE. Trust is a personality trait and therefore fixed from a theoretical point of view to a certain degree. Yet it is also one of the few personality traits that can be leveraged throughout an individual's life. Furthermore, decision making in real-life is way more complex making it crucial to observe the effect of motivation as well. In order to adhere to these premises, intrinsic and extrinsic motivational factors have been studied with respect to their effect on participation in CE. Since the consistency

of results throughout all participation modi in the pre-study, the variable CE, comprising the four observed activities, has been accepted for further research. Five motivational factors have been chosen based on literature and divided into intrinsic and extrinsic motivation. These factors are (1) financial, (2) practical, (3) reputational, (4) social and (5) idealistic motivation. A modified SEM revealed that a latent variable, comprising all motivational factors has a indirect effect on participation, mimicking the results on of the personality trait Trust in the pre-study. Examing the direct effect of the five motivational factors, a significant direct effect of extrinsic motivation on participation in CE is revealed. Consequently, this poses the question what affects trust creation and fosters motivation and moreover, how academic findings can be translated into practical implications and hence improve operation management in the context of CE.

The second study picks up where study one concludes and deals with measures leveraging trust development and the associated knowledge transfer. In this context, literature describes face-to-face interaction as a powerful tool in trust creation. The study asses its potential within the CE and thereby challenges the findings of study one. Study two employs a random allocation experiment at a private event of a second-hand fashion start-up. The experiment was conducted during Berlin Fashion Week 2017. 100 coupons have been randomly distributed via goodie-bags to guests at the start-up's private f2f event. A few days after the Fashion Week a regular sales event of the second-hand fashion start-up took place in Berlin. The study analyzes how many coupons from the f2f event have been redeemed and what the average basket size of coupon users was as compared to the regular attendees of the sales event. The hypotheses were that both dependent variables, (1) coupon redemption and (2) average basket size after f2f event would exceed (1) industry average and (2) average at the overall sales event. These hypotheses are confirmed within the study, as 11 per cent of coupons have been used as compared to an industry average below 1 per cent (NCH, 2014). Furthermore, the average basket size of customers after the f2f was 11.8 per cent higher than the average basket size of all sales event visitors. These results indicate a leveraging effect of f2f interaction in CE activities and thus, make f2f an interesting and powerful tool for customer acquisition in the context of CE. The obvious drawback to f2f activities are their high resource demand and missing scalability. Looking for scalable alternatives and mechanisms the leap from offline operation to online is a logical

one. Especially, considering that majority of CE businesses like Uber and Turo are operating asset-less and position their online platforms as a mediator between supply and demand, the questions arises how trust development can be enhanced online.

The third study consequently deals with this question. Study three ranks nine online attributes with regard to their importance and helpfulness for users/customers in assessing a CE related web presence. A discrete-choice model with best-worst scaling has been applied to the data. The findings revealed that user reviews are the most important online attribute, whereas loud branding the least important in relation to all other attributes in the ranking. Further, the study finds that online attributes which are third-party associated, i.e. not issued or regulated by the company itself, were scored particularly high by participants. These attributes include governmentally regulated warranty and guarantee promises, user reviews and certification. The importance of these online attributes is amplified for users without prior experience with CE. Online attributes conveying pure information, e.g. explanation of the business model and the explicit benefits as compared to linear alternatives have increased importance for respondents without prior touch points with CE activities. The more experienced the respondent is with CE activities, i.e. participating in more than one up to all consumer related activities, the worse ranked are online attributes on explicit information about benefits. Overall this dissertation revealed an increased need for information and transparent communication with the consumer in CE. Consumer behavior is based on a high level of trust. Trust toward the company offering is thus a significant driver for participation. Compared to the currently common linear offerings consumers require understanding of the business model and its circular aspects to consider participation in CE offerings. To increase trust several operational measures can be employed that are aligned with Webb et al.'s suggestion of "repetition and reinforcement" (2009). In this dissertation I assessed impact of both off and online operations, uncovering that f2f interaction and third-party associated online attributes as especially beneficial in customer acquisition. Paired with repeated information on CE benefits reinforcement via f2f interaction and adapted online presence is suggested to break linear consumption regimes. The higher the exposure to CE, the higher the interest in specific company information and community. At this stage online marketing tools and a high penetration of social media channels is expected by customer

and hence needed for their retention. The high involvement of business cooperation in this dissertation ensured an increased level of practical relevance. Thus, multiple direct ways for CE companies to implement the derived practical implications are shown in each of the three studies. With the regards to the initial research question on how the consumer affects a transition to CE and respective operation management, the results of the studies can be comprised to state that the role of the consumer is important, yet complex within a CE environment. CE is a system with intertwined activities that requires a change of mind set in production but also in consumption, making it a process that necessitates proactive involvement of the consumer. The novelty of CE products and services can be overwhelming for consumers and hence needs to be addressed thoroughly and as transparently as possible in order to increase trust and decrease perceived risk.

While offline operations in terms of events and f2f interaction are difficult if not even impossible to scale and also resource-intense, they can be especially valuable for entrepreneurs and managers initiating new products and/or services according to CE. Offline operations can help to acquire initial customers and build a solid community that in subsequence attracts further consumers through organic social proof. For practitioners the findings of this dissertation recommend to utilize offline operations rarely and well planned in order to operate most resource-efficient. Further these these activities should be supported through targeted and pro-active digital activities as well as an optimized web presence as discussed in study three.

Referring to the research questions initially posed, the underlying research managed (1) to prove CE as a valid concept, (2+3) personality traits and motivational factors as drivers for actual participation and (4+5) leveraging factors for offline and online operations in CE in terms of f2f interaction and preferred online attributes. This dissertation is an initial step in elucidating the unknown terrain of consumer behavior in the context of CE and its impact on operations currently taking place mostly within the start-up sector. These first studies pioneer in this field and show revealing findings about the consumer role in CE. They thus lay the foundation and open up avenues for future research. Further, personality traits and online attributes need to be studied in more detail. Various personality traits and online attributes have been beyond the research scope of my studies. However, additional personality traits and online attributes can also impact CE operations. Thus, future studies expanding my initial research focus are

strongly encouraged. In addition, given increased digitization throughout all industries, digital alternatives to f2f interaction should be studied to detect potential alternatives to establish a consumer base. Furthermore, some researcher move away from the consumer as an individual, considering explicitly the "collective" and community-centered aspects of consumption (for example Belz & Peattie, 2009). Given the underlying results of a similar personality trait, perception of online presence and increased relevance of community of CE participants this extension of research perspective could be particularly interesting in the context of CE. Finally, it has to be noted that all studies have been conducted in Germany. While it can be assumed that most findings are transferable, similar research in different cultural contexts is recommended to reveal further influencing factors. There are many questions to be answered and this dissertation is only able to cover a small part of possible research directions and hence, lays the groundwork within the field of CE. It encourages further research and aims to serve as an impetus for scholar and practitioners in evaluating consumer behavior and operations in CE.

Taking a step back and considering the bigger picture, this dissertation achieved not only specific case results but more than that an increased awareness for the consumer's role in CE activities and for a system transition. Widely neglected beforehand, the consumer as a main driver for a system change can be confidently assumed. Already minor tweaks targeted at specifics of CE activities and consumers more likely to participate because of their personality and/or motivation result in increased participation in CE business models, leading to increased profitability. Knowledge about mechanisms affecting consumer behavior does not only support operations on a micro level but also leverages confidence and peceived security of entrepreneurs and SME business owners in innovation related to CE. Consequently, CE will be perceived as less risky and thus, more favorable on a meso level as well. This mindset is necessary to facilitate an overall system change leading to a sustainable consumption pattern and economy. While this dissertation only sets stage to further research on consumer behavior in CE, it certainly shows the increased importance of understanding what drives consumers to consume differently and how entrepreneurs and managers can help consumes to change their consumption behavior accordingly. Re-thinking the way we consume and produce on a large scale, requires re-thinking of micro operations first and especially understanding the consumer as a main actor in a bottom-

up system transition. Only acknowledging the importance of consumers and integrating them actively into the processes, our economy and society can be reshaped step-by-step for the better resulting in a sustainable lifestyle for our and the next generations.

Appendix

A

Table A1: Survey Demographics: Age

18-25	25-30	31-40	41-50	<50	OVERALL
362	125	67	29	21	604
60%	21%	11%	5%	3%	100%
81%		11%	5%	3%	100%
92%			5%	3%	100%
97%				3%	100%
100%					

Table A2: Excerpt Survey Questionnaire

Construct:	Item	Estimate	Std.Err
Trust	I have no problem renting my apartment to strangers.	1.840	0.153
	I have no problem renting the apartment of a stranger.	2.260	0.175
	I leave the door often unlocked.	4.311	0.255
	I have no problem renting out my most expensive clothing item.	3.021	0.202
	I have no problem renting a very expensive clothing item.	2.951	0.189
Cynicism	I agree: No good deed goes unpunished.	2.322	0.148
	I often question the motives of others.	1.412	0.166
Locus of Control	I think I can have real impact on society.	1.478	0.120
	It does not have impact if I change my consumption pattern.	1.405	0.171

Table A3: Results: Recycling

Regressions:	Estimate	Std.Err	z-value	P(>|z|)
ATT ~				
TRS	1.795	.523	3.433	.001
CYN	.654	.486	1.346	.178
LOC	-0.047	.371	-0.126	.900
Recycle ~				
ATT	.064	.029	2.226	.026
TRS	-0.098	.105	-0.938	.348
CYN	.086	.118	.727	.457
LOC	.000	.088	.001	.999

Table A4: Results: Upcycling

Regressions:	Estimate	Std.Err	z-value	P(>|z|)
ATT ~				
TRS	1.847	.546	3.380	.001
CYN	.768	.587	1.307	.191
LOC	-0.120	.439	-0.273	.785
Upcycle ~				
ATT	.159	.044	3.594	.000
TRS	-0.173	.153	-1.134	.257
CYN	-0.252	.227	-1.112	.266
LOC	.196	.157	1.251	.211

Table A5: Results: Renting

Regressions:	Estimate	Std.Err	z-value	P(>|z|)
ATT ~				
TRS	1.900	.574	3.308	.001
CYN	.702	.533	1.317	.188
LOC	-0.074	.401	-0.184	.854
Rent ~				
ATT	.004	.035	.108	.914
TRS	.416	.172	2.423	.015
CYN	.126	.158	.794	.427
LOC	-0.103	.116	-0.893	.372

Table A6: Results: Sharing

Regressions:	Estimate	Std.Err	z-value	P(>|z|)
ATT ~				
TRS	1.853	.547	3.388	.001
CYN	.779	.602	1.294	.196
LOC	-0.129	.449	-0.289	.773
Share ~				
ATT	.083	.031	2.639	.008
TRS	.213	.126	1.689	.091
CYN	-0.014	.134	-0.105	.916
LOC	.006	.099	.056	.955

