



Consumer Engagement in Circular Consumption Systems: a Roadmap Structure for Apparel Retail Companies

Giovana Monteiro Gomes^{1,2} · Natalia Moreira^{3,4} · Aldo Roberto Ometto¹

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Abstract

Organizations that adopt Circular Business Models, such as apparel companies, must overcome barriers on many levels, including the lack of consumer engagement. Data from different stakeholders in the Brazilian apparel value chain were gathered, and interviews with circular apparel companies were conducted to support the development of a roadmap structure that guides companies in engaging their consumers. The roadmap structure has three layers, consumer behavior, business model design, and communication and marketing, and provides sets of activities that contribute to the success of circular transition in apparel companies, by supporting short- and long-term changes in consumer behavior through cohesive processes of product development and promotion. The roadmap structure, therefore, presents an integrated view of important determinants of circular consumer engagement. This tool can be piloted and implemented by apparel retail companies that operate in circular production and consumption systems.

Keywords Circular Economy · Grand Challenges · Consumer behavior · Circular Business Model · Communication · Marketing

✉ Giovana Monteiro Gomes
gimgo@dtu.dk

Natalia Moreira
natalia.moreira@hu.nl

Aldo Roberto Ometto
aometto@sc.usp.br

¹ São Carlos School of Engineering, University of São Paulo, Av. Trabalhador São Carlense, 400, Parque Arnold Schmidt, São Carlos, SP 13566-590, Brazil

² Department of Civil and Mechanical Engineering, Technical University of Denmark, Building 404, DK - 2800 Kgs. Lyngby, Denmark

³ Department of Design, Aalto University, PO. Box 11000, 00076 Espoo, Finland

⁴ Present Address: Creative Business, Utrecht University of Applied Sciences, Heidelberglaan 15, 3584 CS Utrecht, Netherlands

Introduction

The Circular Economy (CE) is founded on the recognition of the world as a “system,” where resources and energy are limited [1] and waste and pollution are design flaws [2]. The idea of Circular Economy can be traced to the work of Pearce and Turner, from 1989 [3], which advocates that circular system patterns are essential to sustain human life [4]. Therefore, the CE, by employing efficiency efforts in production and consumption systems, proposes changes to the economic logic [5].

Until recently, the linear pattern found in the neoclassical economy dictated economic development. This pattern is based on the allocation of materials, energy, and other resources according to market demands without taking into consideration the exhaustibility and finitude of natural resources [3], threatening the future stability [6]. CE emerges as an alternative to this traditional take-make-dispose linear economy [7], by proposing a nature-inspired cyclical process, through the extension of resource usage, minimization of waste generation, and closed loops in industrial ecosystems [5], for example. Therefore, the Circular Economy focuses on benefiting society by redefining the concept of growth [8].

The Circular Economy, by providing solutions to environmental and social challenges, requires collaborative efforts and a systematic perspective addressing Grand Challenges (GC), i.e., “specific critical barrier(s) that, if removed, would help solve an important societal problem with a high likelihood of global impact through widespread implementation” [9, p.1881]. However, the uniqueness and disruptiveness of the Circular Economy transition, which involves business model and design innovation as well as complex resource management [10], led to difficulties for scholars and practitioners to conceptualize, comprehend, and implement this holistic model.

The challenges concerning CE transition are varied, from hard factors (e.g., technical and financial) to soft factors (e.g., regulatory and cultural) [11], requiring a new way of thinking and doing business [1]. Innovative entrepreneurship, i.e., the creation of new products, services, production methods, or business models [12], is, thusly, critical for the Circular Economy’s success. A Circular Business Model (CBM) is the rationale of how an organization creates, delivers, and captures value with and within closed material loops [13] and guides the development of products and services to achieve CE goals.

Moreover, besides the development of technologies, products, and business models, Stahel [5] highlights that the communication of strategies and raising awareness of manufacturers and the public are important allies of the realization of the Circular Economy. Communication and marketing activities are particularly relevant for transmitting information between companies and their consumers. Marketing strategies, for instance, are designed to both inform and convince, eliciting emotive concerns that are more successful than factual communications [14], and persuasive communication has been previously found to influence circular consumer behavior and support the CE transition [15, 16].

Besides raising awareness of environmental and social issues and communicating how circular initiatives address these challenges, how value is perceived by people, especially consumers, needs to change [5]. Innovation brought by the Circular Economy, particularly Circular Business Models (CBMs), implies on mindset and behavioral changes from the consumers and users of circular products and services [17]. The acceptance of circular products has been indicated as a key barrier to be overcome by circular organizations [18], associating the success of CE initiatives with consumers’ willingness to behave according to the Circular Economy principles [19].

Accordingly, this research targets the integration of these three topics: (i) challenges concerning consumer acceptance, especially circular mindsets and behaviors; (ii) Circular Business Model innovation; and (iii) communication and marketing efforts towards the

Circular Economy, as they encompass important considerations for consumer engagement in circular consumption systems. By addressing these three topics, this research aims to provide a systematic approach to consumer engagement in circular consumption systems.

