

Facilitating most population engagement with the circular economy: Challenges for academics and (as) social media influencers

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ABSTRACT

The lack of consumer engagement with the Circular Economy (CE) hinders the use of recycled materials in products manufactured by the B2B companies (e.g., recycled pet bottles in industrial adhesives). Such an institutional void gives space to the rise of a type of network activity: knowledge brokerage, which is a process of knowledge exchange facilitation.

This multiple case study contributes with a practical description of brokerage activities in this context. It investigated how companies could interact with academics through knowledge exchange translated into campaigns to engage most consumers with CE. The network approach, under the knowledge brokerage perspective, was the main theoretical foundation of this work.

Findings indicate doubts that prevent companies from developing better green marketing campaigns. Academics could help to fill these gaps. Regarding campaign management, academics could identify the different groups of consumers, the delivery channels, campaign duration, and disclosure days/times that most engage each consumer group.

Campaigns require educational materials. Academics could identify the amount of information and the presentation format in printed materials. However, engaging most of the population requires a better use of social media. Academics must investigate the posts that could change each group of people's behaviors (including consumers with a lower educational level and less purchasing power).

Companies plan to financially support academics who elucidate these doubts or those who succeed in using social media to induce consumers to review their postures. Such support could increase the research funds for the projects managed by the researchers we have named "academic influencers."

1. Introduction

CE has a variety of meanings and strategies (Kirchherr et al., 2017). It embraces practices to reduce waste and pollution by reducing, recycling, reusing existing products, and regenerating natural resources (Bucur, 2023). Govindan and Hasanagic (2018) summarize CE as the economy of the loops—returns of goods or their parts to a new consumption cycle in the same or another supply chain. According to the literature, there is a considerable convergence on the importance of CE to promote

sustainable development through initiatives such as reuse and recycling at the pace of economic growth, reducing the impact on natural resources (Genovese and Pansera, 2021; Kirchherr et al., 2017).

Despite the broad dissemination of CE concepts and procedures, scholars warn about the complexities triggered by the attempts to adopt a circular business model, considering constraints such as technological lock-ins, inter-organizational imbalances in the pace of change, and cultural limitations related to the levels of society engagement in materials reverse flow practices (Korhonen et al., 2018; Lieder et al., 2018).

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The lack of consumer interest and awareness of environmental issues, side by side with a hesitant company culture of promoting reuse, return, recycling, and similar closed-loop campaigns, are mentioned as the main barriers to the Circular Economy's successful implementation (Kirchherr et al., 2018; Lieder et al., 2018). It is also essential to mention that many countries lack regulatory frames for CE (Mangla et al., 2018), and governance voids are increasingly indicated as a critical aspect of CE adoption (Chiappetta Jabbour et al., 2020; Guarnieri et al., 2023). This problem occurs in Brazil, where the governmental leadership in CE implementation is at a low level compared to the developed economies of the European Union countries, regardless of the existence of public and private incipient networks of collaborations for CE institutionalization (Cramer, 2022).

Circularity may also be hindered by inadequate understanding of waste management and disposal (Jangre et al., 2022; Mathew et al., 2023; Thukral et al., 2023) and reckless or negligent attitudes from authorities and consumers (Agrawal et al., 2023; Dixit and Badgaiyan, 2016). Excessive consumption or purchasing are unpleasant habits or behaviors (Ananda et al., 2023). Some educators or the educational system seem to contribute to the lack of knowledge or the perpetuation of poor habits. Studies indicate that citizens cannot always access information that could change their habits since educators prefer to spread their knowledge primarily through conferences or seminars (Leal et al., 2024). Such preference indicates the strong attachment of academics to institutional theoretical underpinnings to address studies on CE (Greene et al., 2024).