Table A7: Mediation: PT ~TRS

Coefficients:	Estimate	Std.Err	t-value	P(>|t|)
(Intercept)	.12378	.04315	2.868	.00427**
TRS	.09987	.01112	8.984	<2e-16***

Table A8: Mediation: ATT ~TRS

Coefficients:	Estimate	Std.Err	t-value	P(>|t|)
(Intercept)	3.56789	.16156	22.08	<2e-16***
TRS	.50891	.04158	12.24	<2e-16***

Table A9: Mediation: PT ~TRS + ATT

Coefficients:	Estimate	Std.Err	t-value	P(>|t|)
(Intercept)	-0.15811	.05593	-2.827	.00486**
TRS	.05897	.01193	4.945	9.96e-07***
ATT	.07965	.01054	7.553	1.63e-13***

A10 - Study Two - Stein et al.(2020) "Face-to-Face Communication as A Tool to Support Second-Hand Fashion Sales: A Field Experiment at Fashion Week in Berlin". *Sustainability*, 12, 1758)

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Face-to-Face Communication as A Tool to Support Second-Hand Fashion Sales: A Field Experiment at Fashion Week in Berlin

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Abstract: We conducted a random allocation experiment at fashion week in Berlin in 2017, testing how face-to-face (f2f) communication affects sales of a fashion start-up focusing on second-hand. The experiment revealed that 11% of guests of an f2f event afterwards turned paying customers with an average basket size 11.8% higher than the overall sales event average. We add insights to research on entrepreneurial practice as well as on offline operations in the context of circular consumption in fashion, exposing the leveraging effect of f2f communication for customer acquisition and revenue of start-ups in the field of sustainable fashion.

Keywords: second-hand fashion; field experiment; fashion week; face-to-face-interaction; event marketing

1. Introduction

There are many perceptions of sustainable fashion among consumers, such as green, fair trade and slow fashion [1]. Some consumers also include lifecycle stages such as laundering, use, re-use and disposal in their decision-making processes [2]. In light of this, second-hand fashion has come to be regarded as a means to mitigate linear consumption and hence raise the level of sustainability in consuming fashion. However, customer acquisition remains a challenge for most businesses with sustainable business models such as rental and second-hand fashion.

In fashion, face-to-face (f2f) communication has become widespread, even the industry standard, to support information transfer. The increased standardization in fashion retail across regions and new technologies, facilitating replication of competitors' design offers have challenged the fashion industry strongly in the last decades [3]. The goal of differentiation is mostly met by a strong brand, community orientation and focus on communication with target customers to create and maintain competitive advantages [4]. Given the need to remedy negative environmental and social impacts of current fashion business models [5], our research examines whether f2f communication has a leveraging effect in sustainable fashion: How does f2f communication support the sales of second-hand fashion even if new and unworn options are available at the same time and in the same context? In order to examine how f2f communication affects second-hand fashion, Vinokilo (VK), a German fashion start-up, agreed to participate in a field experiment at fashion week in Berlin in 2017. By providing historical data of former events and randomly distributing a tracking coupon at its invitation-only f2f event at fashion week in Berlin, VK allowed for a unique opportunity to collect consumption data. With the help of the acquired data, we analyzed how f2f communication, in the form of an event, results in incremental sales and how it affects average basket size.

Consequently, this paper contributes to the area of sustainable fashion by conducting a field experiment in the form of an f2f event at fashion week in Berlin. While the leveraging effect of f2f communication in sales of linear and first-hand offers has been widely demonstrated in prior research, second-hand offers comprise different product characteristics, making the effect of f2f communication questionable. Second-hand fashion fails to have the newness and up-to-dateness that makes regular first-hand fashion trendy from the get-go, relevant for the current zeitgeist and attractive to consumers. In line with the findings of Guiot and Roux [6], Cervellon et al. identify price sensitivity and frugality as the main drivers to purchasing second-hand fashion [7]. Further, these scholars reveal that ecological drivers rarely influence second-hand purchase behavior, supporting Morgan and Birtwistle's claim that while eco-conscious mindsets are prevalent, corresponding behavior is not [8]. Since prices are not subject to change as compared to, e.g., emotional drivers for purchases, it could be assumed that f2f communication is less likely to make a difference in second-hand fashion sales. Currently, there is no research on f2f communication and its effect on second-hand fashion sales specifically. We close this knowledge gap by conducting a field experiment studying f2f communication in relation to second-hand fashion sales. The insights thus derived allow us to determine the impact of f2f communication on incremental sales on a short-term basis, making this experiment beneficial also for practitioners in small and medium sized companies toying with the idea of an f2f event.

2. Overview: Face-to-Face Communication in Fashion

Sustainability is a complex topic, also in fashion. While a consensus about a need for change "for the better" exists, measures across industry vary immensely. Moreover, with companies like H&M burning overstock [9] while promoting an image as a sustainability pioneer, consumers are left confused and sceptic about sustainable fashion offers. This state of the industry is one major reason why communication about sustainability is fundamental to driving sustainable fashion. An open discourse legitimates sustainable offers [10].

Face-to-face (f2f) communication is largely considered the most beneficial method of communication [11]; f2f communication adds to verbal information involving nonverbal visual cues through kinetic and mimic [12]. Since communication on this level is usually unconscious, it provides further information in interpersonal exchange [13]. Another benefit of f2f communication is the development of an instant discourse where ideas and opinions can be exchanged, and disjointed discussions can be avoided.

In the context of sustainable fashion, f2f communication is relevant at various stages. The importance of f2f for the fashion industry becomes evident when considering current business practices. Fashion retailers turned from product to buyer driven supply chains and initiated co-operations in diverse market environments [14]. Although outsourcing production has become common practice, it initially resulted in considerably longer lead times and convoluted supply chains due to geographic distances, because of complex import/export processes [15,16]. The theory that manufacturing in low wage countries would automatically result in significant cost savings had to be questioned. Scholars highlighted that by interrupting the intermingled creation processes, information transfer was complicated. The lack of effective communication resulted in inaccurate deliverables and thus, led to cost intensive reworks [14].

These problems illustrate the necessity to preserve tacit information beyond local milieus and emphasize the high relevance of interpersonal communication [17]. Similar to other forms of expert knowledge, fashion knowledge centers itself in certain places—most famously the fashion metropoles of Paris, Milan, London and New York [18,19]. Not only during the fashion weeks are these key locations the cradle of new trends. In these cities, a tacit understanding of ideas is promoted by factual proximity. According to various scholars, the transfer of knowledge in fashion is fostered by proximity in local knowledge hot-spots and through the initiation of knowledge communities [20,21]. Consequently, f2f communication is of crucial importance in the context of fashion and already embedded in the core structure of the industry. Fashion knowledge is bundled in cities, allowing designers to maintain a tacit information flow with regard to trends and style movements.

In Germany, this location is usually considered to be the capital Berlin with its respective bi-seasonal fashion week equal to the more prominent and influencing fashion weeks in Milan, London, New York and Paris.

Finally, the relevance of f2f communication in fashion comes down to the consumer. Prior research indicates that sustainable fashion consumption is hampered by an attitude–behavior gap [22], which may partly be attributed to a gap in knowledge of sustainability pertaining to fashion [23]. Lundblad and Davies [1] report that sustainable fashion consumers intend to be perceived as not following the herd and appearing as individuals in their consumption choices. Thus, f2f communication may play a major role in closing the sustainability knowledge gap and corroborating the individualistic nature of second-hand fashion. We hypothesize that f2f communication is especially valuable when transferring tacit knowledge related to benefits of second-hand fashion as compared to new fashion. Referring to the advantages of f2f communication in communicating sustainability, the instant and open discourse can help consumers to overcome doubts and foster purchase behavior. We hypothesize that f2f communication supports second-hand fashion sales as supporting open exchange.

In order to study the effect of f2f communication on second-hand fashion sales, fashion week in Berlin was chosen as the site of study allowing for a compressed look at the fashion industry and its stakeholders [24].

3. Overview: Fashion Life Cycles

Bourdieu [25] acknowledged a hierarchy within fashion, with haute couture at the top followed by ready-to-wear (RTW). It depicts the stringent top-down development from runway collections to streetwear. Nowadays, haute couture as the classic catwalk show is less common and only presented in Paris. Retailers increase their receptiveness to the "newness" of fashion trends, trying to provide ever-new product palettes [26,27], leading to a presentation of RTW fashion at most fashion weeks, e.g., Berlin.

A typical fashion life cycle comprises four stages, as delineated in Figure 1 (modified from [28]). A new trend is introduced and adopted by fashion leaders usually via fashion shows. Comprehensively, the experiment in Berlin took place at the first stage.

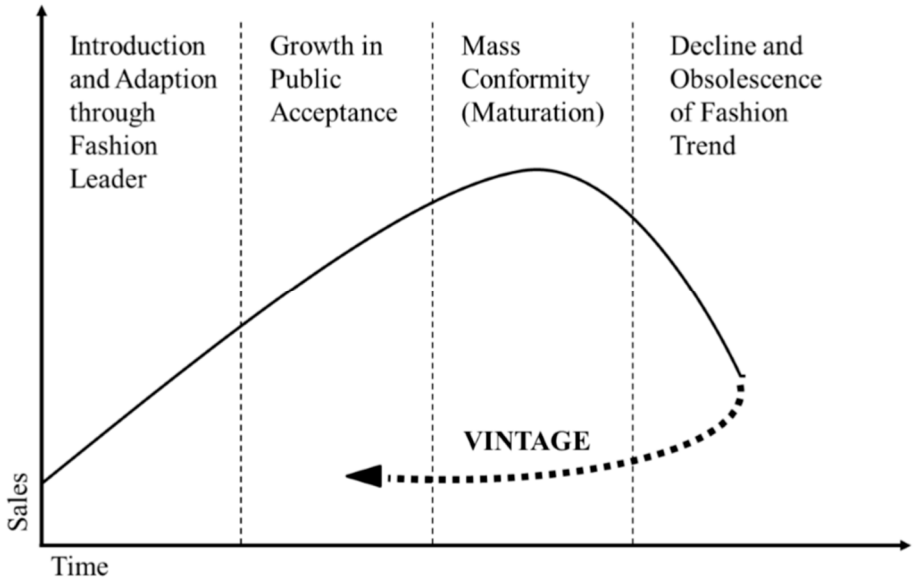


Figure 1. Overview of fashion life cycle (modified from [28]).

