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Digitalization for Sustainable Consumption: Co-Creating and Co-Destroying Value Through Digital Initiatives in Retail

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Abstract

Background: *Although food and commodity consumption is a leading contributor to individuals' emissions, limited attention has been given to green information systems (IS) initiatives in this crucial context. Persisting behavioral patterns, along with diverse personal values underlying consumers' consumption choices and perceptions of sustainability, further complicate efforts to align sustainability initiatives with consumers' values and goals. This study takes a novel approach to investigating how digital solutions may be utilized to represent sustainability and its related challenges to consumers and how such efforts are perceived by individual users in the food and commodity sector.*

Method: *Using a service-dominant logic lens, we explored the potential of digital services to co-create and co-destroy sustainability value. Our approach involved a qualitative case study incorporating in-depth interviews with case company representatives and a critical incident technique survey with customers. Using a thematic analysis, we dissect customers' experiences of value co-creation and co-destruction regarding the value propositions of the case company's digital sustainability initiatives.*

Results: *Our findings showcase emergent linkages and misalignments between the retailer's value propositions and consumers' experiences. We propose a nuanced framework capturing value co-creation and co-destruction across four dimensions, ranging from digital services in physical stores to omnichannel and ubiquitous services. The findings showcase the subjective and context-dependent nature of consumers' interpretations of value, underscoring the importance of tailoring digital interventions to individuals' goals, needs, and contexts.*

Conclusion: *Emphasizing the need to align digital services with consumers' sustainability goals, we propose approaches for physical and online store augmentation to support this alignment and encourage sustainable choices. However, a fine line is acknowledged between promoting sustainable behaviors and encouraging excessive consumption with green IS. We contribute to an understanding of digital services' potential impact on sustainable consumption and extend the knowledge of value co-creation and co-destruction in digital sustainability initiatives.*

Keywords: Value Co-Creation, Co-Destruction, Digital Services, Sustainability, Consumer Behavior.

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Introduction

Amid the growing environmental crisis fueled by increasing consumption worldwide, the urgency for sustainability has become a resounding imperative, necessitating innovative solutions across global industries (United Nations, 2016). While consumption-based emissions are currently most pronounced in the United States, Saudi Arabia, Australia, and parts of Europe (Global Carbon Project, 2020), the remarkably swift growth in such emissions across the Asia–Pacific region emphasizes the pressing need for sustainability initiatives in this dynamic region as well (Euromonitor International, 2022). The concept of sustainability refers not only to the environmental aspect of conserving natural resources (e.g., Goodland, 1995; United Nations, 2016) but also to socially and economically ethical attributes, such as fair trade and labor (Van Loo et al., 2014; Vermeir & Verbeke, 2006). Overall, sustainability can be defined as "*meeting the needs of the present without compromising the ability of future generations to meet their own needs*" (World Commission on Environment and Development, 1987, p. 43). Such sustainable individual and organizational behavior can be purposefully supported by utilizing a combination of technological, economic, and social solutions—that is, green information systems (IS) (Dao & Abraham, 2021; Vom Brocke et al., 2013).

Accordingly, organizations have successfully implemented green IS initiatives—for example, to improve energy efficiency and waste management (Bracarense et al., 2022), compliance with emerging legislation and norms (Butler, 2011), and the adoption of more sustainable work practices (Bose & Luo, 2011). Green IS can be utilized in organizations for automating decisions in favor of sustainable outcomes (e.g., Watson et al., 2018) and for sensemaking regarding environmental goals or the effectiveness of specific activities (e.g., Seidel et al., 2018). Degirmenci and Recker (2023) showed that information democratization and reflective disclosure are fruitful interchangeable methods for promoting more sustainable printing behaviors within an organization. Beyond organizational behaviors, IS are also utilized to facilitate the transition to more sustainable behaviors for individual consumers. Furthermore, digital nudging—based on the idea that the underlying "*choice architecture alters people's behavior in a predictable way*" (Thaler & Sunstein, 2009, p. 6)—has been studied as a path for green IS to facilitate individuals' sustainable choices, for example, in saving water and electricity (Degirmenci & Recker, 2023). Such novel green IS initiatives are also urgently required in the context of food consumption (e.g., Hedin et al., 2019), which "*accounts for 10%–30% of a household's carbon footprint*" according to the Center for Sustainable Systems and University of Michigan (2022, p.1).

However, as green IS initiatives tend to lack personalization, the communicated sustainability goals may be misaligned with the targeted users' beliefs, personal values, and goals. Therefore, negative impacts may emerge, such as users' confusion regarding what is actually sustainable (Melville, 2010), and trigger contrasting and unsustainable behaviors (e.g., Beshears et al., 2015). For example, consumers may be confused regarding what is sustainable when attempting to reduce plastic consumption but are targeted by commercials with "sustainable meal alternatives" packaged in plastic. Furthermore, while sustainability initiatives typically engage with a relatively narrow pool of topics—such as energy efficiency, recycling, and social inclusion (e.g., Ismagilova et al., 2019; Sidani et al., 2022)—less attention is given to pressing contexts, such as food and commodities consumption. For example, facilitating a transition from the consumption of animal-based foods to plant-based foods could significantly help reduce an individual's carbon footprint (Wynes & Nicholas, 2018). In addition, as a systematic transition, such a shift could reduce land use (by 76%), acidification (by 50%), eutrophication (by 49%), and freshwater withdrawals (by 19%) (Poore & Nemecek, 2018). According to previous understandings of digital service design, service providers could mitigate potential conflicts in green IS initiatives by informing their design through an in-depth understanding of how value may emerge for individual system users (Čaić et al., 2018; Payne & Frow, 2014; Tuunanen et al., 2023). However, previously, green IS research has focused on specific company- and society-level sustainability goals (including, e.g., sustainable practices and processes, as well as their parameters), with only a few studies employing individual-level theories (Sedera et al., 2017). Therefore, more attention must be given to how sustainability and its challenges and proposed solutions are represented and perceived by targeted individual users (Stirling, 2006).

To address these problems, this study investigates the emergence of perceived sustainable outcomes of consumer-oriented IS use in the context of food and commodity retail, thereby aiming to answer the following research question: "How can retail companies utilize digital services in co-creating sustainability with customers?" We draw from the metatheoretical lens of service-dominant (S-D) logic in conceptualizing the use of green IS (e.g., mobile applications for tracking consumption choices) as a service exchange, in which two or more actors (e.g., retailers and consumers) accept one another's value propositions and integrate possessed resources (e.g., time, skills, product data, consumption data, and algorithms) to co-create (or co-destroy) value (e.g., environmental, social, and economic sustainability) (Vargo et al., 2020; Vargo & Lusch, 2004, 2016, 2017). By conducting a qualitative case study (Walsham, 1995; Yin, 2009), we investigated how a leading Finnish retail company integrates resources with its customers using digital services. We conducted in-depth interviews (Myers, 2019) with representatives of the case company and employed a critical incident technique (CIT) (Flanagan, 1954; Gremler, 2004) survey with the customers of this company. Through a qualitative analysis,

we identified sustainability-related value propositions emerging in the case company interviews and linked these with critical incidents experienced by customers that evince value co-creation (identified as positive incidents) and value co-destruction (identified as negative incidents) when engaging with the case company's offerings. Accordingly, we propose a framework for understanding value co-creation and co-destruction in digital sustainability initiatives in the retail industry.

The paper is structured as follows. First, we outline the theoretical background of the study by discussing the previous literature on sustainable consumption behavior, followed by a section on viewing technology as a means to facilitate sustainability-related value creation in the retail servicescape. Subsequently, we introduce the S-D logic lens to discuss value co-creation/co-destruction and value propositions. Thereafter, we dissect the methodical steps of the qualitative case study, followed by the study findings and the proposed framework. We then reflect on the key takeaways from our findings and discuss our study in terms of implications for research and practice. We conclude by discussing the answers to the research question and summarizing the study's contributions.

Literature Review

Sustainable Consumer Behavior

Organizations look to adopt new technologies and processes to mitigate sustainability challenges. For example, artificial intelligence (AI) applications are expected to help organizations in energy efficiency and waste management (Bracarense et al., 2022). However, corporate operations alone may not suffice to address sustainability issues, such as climate change and related global humanitarian crises (Davies, 2014). In addition to sustainable transition at the level of businesses, sustainable behavior is also required at the level of individual consumers, thereby purposefully implying meeting current environmental, social, and economic needs without compromising future generations' abilities to meet their needs (World Commission on Environment and Development, 1987). It is widely acknowledged that private consumption is a focal contributor to environmental degradation, resource depletion, and social problems (e.g., Davies, 2014; Gardner et al., 2014; Steg, 2015). There are multiple ways in which individuals can reduce their carbon footprint (i.e., the quantity of greenhouse gases "*emitted into the atmosphere by an individual, organization, process, product, or event from within a specified boundary*" (Pandey et al., 2011, p. 138). For example, living car-free, avoiding transatlantic flights, and switching to a plant-based diet are considered highly impactful actions an individual can take to transition to a more sustainable way of life (Wynes & Nicholas, 2018). However, the global consumption of meat is drastically increasing, and this growth is strongest in Asia (The World Counts, 2023). Simultaneously, Asia accounts for the largest share of global meat production—approximately 40%–45% (Ritchie et al., 2019). Therefore, implementation of sustainable initiatives in the food and commodity sector is increasingly becoming the focus, not only in regions with traditionally high consumption rates but also in the Asia–Pacific region, where economic growth is projected to increase more than 100% from 2021–2040, faster than in any other region (Euromonitor International, 2022).