Additionally, this paper focuses on how these topics interrelate in the context of the transition to a circular fashion. The apparel industry is one of the oldest and largest industries in the world [20] and is responsible for critical environmental impacts, e.g., use of solvents and toxic materials [21] and premature disposal of goods [22, 23], and social impacts, e.g., low wages and unhealthy work conditions [20]. These challenges, therefore, push the apparel industry towards investment in innovation that incorporates sustainability. Adopting a systematic and holistic view and developing new business models are important steps towards this innovation process, and both could be made feasible through a transition towards Circular Economy [24].

Palm et al. [25] highlight that, due to being hugely globalized, the apparel industry contributes to negative environmental changes at a planetary scale and part of its challenge is to recognize the dimension of its effects, consequently, leading to rethinking the scope of the apparel industry's responsibilities and relationships, widening the focus of business activities [25]. The transition to the circular apparel industry, by tackling a grand challenge, requires a coordinated and sustained effort from multiple and diverse stakeholders and comprises solutions that modify organizational routine practices and individual and societal behaviors [9].

Therefore, this research aims to tackle the following research question:

- How can apparel retail companies facilitate consumer engagement in circular consumption systems?

This paper proposes a roadmap for apparel companies to help them engage their current and potential consumers with circular products and services, by combining theoretical and practical findings on consumers' mindsets and behaviors, business model innovation, and communication and marketing towards a Circular Economy.

To the best of our knowledge, such approach has not been explored in the circular apparel field. By merging the research topics, an integrated view of important determinants of circular consumer engagement is presented and displayed in a way that apparel retailers can easily pilot and implement.

Theoretical Background

Circular Mindsets and Behaviors

Circular mindsets and behaviors are part of circular consumption systems, that is, systems that allow the stream of circular offerings. Circular mindsets are the pre-dispositions that consumers hold to participate in these consumption systems [26], which are expressed through circular behavior(s), that is, behaviors that promote resource efficiency and the flow of circular value [15]. Consumers' mindsets vary according to which CBM is being addressed [26], including favoring the acquisition and utilization of circular products [27, 28], favoring access instead of ownership [29, 30], valuing participation in material recirculation [31, 32], favoring digital and shared circular services [33, 34], resisting to obsolescence [14, 35], and valuing multi-functional products [36].

Consumer behavior can also be associated with CBMs, such as acquiring recycled, remanufactured, or reconditioned products [37, 38] or adopting use-oriented products and services [39, 40], and they can emerge in different stages of the circular consumption system, for instance, in the pre-acquisition, e.g., reduce consumption, or in the post-utilization, e.g., return products at their end of life [26].

Moreover, literature reviews in the CE field [26, 33] show that consumers' engagement and behavior towards circular products and services are influenced by several factors. Camacho-Otero et al. [33] investigated factors concerning product-service systems (PSS) and sharing economy, and they identified 29 factors, categorized into economic, demographic, psychosocial, cultural, and socio-material topics. Gomes et al. [26] investigated factors related to any circular behavior and identified 54 factors concerning seven categories, political and legal, economic, environmental, demographic, consumer related, product/service offer, and product/service related.

Frameworks, tools, and strategies that associate these influencing factors and consumer behavior have been developed to enhance CE implementation, such as designing for product care [41] and durability [35], interpreting online communication [14], and facilitating behavioral change [15]. However, to the best of our knowledge, the CE literature lacks a structured framework to guide businesses to promote circular behaviors among their consumers combining reflections on consumers' mindsets and behaviors, business model innovation, and communication and marketing towards a Circular Economy.

Circular Mindsets and Behaviors in the Apparel Industry

Research focusing on circular mindsets, as antecedents of circular behavior, has not been deeply addressed in the apparel and fashion context. Calvo-Porrall and Levy-Mangin [27] indicated that clothing consumers present pre-dispositions to acquire circular products before performing circular behaviors and favoring the access of clothing and sharing them have been highlighted as important antecedents of access-based business models, which propose innovative forms of consumption [14], that is, satisfying consumption needs while complying with CE principles [33].

On the other hand, investigations into consumers' behavior towards circular offerings are gaining traction in the CE literature [26, 33], including research focused on apparel products and services. However, Hvass and Pedersen [42] and Singh et al. [43] indicate that the apparel industry consumers lack awareness, acceptance, and engagement in circular activities. According to Palm et al. [25], this is the outcome of an excessive focus on the materiality of sustainable and circular apparel solutions, putting aside people's, primarily consumers, needs, and desires.

The decisions concerning apparel acquisition, utilization, and disposal are the results of the combination and interaction of several factors, such as consumers' norms and values, socio-demographic conditions, and fashion trends [25]. Nencková et al.'s [44] research, for instance, showed that many demographic features (gender, age, level of education, income, and number of household members) can explain different behaviors towards textile waste separation. Gazzola et al.'s [45] research reached similar results and revealed that women show more interest in sustainable fashion. Environmental awareness and ethical and social concerns have also been indicated to influence circular apparel usage, such as sharing [46] and swapping [47]. Barriers to repairing and mending have been associated with a lack of time and skill [48].

Niinimäki et al. [49] suggest that apparel consumers and users do not make decisions solely based on material sustainability and, therefore, sustainable design should be

approached from consumers' viewpoint, that is, consumers' intrinsic factors should be at the core of the design. Thus, the implementation of CE in the apparel industry needs to reach these deeper cultural levels [25].