Instead of ending its life cycle by becoming “out” and making space for new fashion trends issued at another fashion week, second-hand fashion defies the regular fashion life cycle. Fashion leaders in terms of fashionable individuals re-introduce already produced and known fashion pieces

into the trend life cycle. Bourdieu explicitly refers to vintage fashion as a subcategory of second-hand, challenging fashion hierarchy [25]. It is usually promoted as special and authentic, substituting contemporary fashion, as "a sign of individuality and connoisseurship" [26]. Though consumed nowadays, these items are not newly produced, proposing value of clothing items is maintained after the original production [29]. Second-hand fashion is part of streetwear and defies planned obsolescence of trends. Second-hand fashion is a sustainable offer since product life cycles are maximized and the need for new products diminished. In consequence, an increase in second-hand fashion sales can lead to a decreasing demand of newly produced fashion goods and thus, less resource usage in production.

In its denunciation of mass-design, second-hand clothing represents authenticity [30]. Yet, this inclination for authenticity, expressed through second-hand, has become a broader penchant, resulting in an upgrade from shabby second-hand stores to trendy ones [31].

Originally negligible, the idea of reinventing fashion through second-hand clothing developed into a mainstream phenomenon [32]. Nevertheless, original second-hand fashion, thus not recently produced items, is not represented at fashion weeks. This holds true also for the research environment at fashion week in Berlin. Fashion week in Berlin is a three-day event in January and July, presenting new designer collections and product lines via fairs, runway shows and showrooms/installations.

Although specific events during fashion week in Berlin, such as the Green Showroom, address sustainability issues, no events for alternative consumption patterns occur. This observation of the Berlin agenda is confirmed by other scholars who agree that various issues covering, e.g., labor conditions, environmental impact and other socio-economic topics, are addressed during fashion weeks but there is a lack of general understanding of the interrelation of these challenges [24]. According to Skov [33] the problem lies in the logical discrepancy between the need for prolonged use of fashion items with respect to circular consumption and the fashion logic of always new trends.

Fashion companies dealing with second-hand fashion need to shoulder this double burden. This commercial challenge is often compounded by the sourcing and logistics barriers faced by many companies in sectors of the circular economy that depend on reverse logistics. Against that backdrop, any measure that can alleviate or overcome the commercial double challenge could be relevant to the survival of these companies, including new insights into the applicability of standard business tools such as f2f. As second-hand fashion at fashion weeks addresses a relevant paradox of the fashion industry, VK, the company participating in the underlying experiment, was chosen due to its modern approach to second-hand fashion. This helped ensure that some other typical commercial challenges for circular businesses, such as a diminished consumer experience (e.g., in conventional charity stores or on conventional flea markets), were already addressed. A detailed introduction of the research object, VK, and its historical data follow in the subsequent section.

4. Data and Methods

This paper bears data from a randomized field experiment in the form of a random coupon allocation at an f2f event. While random allocation is largely used in medical contexts, it achieved its stand in social sciences, also known as A/B testing.

Random allocation is considered "the best method to prove causality in spite of various limitations" [34]. The overall sample is divided into a treatment and control group. This happens by chance, neglecting preferences or the will of both researcher and participants of the study. The easiest method of random allocation is simple randomization, where two entirely random groups within a sample are assigned a treatment or not [34,35]. Usually, the allocation sequence is generated using software to ensure randomization. However, manual methods such as tossing a coin are also possible [35]. Kim and Shin emphasize the importance of a minimum sample size of 100 to avoid unequal assignments and to achieve significant results [34].

Vinokilo (VK) is a second-hand clothing market that operates primarily offline. They acquire their supply from sorting companies all over the world, allowing for attractive prices and original

second-hand fashion. VK faces challenges in branding and is to date unaware of what drives customers to participate in its offline model.

VK organizes pop-up events in different cities where they sell second-hand clothing by weight. The clothes are leftovers acquired from sorting companies, allowing for attractive prices while maintaining a certain level of quality. Although VK could be considered a flea market, they differ from the common perception of shabbiness due to a modified business concept. Besides second-hand clothing, VK comprises cultural aspects in the form of regional artists and designers who use the events as a launch platform. Accompanied by music, wine and street food, VK sale events bear a resemblance to small parties rather than stereotypical flea markets. As a consequence, not only individuals subscribing to more sustainable fashion—especially the upcycling and recycling mechanisms comprised in circular consumption principles—but also individuals interested in one of the various other aspects of VK's product portfolio and shopping experience are targeted successfully.

In order to be able to benchmark the observed Berlin flea market of VK, historical data was consulted (see Table 1).

Table 1. Overview of historical data, Vinokilo.

X	Attribute	Min	Base (Median)	Max
X1	Number of visitors	850	1765	2750
X2	Total revenue (in €)	12,854	27,031	40,862
X3	Basket size (in kg)	0.63	0.77	1.3
X4	Number of habitants (in K)	122	560	1790
X5	Location size (in sqm)	400	600	1000
X6	Event duration (in h)	12	12.5	16

In 2016, VK hosted 15 events in both Germany and the Netherlands, attracting more than 30,000 visitors. VK achieved six-digit revenue and profitability in its first operational year. Events that differed significantly from the usual concept were omitted in order to achieve a realistic perspective on VK and its performance and a solid data set for further calculations. As especially revenue and average basket size were observed during the experiment, these variables were studied more extensively. A Shapiro–Wilk test [36] was conducted to confirm normal distribution of these variables. The *p*-values of respective Shapiro–Wilk tests were larger than 0.05 ($p = 0.24$ for Revenue; $p = 0.1$ for Average Basket Size). Thus, the null hypothesis that these two data sets are normally distributed could be accepted.

In order to develop a formula to quantify the effect of f2f communication on the overall revenue a multi-linear regression was calculated with R.

$$\text{Revenue}_t = \alpha + \beta_1 X1_t + \beta_2 X2_t + \beta_3 X3_t + \beta_4 X4_t + \beta_5 X5_t + \beta_6 X6_€$$

The initial formula suggested that five attributes influenced overall revenue. Although this formula accounted for a good fit (Adj. R-sq. = 0.95) only two variables were significant (see Table 2).

Table 2. Multi-regression (1/2).

	Attribute	Estimate	Std. Error	T value	Pr (>|t|)
	(Intercept)	−2.097 + 04	5.771×10^{3}	−3.634	0.00836 **
X1	Number of visitors	1.200×10^{1}	1.366	8.788	4.98×10^{-5} ***
X3	Basket size (in kg)	$3\ .219 \times 10^{4}$.	3.181×10^{3}	10.118	1.98×10^{-5} ***
X4	Number of habitants (in K)	-8.968×10^{1}	1.691	−0.530	0.61228
X5	Location size (in sqm)	1.234	3.981	0.310	0.76561
X6	Event duration (in h)	-1.859×10^{2}	4.498×10^{2}	−0.413	0.69185

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

X4, X5 and X6 were omitted due to lack of significance. The adapted regression formula explained 96% of variation of revenue (see Table 3).

Table 3. Multi-regression (2/2).

	Attribute	Estimate	Std. Error	T Value	Pr (>|t|)
	(Intercept)	-2.158×10^{4}	2.674×10^{3}	−8.07	1.09×10^{-5} ***
X1	Number of visitors	1.154×10^{1}	8.039×10^{1}	14.36	5.32×10^{-8} ***
X3	Basket size (in kg)	3.119×10^{4}	2.501×10^{3}	12.47	2.04×10^{-7} ***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

$$\text{Revenue}_{t} = (-2.158 \times 10^{4}) + (1.154 \times 10^{1}) \times X1 + (3.119 \times 10^{4}) \times X3$$

For the regression to hold true, data was required to be random and independent and residuals had to be normally distributed, with constant variance. The regression formula was then used to quantify the impact of f2f communication. The underlying field experiment observed basket sizes of coupon users after a private event at fashion week in Berlin. If the average basket size of the coupon users differed from the average basket size, the formula would serve to determine what overall impact such an f2f communication with all customers would have on overall revenue of all historical events. Following the fashion event, a regular flea market sale a few days later was used to test the outcome of the f2f event. The hypothesis of the subsequent experiment was that f2f communication results in incremental sales, i.e., people from the fashion week will become actual new customers of VK and will participate in the following flea market sale.

The main goal was to observe how f2f communication during an event at fashion week in Berlin affects the regular sale and how visitors from the f2f event differ in purchasing behavior. Visitors of the f2f event were "tracked" for the following behavior. Coupons adhering to the common company practice of "one free kg" were distributed in a randomized manner. The random sequence was generated manually by assigning coupons to a goodie bag. At the f2f event, every second goodie bag contained a white coupon of credit card size and the wording, "Gift Card for 1 Kilo". The number of coupons required was fixed to 100, adhering to the suggested significance level. In consequence, it was unambiguous that a person using a white coupon had visited the installation at the f2f event before or at least was connected to someone who had. Randomization in this experiment was correctly implemented, as the probability of getting allocated to the treatment group; thus, receiving a coupon was not correlated with individual characteristics nor non-indicated past transactions. There were no seating orders and all goodie bags looked exactly the same (a) from the outside and (b) through the credit card size of the coupon also at the first look on the inside.

Other field experiments of scholars supported the assumption of a low redemption quota of both on- and offline coupons (e.g., 3% online coupon redemption in [37]); the effect of the coupon was assumed to be neglectable. In their study, Jung and Lee [38] compared redemption rates of printed and electronic coupons. They found that e-coupons had higher redemption rates as compared to offline coupons as well as that absolute discounts led to increased redemption as compared to relative discounts. Thus, in order to decrease the effect of the coupon itself, VK issued the lower performing offline coupon with a relative face-value ("one kilo for free").

These findings are supported by reports for the United States, stating an average redemption rate of coupons delivered in a free standing insert (which constitutes the most common distribution form and the one we employed in the experiment with VK) of only 0.6% [39]. Furthermore, the redemption rate in the non-food segment, the corresponding sector to fashion, was even lower, yielding an average of 0.5% redemption.

For this reason, we can causally link the f2f communication with observed differences in consumer behavior between treated and control groups.

Consult Figure 2 for an overview of the field experiment.