Accordingly, it is imperative that individuals and organizations consciously seek to minimize the impact of their actions on the surrounding world (Kollmuss & Agyeman, 2002). As consumers expect retailers to transition toward more sustainable processes and reduce their impact on the environment (Statista, 2021), producers are increasingly adopting new and more energy-efficient and sustainable processes (Poore & Nemecek, 2018). While more sustainable goods enter the market, the consumption patterns of daily goods, such as food, are often difficult to change because they are considered part of one's identity and are subject to cultural, social, and personal norms (Institute for Global Environmental Strategies, Aalto University, 2019). These challenges are partially due to firmly prevailing behavioral patterns and habits which may prevent consumers from transitioning to sustainable consumption, even when the sustainable transition is aligned with their personal values (van't Riet et al., 2011).

While researchers and practitioners often refer to the "Triple Bottom Line" for comprehending economic, environmental, and social issues (Kleindorfer et al., 2005), consumers tend to perceive conservation of the environment as the most prominent aspect of sustainability (Hanss & Böhm, 2012; Simpson & Radford, 2012). The environmental aspect connects closely with the perceived importance of reducing plastic waste and chemical footprints in the processing and packaging of foods, as well as reducing waste and spoilage at stores and at home (Hanss & Böhm, 2012; Peano et al., 2019; Simpson & Radford, 2012). Further, consumers tend to perceive locally produced and seasonal products as sustainable products (Joerß et al., 2017). However, they struggle to recognize which products or services may actually be detrimental to the environment or, for example, the extent to which unnecessary waste is generated. As another challenge, individuals' experiences of sustainable consumption vary depending on their personal perceptions of what behavior is important in terms

of the environment and their individual valuations, ranging from environmental aspects to economic wellbeing and social justice (Moisander, 2007). Consequently, one can identify as an environmentally conscious consumer, even if one does not often make relatively ecological choices.

Therefore, it can be argued that the relationship between an individual's beliefs and feelings and sustainable behavior is strong. Environmental psychology research examines environmentally sustainable behavior based on factors such as attitudes (Milfont & Duckitt, 2004) and feelings toward the environment (Jenkin et al., 2011). Self-interest and a general concern for other people, other species (e.g., animal rights), and the entire ecosystem have been found to motivate environmentally sustainable behavior (Bamberg & Möser, 2007). Thus, it follows that an inadequate amount of available sustainability information may contribute to misalignment between consumers' actions and values (Grunert et al., 2014; Thøgersen, 2005), and available environmental impact information may substantially influence consumption choices (Shao & Ünal, 2019). Considering the urgent demand for sustainability, responsible companies should focus on developing their offerings to enable consumers to close the gap between their attitudes and behavior (Vermeir & Verbeke, 2006). Succeeding in doing so may become key to value co-creation and to thriving in the next industrial revolution (Meyer zum Felde, 2019).

Various strategies have been proposed to promote socially and environmentally sustainable consumer behavior, such as increasing the availability of information and developing the consumption environment (Moisander, 2007; Steg & Vlek, 2009). Technological innovations may influence individuals' behavior at the level of forming, altering, or reinforcing attitudes and behavior or merely the act of complying with a set of rules or norms (Oinas-Kukkonen, 2013). However, customers' perceptions of technology-supported value creation fluctuate, thereby reflecting their personal choices, consumption behavior (Sheth et al., 1991), and underlying personal value structures (Elo et al., 2022). Therefore, aligning technological incentives with users' personal goals and values is essential. Consequently, utilizing technology to support customers' identity and engagement with sustainable actions has been suggested as a fruitful path for designing systems that aim to enable and highlight sustainable consumption (Fuentes & Fredriksson, 2016; Lebel & Lorek, 2008; Meise et al., 2014; Spanjaard & Freeman, 2012).

Motivating Sustainable Consumption Behavior with Technology

More research is required on green IS that supports the sustainable transition of individual users' behaviors (Vom Brocke et al., 2013). IS-enabled sustainability initiatives provide opportunities for developing corporate sustainability capabilities to tackle divergent sustainability-related objectives (Dao & Abraham, 2021). Retail companies may differentiate in fierce competition through the development of relevant value propositions (i.e., representations of how the company may provide their customers with opportunities for deriving value) (Payne & Frow, 2014), thereby supporting corporate sustainability goals. Further, digital services and techniques, such as gamification, have been established as promising areas for research, as these are potential drivers of sustainable behavior change in the context of food and commodity consumption (e.g., Berger, 2019; Mandujano et al., 2021).

Nudging individuals through the purposeful design of choice architecture (Thaler & Sunstein, 2009) has been found to help individuals make more sustainable food consumption choices, particularly in the food and catering sectors (e.g., Bauer et al., 2022; Langen et al., 2022). Furthermore, various studies have investigated the effects of digital nudges on consumption choices in online grocery stores, especially focusing on health aspects, such as energy content, saturated fat, sodium, and other critical nutritional health factors (Valenčič et al., 2023; Ytreberg et al., 2023). However, previous studies on sustainable food choice-related nudges have mostly focused on the brick-and-mortar store context, investigating design choices such as product placements i.e., more sustainable items being more prominently displayed (Bucher et al., 2016), as well as signage and posters promoting sustainable options (Bauer et al., 2022). It follows that there is still a lack of theory-informed knowledge of digital nudges and other techniques supporting more sustainable consumption patterns in digital food retail (Jesse et al., 2021). Furthermore, digital nudges, such as mobile application notifications and augmented reality installations, have yet to be studied in the omnichannel retail context (Lumivalo et al., 2022).

Overall, while technology can be harnessed to facilitate sustainable consumption behaviors, there is a lack of an in-depth understanding of "human responses to climate crisis mitigation strategies" (Bracarense et al., 2022, p. 15). Sustainability itself is a value-laden concept, and the individual perception of sustainable consumption varies based on the behavior the individual considers important for the environment and how the individual values sustainable behavior and identity as a consumer (Moisander, 2007). In other words, individual IS users' personal beliefs, doubts, and motivating factors are substantially related to users' engagement in sustainability-related initiatives (Sedera et al., 2017). Thus, to successfully communicate matters regarding sustainability to support and encourage sustainable consumption behaviors, service providers must understand consumers' sustainability-related perceptions and goals related to the use of a given service (Fuentes & Fredriksson, 2016).

In other words, different approaches and techniques are required to respond to the diverging needs and preferences of various consumer segments and individual consumers (e.g., Berger, 2019). Considering the omnipresence of digital technologies influencing consumption behavior, sustainability-related value propositions could be developed—for example, by offering personal goal-driven promotions based on customers' online browsing data (Blom et al., 2017). In this context, enabling consumers to align their behavior with their personal values and goals requires active engagement in the servicescape (i.e., during the shopping process) (Williams et al., 2008).

Furthermore, green IS initiatives tend to focus on the sustainability goals predefined by service providers instead of aligning incentives with users' personal goals and values. Providers must utilize eco-feedback systems (e.g., Zapico et al., 2016) to help consumers make more eco-conscious choices aligned with the company's sustainability values. In the retail context, sustainability-related digital services tend to rely on such retrospective feedback regarding customers' purchases. Most investigations in the retail context have focused on predefined goals, such as food waste reduction, product disposal/recycling, or increasing the share of organic produce. Only a few studies have addressed other goals (e.g., locality of produce, reducing meat consumption, and food industry ethics) (Meise et al., 2014). Accordingly, there is a lack of knowledge on how to tailor green IS so that individual customers may derive value from using them. Furthermore, while persuasive systems have been suggested as a means to support consumers in their goals toward sustainability (Hedin et al., 2019; Huber & Hilty, 2015; Klieber et al., 2020), research has generally tended toward the assumption that imparting "*information (e.g., information on individual energy consumption) causes behavior change, or a change in awareness and attitude that then changes behavior*" (Huber & Hilty, 2015, p. 367).

Therefore, we argue that what is missing in the literature is a view of technology as a resource for driving and supporting users' transitions toward individually perceived sustainable consumption goals and values. Essentially, such research could translate to an improved understanding of how value may be derived through the design and use of digital initiatives, thereby enabling consumers to rebuild and reinforce their evolving (sustainability) goals (Lumivalo et al., 2022; Tuunanen et al., 2010). In an attempt to address this gap in knowledge, we utilize the S-D logic framework, which provides a useful lens for investigating collaborative green IS initiatives and how value propositions are realized between service providers and IS users.

Application of the S-D Logic Lens

With the shift away from stationary systems and toward wireless, consumer-oriented, and ubiquitous IS, the user experience and the usage itself have been acknowledged as focal drivers of IS use (Lyytinen & Yoo, 2002; e.g., Tuunanen et al., 2010). It has been established that the provision of IS is, in fact, a service-like process, in which IS service quality—as perceived by users—is a key indicator of IS success (Pitt et al., 1995). Similarly, service research scholars have long sought to understand how value can be created for service users and customers—a question that has gained increasing momentum in the current era of AI and technology-enabled services (e.g., Ostrom et al., 2021). Accordingly, it has been established that the success of a given service depends on its value-creation potential for individual users and other actors involved in the service process (Čaić et al., 2018).