Cultural and routine aspects implied in the shift from linear to circular loops of materials require time and evolving strategies from the business to capture the effective action of the consumers (Lieder et al., 2018). Studies linked CE challenges fulfillment with practical changes in the companies and consumers (Merli et al., 2018). Bucur (2023) argues that the adequate transition to a CE cannot be carried out without fundamental societal changes. Consumer awareness and engagement can lead businesses to adopt CE (Bocken et al., 2022). The consumers' role – awareness, proactive behavior, and sound education to sustainability in practice – is essential (Bocken et al., 2022; Lieder et al., 2018). Thus, consumers must know how their purchasing decisions impact the environment, mainly at the product's end of life. Social norms, culture, and attitudes towards the life cycle extension of products are among the drivers of the CE (Mondal et al., 2023).

Institutionalism looks at the ways organizations adapt to societal norms – mainly top-down pressures – to provide macrolevel reactions that usually end up in isomorphic answers that try to legitimize business conduct without fully considering consumers' constraints, expectations, and shared cognitions (Alonso-Almeida et al., 2020; Elzinga et al., 2020). Therefore, in both the organizational and academic world, it is necessary to shift the focus from institutional organization processes to action orientation for sustainable development education (Sinakou et al., 2022). Bottom-up perspectives on societal networks for collaborative learning (Pinyol Alberich and Hartley, 2023) have arisen as alternatives to traditional theoretical focus in CE research. The change in focus aimed to overcome the absence of regulatory guidelines (Chiappetta Jabbour et al., 2020) and institutional approaches since the previous focus did not pay attention to pluralism (Greenwood et al., 2011) inherent to complex realities as CE (Alonso-Almeida et al., 2020; Stål, 2015). Knowledge brokerage is “a process of facilitating knowledge transfer and exchange” (Partidario and Sheate, 2013: 28), has been increasingly applied to research in the fields of healthcare and sustainability (Chew et al., 2022). The better the knowledge transfer, the more significant the change will be.

A better education results in knowledge that can improve attitudes and behaviors favoring CE. Education is, therefore, a central leverage point towards a sustainable circular economy (Mies and Gold, 2021). Marketing campaigns can be used to educate consumers. The relationships between marketing, waste management, commercialization, recycling, sustainable development, and CE have significantly

improved, showing the importance of marketing campaigns in CE (Aguilar-Morales et al., 2023). Findings indicate that environmental awareness is associated with higher purchase intention (De Silva et al., 2021), higher return intentions (Ratay and Mohnen, 2022), improvements in biowaste and residual waste sorting by individuals (Crome et al., 2023), or the intention and the willingness to pay a premium price for sustainable fashion products (Dangelico et al., 2022) or to purchase recovered products (Ayati et al., 2022). Companies and organizations can also benefit from increasing consumer awareness and engagement. Digitalizing waste recycling through informal waste sectors maximized pick-up time and enhanced efficiency with a lower cost of operating trucks by up to 75% (Maiurova et al., 2022). Retaining material value through recycling can be promoted by illustrating the economic benefits of the CE, better sharing of waste-related data, and increasing dialogue and cooperation between key players (Salmenperä et al., 2021).

Green marketing campaigns should dedicate particular attention to non-academic consumers (the most significant population). These campaigns must engage the different stakeholders in green education or create networks concerned with sustainable consumption (Prieto-Sandoval et al., 2022). Changes in the educational system (Barros et al., 2023) could also improve green marketing by promoting knowledge exchange. Digital education seems the best alternative to educating most of the population. However, digital education appears to be in its infancy. The literature only presents strategies to involve consumers in campaigns for returns and recycling, such as gamification and micro-influencer activism in social media (Cruz & Rosado da Cruz, 2023). Pioneering firms are disclosing environmental information through social media such as Twitter (currently X) (L'Abate et al., 2024) and LinkedIn (Tsironis et al., 2022).

Social pressure can help change consumers' habits (Islam et al., 2021; Yadav et al., 2022). More engaged consumers result from adequate information dissemination on their rights and responsibilities regarding environmental issues. This type of initiative can boost self-will regarding the consumption of more durable and recycled products, raising increasing sensitivity among citizens committed to the importance of green product consumption. Social pressure is based on social media platforms, digital apps, and other ways to connect consumers, and it is moved by the commitment to a cleaner society (Bucur, 2023). Posts on these platforms can spread content that induces society to review its behavior. A benefits analysis of digitization indicates that it enhances resident engagement in waste management (Jiang et al., 2021). A combination of education and social pressure may also be helpful. Such a combination contributed to better biowaste and residual waste sorting by individuals (Crome et al., 2023).