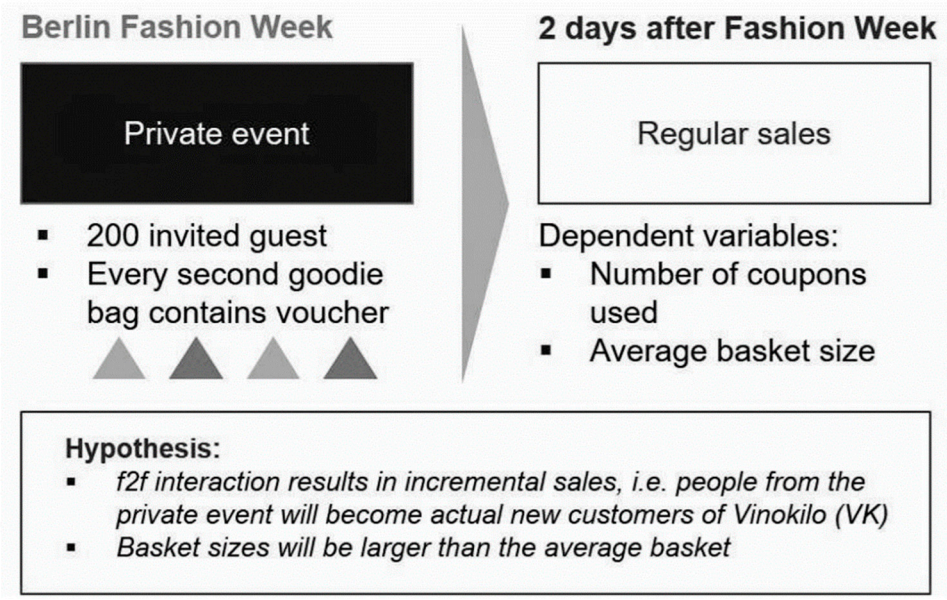


Figure 2. Overview of field experiment in Berlin, 2017.

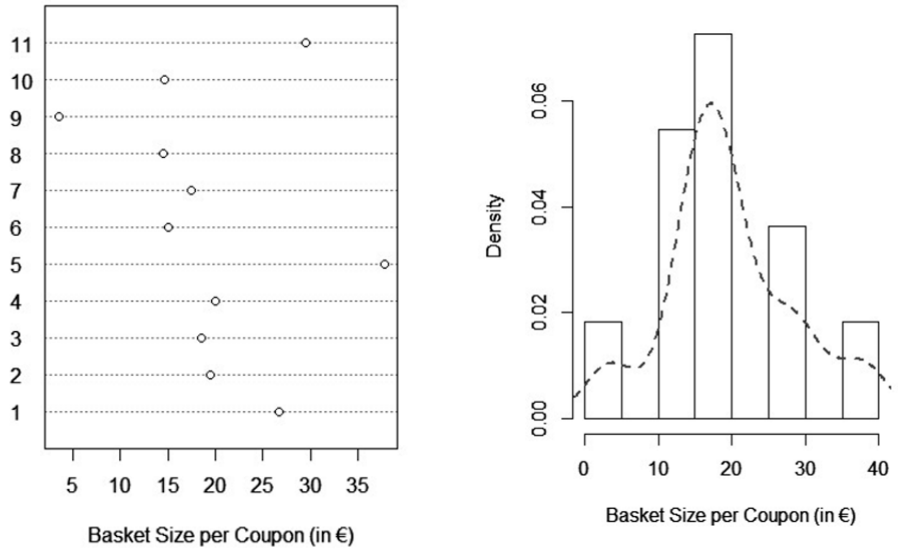
Two days after the f2f event, the regular sales took place in Berlin. This proximity to the fashion week both in terms of time and location aimed to avoid the coupons falling into oblivion and to test for immediate effects of f2f communication.

After the regular VK sale, the number of white coupons and respective basket sizes were analyzed in relation to basket sizes of prior events.

5. Results

The general outcome of the Berlin event was above average as benchmarked to historical data of prior events yet failed to be a significantly positive outlier. Referring to the research question whether f2f communication results in incremental sales and how it affects average basket size, Table 4 can be consulted. The coupon redemption quota was calculated by dividing the number of coupons used at the regular sales event with the number of distributed coupons at the private event. As stated in Figure 3a, 11 coupons were redeemed at the sales event. This equals a redemption rate of 11%. Basket sizes of coupon users ranged from 3.5 to 37.8 Euros.

Basket size (in €) of the overall event was 17.68 as compared to 19.75 Euros for coupon users. This result represents an average basket size increase of 11.8% as compared to the average of all visitors of the Berlin event.



(**a**) (**b**)

Figure 3. Results: (a) Number of coupons and basket size per coupons and (b) distribution basket sizes.

Table 4. Results of Berlin event.

X	Attribute	Event: Fashion Week in Berlin
X1	Number of visitors	2006
X2	Total revenue (in €)	42,854
X3	Basket size (in kg)	1.18
X4	Number of habitants (in K)	3520
X5	Location size (in sqm)	400
X6	Event duration (in h)	12

Employing the regression formula deducted above, the difference in revenue as associated with increased basket sizes through f2f activity is displayed in Figure 3b. It was applied both for the Berlin event and the historical event data provided for the business year 2016. While for the Berlin event 1% revenue increases could have been achieved if all visitors had an f2f experience with the brand, the impact of f2f communication considering all events in 2016 was significantly higher. The respective analysis reveals a possible revenue increase by 60.8% through f2f communication (Table 5).

Table 5. Results of actual revenue and f2f approximation.

	X1	X3	X2	F2f-Impact
Event (Historical Data 2016)	**Number of Visitors**	**Average Basket Size (in kg)**	**Revenue (in €)**	**Revenue_t (in €)**
1	2322	0.74	27,031	46,386
2	2750	0.68	29,751	51,325
3	2150	0.77	27,365	44,401
4	1300	0.76	18,039	34,592
5	850	0.84	12,854	29,399
6	1950	0.63	21,706	42,093
7	1100	0.64	13,271	32,284
8	950	0.75	12,965	30,553
9	2250	0.83	30,851	45,555
10	990	0.99	17,413	31,015
11	1928	0.98	31,900	41,839
12	1765	1.3	40,862	39,958
SUM			315,875	507,925

Consequently, incremental sales as well as increased basket sizes were observed at the regular sales event of VK. This allowed a confirmation of short-term effects of f2f communication on participation and basket sizes in second-hand fashion sales.

The main hypothesis of this study was that f2f communication with customers in form of an f2f event at fashion week, representing the brand and its core values, will result in incremental second-hand sales.

This hypothesis can be tentatively confirmed, given that the average coupon redemption rate of 0.5% for non-food products [40] was surpassed by 22 times. Furthermore, the guests at the f2f event were not connected to VK before the event. Although the experiment was conducted at a small scale due to the complex and special setting, these results can be confidentially considered potent tendencies for the success of f2f activities for second-hand businesses.

6. Discussion

Our study confirms premises of f2f communication in regular "linear" sales processes to hold true for second-hand fashion sales. While second-hand purchases are mostly made based on monetary considerations, f2f communication appears to strengthen eco-conscious attitudes. This finding establishes f2f communication as a powerful tool to potentially bridge attitude–behavior gaps in second-hand fashion sales.

As the epitome of f2f communication—one-on-one interactions—is frequently not possible in commercial settings for reasons of time and cost, best practices for addressing larger target groups have developed over time. First, roadshows are considered popular as they can achieve representative insights by enabling a company to cluster f2f communications (e.g., via city) and develop best practices.

Second, and often considered the most efficient measure in terms of effort/value ratio, is participation in fairs. Major uncertainties are outsourced to a third party and costs are clear and predictable. Different target groups can therefore be accessed and their compatibility with the business tested without high financial risk.

Third, f2f activities with customers can take place in the form of organized public or private events. An own event is connected with the most planning effort and uncertainty. The company will be responsible for ensuring enough visitors as well as planning and execution of a program. This can be too resource intense for a young company in terms of money, time and people.

Still, an own event offers great opportunity to advance trust in f2f communication and can aid brand development significantly. It allows a company to shape its brand perception and simulate a social interaction with the brand via employees and atmosphere without requiring one-on-one f2f

communication. This form of f2f communication was chosen by VK due to the industry standard and the high control over brand and customer experience [41].

All of these formats are fast to implement and easy to follow-up if connected to a trackable campaign, e.g., via coupon codes or direct on-site registration. Chosen employees of the relevant company will have to be trained in order to portray information adequately and represent the company in a credible manner. This can be done informally or via a small internal task force.

Referring to the introductory comment, f2f activities can have high relevance, particularly for startups, in assessing customer feedback directly, sometimes indicating the need for product or service improvements at the same time as fostering customer acquisition in complex business models.

As noted above, sustainable fashion consumption may be fostered by informed customers where information may relate to core values of the company and about benefits of participation. By including participants in the art installation and making them part of a social interaction with the brand and its employees, visitors of the f2f event were able to assess VK also in terms of associated sustainability dimensions and, consequently, become active customers.

Another opportunity while considering f2f communication is to have events partially sponsored by other brand-supporting companies. The higher the resource efficiency the lower the risk and, thus, the higher the viability of an event that is entirely under the company's control. For small to medium sized companies, this aspect is especially important and has to be taken into consideration adequately. Large fashion corporations are also changing their business operations. One intriguing example is the sports brand Nike. Nike is refocusing its activities from product towards collaborative communities, e.g., reducing their traditional celebrity-starred advertising for about 55% and investing in (virtual) communities like Nike+. An estimated 40% of community members were motivated for their first-time Nike purchase through the shared brand experience at Nike+ [42]. Hence, it can be stated that by interacting, users of Nike+ were more likely to buy Nike products, suggesting future research comparing f2f and virtual interaction in the context of CE and sustainable fashion to devise more scalable solutions.

In summary, f2f communication was a successful measure for second-hand sales at fashion week in Berlin. Eleven percent of coupons were used, resulting in approximately 20 new customers, taking all 200 attendees into account. The increased average basket sizes show the value enhancing in purchase behavior. Particularly in fashion, where f2f communication is indispensable, private events to get in touch with the respective brand and values appear to be very effective in second-hand contexts as well, surpassing expectations and industry standards, i.e., 0.5% coupon redemption.

For practitioners, this experiment shows the potential of offline operations in the context of second-hand fashion and reveals a powerful tool to achieve the relevant shift from purchase intention to action. Considering the often-short-term planning horizon of SMEs, these findings show attractive short-term conversion of customers and respectively incremental sales. Moreover, this study emphasizes the importance of adequate knowledge transfer to the consumer and to support target customers in overcoming entry barriers. While the literature suggests that f2f communication is currently one of the most effective measures to increase trust and facilitate knowledge transfer, the cost factor of f2f activities is an important aspect for its large-scale applicability. Alternatives to own events vary from less expensive tradeshows to roadshows and allow specific regional clustering of customers. Digital solutions such as celebrities on social networks [23] or sustainable fashion bloggers [43] could offer similar benefits at lower expenses. Practitioners as well as scholars are advised to keep an eye on technological development in order to test how digital opportunities can (a) leverage participation in combination with f2f operations and (b) become a viable alternative to f2f communication overall due to ameliorated capacities in knowledge transfer, especially with respect to sustainability-related product characteristics.