In traditional business school research, value has been viewed from an economic standpoint, such as the goods-dominant approach to value creation through manufacturing of goods/services and then exchanging these for economic value (Vargo & Lusch, 2004). This has been criticized as a narrow and inadequate understanding. Shifting away from solely economic and goods-dominant approaches, a more comprehensive and experiential approach has been adopted that highlights a customer's subjective judgment of benefits, sacrifices, and personal values and the significance of the service experience itself (Akaka et al., 2015; Prahalad & Ramaswamy, 2004). It follows that business researchers have increasingly begun to view customers as partners in the co-creation of value and the experience with service providers (Helkkula et al., 2012; Prahalad & Ramaswamy, 2004; Vargo et al., 2020).

Accordingly, the S-D logic framework challenges the goods-oriented view of value creation by regarding generic actors (e.g., providers and all stakeholders involved) as actively attempting to benefit each other through a process of resource integration and collaboration (i.e., co-creation of value) (Vargo & Lusch, 2004). S-D logic assumes that value cannot be created by providers' internal processes and delivered to customers; rather, it can be derived from collaborative exchange (Vargo & Lusch, 2011, 2016). In this line of thought, value is viewed in holistic/general terms as an improvement in wellbeing, subjectively and phenomenologically determined by each beneficiary (Vargo et al., 2020). S-D logic views service as the fundamental unit of exchange in all economies, involving multiple actors who co-create value (Vargo & Lusch, 2016).

It follows that companies alone cannot produce and deliver value; rather, they can offer value propositions that customers may accept (Vargo et al., 2008). However, as service exchange is unique and dependent on aspects such as the intentions, capabilities, expectations, and perceptions of the involved actors, it follows that negative

outcomes may also emerge (Lintula et al., 2017; Plé & Chumpitaz Cáceres, 2010). Such *value co-destruction* may lead to a decrease in wellbeing for at least one of the involved actors (Plé & Chumpitaz Cáceres, 2010). For example, digital service users may perceive a lack of access to relevant information when they need it, or that the resources invested in the process exceed the gains (e.g., Camilleri & Neuhofer, 2017; Lintula et al., 2018). As the use of digital services is more challenging to control than traditional services due to their technology-mediated nature, understanding and engaging with users is essential (Storbacka et al., 2016; Williams et al., 2008). Thus, service providers should not only understand how value may emerge for their customers but also acknowledge and assess the potential risks of value co-destruction (Lumivalo et al., 2023). Therefore, we aim to investigate and dissect a variety of green IS use occurrences in the retail industry that lead to either positive and sustainability-enhancing outcomes or negative outcomes, such as withdrawal from sustainable behavior.

Methods

We conducted a qualitative case study (Walsham, 1995; Yin, 2009) consisting of in-depth semi-structured interviews with the case company representatives (n = 5) (Table 1) and a semi-structured survey with its customers (n = 45) (Appendix A). The case company operates in a network of regional cooperatives (online and offline), providing food, commodities, and services in retail store units—from minimarkets to department stores and hypermarkets. It also provides consumers with personal consumption data on a mobile application, which may be used, for example, to analyze the carbon footprint of one's grocery shopping or to display the origins and nutritional values of purchased items. Previously, scholars such as Leewis et al. (2021) and Radhakrishnan et al. (2022) utilized semi-structured interviews as an appropriate method in IS research to obtain in-depth insights into a phenomenon. The case company represents the largest retailer in its field in Finland and was selected to provide a market-leading perspective on the subject. The interviewed company representatives were selected based on the recommendations of the vice president of communication, with the goal of including participants related to the company's sustainability values and customer engagement profiles.

The open-ended interviews focused on themes related to sustainability and digital service provision. The interviews were conducted using a video conferencing tool and lasted for 47–102 minutes. The interviewees had divergent roles (CEO, marketing manager, etc.) in the case company; therefore, they had different insights into the proposed semi-structured questions and themes. Most of the interviews lasted approximately 60 minutes. The first and longest interview (102 minutes) included a section in which the interviewee thoroughly introduced the company's sustainability strategy and values. The interviews were conducted through a semi-structured interview guide, where interviewees could elaborate on the themes raised. The interview themes are described in Appendix B.

Table 1 – Interviews with Case Company Representatives

Representatives of the Retailer Company	Age Range/Sex	Position	Duration of the Interview
R1	41–50/F	Vice president of communication	102 min
R2	51–60/M	CEO	59 min
R3	31–40/F	Marketing manager	56 min
R4	31–40/M	Director of development	47 min
R5	41–50/M	Senior vice president of retail	61 min

The interviews were recorded and transcribed. The audio-recorded interviews enabled repeated revisiting of the data to check for emerging themes and ensure we were true to the data collected. The interviews with the company representatives aimed to obtain an understanding of how the case company proposed value to consumers in its region by harnessing digital technologies. Thus, the themes of the case company interviews were related to corporate sustainability goals, sustainability initiatives, customer engagement, and digital services. We opted to interview the case company's regional representatives, who had an in-depth understanding of the company's strategy, mission, and actions for improving sustainability, as well as its core processes, with particular emphasis on digital services.

We used an inductive coding procedure (Gioia et al., 2013), wherein two authors (Authors A and B) individually coded the data from the S-D logic lens. The coders assessed the transcribed interviews by seeking sustainability-related value propositions. The identified value propositions were organized into first-order concepts, second-order themes (groups of value propositions), and third-order aggregated dimensions. Exemplar quotations and respective codes are provided in Appendix C. Both coders independently assessed the entire transcribed data, identifying first-order concepts proposed by the company respondents to facilitate

sustainability value through digital service provision. The concepts were developed from informant-centric terms (Gioia et al., 2013) through instances where the respondent introduced a corporate initiative for facilitating sustainability, such as involving consumers in developing new store assortments or emphasizing more sustainable products on price tags. For example, the first-order concept "Supporting local customers' goals by involving them in decision making" was coded to indicate the opportunity for local customers to suggest sustainable goods and products, such as local bread or plant-based alternatives, to be included in the store's assortment. After individually developing the first-order concepts, both coders also performed coding consistency checks to ensure the credibility of the codes in each other's coding. The coders further developed this set by eliminating duplicates and merging codes in consultation with each other (Atkinson, 2002). Then, the two coders compared them and discussed emerging inconsistencies, striving for consensus. Sixteen first-order concepts were finalized using this technique.

Author A grouped similar first-order concepts into eight second-order themes by identifying similarities and inconsistencies in the categories (Gehman et al., 2018; Gioia et al., 2013). For example, the first-order concepts "Online store improves distribution of locally sourced products" and "Supporting local actors in value chain and providing local services" were grouped under the second-order theme of "Broad network of online and physical outlets for access to locally sourced goods and services." Subsequently, another author reviewed the themes and concluded that they were coherent and representative of the dataset. Finally, Author B developed four dimensions, overreaching first-order concepts and second-order themes. For example, the second-order themes "Broad network of online and physical outlets for access to locally sourced goods and services" and "Effortless consumption of sustainable items standardized online and offline" were aggregated into the third-order dimension of "Broad omnichannel retail network for consumption of sustainable goods and services." These third-order dimensions represented an aggregated view of the case company's value propositions.

To check the reliability of the coding, Author C helped to re-code the data using the codes and themes that had emerged; then, Authors A and B compared the codes. This yielded the study's Cohen's kappa for all the codes and the source data. We calculated an unweighted average of these values and obtained an average value of 0.938 for Cohen's kappa (Rau & Shih, 2021). Through this value, the strength of the agreement being near perfect (Landis & Koch, 1977) helped to eliminate bias in the interpretation of the codes, and, therefore, there was no need for further data collection.

Subsequently, we investigated customers' perceptions of the case company's value propositions using a critical incident technique (CIT) survey (Flanagan, 1954; Gremler, 2004). Critical incidents in IS use can be regarded as particularly influential use experiences, distinguished by the user "*as unusually positive or negative*" (Edvardsson & Roos, 2001, p. 253). Such experiences are typically highly influential on human behavior (Flanagan, 1954).

Accordingly, as a widely utilized research method across divergent research fields, including IS (Gogan et al., 2014), CIT is considered to be an appropriate method for investigating previously undiscovered phenomena (Gremler, 2004) and a useful tool for reflecting customers' perceptions of services (Bitner, 1990). Therefore, CIT was deemed a sound method for understanding and reflecting on users' perceptions of the sustainability-related value propositions proposed by the case company in this study. In this context, positive critical incidents perceived by users may comprehend instances such as personalized and situationally appropriate dissemination of consumption information that the user perceives as helpful in making informed decisions (e.g., Valenčič et al., 2023). Negative critical incidents, in turn, could emerge through the provision of unnuanced or inaccurate information, potentially leading to negative feelings, such as frustration (e.g., Lumivalo et al., 2022; Melville, 2010).

The consumer informants in the CIT study were recruited through the networks of the case company by distributing a call for participation online. As an incentive to attract participants, a number of gift cards were drawn among the volunteering individuals. The semi-structured survey sample was collected online. The link to the survey was distributed through the case company's social media channels, thereby enabling the investigation of customers from different age groups, economic backgrounds, and consumer interests. To establish relevance and focus, the goal of the survey was to investigate critical incidents among a wide range of customers when engaging with the case company's offerings. No background regarding a particular interest in environmental activism or sustainability initiatives was required from the included informants.