In sum, the fundamental problem to be addressed relies on aware and engaged consumers with the CE, thus benefiting the environment, the population, and the companies. However, most consumers' lack of knowledge and poor habits and behaviors may hinder achieving such benefits. This problem could be addressed through well-orchestrated green marketing campaigns, improvements in the educational systems (to boost the connection between business and consumers), and social pressure (facilitated by the mediation of social platforms). Solving this problem points to better cooperation between companies and educators to increase consumer awareness and engagement with CE. Success in this cooperation can induce positive environmental behavior change and care of consumers (van Bueren et al., 2023) or promote community and consumer engagement in circular practices (Souza Piao et al., 2023). This collaboration can also help firms design strategies to inform consumers effectively and promote circular products and services (Shevchenko et al., 2023). Thus, our research question is: How can companies and academics collaborate to improve consumer engagement with the circular economy?

To adequately address this question, a multiple case study was carried out under the lens of network theory, with eight Brazilian small and medium B2B firms struggling to implement CE activities such as return and recycling. Section 2 presents the literature review that sets out the

existing knowledge to underpin a better understanding of the problem. Section 3 presents the research methodology. Section 4 shows how companies and academics can collaborate to improve consumer awareness and engagement (with the CE). Discussions, conclusions, limitations, and suggestions for future research are presented in Section 5.

2. Literature review

Barriers and levers to effective engagement of citizens in CE described in this literature review are strongly supported by the network approach (Lim et al., 2024; Ratsimandresy and Miemczyk, 2023). This perspective emphasizes knowledge flows (Asgari and Asgari, 2023) and learning for CE implementation in pluralistic ways (Pinyol Alberich and Hartley, 2023) as theoretical bases for behavioral change (Greene et al., 2024). Seminal early studies that brought resource-based view and inter-organizational relationship in the supply chain as ways to trigger sustainability (Gold et al., 2010; Seuring and Müller, 2008), providing pioneer insights to the incorporation of sustainable practices, as reverse logistics, cannot be dismissed. Nevertheless, the advancement of the forms of collaborations and technological (digital) resources in current society leads to the imperative of new approaches adoption to the supply chain contexts (Ratsimandresy and Miemczyk, 2023).

Therefore, we seek to advance to new looks that delve into more detailed aspects of collaboration as ways in which networks actors can act as brokers to effectively engage persons in education and dissemination of CE in and outside the organizations. Under this perspective, knowledge brokerage arises as a relevant expression of network theory and theory of change (Chew et al., 2022). Brokerage, in this context, is a type of activity that emerged in the last 15 years with the aim to promote social intervention that facilitate dialogue and intellectual exchange between individuals in their diverse social structures (Partidario and Sheate, 2013). Knowledge brokers create synergies between groups (Long et al., 2013). They facilitate knowledge flows that otherwise would remain blocked by institutional voids that hinder circular economy practices adoption by the majority of the consumers.

2.1. Barriers to consumer engagement

Poor consumers' knowledge, inadequate consumers' behavior, and educational failures, all from the consumer side, can produce setbacks in CE initiatives from business. Govindan and Hasanagic (2018) already highlighted the need for education about the circular economy, the importance of changing society's attitude concerning remanufactured products, and the urgency in shifting from the traditional linear to the circular model in the economy.

2.1.1. Poor consumers' knowledge

Poor consumers' knowledge and abilities to manage waste and effectively engagement with CE practices have been overlooked in academic literature (Hobson et al., 2021). The gaps involve lack of knowledge and reckless attitudes. Such elements hinder consumers from taking ownership of CE practices. Thukral et al. (2023) identified the need for more general awareness about e-waste management and disposal. Customer awareness is also highlighted as a barrier to effective e-waste management in developing economies (Jangre et al., 2022). These findings suggest that lack of knowledge can block actions by consumers interested in contributing to CE. This knowledge dearth constitutes a problem. In Malaysia, for instance, many consumers are willing to recycle but need more knowledge and information on the disposal and recycling channels (Mathew et al., 2023). In Brazil, less than 12% of the potentially recyclable materials are collected, in contrast with 43% of Italy, and 40% of France (Conke, 2018).