7. Avenues for Future Research

Face-to-face communication can be beneficial for businesses with a circular business model, as demonstrated in this paper. VK, the study object, was not only characterized by its circular character, but also by its unique shopping experience. Further study could indicate the extent to which the

character of the shopping experience determines the potential impact of f2f interventions. Similarly, future research could seek to demonstrate how much other types of fashion sustainability (e.g., based on fair labor or a toxics-free production chain) could benefit from f2f communication. Given the characteristics of the purchasers of sustainable fashion, not all forms of f2f may be equally appropriate. Big-budget, lavish events, for example, may not resonate with the lifestyle and buying psychology of sustainable fashion buyers. Further research could aim to find out what type of f2f interventions are most appropriate for second-hand fashion audiences.

Another intriguing aspect is the overall interest in second-hand clothing. While being introduced to Berlin in the contrasting context of fashion week, the Berlin sales event of VK was profitable. This indicates market interest in used and left-over clothing items. Second-hand fashion, if properly communicated, can be a viable and more sustainable alternative to newly produced fashion. However, and this is another avenue for future research, it should be studied if an increase of second-hand fashion sales does in fact have a reducing effect on linear fashion sales or if they are complementary and thus, might even amount to an increase of overall fashion consumption, satirizing the idea of increased sustainability by consuming second-hand fashion.

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A11 - Study Three - Stein et al. (2020) "Consumer Perception of Online Attributes in Circular Economy Activities. *Sustainability*, 12, 1914)

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Consumer Perception of Online Attributes in Circular Economy Activities

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Abstract: Businesses like Airbnb have shown that a successful circular economy (CE) business can operate exclusively online. Although online communication and web appearance attributes have been subject to academic research given accelerated digitization, there is still a lack of knowledge about online attributes and their role in facilitating CE. We close the portrayed knowledge gap by conducting a discrete-choice experiment with best to worst scaling and focusing on the effect of CE experience on the perception of a CE website by ranking nine online attributes, grouped in three subsets. We therefore contribute by identifying online attributes that are perceived as favorable for CE businesses and detect how participation in CE activities affects the perception of these attributes. We find that third-party associated online attributes (e.g., user reviews or third-party guarantees) rank significantly higher throughout CE consumption patterns of the sample, being always amongst the top three attributes. This novel finding on online preferences opens a new direction for further research, as well as allows practitioners to optimize online operations accordingly. Furthermore, we find that users without prior touchpoints with CE have a higher need for information about the business model as compared to CE active users who are more interested in community related attributes.

Keywords: circular economy; perception; online preferences; consumer engagement

1. Introduction

The growing field of circular economy is expanding to new research directions. Studies focused on the policy, business, economic and environmental aspects of such transitions and giving an overview of the state of art on a macro, meso and micro level [1]. Today, as a growing number of businesses adopt CE and circular systems approach, there is a need to further study the micromanagement aspects of such a transition. In their review on CE, Ghiselli et al. [1] reveal that implementation at the micro level (single company or consumer) is particularly understudied in the fields of green consumption and recycle and reuse. Referring to Ramani et al. [2], the scholars identify a need for future research addressing consumer choices to support stakeholders in matching consumer needs. In this context, the evolution of information technologies and the internet as a major communication channel appear as a game changer, allowing for new ways of information exchange with customers [3]. This includes opportunities significantly simplifying processes, e.g., the order process where previously one had to call companies and recite incredibly long product numbers to place an order. In addition to facilitated order processes, information transfer has been affected by digitization as well. With the aid of the internet, companies can find ways to address heterogeneous

customers' needs for information on different levels. They can precisely adjust the amount and kind of information, as well as determine how interactive the communication with customers shall be. Furthermore, the internet facilitates the management of information accessibility, timeliness and display at comparatively low cost [3,4]. Yet, as in every relationship as time passes, we have reached a point where digitization may have rendered the relationship between customers and company more complex. Customers are more aware and interested in processes than ever before. In particular, data on social and ecological responsibility are increasingly of interest and might affect customer behavior. While positive information leverages customer attitude towards the company, an absence of it might have the opposite effect [5]. The new and enhanced role of customers presents substantial challenges for companies [6]. The high degree of customer involvement may complicate operations and, yet, seems to be necessary to maintain competitiveness.

Various studies researched the impact of online store attributes and website characteristics on customer satisfaction and overall financial performance. Inter alia, website attributes, like quality of system architecture and quality of content, are shown to have an impact on consumer online satisfaction (see, for example, [7]). Although these studies revealed the influence of certain online attributes on a company's web presence, they fail to acknowledge a ranking of these factors and, thus, fail to uncover potential for optimization. Jin et al. [8] have been among the first aiming to close this apparent knowledge gap by studying marketing and basic online attributes and assuming different levels of impact. One of their findings is that marketing-related online attributes have significant influence on online satisfaction, while other attributes do not. Furthermore, their work emphasizes the difficulty of achieving loyalty online, since no transfer of offline to online loyalty occurs. However, further insights on an actual ranking of online attributes remain untapped. To the best of our knowledge, neither are these questions studied in the context of sustainability and, specifically, circular economy-related businesses. We know consumers have preferences in online attributes, with first, scholars, to study a ranking of these. However, we do not know if these preferences remain the same, switching from linear offers to circular alternatives. The ensuing research questions are apparent: What are consumer online preferences in the context of CE businesses? Do they change? If so, how can managers and entrepreneurs make use of this knowledge to grow their CE-related business?

Considering the recent interest in business models adhering to circular economy (CE) principles which aim to foster a more resource-efficient consumption pattern at a larger scale, indications in which online attributes can foster participation are missing and would be extremely valuable. CE comprises several sustainability-focused activities under one roof and often goes hand in hand with the innovation of a business model. If reaching critical mass, a consequent disruption of an industry can happen, as in the example of Airbnb and the travel/hotel industry. Sticking with this example, Airbnb does not have assets but is mediating supply and demand via their online platform. A lot of CE-based businesses are operating in this manner and, in consequence, are operating solely online. Hence, knowledge about most helpful online attributes of a website based on CE principles can be a crucial drive for their success.

In order to close this knowledge gap, we are studying online attributes in relation to participation in four CE activities, namely: recycling, upcycling, renting and sharing. These activities will be viewed from the perspective of their consumer-centered aspects and not technical features. This means, for example, that technical features of recycling will be neglected. Thus, our research is focused on consumer-centered activities and sectors, making it applicable to a multitude of companies and industries. This study assesses which online attributes have the biggest importance by ranking the nine chosen online attributes and clusters based on participation in CE. The aim is to reveal attributes of relevance in evaluating the website of a CE business with regard to prior experience with consumer-centered CE activities. Our goal is to identify online attributes that are perceived as favorable for CE businesses and to detect how participation in CE activities affects the perception of these attributes.

The remainder of this paper is structured as follows: in section two, we review the pertinent literature. In section three, we describe our method and data. In section four, we present our results,

with following discussion in section five. We end with conclusions and future research outlook in section six.

2. Literature Review

As described in the introduction, there are online attributes consumers prefer, while others remain irrelevant. Taking a step back, this assessment of different attributes roots in the two-factor theory of Herzberg [9]. While various scholars have advanced the initial model—ranging from the KANO model offering four classes of factors [10] to the Chitari et al. hedonic versus utilitarian perspective [11]—the main premise remains as in the original work. Herzberg states that hygiene factors are attributes whose absence can result in dissatisfaction but whose presence does not add to the overall satisfaction [9]. However, there are motivational factors that do increase satisfaction while their absence does not result in immediate dissatisfaction. Referring to our study setup in the context of digital operations, scholars revealed that convenience of website handling, overall usability, data and privacy confidentiality and credibility can be considered hygiene factors in online environments [12]. By contrast, they find motivation factors, i.e., factors whose presence adds to overall satisfaction, to be quality of content and user experience on the website. Jin et al. [8] based their study also around Herzberg`s two-factor theory, demonstrating a different level of impact of different online attributes.

Different aspects play into consumer satisfaction and are currently transferred to a digital context. Another study supported these initial findings and emphasized the reliability of information as an important hygiene factor [7]. Especially communication has been found to be a driver for customer satisfaction [13]. One particularly important aspect in customer communication is the portraying of the corporate's current position and activities on ethics, environmental and social issues [14]. Furthermore, literature observed that, in some cases, digital communication can lead to even more intimate exchanges (e.g., [15]). A study on Airbnb users revealed that users tend to convey a personal touch by using personal names in the comment section [16].

Instant messengers and/or chatbots have been established as an industry-overarching trend to ensure timely communication with the user and, thus, can be considered a digital mechanism covering aspects of f2f interaction, immediacy of communication and reaction [17]. With regard to communication being a driver for customer satisfaction, channels allowing for exchange between the company and its consumers can be considered motivational factors. A high activity on social media channels (SM) addresses another aspect of f2f interaction. Depending on the published content, a perceived proximity between the company and users/potential customers can be established. Recent studies indicate that users can even improve their perception of a company`s reputation when reading comments online as compared to the news, making a comment section a valuable interaction tool for practitioners [18].

The relevance of SM can be particularly well-observed in cases of personal branding (e.g., celebrities and influencers) where users feel "close" and "as if they know" the individual they are following. This supports matching the online celebrity with products fitting their personality and perceived values [19]. Another level of identification is achieved through presentation of the team. This online attribute shows the people behind a specific product and/or service and illustrates their motives to work for the company. This gives users the perception of having and recognizing a contact person in case of questions or the like.

The display of "impact on sustainability" usually aims at an emotional attachment with the company brand and offering as basing on pleasing three features of the self: self-gratification, self-enrichment and self-enabling (see [20]). Thus, users are prone to improve their self-image through using offerings of a company communicating their sustainability impact and feel as more integral individuals [21]. Sen and Bhattacharya support the notion that corporate social responsibility (CSR) activities can reinforce an individual's desire for self-enhancement [22]. Although consumers might not donate to charity or be particularly interested in sustainable consumption, they can easily address a subconscious desire to support a good cause by purchasing products/services of a company active in CSR [23].

Literature suggests that user reviews have become increasingly powerful in a variety of product and service categories (e.g., [24]). The average rating provides consumers with quick information on a product/service quality, as well as influences their expectation and purchase decision [25,26].

Next to user reviews, the offer of a guarantee or warranty can influence purchase decision behavior by indicating not only a certain quality standard but also leveraging the relationship between consumers and company [27–29]. Although sometimes guarantees such as "service quality promises" are voluntarily communicated, they tend to be regulated by policies and laws [30]. In consequence, the users can be sure that the information of a guarantee or warranty is linked to a third-party approval and control. Third-party certification initiatives in e-commerce have enhanced consumer confidence and boosted sales [31]. Third-party certifiers are private or public committees who evaluate and certify assertions based on a specified set of standards [32]. As providing assurance about the product and/or service, certification can reduce uncertainties and even decrease overall transaction costs that arise from information asymmetries [32,33]. Similar to guarantees or warranties, third-party certification is one method to display a firm's compliance with standards, values and sometimes also legal requirements, especially when certification is a voluntary evaluation [34].