We followed Gremler (2004) in conducting a CIT survey. The survey questions were formulated in such a manner that they corresponded to the question layout of previous studies using the critical incident method (e.g., Bitner et al., 1990; Kari et al., 2020; Meuter et al., 2000). The respondents first answered preliminary multiple-choice questions regarding demographics (such as age, gender, and profession) and regarding the participants' interest in trying new innovations and sustainability values. Thereafter, open-ended questions regarding experienced critical incidents were presented. The open-ended questions were led by the request, "Think about an outstanding experience where you used a company's digital service, and the service in question had a

significant impact on the implementation of sustainability in consumer choices." In this regard, examples of the digital services of the company in question were also provided, such as the mobile application, mobile scanners that used certain physical outlets, and the webstore for food and groceries. Subsequently, the participants were prompted to determine whether the experience in question had a positive or negative effect. Thereafter, we asked the following open-ended questions to obtain an overall picture of the critical incident:

- Explain what you were doing before the critical incident and what happened then.
- What exactly caused the incident to be positive/negative?
- Why do you consider this incident to be an outstanding experience for you?
- How did your behavior change after the experience?

Having answered the questions, the respondents were then given the opportunity to report on another critical incident. Seven respondents opted to report another critical incident, which was recorded by asking the same questions again. After completing the questions for the second critical incident, none of the participants opted to report a third critical incident.

In addition, the informants were questioned regarding topics that they personally regarded as the most important sustainability values related to their consumption. Drawing from the literature on sustainable consumer behavior, the informants were provided with the following personal sustainability value options: environmental conservation (EN), social justice/fair trade/ethical choices (SJ), local or domestic produced products (LO), animal rights (AN), reducing plastic waste or chemical footprint (RP), waste reduction (WR), nutritional quality of food (NQ), and social and economic factors (SE) (such as increasing employment rates). While the informants were given the opportunity to name sustainability topics beyond the given options, new topics were not named by any of the informants. As the previous literature has highlighted the focal role of a customer's underlying value structures in value creation (Elo et al., 2021), our analysis aimed to link the reported sustainability-related personal values with the reported critical incidents to attain a deeper understanding of the emergence of value co-creation/co-destruction for the customer in service exchange.

The combination of the answers to the open-ended questions resulted in the recording of each critical incident—that is, the unit of analysis in the study. The survey was open to respondents from December 2021 to April 2022; there were 45 respondents in total. Among them, 35 identified as female, and 10 identified as male. The majority (32) of the informants were employed; there were also four students, two entrepreneurs, two unemployed, two retirees, two on parental leave, and one who reported their background to be "other". Eighteen of the informants were in their twenties, fourteen in their thirties, six in their forties, six in their fifties, and one was over sixty years old. As part of the demographics, the customers were also asked to rate their interest on a scale of 1–10 toward using digital services and other technological innovations, such as mobile applications. The mean was seven, and the median was eight. After excluding entries that did not meet the critical incident criteria, 39 respondents were included; moreover, 51 critical incidents were extracted from the data.

Using thematic data analysis (Braun & Clarke, 2012), Authors A and B coded the survey data from the perspective of the third-order value proposition dimensions derived in the previous study phase. The developed codes were further categorized as positive (+) or negative (-) experiences and linked to the personal underlying sustainability values, as reported by the respondents in the survey. Each of the 51 consumer experiences that emerged in the data were categorized. Thirty-nine positive experiences (indicating potential value co-creation) and 12 negative experiences (indicating potential value co-destruction) emerged from the analysis. Author C reviewed the linkages of the consumer experiences to the value proposition dimensions, thereby concluding that the analysis was concise and representative of the data.

Findings

Based on our analysis, the reported "positive" and "negative" customer experiences were linked to the emerging value proposition dimensions (cf. Figure 1), evidencing value co-creation and value co-destruction as realized by customers. Accordingly, we propose a framework for sustainability value co-creation and value co-destruction through digital services in the retail industry; this yielded four value proposition dimensions associated with value co-creative and co-destructive customer experiences and customers' underlying sustainability values (Table 2). The framework illustrates how a company's sustainability-related value proposition may be realized in practice. Furthermore, the framework connects co-creative and co-destructive customer experiences with the underlying sustainability values disclosed by customers, thereby showcasing potential connections with both positive and negative realizations of the company's value propositions in relation to customers' personal values. Below, we depict each value proposition dimension and the linked critical incident experiences with examples from the informants' statements, along with the connected underlying personal sustainability values.

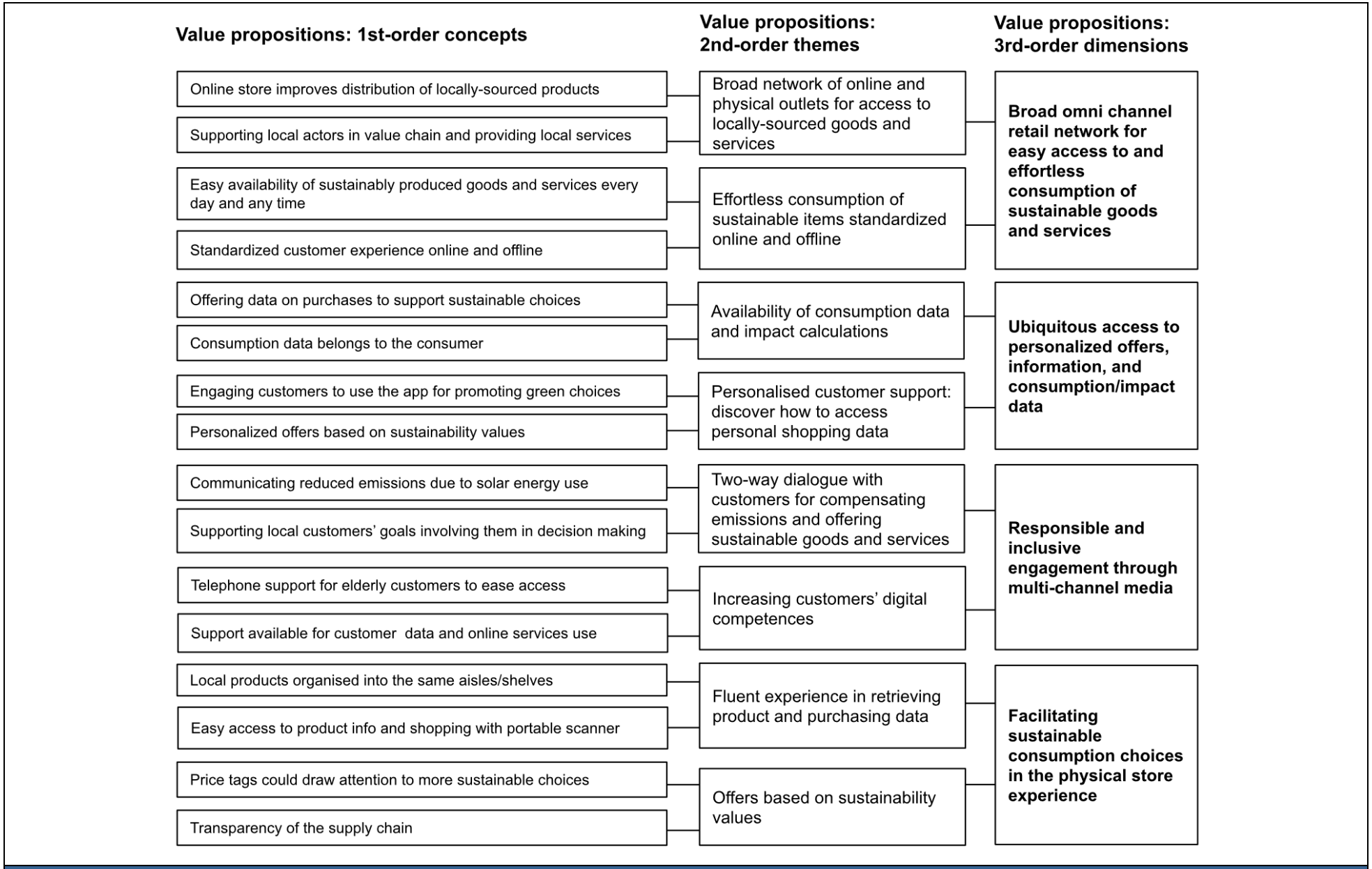

Figure 1 – The Coding Process of the Case Company's Value Propositions

Table 2 – Framework for Understanding the Realization of Retailers' Value Proposition Dimensions Related to Customers' Critical Incidents of Value Co-Creation and Co-Destruction and Underlying Sustainability Values