Circular Business Models

A business model (BM) is defined by Richardson [50] as the conceptual and architectural implementation of a business strategy and the foundation for the implementation of business processes. That is, the BM describes the “system of interdependent activities performed by a focal firm and its partners and the mechanisms that link these activities to each other” [51, p.331].

BMs can also be described based on systematic and synergic configurations of interchangeable elements [52], outlining how an organization operates its enterprise, creating, delivering, and capturing value [53]. These BM elements consist of factors concerning the offering, market, competitive strategy, business scope, how the organization makes money, and internal capabilities [54]. The performance of a BM does not depend solely on the content of these individual components, but also on the fit between them [55].

Additionally, the business model design takes into consideration the needs and expectations of multiple stakeholders, beyond the organizations and their customers [51]. Four drives have been identified to affect BM design: *goals to create and capture value*, focus on creating value for all business model stakeholders; *templates of incumbents*, awareness of existing BM templates and evaluation of their pros and cons; *stakeholders' activities*, cooperation among stakeholders to the development of a unique solution; and *environmental constraints*, the constraints in which the BM is embedded, e.g., cultural, legal, and economic [51].

Innovation in business model design towards circularity can emerge from an organization's commitment to sustainability, allowing the identification of new opportunities and competitive advantages due to differentiation [56]. A CBM is based on utilizing economic value retained in products after use in the production of new offerings as its conceptual logic [57]; therefore, CBM enables economically viable ways to continually reuse products and materials, using renewable resources where possible [1].

Bocken et al. [1] suggest that there are two groups of strategies concerning CBM, the first focusing on slowing loops and the second focusing on closing loops. The first group (slowing loops) encompasses four strategies: *access and performance*, satisfying user needs without the need to own physical products; *extending product value*, exploiting the residual value of products; *classic long life*, offering products with high durability and easy repair; and *encourage sufficiency*, solutions that decrease end-user consumption. The second group (closing loops) includes two strategies: *extending resource value*, exploiting the residual value of materials and resources, and *industrial symbiosis*, using residual outputs from one process as feedstock for another process.

Similarly, the British framework for implementing the principles of the CE in organizations [58] presents six groups of CBM: *on-demand*, providing an offer only when its demand has been confirmed; *dematerialization*, replacing physical products with virtual/digital ones; *product life cycle extension/reuse*, extending the life cycle of products by designing for durability, repair, modularity, and/or refurbishment; *recovery of secondary raw materials/by-products*, creating products, in open or closed loops, from secondary raw materials/by-products and incentivizing take-back systems; *product as a service/*

Table 1 Building blocks of Circular Business Models, adapted from [59]

Building blocks	Definitions
Partners	Cooperative networks and partnerships that support the Circular Economy
Activities	Practices aligned with the Circular Economy goals, such as optimizing resource efficiency and designing circular products and services
Key resources	Suppliers and materials that allow circular flows
Value proposition	Offer products and services within the strategies of CBM (e.g., product life cycle extension)
Customer relations	Strategies to communicate with customers and establish relationships with them
Channels	Channels used to capture and deliver value and communicate with stakeholders
Take-back systems	Systems that include the reverse logistics of products, including appropriate channels and communication strategies
Customer segments	Identification of customer types, directly linked with value proposition
Cost structure	Criteria and principles to evaluate financial changes in Circular Business Models
Revenue streams	Value captured by the organization in the form of Circular Business Models
Adoption factors	Organizational capabilities and external factors related to the implementation of Circular Business Models

product-service system, leasing products or offering them based on performance; and *sharing economy and collaborative consumption*, sharing products/resources between users/organizations.

CBMs have been conceptualized by Lewandowski [59] in 11 building blocks, that is, elements that allow the designing of a business model according to the CE principles (Table 1).

Circular Business Models can be driven by a range of internal levers (e.g., good leadership, availability of resources, and implementation of circular practices) and external levers (e.g., customer demand, governmental incentives, and facilitating infrastructure); however, businesses transitioning to the CE should be aware of barriers that hinder the emergence of CBMs, such as financial risks, lack of availability of technology/resources, absence of collaboration among stakeholders, and lack of consumers' awareness and involvement [60].

Communication and Marketing Approaches for a Circular Economy

Increasing environmental challenges together with irresponsible consumption and production practices call for marketing research focused on sustainability [61]. The literature on consumer behavior shows that providing the consumer with knowledge of the environmental benefits of circular products and promoting consumers' environmental awareness [31, 62, 63] can influence their willingness to engage in circular consumption systems and, consequently, their behavior towards circular products and services [26]. Therefore, the marketing and communication field, which studies the influence on human culture to stimulate attention, interest, desire, and action [14], is fundamental for the promotion of CE.

A review of the relationship between marketing studies and sustainability showed that the greater portion of papers published concerning consumer-level marketing approaches concerns sustainable production and consumption, focusing on consumer behavior, while

firm-level marketing studies focused on identifying market opportunities, designing products, networking/partnering, sustainability-oriented marketing strategies, and trade-offs [61].