It is also essential to observe that practical knowledge on CE is a gap also among technology students in diverse countries. Findings indicate that American engineering students do not have a good understanding of

climate change science. This means that engineering students do not know what relevant actions – as correct waste management – must be taken to address climate change (Milovanovic et al., 2022). Thus, there is compelling evidence from a range of different contexts that poor understanding on basic environmental issues like waste recycling is a barrier to promote CE. Gonella et al. (2024) concluded that limited cognition hinders people from engaging in the CE of Brazilian firms. The appropriate communication of eco-friendly benefits of products, in nowadays and future perspective of its use, thus, is becoming a relevant activity for circular business (Lopes et al., 2024). Therefore, related education, incentives and communication programs should be incentivized.

2.1.2. Inadequate consumers' behavior

Inadequate consumers' habits and practices can also negatively influence CE (since a significant portion of excessive consumption occurs in homes). To curb the overconsumption, it is necessary to understand consumers' purchasing habits. The relationships between consumers' behavior and the context of food consumption (as the main category of purchased products) are complex because they depend on lifestyle, habits, culture, and food package presentation. Other variables, such as innovation and infrastructure, must also be considered to achieve suitable solutions to avoid wastage. Businesses need to formulate strategies that help consumers minimize food waste in their homes and give priority to products with more simple and ecologically designed packages (Testa et al., 2020). The success of these strategies can provide retailers with a strategic competitive advantage (Ananda et al., 2023). Furthermore, food consumption is related to the consumers' ethics of life. Such an ethic depends on the level of awareness of the consumers regarding the importance of avoiding wastage and taking it as morally unacceptable (Lehtokunnas et al., 2022).

The misalignment between purchasing and consumption can negatively impact companies along the supply chain. On the other hand, this exact misalignment contributes to increasing company revenues. The analysis of this dichotomy suggests that changing consumer habits may not be in the financial interests of companies. Furthermore, the problem of overconsumption may differ between nations. Thus, producers and marketers should better understand consumers' needs to influence their purchase intention toward food consumption to avoid overconsumption (Winterstein et al., 2024). Nonetheless, not many studies address consumers' knowledge of products and package returns, which is essential to improving educational awareness campaigns (Sousa et al., 2021).

Poor consumer habits also affect (re)manufactured products. When per capita income increases, the propensity to accept products containing recycled materials typically decreases (Neves and Marques, 2022). Although relevant, little is known about the causes of rejection of specific products or habits. There is not much research on the relationships between cognitive-affective traits of consumers' personalities and proneness to adopt habits in favor of CE, and investigation on demographic profile and willingness to adopt responsible consumption actions is understudied as well (Kutaula et al., 2022). A recent review in Brazil on how the CE can promote social inclusion has found that reuse and reduce activities are the most cited in surveys, and that strategies of reverse logistics and recycling are the most common involving consumers and communities (Souza Piao et al., 2023).

Scholars emphasize the need for sustainable supply chain development, including rejecting linear production systems or supply chains (Kelleci and Yildiz, 2021; Machado et al., 2019). Kunamaneni et al. (2019) list some factors that make consumers more reluctant to act within circular thinking: the attachment to products' aesthetic design and the brands, and the lack of widespread knowledge on reusing rather than recycling. Furthermore, there are voids in governmental regulation of recycling (e.g., products that can undergo reverse logistics). A global review of consumer behavior towards e-waste identified that consumers' disposal and recycling behaviors are the two principal areas of research interest. In contrast, reuse and repair behavior were

investigated to a lesser extent (Islam et al., 2021). Vidal-Ayuso et al. (2023) reinforce such findings, observing that the post-purchase phase relating to “use,” “recycle,” and “upcycle” was still found to be obscure in academic literature. These findings suggest that consumer habits (however derived) may constitute a barrier to CE.