Value Proposition Dimension	Realized Value Co-Creation (+) and Value Co-Destruction (-)	Customers' Underlying Sustainability Values (Hits)							
		EN	SJ	LO	AN	RP	WA	NQ	SE
Broad omnichannel retail network for sustainable consumption of goods and services	+ Webstore and pick-up venue during the pandemic (1)		1	1				1	
	+ Less wastage and impulse purchases due to webstore (3)	1	1	3	2	1		2	
	+ Responsible selection of goods in the webstore (3)	1		3		1	2	1	
	+ Easy to acknowledge products' country of origin in the webstore (1)			1		1	1		
	+ The employment impact of webstores (collecting of goods) (1)			1		1	1		
	+ A purely digital shopping process – no paper needed (1)			1		1	1	1	
	- Buying unneeded items in physical store due to the persuasive impact of digital offers (3)	1	2	2	1	3	2	1	
Ubiquitous personalized offers, information, and consumption/ impact data	+ Accurate consumption data as a support mechanism for more sustainable consumption (8)	2	3	8		6	8	4	1
	+ In-app digital offers on sustainable items supporting sustainable consumption choices (8)	1	4	6	3	4	6	4	2
	+ Usability of the app features, such as paperless receipts (4)	2	2	4	1	3	3	3	1
	+ Accumulating bonuses that can be easily invested in sustainable funds (1)			1		1	1	1	
	- Digital in-app offers increase excessive consumption in webstore (3)	1	2	2	1	3	2	1	
	- Digital in-app offers concern poorly fitting and unsustainable goods (1)	1	1	1	1	1			
	- Poor usability of the app and forced use of a plastic card (2)			2		2	2	1	
Responsible and inclusive engagement	+ Assistance available for use of digital services (3)		1	3		2	3	2	
	+ Adverts on products of local/national origin (1)			1		1	1		1
	- Not acknowledging customer requests on introducing new products into the selection (1)	1	1	1	1	1	1	1	
Facilitating sustainable consumption choices in the physical store experience	+ Carrying various sustainable items in the selection (1)			1			1	1	
	+ A digital scanner for checking products in store (1)			1					
	+ Reusable packaging made available at the checkouts (1)			1		1	1	1	
	+ Self-service checkouts for efficient shopping (2)			2		2	2	1	
	- The checkouts printing out paper receipts regardless of the in-app digital receipt feature (1)			1		1	1	1	

EN = Environmental conservation
SJ = Social justice/fair trade/ethical choices
LO = Local or domestically produced products
AN = Animal rights
RP = Reducing plastic waste or chemical footprint
WA = Reducing spoilage and waste
NQ = Nutritional quality of food
SE = Social and economic (such as increasing employment rates)

Broad Omnichannel Retail Network for Consumption of Sustainable Goods and Services

Value Proposition Emerging from the Case Company Interviews

In the analysis of the case company interviews, the first emerging value proposition dimension relates to the provision of a broad network of physical and digital outlets that enable the effortless consumption of sustainable goods and services. We found that the case company emphasized social sustainability value related to locally sourced goods and products, as well as the wellbeing of local people and organizations in their customer value propositions. Further, the company actively supported local purchasing power by promoting the employment of local people and procuring services from small companies, in addition to carrying local produce:

> *For example, we made a deal with local fishermen to buy the fish they caught from the local lakes. There are many advantages to this. We secure their living and ensure that we always have fish from the lake available, while also providing fish recipes for customers and ensuring healthiness through this.* (Director of Development)

Proposing the value of locality from the case company's perspective involves providing services, such as physical stores or delivery options from online stores, to reach remote locations in Finland, thereby maintaining the vitality of the town. To address new challenges that emerged during the COVID-19 pandemic, the case company launched a call center offering a telephone service for elderly offline customers to place grocery orders that were delivered to their doorsteps.

Overall, the case company's representatives highlighted the significance of their online grocery stores in promoting local and sustainable value. Their stores featured products from small-scale local suppliers, thereby enabling wider distribution than through physical stores. In addition to a vast network of physical outlets, the online store aimed to provide customers with a seamless experience when purchasing locally sourced goods and services, with the goal of making it easier for customers to access sustainable and ethical products.

Customers' Critical Incidents of Value Co-Creation/Co-Destruction

Thirteen critical incidents were identified in relation to the value proposition of the "Broad omnichannel retail network for consumption of sustainable goods and services" in the survey data collected from the case company's customers. The majority of these experiences were disclosed as "positive;" thus, they were labeled as value co-creation. In one of the themes, three of the critical incident experiences particularly highlighted how online retail shopping reduces impulse purchases, and, thus, household waste also decreases compared to shopping at physical brick-and-mortar outlets. For example, one of the informants stated: *"[The mobile app's] "own purchases" function has opened my eyes when it comes to my own grocery and food purchases".* (Co25)

In two of these experiences, planning and thinking about needs more carefully when placing an online store order were highlighted. According to the respondents, planning can help reduce food waste at home while simultaneously saving on food costs: *"I do not order anything extra in the store; there are no impulsive purchases".* (Co31)

However, not all experiences related to the first value proposition led to purchases supporting the personal sustainability values disclosed by the informants. Three respondents related buying unnecessary items to the persuasive impact of the case company's digital offers:

> *You will often see offers from [the mobile app] for restaurants. For example, when the application displayed information about the discounted price of poultry on [the service station of the retail chain], I bought it, but I see it was not responsible. I wish there were more offers for vegetarian food, local food, or food where animal welfare was safeguarded.* (Co3)

One of the respondents valued pre-collected and packaged foods. In four experiences, responsible selection (i.e., product variety enabling sustainable consumption) in online shopping came to the fore to a certain extent. Of these, two customer experiences referred to domestic products in the product range that are regarded as sustainable for their raw materials, which are clearly marked in the online store and are therefore easy to find. In one answer, the low price of domestic products in the online store was also brought up, which partially influenced the purchase decision of domestic products over imported products. In one customer experience, with regard to the responsible selection in the online store, it was also highlighted how the selection of plant-based products in the online store had positively surprised and encouraged the informant to use the online store for shopping. *"From [the retailer's mobile app], you can monitor your own purchases during the year and thus possibly change your own consumption choices. We ourselves have tried to reduce red meat".* (Co24)

One of the respondents shared that, when browsing the product range of an online store, the country of origin of a particular product is easily identifiable, thereby enabling the potential exchange of the product for a domestic equivalent, if necessary. Compared to a physical store, the respondents noted that checking their country of origin was easier in an online store.

A few of the respondents reported that online shopping provided planned and smoother experiences, as well as ease of pickup. Furthermore, contactless shopping was considered an advantage due to its quick and easy pickup. With regard to sustainability values, it was highlighted that no contact increased perceived sustainability, particularly during the COVID-19 pandemic or in the event of unexpected cases of illness. Additionally, it was noted that the company's online services could be managed without unnecessary paper attachments. While numerous experiences were positive, one customer found the plastic bonus card to be superfluous, as the bonus system could be handled through digital apps on smartphones.

Ubiquitous Personalized Offers, Information, and Consumption/Impact Data

Value Proposition Emerging from the Case Company Interviews

In the second value proposition dimension, "Ubiquitous personalized offers, information, and consumption/impact data," the case company opted for collaborative and interactive communication with its customers, with transparency as one of its key values. One of the representatives clarified that, in their opinion, personal consumption data belonged to the customer. Hence, the customer was entitled to have access to the data collected and the right to decide on its use. It can be inferred that the case company aimed to support its customers in following their own choices and values. Moreover, the case company respondents implied that they had a responsibility, shared with their suppliers and producers, for the overall sustainability of their offerings. It was concluded that, in the ideal case, both the consumers and the case company agreed that they should share responsibility for sustainability. To foster transparency, the case company provided a mobile application for its customers that presented multifaceted information regarding their personal consumption and environmental impact. The application included features such as offers, purchased items, consumption rate of domestic food, household carbon footprint calculation, household plastic bag usage, and the nutritional macros of purchased groceries. However, it was emphasized that customers were responsible for their own consumption choices and whether they chose to disclose their data.

In the application, customers can also compare the prices of products between the case company and its competitors. As the application did not support personalization regarding customers' consumption preferences, the case company informants indicated that there was more potential for promoting sustainable choices than was offered at the time of the interviews (i.e., harnessing customer data for tailoring more personalized offerings). However, one of the case company representatives emphasized the low adoption rate of the mobile application: approximately 50% of the company's client base had not adopted the application at all. While accessibility was not regarded as an underlying reason for the relatively low rates, it was mentioned that more customer insight was required to understand and tackle the issue.

Customers' Critical Incidents of Value Co-Creation/Co-Destruction

Related to the second identified value proposition dimension, the informants discussed their critical incidents regarding personalized, consumer-data-derived offers mainly available on the mobile application. The analysis of the research data revealed that most of the customers' critical incident experiences were related to this dimension, implying that the majority of the respondents clearly used the application. In the analysis, 27 critical incidents were related to this dimension, of which 21 were disclosed as "positive" (reflecting value co-creation) and five as "negative" (reflecting value co-destruction). The personal consumption data and information on purchases provided by the application emerged from eight experiences as a potential digital service feature facilitating the co-creation of sustainability value. In four of these experiences, it was believed that concrete numbers of the share of domestic products would make one think more about one's own purchasing behavior and thereby guide and encourage more sustainable purchasing behavior.