Chamberlin et al. [14] investigated online communication practices and how they can help companies promote CBMs, by tackling specific factors found to influence consumers' behavior (e.g., fear of contamination, convenience, and availability). Their results show that strategies vary according to which factor they want to address, from simple and clear messages that elicit convenience (e.g., "free shipping") to creating a familiar atmosphere to business models that might be unknown to consumers (e.g., PSS) and also depending on the characteristics of consumers' groups.

Individual value, for instance, has been found to influence people's response to waste-water products, e.g., recycled water and plant pottery [64]. According to Judge et al. [64], these products can be promoted to people who hold strong biospheric values by emphasizing, in product messages, positive environmental consequences. The success of marketing strategies, especially those focused on sustainable or circular products, can be related to how messages are framed, that is, tailoring them according to consumers' intentions and behaviors and evoking their values [14, 64].

Additionally, Grębosz-Krawczyk and Siuda [65] found that an effective marketing communication strategy is essential for engaging consumers in circular take-back as a way to raise consumer awareness of the benefits of the circular flow of resources and to publicize the existence of circular initiatives, such as recycling campaigns.

Moreover, the use of labeling schemes has been studied as a strategy to overcome barriers concerning consumers' perceptions, such as quality and performance, of circular products [66]. Although this strategy is perceived as important for guiding consumers' acceptance and engagement with circular products, companies and sectors face impediments to establishing such labeling schemes, like financing, collaboration among stakeholders, especially between public and private sectors, and a comprehensive, unified, and clear scope [66].

Methodology

This paper is the outcome of a long-term research which has the overall objective of developing a roadmap structure to guide consumer engagement for Circular Economy solutions in the apparel industry. This research began with the categorization of the apparel industry in Brazil, where the research was conducted. During this initial step, researchers drew a multilevel perspective scenario, based on Geels [67], and identified the main barriers and windows of opportunity for the transition to a CE in the Brazilian textile and apparel industry [68].

With the focus on consumer engagement defined, the confirmation of cultural inertia and little consumer awareness as a barrier to the CE transition in Brazil, and the evidence, from stakeholders in the apparel industry value chain, that the development of circular mindsets could be a window of opportunity for circular initiatives [68] the research continued through a systematic literature review for the identification of consumers' mindsets and behaviors related to the Circular Economy, the factors that affect them, and the determination of their role in circular consumption systems [26].

These results show that circular consumption systems are realized by the circular flow of products and resources through chained behaviors that are guided by circular mindsets

and influenced by a varied number of contextual and intrinsic factors [26]. Some of these factors were tested among Brazilian and Dutch consumers, to assess if the value-belief-norm theory [69] could explain the willingness of apparel consumers to engage with circular products, a hypothesis that was supported [62].

Until this point, data was collected from the CE literature, stakeholders in the apparel value chain (e.g., researchers, suppliers, and associations), and apparel consumers. Therefore, this paper gathers the results from this previous research and complements the perspective of apparel companies on consumer behavior, BM design, and communication and marketing efforts towards a Circular Economy, translated into a roadmap structure.

Interviews

The data collection with apparel companies occurred through semi-structured interviews. Following Kallio's et al. [70] and Fylan's [71] guidelines, the sample population was indicated, and an interview schedule was prepared. The criteria for the involvement of apparel companies in this study were the following: companies that commercialize circular apparel products (under any approach of CBM), that communicate their efforts towards the CE, and that operate in Brazil. Additionally, the interview schedule (available as a [complementary file](#)) was divided into the three main topics: Circular Business Model, communication and marketing, and consumers' profile (sociodemographic and psychological factors).

The interviews were carried out in January and March of 2022, virtually and in Portuguese, with the founder and owner of Company A and the sustainability manager of Company B. Company A was founded in 2018, and it has one physical store, located in the state of São Paulo, Brazil, and online channels for sales. Company A manufactures and sells women's clothing with extended lifetimes (timeless and versatile); it sources fabric considering sustainability factors (circularity of materials, social and environmental commitment of suppliers, etc.). Moreover, the manufacturing is done locally, as the clothing designs are developed by the owner, and the fabric cutting and assembly are done by seamstresses from the same location as the physical store.

Company B groups several apparel brands, working with a wide range of clothing, footwear, and accessories items, and it has physical stores across all Brazilian states. Only 10% of what is commercialized by Company B is produced by them, the remaining is outsourced from suppliers located within a 50-km radius of the company's headquarters. Currently, three of Company B's brands (B1, B2, and B3) strongly incorporate Circular Economy principles and adhere to CBMs. B1 is an online platform for selling and buying second-hand apparel, focused on luxury brands. B2 does not operate fully circularly, however, has collections with products made from cycled materials, such as recycled cotton, fabric scraps, and post-use jeans. And B3 sells carbon-neutral footwear, also partially made from cycled materials (e.g., repurposed fossil-based resources).

These companies were chosen to complement their approaches on the three focus themes (business model design, communication and marketing, and consumer behavior), aiming to achieve a roadmap structure that is flexible in terms of CBM, apparel product, size, and location, yet that still provides structured guidance towards the engagement of consumers in circular consumption systems.