In the context of e-commerce purchases, certifications also significantly increase purchasing prospects due to reduced perceived risk [35]. These findings are supported by various scholars, suggesting that third-party certification is an effective tool in trust creation. Luo [36] suggested that third-party certification serves as the creation of trust between the e-vendor and consumers. Although a potential customer may possibly lack their own experience with a company, a third-party logo symbolizes relevant and positive information about a company. Miyazaki and Krishnamurthy [31] state that these logos denote "values, behavioral intentions, adherence to specific policies or certification standards, technical capabilities, or even satisfaction of prior customers". Sønderskov and Daugbjerg go one step further, implying governmental involvement in certification as a relevant aspect to increase consumer trust towards these tools [37].

This overview shows that there are already tools and measures in place that can be divided into hygiene and motivational factors and placed into a digital context. While most information in our current economic setup have trickled down to the consumer, making him/her aware of potential pitfalls of linear consumption processes, this is not yet the case for CE offerings. Consumers are in need of information to assess benefits and potential risks of CE offers, making close communication between the company and consumer crucial for a successful practice [38].

However, we do not make our choices in a vacuum. They are based—consciously or subconsciously—on an assessment of the alternatives, expected risks and rewards [39]. These factors can be especially relevant when considering participation in a different kind of business model or innovation.

Since our choices and preferences are relative to other options, an individual assessment of a singular online attribute with regard to CE is flawed. Alternatives are needed to determine the most helpful attributes, i.e., the ones resources should be allocated to first. Based on these insights and in order to assess the most beneficial online attributes in CE activities, we conduct a discrete choice experiment with best-worst scaling. In accordance with the Ellen MacArthur Foundation [40], the underlying study focuses on consumer-centric CE activities. Our methodology is elaborated in detail in the following section.

3. Method and Data

Discrete choice model (DCM) is a research method that derives information about the decision-maker via hypothetical situations. Contrary to revealed preferences, i.e., in the form of company data or real-life market tests, participants of a DCM have to make decisions amongst alternatives in a theoretical context. In particular, DCMs with best-worst scaling (BWS) have been featured more and more in academic research due to their high flexibility. Inter alia, BWS has been featured studying marketing activities (e.g., [41]), health care topics (e.g., [42]) and willingness-to-pay (e.g., [43]), as well as evaluating hypothetical attributes of advertisement (e.g., [44]). The latter served as a conceptual analogy for the underlying research design, as we are also studying attributes of a hypothetical

website. Finn and Louviere introduced in 1992 BWS as a subcategory of DCM by [45]. The scholars establish BWS as modeling "the cognitive process by which respondents repeatedly choose the two objects in varying sets of three or more objects that they feel exhibit the largest perceptual difference on an underlying continuum of interest" [45]. In other words, respondents were confronted with a set of attributes and chose their least and most preferred answer. While there have been conjoint analyses in the context of consumer behavior and preference in CE (e.g., [46]), to the best of our knowledge, the above methods were not used before in the context of online studies to better understand consumer preferences in circular economy-related activities.

In the underlying study, the hypothetical context is the website of a CE business, i.e., a business either associated with recycling, upcycling, sharing or renting activities. There was no explicit priming on what kind of CE activity has to be chosen in the imaginative context. In this study, we used DCM and BWS methods, considering that we aim to reveal factors influencing the final ranking, e.g., educational background, general attitude towards off- and online purchasing and demographic situation. Another perk of this research method is the possibility to apply BWS to more than seven attributes as compared to other preference measures, e.g., ranking methods where more than seven attributes affect accuracy and consistency of results [47]. Results of a BWS offer a higher degree of discrimination [48]. Indirect comparison BWS out-classed other methods, displaying not only the highest discrimination but, also, predictive power. Furthermore, Hinz et al. [49] promote BWS as a fit for studies with heterogeneous backgrounds in terms of, e.g., education or even culture, due to the high consistency of interpretation across respondents. This is expected to achieve more realistic results than verbal scales (e.g., Likert), because there is no need for a transfer of their preferences into an artificial concept. The binary assessment is intuitive and comparable to real-life purchase decisions, which renders the BWS an indicator for actual customer behavior [50].

We use the balanced incomplete block design (BIBD). BIBD allows for each comparison to comprise the same number of items and for it to appear equally often with other items. Yet, only a few BIBDs have maximized symmetry—a BIBD of 9 items is one of these best practices [51]. Given the limited attention span of consumers, we decided to study not more than 10 items to keep complexity at bay. The only other favorable BIBD below 10 would be 7, making an equal distribution of three subcategories impossible; i.e., the underrepresentation of one category could lead to biased results. Since we rank nine attributes, other ranking methods would not lead to similar methodologically solid results as BWS.

Given the state of literature, our experiment focuses on online attributes that are currently in vogue (e.g., chatbots, social media integration, etc.). We also used credibility-enhancing factors such as third-party certification in order to assess their overall importance for users in the context of CE. We observe whether differences in ranking occur if focusing on different demographic subclusters and different states of participation in CE activities. The observed online attributes were divided into three subgroups. The first subgroup tries to simulate face-to-face interaction digitally. This kind of information is company-issued but adaptive and flexible; i.e., it does react to individual users or, in terms of social media, gives individual users the impression to be part of live events (e.g., Instastories and Snapchat). The second subgroup of attributes is company-issued rigid information, i.e., fixed information pieces/categories on the company website. This cluster comprises an explanation of the business model and its specific perks in order for the user to gain an understanding of the product and/or service and its advantages over linear alternatives. Besides, a "loud brand" has been included into the choice set. While brand prominence generally depends on the degree to which a product has visible markings that help ensure observers recognize the brand" [52], a loud product is directly recognizable due to its noticeable branding, e.g., logo, design theme or color. This way a company can decide how openly and prominently it wants to display its brand, both on as well as offline. In terms of a loud brand online, the prominence of a logo, overall coherence of design and high recognition value are assumed to show professionalism and a high quality of the respective company offerings. Last, the company can decide to which degree it displays its impact on sustainability. The third subgroup of online attributes introduces third-party information. While the company develops and decides on how far corporate social responsibility (CSR), brand and business model are depicted

on the website, the following features are externally issued. The first attribute are user reviews with the common star and text rating.

Table 1 depicts an overview of all nine online attributes. These short explanations were displayed throughout the discrete choice experiment, given that the respective attribute was part of the current choice set. This aimed at a consistent understanding of the attributes and, thus, a minimization of survey errors.

Table 1. Overview and explanation of observed online attributes.

Attribute Short Name	Explanation
Company-issued flexible attributes	
Instant chat/chatbot	Instant communication tool for communication with company. Possibility to reach company representatives in case questions or problems with product/service occur.
Team presentation	Meet the team. This section of the website describes motivation, philosophy and shows the people behind the curtain
Community on social media	Social media channels are linked to the webpage, e.g., in the form of the last Instagram mentions of the company or number of Facebook likes.
Company-issued rigid attributes	
Loud brand	Recognizable branding (logo, font and design). Branding is prominent on website.
Explanation of business model	A dedicated section on the website that explains what is special about the business and how it adheres to circular economy (CE) principles. Processes are illustrated to facilitate understanding and delineation from linear alternatives.
Impact on sustainability	Section of the website that explains how CE has an effect on overall sustainability. Shows explicitly, e.g., in form of data, how much waste has been avoided or how much of a resource have been reused by the company.
Third-party associated attributes	
Guarantee/warranty	A certain level of service/product quality is promised by explicit company claim. If the product is new, yet a sustainably produced warranty is offered. The promise is backed by legislation.
User reviews	Reviews of prior customers with the common "text and star" layout for each product/service.
Third-party certification	A third-party certification assesses the company and its processes. It confirms claims of CE and sustainability are true and approved.

In order to achieve the optimal experimental design, several premises have to be fulfilled, according to Lee et al. [48]. First, each studied attribute has to appear an equal number of times within the survey questionnaire in order to avoid overrepresentation and, thus, biased results. Second, the combination of items has to be balanced to avoid contextual effects. Third, each choice set has to have an equal number of attributes, with the minimum being three. This structure prevents bias through interpretation by and confusion of the survey respondent.

Our experiment was implemented using the online platform DISE [53]. DISE allows for using a balanced incomplete block design (BIBD). A BIBD fulfills all before-mentioned criteria for ideal experimental design, resulting in each of the nine online attributes appearing four times with a pair frequency of one, resulting in, overall, twelve choice sets with three attributes in our BWS. A randomizer has been integrated in the DISE questionnaire in order to control for possible order effects.

Overall, the questionnaire comprised five sections: (1) short introduction with briefing, (2) BWS choice sets with a definition of each displayed attribute, (3) additional attributes to indicate tendencies, (4) questions about online and offline consumption (Likert-scaled) and (5) demographic and socio-economic questions. While the additional questions (section 3 and 4) serve as indications for future research topics, the primary focus of this study lies on the BWS of the nine chosen attributes and the understanding of customers preferences in digital operations (see an example of the screen in Appendix A).

The results of the BWS are deducted by subtracting the number an attribute has been worst from the number it has been considered best. According to Marley and Louviere [54], this easy calculation

results in a close approximation of the respective multinomial logit results. In addition, according to Cheung et al. [55], this analysis is the most common evaluation method of BWS experiments. To sum up, the beforehand introduced nine attributes of the online shops were ranked via a DCM with BWS in order to prioritize implementation for practitioners. This way, we are able to observe which attributes are more important and whether there are specific overarching topics that foster customer acquisition.

In our study, respondents have received the briefing that recycling is considered a usage of product components, while upcycling is the re-using of the product as a whole. Sharing was defined as a peer-to-peer interaction, while renting involves a third party, i.e., a company who has ownership of the products or services. Respondents were asked to indicate their participation in these CE-adhering activities. Furthermore, they have to imagine the website they are evaluating to be a CE-based business. A pre-testing showed that respondents were confidently differentiating these participation modes and thinking of possible CE businesses and websites, making the priming sufficient. Since the actual type of CE activity is irrelevant to our analysis, the common method variance is negligible, making further tests redundant. We collected the data via an online survey developed with the software DISE. All incomplete questionnaires, as well as questionnaires answered by minors, have been omitted from the sample. In total, 99 fully answered and adequate best-worst sections have been acquired between May to June 2017. This resulted in, overall, 1188 choices made as each of the respondents has been confronted with 12 choice sets. However, only 97 people agreed to share their CE activities; therefore, the two best-worst sections of these respondents were not included in the compared rankings. The sample size is satisfactory and the best practice, referring to an overview of sample sizes in DCMs in health by De Bekker-Grob et al. [56]. Their research revealed a third of DCMs has a sample size of $n < 100$.