> *Looking at the data was not a really positive experience for me. Rarely do you get low-threshold raw data on how my daily activities affect both nature and my wallet. Now, I take a plastic bag with me to the store more often.* (Co14)

One experience emphasized setting one's own long-term goals based on consumption data and, for example, partially replacing red meat with plant-based products. Concrete data on the amount of bottled water purchased made one informant change their consumption behavior on the matter ex post: *"After checking the information in the app, I changed my consumption of bottled water. Water from the tap is also good".* (Co7)

Further, two customer experiences focused on observing the number of plastic bags purchased. According to the respondents, seeing the number of their own plastic bag purchases was thought-provoking and motivated them to take a durable bag with them when shopping. One of the respondents commented that it became a special experience in addition to changing their purchasing behavior, as concrete numbers regarding their own daily choices and their effects on both nature and their own finances are rarely available. One of the respondents particularly appreciated the fact that the information was presented without background assumptions regarding whether a certain number of plastic bags purchased, for example, was good or bad. According to him, seeing the reduced number of purchased plastic bags also encourages the expansion of more sustainable operations to other areas of consumption:

> *The information in the app has influenced my consumption behavior on a wider scale. When you can concretely see the effect of your own grocery shopping or the fact that you don't buy plastic bags, it encourages the expansion of the same activity to other types of consumption.* (Co25)

The data highlighted the advantages offered by the application for retail purchases. The image of the company in question included its affordability, which emerged in the form of advantages. Among the benefits offered by the application, we found both experiences of joint creation of sustainability values (n = 8) and joint destruction (n = 4). According to these two experiences, the benefits are useful and encourage the use of the application in the future. According to five customers, certain benefits encourage more sustainable choices, particularly regarding domesticity: *"I was able to check the origin of the product on the mobile app. I changed it to a domestic product".* (Co34)

Some of those who answered this question also believed that the advantages found in the application reduce waste. One of the respondents (Co38) said that he bought larger package sizes, which he believed was a more sustainable choice, as it would contribute to reducing emissions. On one hand, the "offers" feature in the application was found to reduce the need for paper advertisements—for example, reducing the need for paper waste. On the other hand, according to the critical incidents disclosed by three informants, personalized, consumption-data-derived benefits were perceived as "negative," potentially co-destroying sustainability-related value. For example, one informant expressed that the offers led to unnecessary consumption, as impulse purchases were made. According to another informant, availing of personalized digital offers and the corresponding low prices of products occasionally sacrifices one's own values of sustainability. For example, he would like to act more responsibly when shopping, but he would also like the benefits offered on the application to support his sustainability values/goals: *"I feel that, as a consumer, I should only buy things that I need. I don't feel that this advertising was directly "irresponsible," but that's why I bought the product".* (Co11)

Additionally, one of the informants perceived that the digital offers tended to include animal-based meat products, whereas they acknowledged the consumption of vegetarian, local, or organic food as a more sustainable behavior. In such cases, personalized offers were not considered to appropriately encourage sustainable consumption behavior. Critical incident experiences were also found in the application's functionality for both the co-creation of sustainability value and value co-destruction. In three critical incidents, the receipt service offered by the application was highlighted, where the personalized digital service feature enabled sending receipts directly to the application, thereby doing away with longer paper receipts.

Responsible and Inclusive Engagement

Value Proposition Emerging from the Case Company Interviews

Compiling the third value proposition dimension, we found that the case company's representatives clearly expressed dedication to proposing support and caring for their customers. The case company developed various digital and physical services to help realize this goal, including asking for local customers' opinions and concerns when establishing new retail units in an area. The company actively engaged with customers through its corporate website, social media channels, and direct email. To foster digital inclusion, the case company also provided support for its elderly customers with respect to their digital competencies. The company claimed to highly value interactive communication with its customers. The Vice President of Communications and Marketing stated that they receive approximately 7,000 messages per year through the website feedback channel and 10,000–12,000 messages per year through social media and respond to most of the messages.

One of the case company representatives stated that the company acknowledged that there was room for improvement with respect to the company's sustainability brand. The company has committed numerous actions toward lowering its carbon footprint, thereby offering more sustainable alternatives for traditional goods and products and other incentives. For example, the company installed the country's largest solar panel setup on the rooftop of one of its hypermarkets to substantially lower the hypermarket's and customers' environmental impacts from energy consumption. In addition to using physical in-store signage, various online campaigns—

including influencer marketing, website activities, and directed social media marketing (Facebook and Instagram)—were undertaken to communicate sustainability-related achievements and propositions to consumers. However, communicating sustainability-related value propositions was found to be challenging.

Customers' Critical Incidents of Value Co-Creation/Co-Destruction

Only a few critical incidents reported by the informants were identified as linked to the case company's communication and customer engagement activities. Five related critical incidents emerged, of which four were identified as having a "positive" impact and one having a "negative" impact on the informants' perceptions of sustainability. Two positive customer experiences emphasized the staff's help in using digital services and the gift card, even though the self-service checkout was used to make purchases. According to one customer, the use of coupons was also instructed, and the staff remembered mentioning the use of benefits at the checkout. Thus, help was available when needed. One of the critical incidents was related to the company's marketing communications, which translated into a positive value co-creative experience. This informant reported that the company tended to advertise domestic products; because of this, the informant was under the impression that the company's aspiration was to guide customers toward more sustainable consumption behavior. According to the respondent, this encouraged customers to opt for domestic alternatives instead of imported ones: *"[The company] clearly wants to promote responsible behavior and guide consumers to make more sustainable purchases".* (Co2)

In addition to co-creative service experiences, we also found one negative service experience, which evidenced perceived value co-destruction. This experience was related to customer service and reciprocity. Although the company emphasized reciprocity in its own customer service, it had not responded to or considered the product requests that were digitally disclosed by the informant. The customer had waited several weeks before getting in touch again; even after doing so, only one of the product requests was included in the store selection, which caused disappointment. After this value co-destructive experience, the customer switched to using the retail services of a competing chain because product requests were better considered: *"I made requests for several gluten-free products for my daughter. For several weeks, I waited for the store to start carrying the requested items. Despite this feedback, only one of the requested items appeared in the store".* (Co3)

Facilitating Sustainable Consumption Choices in the Physical Store Experience

Value Proposition Emerging from the Case Company Interviews

The fourth of the case company's value propositions was to ease customers' everyday shopping experiences in physical stores through relevant product placements and information. The interviews showcased that digital solutions were rarely used in the physical store for the purpose of departing information, but self-service technologies were implemented in numerous stores, particularly in the form of self-checkout technologies and by utilizing portable scanners while collecting items. Further, the company dedicated specific shelves to communicating about products that supported specific sustainability goals (e.g., local products and produce). The previously mentioned transparency value was considered relevant with respect to the transparency of the supply chain. In the future, the case company plans to invest in transparently providing supply chain data to customers on an ad hoc basis, potentially by utilizing distributed ledger technology. However, challenges were acknowledged regarding the requisite commitment of all actors in the supply chain. In other words, there may not be full transparency if one actor in the chain decides not to disclose the information required for implementing such a service:

> *Customers would like to have information in the store about products, etc., based on their values and preferences, such as the impacts of the supply chain. However, limiting information by one actor in the chain leads to gaps in sustainability information.* (Senior Vice President of Retail)

Customers' Critical Incidents of Value Co-Creation/Co-Destruction

Six critical incidents reported by the informants were linked to the fourth dimension related to the sustainable consumption choices enabled by the company in the physical store. Five of the critical incidents were identified as positive, and one was identified as negative. According to one participant, a handheld scanner had a great impact on the consumption experience at the physical store. There were two experiences related to the use of self-service checkouts, one of which emphasized the ease of making purchases with self-service technology, and the other focused on the good visibility of reusable shopping bags at the physical self-service checkout. According to the latter critical incident, reusable bags were clearly displayed at self-service checkouts in addition to regular checkouts, which were found to increase their usage instead of plastic bags: *"I've started using reusable bags when shopping because they are placed so that they are easier to reach at the checkout counter".* (Co16)

One customer stated that the company's selection incorporated a great variety of sustainable products, and that their selection was easy to access. In the future, the informant is committed to becoming familiar with a wider range of sustainable products. However, one critical incident reported by an informant was related to the unnecessary environmental strain caused by paper receipts. The informant had an experience in which sustainability values were co-destroyed, as the customer was not given the option to opt out of receiving physical receipts, regardless of having the receipts of each transaction archived in a digital format in the mobile application: *"I get upset every time I see a printed receipt. The receipt also comes to my mobile app, but now I have to put the print receipt in trash".* (Co37)

At the time of data collection, the retailer was in the process of initiating a paper waste reduction program. This included the option of defaulting to a digital receipt only, which was activated for customers who had previously opted for a "digital receipt only" on the mobile application.

Discussion

Our study uncovers the sustainability-related value propositions of a leading Finnish case company and customer experiences (critical incidents) when utilizing digital services. The findings show the company's efforts to promote local and sustainable goods through a broad omnichannel network, alongside personalized digital services that provide customers with data on their consumption patterns. This approach aims to empower customers to make informed, sustainable choices. Furthermore, the study delves into the company's strategies for responsible customer engagement and the facilitation of sustainable choices in physical stores. These strategies include customer support in digital competencies and transparent communication of sustainability-related information. The findings reveal the complexities and challenges of aligning retail services with consumer sustainability values and the broader goal of enhancing sustainable consumption behaviors. In the following section, we discuss the theoretical and practical implications of our study, along with its limitations and future research directions.