Roadmap Development

The transition to a CE, especially in the apparel sector, undertakes GC concerning the current production and consumption patterns, reflecting on social, environmental, and economic changes. George et al. [9] propose a framework, from an organizational perspective, that addresses Grand Challenges through three main steps: articulating and participating in GC, multilevel actions, and outcomes and impact.

According to the authors, the first step to addressing Grand Challenges is to identify and vocalize the transition goals and inspire the participation of actors to reach them, providing a collective sense of purpose. This step is only possible by targeting societal barriers and identifying and addressing actors' needs. To move to the second step, George et al. [9] suggest that organizational constraints (e.g., transaction costs and stakeholder coordination) should be identified and managed and institutional context (e.g., societal norms and environmental regulations) mapped, allowing to achieve a multilevel action, that is, behaviors or actions from actors that influence many levels (individual, community, regional, etc.) that should be aligned synergically to achieve the proposed goals. Finally, to advance to the third step, reinforcing mechanisms should be used to motivate actors, and coordinating architectures made available to enable dialogue and understanding from all stakeholders, achieving measurable outcomes and impacts, such as behavioral changes [9]. The approach to the roadmap structure development takes into account this framework.

A roadmap is a tool used to plan innovation processes [72], such as addressing GC and engaging consumers in the CE. This tool is flexible, commonly used for long-range planning, and can have a multiorganizational target, that is, it captures the landscape, threats, and opportunities for a particular group of stakeholders in an application field [73]. Roadmaps have been adapted to support many strategic aims; however, one of their main traits is to be a time-based structured framework, that is, they represent and communicate strategic plans in a temporal sequence [73].

Roadmaps can have different purposes (e.g., product, capability, and integration planning) and representations (e.g., bars, tabular, and graphical) [73]. The one developed throughout this research was designed as a strategic planning roadmap; that is, starting from a future vision for the organization, it guides the mapping of the current position and the identification of gaps, to then provide the tools to achieve the organization's future vision. Additionally, it is represented in a multiple layer format, allowing the tracking of the evolution within each layer together with the interlayer dependencies [73]. However, differently from the traditional "technology, product, and market" layers, the proposed roadmap structure will be represented according to three main themes addressed: consumer behavior, BM design, and communication and marketing (Fig. 1).

The roadmap structure was developed according to these features previously described. The first draft was built based on the data collected from earlier stages of this long-term project (including desk research, systematic literature reviews, workshops, interviews, and a survey). The roadmap boxes are the activities identified to be relevant to apparel manufacturers and retailers to guide the engagement of their consumers, concerning each one of the three domains: consumer behavior, BM design, and communication and marketing. Throughout the data collection process, it was possible to gather information if and how these activities were linked. To address the inputs and

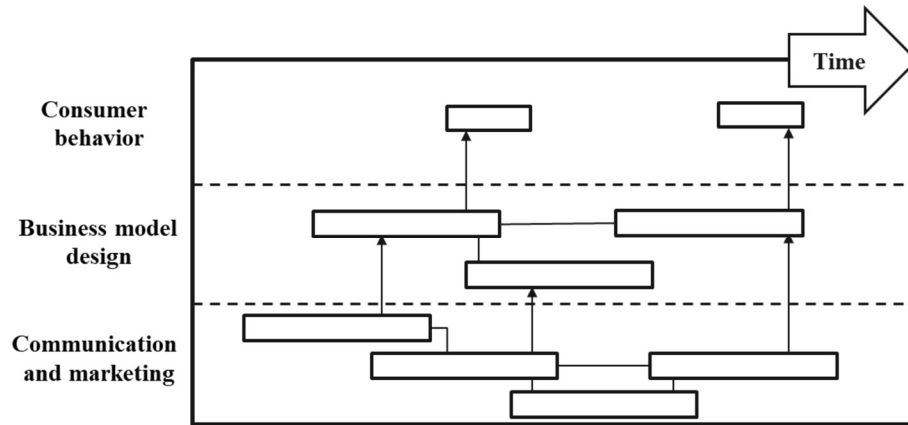


Fig. 1 Roadmap structure format. Source: Authors (adapted from [73])

experiences from companies employing CBM and CE strategies in the apparel sector, the data collected from the interviews with Company A and Company B were used to complement and refine the roadmap structure. Discrepancies were resolved through discussion.

Results

During the first part of this section, the interview results are presented, focusing on the main insights from Company A and Company B.¹ Following, the roadmap structure is presented, including how it addresses Grand Challenges and its main features.

Interviews

Company A

The interview with Company A's founder and owner allowed a great deal of comprehension of the research theme from the perspective of a close relationship between the company and customers. The interviewee is responsible for the design of the company's BM, for drawing and assembling the pilot for all the company's clothing, for establishing communication and marketing strategies, and for most of the company's sales, resulting in an integrated view of the topics addressed in this paper.

Company A works with two CBM, circular inputs, by using polyester fabric from PET (polyethylene terephthalate) and organic cotton fabric, and life cycle extension, by designing timeless clothing and enhancing durability through careful material selection. The interviewee believes that their company's competitors are other sustainable brands, as its consumers usually seek this kind of product. However, these sustainable brands are also

¹ The insights shared in the "Interviews" subsection represent the interviewees' perspectives and do not represent the journal or authors' opinions.

perceived as collaborators, that is, the brands that implement CBMs in the same city where Company A is located have different strength features, and, according to the interviewee, these brands were able to create a collaboration network, where they refer clients to one another without hindering their revenue. However, Company A is still struggling with end-of-life strategies, mainly because it would interfere with their collaborators'/competitors' position in the market, e.g., second-hand and upcycling shops.