Figure 1 illustrates the demographics of the respondents in terms of age and gender. Fifty-four percent of respondents are male and 43 percent are female (remaining 3% diverse), thus, almost equal to the balanced gender distribution in Germany [57]. Referring to age, an age sand clock similar to the overall German population can be observed. Yet, the majority of respondents are between 18 and 25 years old, amounting to 55 percent of respondents. Only 9 percent of respondents are above 50 years old. This is likely due to limited access to the internet in the older population and, in consequence, the online survey. However, this does not imply that older people do not participate in CE activities. Occupation and the highest level of education suggested that majority of respondents are still students, which explained the sample's slight bias in age structure. Over 70 percent of respondents have an academic degree, which furthermore matches the whole German population [58]. Twenty-nine respondents indicated to not participate in any activity affiliated with CE; i.e., they did not participate in any recycling, upcycling, renting or sharing activities. This amounts to almost a third of respondents. The nonparticipants comprise 59 percent male and respectively 41 percent female respondents. Almost two-third of respondents revealed participation in a minimum of one CE activity. Age and education structures appear to be neglectable factors observing CE activities of this sample, since no distribution pattern can be detected.

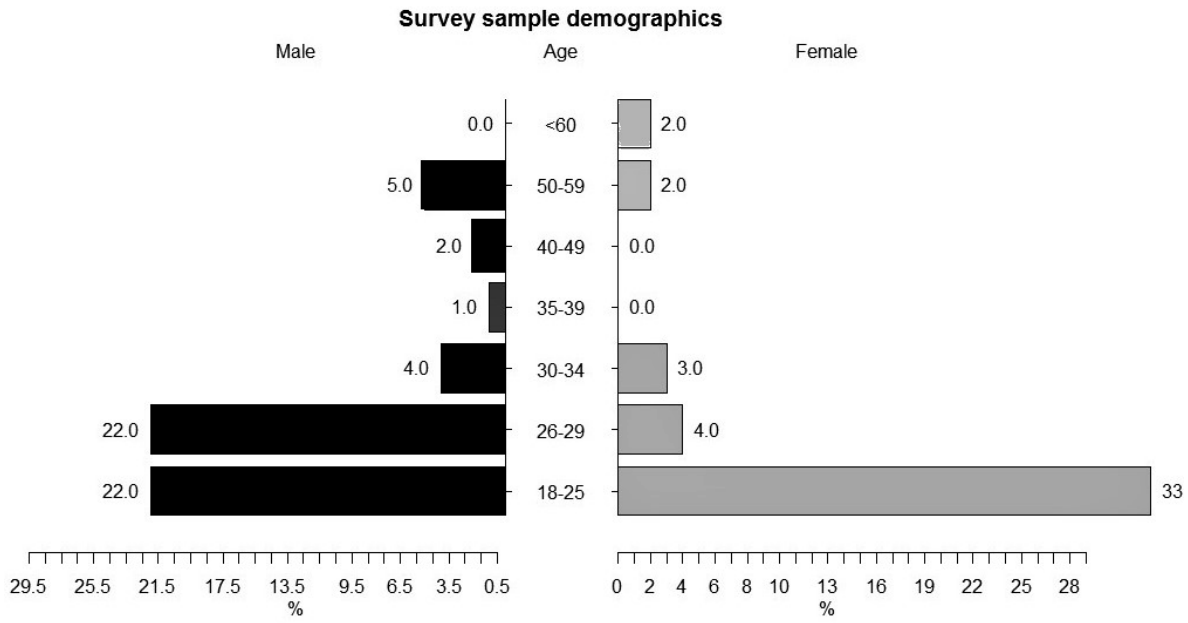

Figure 1. Overview survey demographics.

Our study is innovative in being the first to conduct a BWS in the context of consumer perception of online attributes in the context of CE business models. Further, we study nine online attributes we divided in three self-developed subsets. These subsets are especially valuable for practitioners, as indicating the scope of action.

4. Results

The ranking results show that user reviews (100) and guarantee/warranty (88) score both high and are the most and second-most helpful online attributes, respectively. Table 2 shows the absolute score (times named best minus times named worst), as well as standardized and weighted scores. The explanation of the business model (66) third-party certification (63) are important as well. Impact on sustainability (55) was rated moderately high. On the other hand, a high activity on social media (36), instant chat/chatbot (33) and the presentation of the team (32) were rated low. A loud brand is ranked lowest (29), indicating that these attributes have little significance in the evaluation process of a website of a CE-adhering business. Less important attributes are interpreted as the ratio relative to the most important attribute. Consequently, this does not mean that lower ranked attributes are not helpful at all but only in comparison to the other attributes [59].

Table 2. Results and ranking of discrete choice model with best-worst-scaling.

Rank	Item	(B-W) Score	SQRT (Square Root Ratio Most-to-Least Counts)	Std Score	Std Weight (%)
1	User reviews	147	1.97	100	20
2	Guarantee/warranty	137	1.73	88	18
3	Explanation of business model	71	1.29	66	13
4	Third-party certification	57	1.25	63	13
5	Impact on sustainability	20	1.08	55	11
6	Activity on social media	(80)	0.71	36	7
7	Instant chat/chatbot	(102)	0.65	33	7
8	Team presentation	(119)	0.64	32	6
9	Loud brand	(131)	0.57	29	6

Figure 2 illustrates the standardized ranking in decreasing order of the three subgroups of attributes: company-issued flexible (grey), company-issued rigid (green) and third-party information (black) and which subgroup of attributes plays a more important role. It can be seen that, in the overall ranking, the online attributes associated with third-party information are especially well-ranked. User reviews (top rank), guarantee/warranty (2nd place) and third-party certification (4th place) are all in the first half of the ranking results, scoring in sum higher than both other subgroups. All online attributes in this group yield a combined best-worst (B-W) score of 341, as compared to −40 and −301 for the combined ranking results for company-issued rigid and flexible attributes, respectively. Comparing the overall ranking with the rankings focusing on participation intensity, it can be seen that there are differences. Respondents who are participating in all listed CE activities, i.e., in recycling, upcycling, renting and sharing, support the notion that user reviews are the most helpful online feature of a web presence. However, they consider a prominent branding more important than the overall sample, ranking a loud brand moderately high (6th place).

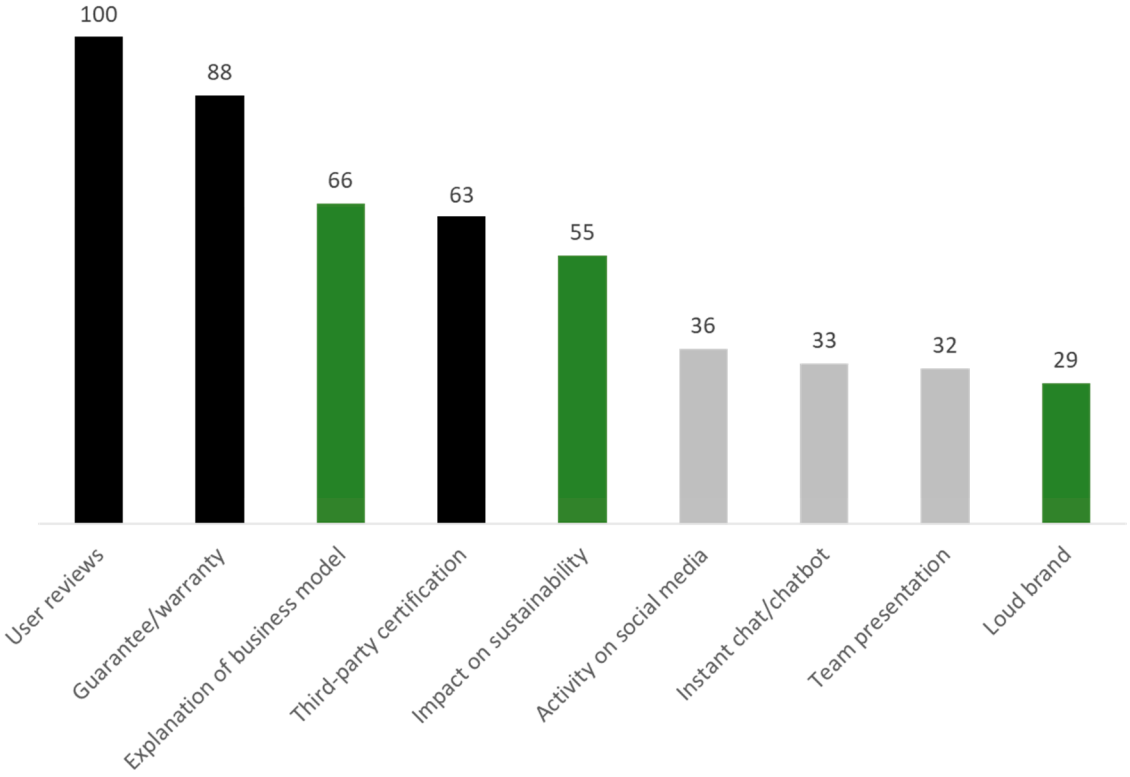

Figure 2. Results clustered in company-issued flexible (grey), company-issued rigid (green) and third-party associated (black) attributes. Standardized score.

Table 3 compares the overall ranking with the ranking of respondents who participate in (1) all CE activities, (2) at least three CE activities and (3) do not participate in CE activities at all. The ranking illustrates that, although differences in ranking are observable, the three online attributes associated with third-party information consistently score amongst the highest attributes. Thus, it can be concluded that these attributes have the highest importance and are the most helpful for users evaluating a web presence. The results show a high importance of third-party associated online attributes for consumers. Throughout all participation modes in CE activities, at least one of the online attributes user reviews, third-party certification and guarantee/warranty scored amongst the top three. This shows the importance of objective assurance for consumers when confronted with an offering that diverges from standard procedure. The high significance of third-party-associated information leads to the perception that the company by itself has only limited power over the

consumers' perception of its trustworthiness and quality standard. Third-party-associated information is necessary to achieve the most helpful website design for purchase evaluations. The high ranking of user reviews shows the importance of social proof and authentic information on product and/or service.

Table 3. Results and ranking of discrete choice model with best-worst scaling.