Theoretical Implications

Our findings contribute to IS and service research in the following three ways. First, our study revealed that S-D logic provides a useful lens for understanding how the value propositions of a case company may be realized in critical incidents reported by customers (i.e., outstanding experiences of value co-creation and co-destruction). As the success of a given service can be regarded as dependent on its value co-creation (and co-destruction) potential, further research into value co-destruction is needed, particularly in conjunction with technology-enabled services (Čaić et al., 2018; Ostrom et al., 2021; Tuunanen et al., 2019). Moreover, although value propositions as key to realizing the value co-creation potential of a digital service have been discussed from the perspective of supporting social connections, personal identity, and individual values and goals (Tuunanen et al., 2010), the connection of value co-destruction with value propositions has remained unclear. Our methodical approach enabled a view founded on S-D logic of the company and customers as active resource integrators in service exchange (Vargo & Lusch, 2016), thereby contributing a novel illustration of how a company's value proposition offerings may lead to both value co-creation and co-destruction as perceived by the customers (Plé & Chumpitaz Cáceres, 2010). Furthermore, making the connection between the value co-destructive critical incidents and the value propositions of the case company, our study extends the current understanding of system value proposition design and the phenomenological, contextual, and experiential nature of emerging value (Helkkula et al., 2012; Vargo & Lusch, 2016). Accordingly, we argue that customers' negative and contradictory perceptions of value are connected to the realization of value propositions and ought to be carefully considered by researchers and practitioners.

Second, our findings reveal how customers may perceive the value propositions of a given sustainability initiative. Most consumer experiences related to retailers' digital offerings are positively perceived. For example, the mobile application included data on consumers' choices and could show how many plastic bags they had bought in a year or what percentage of their purchases were locally sourced. These aspects of digital services were also found to support the underlying personal sustainability values disclosed by consumers. Furthermore, we found that negative value outcomes may emerge, whereas positive ones are pursued by the stakeholders involved (e.g., Lintula et al., 2017; Lumivalo et al., 2023; Plé, 2017). Consumer informants experienced value co-destruction, particularly in the dimensions of ubiquitous personalized offers, information, and consumption/impact data. For example, while digital processes help consumers reduce excess buying, negative experiences also emerge. Offers provided over the mobile application increased purchasing and led consumers toward unsustainable purchasing. Furthermore, whereas the option of having a digital copy of the receipt archived in the application was warmly welcomed by a few consumers, the positive impact of the feature turned against itself, as it was not possible to opt out from the automatically printed paper receipt.

Third, while (Lumivalo et al., 2022) investigated pro-environmental consumers' perceptions of the status quo of sustainability initiatives in the retail industry, our study is the first to investigate digital services for sustainability value co-creation in the omnichannel among a more general customer segment without prerequisite interests for sustainable consumption and transition. We present evidence to support the notion that generally providing consumers with access to consumption data is by no means a sufficient action to enhance the co-creation of sustainability value (Huber & Hilty, 2015). The consumer respondents in our study averaged relatively high motivations toward adopting new technologies and digital services, as well as a wide array of underlying sustainability-related personal values per se. Interestingly, our findings reveal that personal sustainability-related values may not steer the value co-creation potential of a sustainability initiative. Instead, we find that other values—such as savings and convenience—may override the stated underlying personal sustainability values and drive the value-creation process. This finding is partially counterintuitive to previous literature, which has discussed personal values as drivers of value co-creation (and co-destruction) (e.g., Elo et al., 2021). Accordingly, we argue that, when personalizing digital sustainability initiatives and offerings, understanding customers' personal underlying values and goals in a holistic manner is essential instead of merely mapping customers' sustainability-related values for reference to activities. Such personalization of sustainability initiatives is urgently required for activating consumers' inherent personal values as contributors to more sustainable consumption choices in the food and commodities retail industry.

Practical Implications

Our study guides service providers in designing personalized digital interventions that resonate with consumers' sustainability values, enhancing the effectiveness of sustainability initiatives in retail. While the identified value proposition dimensions provide managers with a starting point for leading sustainable innovation and transitions with customers, a personalized and data-driven approach to the development of value propositions is recommended. Therefore, as our first managerial implication, we propose that data managers incorporate their customers into their value proposition development by carefully considering data flows on consumer behaviors and preferences. Second, we propose that managers aim to unify their sustainability-related offerings in their online and physical stores, which are likely to provide more opportunities for value co-creation. Although the digital store provides a means for obtaining information (e.g., local produce) and shopping in a more organized manner (e.g., mitigating impulse shopping), the physical store may benefit from the installation of technologies to augment the shopping experience with similar tools and content. However, there is a fine line between promoting sustainable behaviors and encouraging excessive consumption with digital benefits and recommendations. Therefore, to mitigate co-destructive value realization, value propositions must be embedded with smart features to personalize offerings according to customers' personal values, characteristics, and contexts (Akaka et al., 2015). It follows that, for enabling value co-creation, several indicators (e.g., self-disclosed items such as personal values and goals, along with measured items such as conversions, location/context, and constructed items like reference groups) ought to be employed when targeting and personalizing sustainability initiatives. We found that most of the informants were somewhat interested in receiving relevant information derived from personal consumption data; the subjects of interest varied substantially in the sample. Finally, whereas previous studies have emphasized consumers as focal contributors to the co-development and co-design of such initiatives to support consumers' evolving goals, we regard collaboration with individual users as being continuously required to foster increased sustainable consumption behaviors (e.g., Loef et al., 2017).

Additionally, our study has implications that are particularly relevant to the Asia–Pacific region. With the region's rapid economic growth and increased consumption rates (Euromonitor International, 2022), the insights gained from this study on the interplay between value co-creation and co-destruction have significance for the region's efforts in sustainable development initiatives. The Asia–Pacific region's cultural, social, and economic contexts are diverse; therefore, individuals' perceptions of sustainability-related value propositions are likely to differ within and across regions. It must be noted that the Asia–Pacific region is the only region, globally, where per capita consumption of red meat (beef) is projected to increase over the next 10 years (The Food and Agriculture Organization, 2022). Therefore, as regionally emerging social and cultural norms may negatively steer sustainable consumption behaviors, digital sustainability initiatives have become particularly essential in the Asia–Pacific region. As we examine the interplay of personal sustainability values and other motivating factors in driving value co-creation, the implications of our study emphasize the importance of understanding and accommodating the unique motivations and behaviors of consumers in a given cultural, social, and economic context. In particular, we see that the Asia–Pacific region's rich tapestry of cultural norms and diverse personal values adds complexity to the process of crafting effective digital interventions for sustainable behaviors. Therefore, our findings suggest that tailoring digital interventions to the specific goals, needs, and contexts of individual consumers is not only beneficial but also crucial in the Asia–Pacific region. Future research endeavors could focus on exploring the cultural nuances and contextual factors that influence the effectiveness of tailored interventions in different Asia–Pacific markets, paving the way for even more impactful sustainability initiatives. Furthermore, examining the alignment between observed sustainability value propositions and value propositions publicly communicated by a company

would likely provide beneficial insights for the company. Accordingly, tailored digital interventions need to be investigated further and fitted to individual consumers' goals, needs, and contexts as a focal ingredient to facilitating sustainability value co-creation and mitigating co-destruction.

Limitations and Future Research

The limitations of our research must be acknowledged. Primarily, the study's reliance on a limited sample from a specific Finnish retail company may not fully encapsulate the broader retail sector's dynamics. The small sample size, the characteristics of qualitative research, and the critical incident technique employed may affect the generalizability of our findings. Moreover, the research did not extensively explore the influence of varied contextual factors, such as cultural norms and regulatory frameworks, which may be crucial in understanding the complexities of value co-creation and co-destruction. Additionally, focusing predominantly on direct customer interactions within the retail servicescape potentially overlooks the broader systemic impacts of digital sustainability initiatives. Another limitation concerns the selection of company representatives for the interviews. The participants were invited to participate in the study based on recommendations from the company's Vice President of Communications and Marketing, potentially introducing a bias in the perspectives shared. While this selection approach likely does not significantly skew the overall findings, especially when combined with customer insights from the CIT survey, it is important to acknowledge that the included participants might convey specific company practices and values.

Furthermore, the CIT method, while robust in capturing significant customer experiences, may pose limitations in capturing a wider array of consumer interactions. The temporary limitation in recalling critical incidents should also be acknowledged, as informants' memories may be limited in recalling some of the incidents in detail in cases where a significant amount of time has passed at the time of the survey (Edvardsson & Roos, 2001). Finally, we found that the respondents' perceptions of sustainability and sustainability factors may affect the critical incidents they describe. While the respondents were guided to consider different aspects of sustainability through us asking about different sustainability factors, limitations occurred in the comprehensiveness of the responses; divergent underlying perceptions of sustainability were evident in the descriptions. Furthermore, the respondents were not required to be particularly interested in pro-environmental behavior. It can be assumed that the results would have been different if respondents had been required to have special sustainability and environmental awareness and to constantly take their own sustainability values into account in their everyday lives.

Future research should explore the dynamics across various retail settings, incorporating longitudinal studies and examining the influence of cultural and contextual factors on value co-creation and co-destruction. An interesting future research path would also be to investigate value propositions for consumers navigating physical stores and to explore the theoretical relationship between value co-creation and value co-destruction as a dynamic, evolving process. Moreover, exploring techniques, such as gamification, for combining virtual and physical dimensions with respect to consumers' sustainability goals is also a possible future research direction (cf. Hedin et al., 2019; Mandujano et al., 2021; Spanjaard & Freeman, 2012). Studies could also investigate the balance between promoting sustainable behaviors and the risk of encouraging overconsumption through digital interventions. Addressing these limitations will enhance our understanding of sustainable consumption in retail and contribute to the development of more effective digital sustainability initiatives.