The interviewee believes that the company's appeal to its consumers is the uniqueness of the apparel design. Although Company A's commitment to the CE is important to its customers, allowing, for instance, to charge higher prices (compared to linear apparel) due to the awareness of a just price (i.e., valuing the fabric quality, local workforce, and the complexity for assembling the pieces), the sustainability of the clothing is perceived as a not strong influence to, alone, incite consumption behaviors. For example, some colors and prints are only available in fabrics composed of a mixture of textiles, which have lower environmental performance compared to fabrics from organic cotton; however, the interviewee believes that their customers need to feel well in their clothes, including their identification with colors and prints; therefore, Company A offers "less sustainable" items, which is communicated to the clients, who are, then, able to make the consumption decision aware of its consequences.

The interviewee also shared that some aspects of circularity are not perceived as important for their customers. Company A provides packaging handmade from fabric scraps. Although some clients value this initiative, keep their packaging, and reuse it in subsequent purchases, other clients are annoyed by the lack of single-use and "giftable" packaging.

Therefore, Company A's clients have two main profiles: (i) the clients who are involved with sustainability and are interested in sharing information about clothing production and its social and environmental impacts and (ii) the clients who are driven by design and comfort, that is, although they are aware of the company's sustainable efforts, they do not influence these consumers' decision to acquire the company's products. This knowledge of consumers' characteristics was reported as the result of familiarity with customers, especially the loyal ones. However, they do not seem to deeply guide the design of the company's CBM nor the design of products, which is the outcome of the interviewee's values, especially biospheric ones.

Although all customers from Company A are aware of issues concerning sustainability and circularity, the interviewee reckons that the amount of people caring about these issues is growing. However, people are less inclined to hear and discuss these issues, at least through the communication channel established by the company, i.e., Instagram. During the interview, Company A's founder said the communication interventions focused on educating and raising awareness of consumers were frequent, but she believes the COVID-19 pandemic and the political instability in Brazil made people less open to these kinds of communications and marketing strategies, and the Instagram became a digital place to forget about the "negative things in life."

Company A, therefore, changed its marketing and communication strategies. As raising awareness on important questions in the apparel industry, such as slavery and healthy work conditions, began to drive customers away, the company's current strategy focuses on opening communication and stimulating critical thought and fact-based consumption decisions, by positioning the company as sustainable and promoting the benefits of consuming their products.

Company B

Company B provided the perspective of corporations and medium and large enterprises. Company B's first leap towards the Circular Economy was in the late 2010s, when the

group acquired B1, a second-hand online platform, as an investment in circularity, perceived by the company as the future of fashion. B1 currently enables the circular flow for other Company B's brands, which now have collection points across their physical stores, giving products a subsequent life through commercialization in B1's platform, therefore, implementing a life extension CBM. B2, on the other hand, employs two CBMs, the recovery of resources and the use of circular inputs. Circular inputs are also the CBM implemented by B3, which uses the Life Cycle Assessment (LCA) technique to guide the choice of materials, resources, and processes to offer its clients carbon-neutral products.

According to the interviewee, the company's circular brands compete with products and services from "linear" brands, despite the market efforts to create a segmentation for sustainable products. Company B's clients, regardless of brand or platform, are mostly driven by aesthetics and price. Although sustainability and circularity may be important and valued by some customers, these factors alone do not drive the acquisition of apparel. Moreover, the interviewee highlighted that the company has some difficulties implementing some CBM. For example, B1 operations suffer from consumers' barriers to acquiring second-hand items, such as a lack of trust and myths concerning the items' previous owners, especially for luxury items which is B1's market niche.

Regarding the communication and marketing strategies, Company B focuses first on raising awareness of their consumers to then present their brands as sustainable and circular. The main channels the company uses are its social media, mainly Instagram, but also its physical stores. B3's Instagram profile, for instance, provides information to educate customers on themes sensitive to sustainability (e.g., consuming less meat, protecting forests, and extending products' life cycle) and presents how the brands' products contribute to these themes. Moreover, B3's physical stores create an environment that elicits sustainability, enhancing consumers' visual and tactile experiences.

Concerning the consumers' behavior, the interviewee emphasized that, like the majority of medium and large retail enterprises, Company B has a clear profile of the brands' consumers, in terms of sociodemographic features, and the customers from B1, B2, and B3 are not significantly different from the other Company B's "linear" brands. Furthermore, the company develops a persona (fictional characters created to represent a product's core customer features, helping the brand envision their needs and identify the factors that influence their behavior) for each new product or collection release. Although the development of this persona somehow addresses consumers' intrinsic factors, they are not mapped by the company.

Overall, the interviewee shared that the main challenges towards the engagement of consumers in Company B's circular brands are, on a landscape level, the lack of enabling levers, such as public policies and legislations that promote the CE in Brazil, and, on the consumer level, the lack of awareness and knowledge of the Brazilian population towards sustainability and circularity.