Item	Overall Rank	Participation in CE Activities		
		All	At least 3	None
User reviews	1	1	1	2
Guarantee/warranty	2	2	2	1
Explanation of business model	3	8	4	3
Third-party certification	4	3	3	4
Impact on sustainability	5	4	6	7
Activity on social media	6	4	6	7
Instant chat/chatbot	7	7	7	5
Team presentation	8	8	8	8
Loud brand	9	6	8	9
n (number if respondents participating in CE)		3	18	29

5. Discussion

Our results offer various managerial and practical implications. Companies can direct existing customers into marketing and sales channels and motivate customers with positive reviews to deliver user-generated content for social media. This would give a more personal and transparent touch to the respective company while indicating social proof through someone's loyalty towards product and/or service for new customers. This measure could probably be used across all social media channels, as well as be a core aspect in commercials and performance marketing (for example, in the form of banners featuring testimonials). Consequently, instead of fabricating content, a company can leverage its existing customers and use their loyalty and engagement to leverage credibility and service perception in addition to featured user reviews. Only satisfied customers would agree to represent a product or service, resulting in an intuitively positive connotation. Hence, the positive result of user reviews is advised to be transferred to company-controlled and low-scoring online features as social media channels. It is advised to actively integrate customers into the social media content generation. This suggestion is supported by Gounaris and Venetis [60], who suggest that service quality and customer bonding are antecedents of trust. Both of these aspects can be focused and fostered by integrating real consumers and their stories into marketing channels.

While these findings hold true also in a non-CE context, most consumers might not be aware of the advantages of CE business models and, thus, need to be educated even more about CE mechanisms through various marketing channels. Information has to be consistent with company values and, therefore, support the overall credibility of the company. Second, expectations are automatically managed through real customer feedback used in marketing. Third, by remaining true to customer feedback, i.e., in terms of actual user reviews, and using it combined with important information, a social proof is established. This serves an overall decreased risk perception. In the context of CE, trust and decreased risk perception are of particular importance as an integral part of the business model, e.g., renting a room at a stranger's house or driving with a stranger requires a certain level of trust. As a consequence, it is especially vital for CE businesses to integrate the user more into marketing activities and to incentivize more user reviews. Referring to literature, the number and valence of user reviews can positively influence customer decision processes. A large volume of user reviews results in higher attention for a specific product and/or service and, hence, increases the probability of a purchase [61]. Moreover, Ghose et al. [62] attributed a positive impact on user choice to the valence of user reviews. According to Goes et al. [63], online interactions with the user can result in an increasing number of reviews as well, supporting the beforehand mentioned

cross-channel interaction. Thus, managers are well-advised to encourage users to review their products and services in order to increase the positive effects of the online attribute user reviews.

Another major implication can be derived from the ranking of a third-party certification. According to Busch et al. [64], credibility of a third-party certification requires a high level of objectiveness and independence of the certifying initiative. Jiang et al. [65] indicate that the sheer exposure to certification logos is influential in purchase decisions in e-commerce. In the case of CE business, various certifications exist, but no exclusive certification for CE businesses exists to date. Hence, customers connotate approval and high-quality standards with third-party certification. We therefore recommend to consider an industry-overarching certification developed by practitioners and scholars to increase information transfer in and attention for CE businesses, as well as adapt a quality standard. The corresponding committee should comprise CE company representatives, scholars, institutional representatives, etc. to ensure objectivity and, thus, increase the validity of the certification [64]. In addition, partners like the Ellen MacArthur Foundation, a think tank specializing in CE, can promote the certification and boost credibility and expertise. In order to develop a universal set of evaluation criteria, CE has to be defined more clearly. The development of appropriate evaluation criteria requires intensive work and re-work. Thus, while leveraging user reviews, integrating user content in social media are short and medium-term measures; the development of a third-party certification is suggested as a long-term measure.

Furthermore, the results show that ranking differences between respondents with prior CE experience and respondents without CE experience exist. Respondents without prior CE touchpoints rank explanations of business models and respective benefits of CE activities higher than respondents who are highly active in CE and participate in all four activities. The latter are more interested in explicit information on how the company positively impacts sustainability. The respondents also rank a loud brand and activity on social media as more important, implying an increasing focus on communities with increased activities in CE. Respondents with a high exposure to CE rank the explanation of the business model and its benefits according to CE principles less positively, indicating that this information is less important when the overarching mindset is already established. These findings are especially relevant for practitioners, as they indicate that, for customer acquisition in target groups without CE experience, more information on business models should be displayed as compared to a focus on community and branding with a CE savvy target group. These findings are recommended to be further researched with a larger sample of respondents who participate in all CE participation modes and, preferably, in a supervised experiment with, e.g., simulation or usage of a website.

Overall, it is important to conclude that the results of the experiment show great potential for companies that are considering optimization of their web presence. The ranking helps to prioritize measures and funds. Yet, while online attributes linked to third-party-associated information ranked higher in the experiment, this does not mean that other attributes should be completely neglected. The ranking is relative; thus, all attributes can be important, and the results should be interpreted accordingly. Another key finding is that the higher the respondent's exposure to CE, the less relevant they consider explanations of the business model and benefits in comparison to linear consumption. Hence, managers and entrepreneurs introducing CE products and services are advised to address the CE background of their target audience in order to optimally foster participation and respectively boost revenues.

Our study further contributes to the field of study related to CE and consumers. Given we conduct the first BWS for online attributes in the context of CE activities, our results are prime insights into consumer engagement in CE and, in particular, the effect of digital tools on consumer activation. Addressing the knowledge gap other scholars illustrated [1], we add knowledge to the understudied field of the implementation of CE activities on a micro level.

One limitation of our work is the limited number of attributes studied. While we are confident that our choice of attributes is relevant, it is only a fraction of potential attributes that are used in online operations and, therefore, ranked in relative comparison. Especially, considering the fast pace of technological innovation, it is possible that there are even more relevant attributes to support a

transition to CE. Second, the study was general on several CE activities and not on specific aspects of specific CE activities. It could be that recycling activities online (like applying for a free shipping label to return your old phone) might be very different than reserving a place with Airbnb, and therefore, the attributes rankings might change.

6. Conclusions and Future Research

Our study demonstrates the importance of different online attributes in order to better engage consumers in online activities related to circular economy activities such as recycling, reuse or sharing of products. Although some of our findings might hold for any product, we think that it is especially important to test such preferences in the context of promoting CE activities, as the use of the internet and IT platforms to promote such behavior is rapidly increasing.

Our work contributes to the emerging field of CE by providing a survey setup that researchers and practitioners can adopt to expand knowledge of online preferences and their interplay with participation in CE activities. This tool can be used in different countries in different stages of circular economy policy and practice designs and implementation to better inform industry and policy. Our results show that participation in CE activities influence perceptions and shifts focus, resulting in a different ranking of online attributes. This means that different strategies need to be adopted for different types of consumers, depending on their knowledge and experience with CE activities.

For practitioners, our study offers valuable insights on how to deal with consumer perceptions in order to increase participation in their CE-related businesses. While our results show that third-party related attributes are the best ranked, entrepreneurs and managers are still able and strongly encouraged to navigate all processes around these attributes in order to maximize conversion. Practitioners should also be motivated to apply our study setup to their company-specific context and rank additional/different attributes to determine their specific action plan.

Based on this initial study, we offer several pathways for future research to expand on this topic. While user reviews and guarantee/warranties are already commonly used, one interesting direction for further research would be in how far these mechanisms can be optimized and potentially monetized. Studies revealing how high the willingness-to-pay for additional information in either form are strongly recommended. For example, a study focusing on willingness-to-pay for third-party CE certification should be conducted to foster understanding for the potential of this measure in the context of CE. As our results suggest, it is also important to further study the differences between respondents without prior CE experience and respondents who are highly involved in CE activities, as they have different preferences and expectations. This leads to the expanding body of literature that supports the need for further segmentation of what we might define as the "green" consumer, given the different aspects and complexity of such behaviors [66].

Due to the limited number of attributes we tested, we suggest to apply our study design for a multitude of attributes and compare the best-scoring ones across singular studies. We also suggest breaking down the analysis to specific CE activities, as it might be that the ranking will change in the more specific contexts, as well as expand research from a single location to an international context. A comparison of different countries might also be interesting with regard to cultural differences and levels of acceptance of CE in different geographies. Further, future research is advised with regard to the interplay of personality traits and consumer perceptions of online attributes. The scholars Mulyanegara et al. [67] and Matzler et al. [68] illustrated a significant relationship between personality traits and brand preferences of consumers, which might be transferable in the context of consumer perceptions of online attributes in the context of CE.

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Appendix A. Online Survey Example Screen

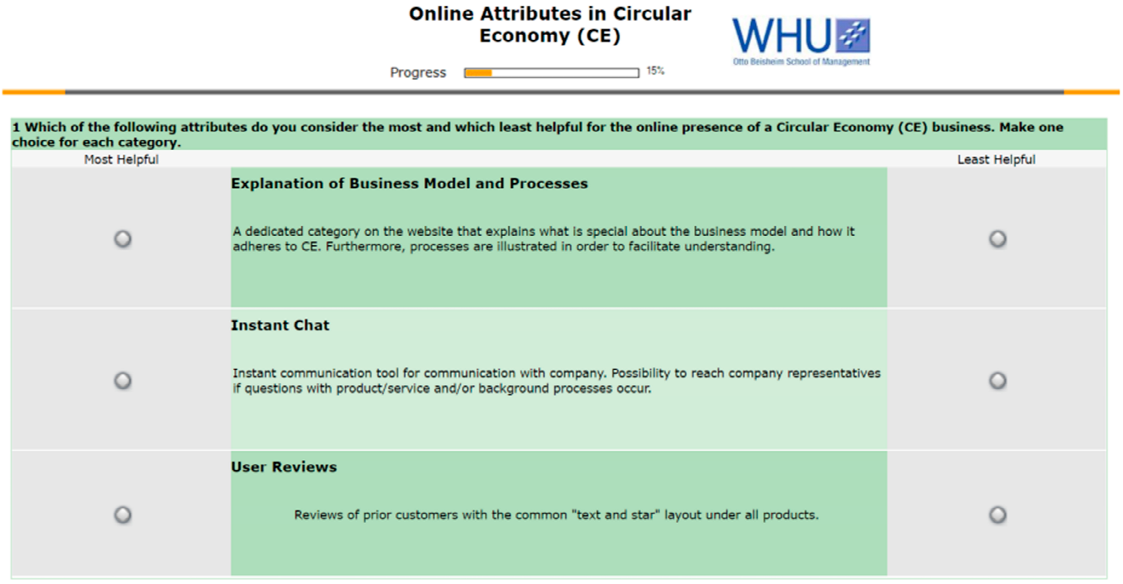

Figure A1. Example of Screen Survey (DISE)

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