Conclusion

We employed S-D logic to explore the intricate relationship between digital services and sustainable consumption in the retail sector. Our investigation into a leading Finnish retailer's sustainability initiatives and their reception by customers reveals the multifaceted nature of value co-creation and co-destruction. The findings suggest that, while digital services can facilitate sustainable consumer behaviors, they can also inadvertently lead to unsustainable practices. This dual potential underscores the complex interplay between a retailer's digital offerings and the varied sustainability values and personal preferences of consumers. Our contribution extends beyond identifying these dynamics to propose a nuanced framework that captures the essence of digital service interactions in retail spaces. This framework not only aids in understanding the current landscape of digital sustainability initiatives but also paves the way for future research aimed at enhancing sustainable consumption through digital means. Our study's insights are particularly pertinent in the context of the Asia–Pacific region, which presents unique challenges and opportunities in the pursuit of sustainable development goals. The study's findings provide a comprehensive overview of how digital services in the retail sector can simultaneously enable and inhibit sustainable consumption. They highlight the importance of a personalized, data-driven approach to sustainability initiatives, emphasizing the need to align these initiatives with the diverse values and needs of consumers. These insights contribute significantly to the literature on sustainable consumption and digital service design and offer valuable guidance for researchers and practitioners in the field.

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Appendix A – Survey Informants' Demographics and Sustainability Values

Table A –Survey Informants' Demographics and Sustainability Values

Informant ID	Informant Age	Informant Sex	Informant Occupation	Sustainability Values SJ = Social justice/fair trade/ethical choices; LO = Local or domestic produced products; AN = Animal rights; RP = Reducing plastic waste or chemical footprint; WR = Reducing spoilage and waste; NQ = Nutritional quality of food; SE = Social and economic (such as raising employment rates); EN = Environmental conservation.							
Co1	51-60	F	Employed		SJ	LO		RP	WR	NQ	
Co2	21-30	F	Employed		SJ	LO	AN	RP			
Co3	31-40	F	Employed	EN	SJ	LO	AN	RP			
Co4	21-30	M	Employed			LO		RP	WR	NQ	
Co5	51-60	M	Employed			LO					
Co6	41-50	F	Entrepreneur		SJ	LO				NQ	
Co7	51-60	F	Employed			LO		RP	WR		
Co8	21-30	F	Stay at home parent			LO					
Co9	51-60	F	Employed			LO		RP	WR		
Co10	21-30	F	Student		SJ	LO		RP	WR	NQ	
Co11	21-30	F	Student					RP	WR		
Co12	41-50	M	Unemployed	EN	SJ	LO	AN	RP	WR	NQ	SE
Co13	31-40	F	Employed	EN		LO	AN	RP		NQ	
Co14	21-30	F	Employed			LO		RP			
Co15	21-30	F	Employed			LO		RP	WR		
Co16	51-60	F	Employed			LO		RP	WR	NQ	
Co17	41-50	F	Employed	EN		LO		RP		NQ	
Co18	31-40	F	Employed		SJ	LO			WR		
Co19	41-50	F	Employed	EN		LO					
Co20	31-40	F	Unemployed			LO			WR		SE
Co21	21-30	F	Employed			LO		RP	WR		
Co22	21-30	F	Employed		SJ	LO			WR	NQ	SE
Co23	Yli 60	F	Retired			LO		RP	WR	NQ	
Co24	31-40	F	Employed	EN		LO		RP	WR		
Co25	21-30	F	Student		SJ	LO		RP	WR		
Co26	31-40	F	Employed	EN	SJ	LO	AN	RP	WR	NQ	
Co27	41-50	F	Employed			LO		RP	WR		SE
Co28	31-40	F	Employed								
Co29	51-60	M	Retired			LO		RP	WR		SE
Co30	21-30	F	Employed			LO			WR	NQ	
Co31	41-50	F	Employed		SJ	LO		RP	WR		
Co32	31-40	F	Employed			LO		RP	WR		

Table A –Survey Informants' Demographics and Sustainability Values											
Informant ID	**Informant Age**	**Informant Sex**	**Informant Occupation**	**Sustainability Values** SJ = Social justice/fair trade/ethical choices; LO = Local or domestic produced products; AN = Animal rights; RP = Reducing plastic waste or chemical footprint; WR = Reducing spoilage and waste; NQ = Nutritional quality of food; SE = Social and economic (such as raising employment rates); EN = Environmental conservation.							
Co33	31-40	F	Employed			LO			WR	NQ	
Co34	31-40	F	Employed			LO		RP	WR		
Co35	21-30	F	Employed		SJ	LO	AN		WR	NQ	
Co36	21-30	M	Employed			LO		RP	WR	NQ	
Co37	21-30	M	Employed			LO		RP	WR	NQ	
Co38	21-30	M	Student					RP	WR	NQ	
Co39	21-30	F	Employed			LO	AN		WR	NQ	
Co40	21-30	M	Student					RP	WR	NQ	
Co41	21-30	F	Student		SJ	LO				NQ	
Co42	31-40	M	Employed	EN	SJ		AN	RP	WR	NQ	
Co43	41-50	F	Employed	EN			AN				
Co44	31-40	O	Stay at home parent	EN	SJ	LO	AN	RP	WR	NQ	
Co45	31-40	M	Employed		SJ	LO				NQ	

Appendix B –Themes of the Semi-Structured Interviews

Theme 1: Company's Sustainability Values

1. Describe your company's core sustainability values.
2. How do these sustainability values translate into the value propositions offered by your physical stores?
3. Similarly, how are these values integrated into the digital services your company provides?
4. How do these values manifest in other services offered by your company?

Theme 2: Role of Digital Services in Achieving Sustainability Vision

1. Could you outline the future vision your company has for sustainability?
2. How does technology play a role in realizing this vision?
3. Have you leveraged customer data to advance your sustainability goals and vision?
4. What tangible outcomes can be realized through the successful execution of this sustainability vision?
5. What sustainability-related challenges does your company encounter?
6. How does your company perceive external pressures related to sustainability, such as climate change?

Theme 3: Value Co-Creation and Sustainable Practices

1. Can you describe the nature of interactions or dialogues concerning sustainability between your customers/stakeholders and the company?
2. What specific role does your company play in the realm of sustainable development, particularly in addressing issues like climate change? How does this relate to your customers' experiences?
3. In terms of realizing your company's future sustainability policy, what challenges do you foresee?
4. What resources are available to your company to execute its sustainability-focused developmental plans and visions?
5. How is sustainability integrated into your company's development efforts? Is it systematically approached, problem-based, or organized in some other way? What is the role of technology in supporting these efforts?

Appendix C – Exemplars of the Coded Semi-structured Interview Data

Table C – Exemplars of the Coded Semi-structured Interview Data

Exemplar quotation	Code	Category/Themes 1st order concept value propositions
"In our case, the concern is for the area. So how does Central Finland stay as the best place to live from the perspective of wellness. How can the company help the local community. In our case we try to enable the shops to be open at the smallest communities if it is even a little bit profitable. So, we don't close shops based on productivity. We want our local community to be well. For example, we buy all the fish from the local fisher men. We say to them that fish all you want, we will buy whatever you fish." (R1)	Local community support	Supporting local actors in value chain and providing local services
"Our mission regarding the customer data in our digital app is to make sure that the customer doesn't feel like we are following them, but that they are following their own shopping." (R5)	Consumption data	Consumption data belongs to the customer
"When covid stated, the elderly could not get into stores, we opened this customer service to be inclusive. We were able to deliver their groceries into their door and then send a bill afterwards. If they could not use the internet, we provided the service even over a telephone." (R4)	Co-creation	Telephone support for elderly customers to ease access
"In the last week, we have just announced a competition to get customers involved in our name competition. We ask them for some help. If we think about design of digital services and how we could do that together with our customers in the future - who knows what it is like in 10 years' time from now, but we want to include them." (R3)	Inclusive engagement	Supporting local customers' goals and involving them in decision making
"The internet currently allows all kinds of black-market hustling. If we are going to make a digital service for our store. It should be waterproof so that it will take care of all the ethical questions that there might be and that we are going to be able to say where the origins of our food come from, for example." (R2)	Facilitating consumption choices	Transparency of the supply chain

About the Authors

Juuli Lumivalo is a Postdoctoral Researcher in the University of Jyväskylä, Faculty of IT. She is Coordinator of the Finnish Hub for Digitalization and member of the Value Creation for Cyber-Physical Systems and Services Research Group. Lumivalo's current research interests include digital and cyber-physical service use, value co-creation/destruction, service-dominant logic, technology as an actor, continuous service innovation, and development and use of information systems for driving sustainable transitions. Lumivalo received her doctoral degree in Information Systems at the University of Jyväskylä in 2020. She was a doctoral fellow at the Doctoral Consortiums of the International Conference on Information Systems and the European Conference on Information Systems. Lumivalo's work has been published in peer-reviewed venues such as Journal of Service Research, Pacific Asia Journal of the Association for Information Systems, The International Conference on Information Systems (ICIS), European Conference on Information Systems (ECIS) and Hawaii International Conference on System Sciences (HICSS).

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