Roadmap Structure

The roadmap structure (Fig. 2) gathers conceptual and practical insights to guide apparel companies to engage consumers in circular consumption systems. It presents a configuration of activities (blocks) in the three domains (layers) of this research, consumer behavior, business model design, and communication and marketing. These activities are presented in a time-based order (from left to right). Moreover, these activities influence each other

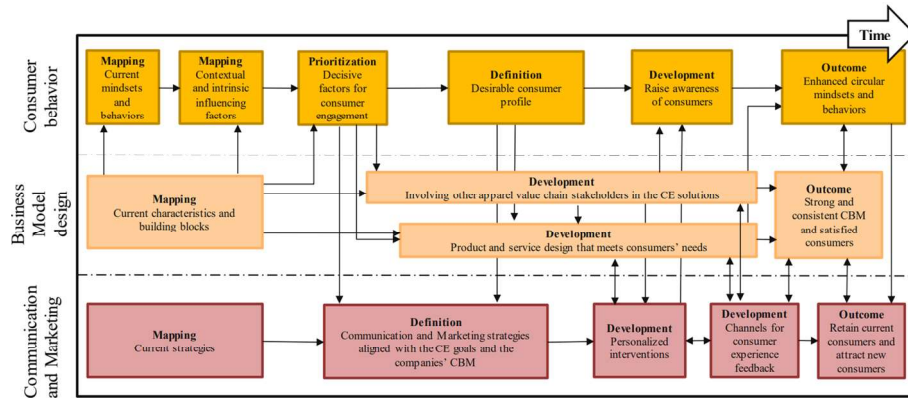


Fig. 2 Roadmap structure for apparel consumer engagement in circular consumption systems. Source: Authors

(represented by the arrows), by providing necessary inputs. Next, a description of each activity is presented (Table 2).

Furthermore, the roadmap structure development was guided by George et al.'s [9] framework for addressing Grand Challenges. The roadmap structure gathered the main stakeholders of the apparel value chain to solve a common grand challenge, the environmental and social negative impacts of the apparel industry, by engaging consumers with apparel circular products/services. Additionally, these stakeholders are involved in the solution proposed, when considering consumers' features and when including the apparel value chain in designing CE offerings and communication and marketing approaches, resulting in a synergic framework. Finally, by sharing value among the company, its consumers, and the value chain stakeholders, the roadmap structure keeps all actors motivated, at the same time achieving lasting changes in circular consumption systems.

Discussion

The apparel sector is responsible for environmental pressures at the planetary level, through increasing demand for natural resources and pollution footprint, accelerated consumption, and material leakage across all stages of apparel's life cycle. These pressures are Grand Challenges faced by the industry and society, calling for systemic changes that involve companies, policymakers, consumers, suppliers, and other stakeholders.

The evaluation of the Brazilian apparel scenario [68] showed that companies are transitioning to the CE and implementing CBMs, still, they are niches in the Brazilian apparel industry, exemplified by the interviewees, Company A and initiatives B1, B2, and B3. These niches can gain scale and make the circular fashion the new sector regime, collaborating with diminishing the pressure on the environment. However, companies implementing CBMs face several barriers, including cultural inertia and lack of consumer awareness.

Brazilian consumers are, overall, interested in consuming circular apparel; however, this behavior can be perceived, by these consumers, as effortful, calling for interventions

Table 2 Description of the roadmap structure activities

Type of activity	Layer	Activity	Description
Mapping	Consumer behavior	Current mindsets and behaviors	To identify the current mindsets and behaviors of consumers, including if they differ according to the company's product or CBMs
		Contextual and intrinsic influencing factors	To identify which factors influence, positively and negatively, the engagement of current consumers. If possible, relate the factors to consumers' mindsets and behaviors
		Business model design	To draw the current business model canvas, by identifying its characteristics and how they relate to consumer behavior and communication and marketing strategies
		Communication and marketing	To identify the company's current communication and marketing strategies, including how they promote the company's CBM(s) and address the consumers' mindsets and behaviors
Prioritization	Consumer behavior	Decisive factors for consumer engagement	To identify, according to consumers' mindsets and behaviors and the company's CBM, what are the main factors hindering and boosting engagement in circular consumption systems
Definition	Consumer behavior	Desirable consumer profile	To choose what mindsets and behaviors to encourage, in accordance with current consumers' features and needs
	Communication and marketing	Communication and marketing strategies aligned with the CE goals and the companies' CBM	To choose the company's main communication and marketing approaches, considering the behaviors the organization wants to encourage and the factors that influence consumer engagement

Table 2 (continued)