2.1.3. Educational failures

Many academics worldwide have focused on sustainability and CE (Hankammer et al., 2019; Kirchherr et al., 2018), as indicated in the previous section, but their efforts are often communicated within the academic community rather than widespread disseminated. For instance, Portuguese teachers prefer to increase students’ sustainable development education through conferences, seminars, or research projects (Sinakou et al., 2022). Assuming that such practices could be adopted more often, it is questionable whether change in dissemination practice towards social media channels favored by consumers might better contribute for improving the knowledge of the non-academic population. There is an increasing understanding that academics (Sinakou et al., 2022) and higher education institutions need to adopt action-oriented to sustainable development.

Whilst educational systems have to update their curricula to meet emerging labor market needs, the long durations of academic in incompatible with the fast pace of technological changes that underpin a successful transition to a CE (Spada et al., 2022). An analysis of curricula, teaching, and learning renewals promoted in higher education programs identified critical differences between the expected and the actual learning outcomes (Leal Filho et al., 2018). Findings showed that education providers desire to approach sustainability from an integrative perspective. However, this approach typically demands more administrative resources to develop formal and hidden curriculum mechanisms. As a result, intra- and inter-cultural learning characteristics are increasingly necessary to fulfill educational structural voids (Gutierrez-Bucheli et al., 2022).

Therefore, according to Zhang et al. (2024), there is a need for more effective results concerning education for sustainability – curriculum, practices, and higher education initiatives. Initiatives to educate the entire academic staff (students, teachers, administrative professionals) using learning by doing and active learning strategies for sustainability have reached some European universities of Greece, Italy, and Portugal (Bacelar-Nicolau et al., 2023), but the context of Latin American universities is different. According to (Leal Filho et al., 2021), the Latin American universities resent from financial investments, need more efforts in developing appropriate resources and materials, and lack awareness and support from their administrations. This scenario suggests the existence of elements that prevent educational institutions from adapting more quickly to the demands and challenges of the CE.

2.2. Levers to engagement

Levers that can be used to improve consumer awareness and engagement with the CE are presented in the literature. These levers were organized into green marketing, improvements in education, and social pressure, separately described as follows.

2.2.1. Green marketing

Green marketing effectively informs and influences consumers to stimulate their interests, desires, and actions. Green marketing campaigns are an opportunity to influence producers’ and consumers’ decision-making processes in a positive way (Prieto-Sandoval et al., 2022). Green self identity performance is an inductor for consumers to buy circular products. “Consumers with a strong green self-identity and moral-based personal norm would always perceive higher green value from their circular products.” (Sajjad et al., 2024: 4). Actions aimed at influencing consumers can be based on the marketing mix. The marketing mix paradigm encapsulates the most efficient marketing actions (Leonidou et al., 2013). These actions are divided into seven elements

(also known as the 7Ps of marketing) which include place, price, product, promotion, people, physical evidence, and process. Nudges are any aspect of the decision-making environment that changes people’s behavior predictably without prohibiting options or changing their economic incentives (Thaler and Sunstein, 2008), which are also relevant to this context. According to Novela et al. (2018), a green marketing mix based on the 7Ps approach positively affects customer satisfaction. Adaptations in the 7Ps of the marketing mix and nudges have been found in the beauty sector to support the communication of circularity to consumers through simplicity, transparency, and effectiveness. Success in this adaptation can contribute to filling the “intention-behavior” gap issue in the circular economy transition (Rainatto et al., 2024).

Di Iorio et al. (2023) suggested that European consumers are incited to seek more information and change their behavior in favor of CE when in contact with “green” clues. Such conclusion highlight the positive effect of nudges on inducing more beneficial decisions for society and the environment (Rainatto et al., 2024). Thus, nudges constitute one standard marketing tool for persuasive communication (O’Shaughnessy and O’Shaughnessy, 2004). Nevertheless, it is also relevant to plan strategies of consumer engagement through social media because pro-environmental consumption behavior cannot last in the void of further stimulus and reliable information, for instance, about labels and packages of products (Di Iorio et al., 2023). Some scholars believe it can induce environmental awareness changes (Warmington-Lundström and Laurenti, 2020) to drive sustainable consumption behavior (Torma et al., 2018) or close the gap between the intention to recycle and actual action towards recycling (Flygansvør et al., 2021). To provide such benefits, nudges aim to (i) make information more straightforward for consumers, (ii) promote changes that induce better choices where consumers act on impulse, (iii) create better policies, and (iv) use social norms to influence human behavior (Lehner et al., 2016). Therefore, firms can improve their consumers’ environmental awareness by developing a green marketing strategy focusing on education or creating an environmentally aware community of consumers (Prieto-Sandoval et al., 2022).