Type of activity	Layer	Activity	Description
Development	Consumer behavior	Raise awareness of consumers	To boost consumers' knowledge and awareness concerning circularity and sustainability, especially in the apparel industry's context, by approaching factors that influence their behavior
	Business model design	Involving other apparel value chain stakeholders in the CE solutions	To collaborate with stakeholders in the apparel value chain to develop CE solutions, address consumers' needs, and share value with them
	Communication and marketing	Product and service design that meets consumers' needs	To design new products and services considering consumers' features, needs, and the mindsets and behaviors encouraged
		Personalized interventions	To create communication and marketing strategies for each consumer profile identified, promoting customized experiences that boost the mindsets and behaviors the company is seeking to encourage
Outcome	Channels for consumer experience feedback		To make available channels for consumer feedback, including their experiences in the use and post-use phases, improving the development of products/services and approaches to communication and marketing
	Consumer behavior	Enhanced circular mindsets and behaviors	Consumers with responsive circular mindsets and behaviors that endorse the CE principles and allow the flow of resources and products in circular consumption systems
	Business model design	Strong and consistent CBM and satisfied consumers	Circular Business Model(s) that promote CE solutions and are aware of consumers' features and attentive to how to address them
	Communication and marketing	Retain current consumers and attract new consumers	Loyal consumers who feel valued by the company's efforts to meet their needs and new consumers who are attracted to the company's offerings and how they are communicated

that increase their awareness and activate their feelings of achieving positive environmental and societal outcomes by consuming circular apparel [62]. Additionally, consumers' mindsets and behaviors were found to be fundamental to the flow of products and resources in circular consumption systems, along with the factors that influence, boost, or hinder their engagement with circular products and services [26].

This paper addresses the challenges of engaging consumers, specifically in the apparel industry, by promoting changes in BM design, especially concerning stakeholder involvement and product design, and by giving particular importance to consumer behavior and communication and marketing strategies. The roadmap structure provides a path for apparel retail companies, of any size, to incorporate their consumers' contextual and intrinsic features in developing circular products and services, as well as establishing appropriate strategies to communicate and promote the company's sustainability and circularity efforts. This consistent and unified approach can result in willing and loyal circular consumers.

Changing behaviors and mindsets is a hard and slow task, yet, necessary for the success of the Circular Economy. Regardless, immediate actions ought to be carried out to engage consumers and start promoting circular products and services. Values, beliefs, and norms are key drivers of individuals' choices and behaviors, and the roadmap structure proposes that the companies understand these drivers and identify the factors that are extremely important to their consumers, adapting products and marketing strategies in accordance. For instance, consumers who show strong hedonic values and have a consumerism lifestyle probably will not engage with long-lasting products to reduce consumption; therefore, providing customers with products/services and communication and marketing strategies that support their values (e.g., convenient platforms of shared apparel and promotion of the initiative as unique and luxurious, respectively) allow the circular flow of resources and products while still promoting changes in consumers' behaviors and mindsets.

Therefore, the roadmap structure, besides contributing to the long-lasting changes and raising the awareness of consumers, also supports the success of circular initiatives in the early stages of the transition to a Circular Economy. Additionally, the roadmap structure can be employed as an iterative process, identifying new opportunities and making adjustments at each run, as an adaptive tool to the rapidly changing apparel sector context.

Limitations and Future Research

Although this paper addresses the Circular Business Model design, the feature that has a greater influence on consumer behavior, i.e., product development, was the focus; however, it is acknowledged that all CBMs' building blocks are indispensable for the CE transition and further research should address how these blocks can influence consumer engagement.

Furthermore, previous research and interviews show the lack of macro-level incentives and enabling legislation concerning the Circular Economy implementation in Brazil, which can hold back the growth and continuance of circular apparel initiatives. The roadmap structure encourages collaboration among value chain stakeholders to develop circular solutions, which can enhance stakeholder alignment on other fronts, such as pressuring for public policies favorable to the Circular Economy transition. However, the roadmap structure does not address these systemic challenges, which should also be considered in further research.

Additionally, this roadmap should be implemented by apparel companies and improvements inputted into the tool, including long-term perspectives for researchers and practitioners.

At last, the roadmap should also be tested in other B2C markets, as the structure suggested could guide manufacturers and retailers with close relationships with their end users to engage consumers in the Circular Economy.

Conclusion

Apparel companies that implement Circular Business Models face challenges concerning consumer engagement in these new streams of value, products, and resources. The roadmap structure presents activities that gather three essential concepts in shaping and promoting consumer engagement, consumer behavior, business model design, and communication and marketing approaches. The roadmap structure proposes that products and marketing efforts should be designed according to the behavior the companies wish to promote, as well as consumers' current mindsets, behaviors, and influencing factors.

Furthermore, circular apparel companies, such as the interviewed ones, have similar approaches to consumer engagement, already combining the three layers proposed by the roadmap. However, they lack a structured tool to guide this process and to provide insights for new business opportunities, including iterative implementations to achieve a cycle of continuous improvement. The roadmap structure aims to fulfil this gap. Therefore, the proposed tool can benefit the transition to a circular fashion, especially in Brazil, and contribute to the research of consumer behavior and engagement in the Circular Economy literature.

Abbreviations *BM*: Business model; *CBM*: Circular Business Model; *CE*: Circular Economy; *GC*: Grand Challenges; *LCA*: Life Cycle Assessment; *PET*: Polyethylene terephthalate; *PSS*: Product-service systems

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Data Availability The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics Approval No approval of research ethics committees was required to accomplish the goals of this study. No personal identifying information were included, and individuals interviewed consented to their participation and the publication of this manuscript.

Competing Interests The authors declare no competing interests.

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