2.2.2. Improvements in education

Attitude and knowledge are the most influential elements in consumer decision-making regarding buying choices (Vidal-Ayuso et al., 2023). Attitudes, behaviors, and knowledge can be improved by education which has emerged as a central leverage point for the transformation towards a sustainable circular economy (Mies and Gold, 2021). Several benefits of a good education are presented in the literature. Climate change debates in higher education has helped individuals find new, environmentally friendly ways to address their hedonic choices (Tolppanen et al., 2022). Farmer field school training significantly increases the adoption rate of environment-friendly irrigation and fertilization technologies (Cai et al., 2022), while educational knowledge positively affects energy consumption in agricultural greenhouses in Iran (Behroozeh et al., 2022).

However, such benefits may vary among the academic courses. Gonella et al. (2024) investigated people awareness on CE principles in Brazil through the Theory of Behavioral Choice. They found that social influence, influence of the peers, family and social media celebrities are positive levers of CE practices. The management of social media as Instagram, for instance, to educate consumers about the features and ways to sustainably use and return products, is blossoming among firms that understand and prioritize the role of consumers in circular business models (Gomes et al., 2023). Another fruitful strategy is the adoption of online marketing influencers as they easily inspire and catch followers committed to their messages, and enable firms to measure the interaction results through digital signs as “likes” (Minárová et al., 2019).

Awareness training could be based on scientific facts, packaging information based on labeling schemes (“eco-labeling”) and nudging for sustainable behavior. Such elements can support consumers’ sustainable

Table 1

Barriers and levers presented in the literature.

Code	Group	Summary
Barriers	Poor consumers' knowledge Inadequate consumers' behavior	Low awareness about e-waste management and disposal or climate change. Inadequate consumer habits and practices related to purchasing or consuming goods and foods. Low propensity to accept products containing recycled materials or non-perfect appearance.
	Educational failures	Educators communicate only on academic forums. Courses not aligned with the labor market needs (content and duration). Universities resent financial investments, which prevent the improvement of their offers.
Levers	Green marketing	Green marketing can stimulate consumers' interests, desires, and actions toward CE. The 7Ps of marketing, the nudges, and social media can influence people's behavior or social norms.
	Improvements in education	Education can help individuals adopt new environmentally friendly ways of life and work. Social media and its influencers can improve the consumers' education. Firms can help to educate consumers using scientific facts, packaging information and nudging.
	Social pressure	Subjective aspects and offers can influence consumer behavior. Social pressure on individuals can impact the CE readiness. Social media platforms can spread content and messages that induce consumers to review their behaviors.

buying behavior (Otto et al., 2021). Higher education institutions can help companies to improve the knowledge of their supply chain partners. However, some changes in the educational institutions' focus (e.g., expertise and dissemination) will be needed (Leal Filho et al., 2018). Online learning methods have become important by providing online education (Baptista et al., 2021), which requires producing and sharing of digital artifacts as videos and podcasts. A model to evaluate the effectiveness of audiovisual products was tested on environmental awareness actions. Results enabled the identification of the aspects that increase awareness campaigns' effectiveness. The model also provides information on the effects of a particular stimulus on subjects. Such achievement can improve campaign planning and the creative and production team's actions (Romero-Luis et al., 2023). Despite the importance of the topic, the literature lacks a better understanding of companies' use of online education.

2.2.3. Social pressure

Subjective aspects can influence the effectiveness of marketing actions. The perceived importance of subjective norms can be changed through peer pressure (Lakshmi et al., 2022). Offers or actions may also influence consumer behavior (Lehner et al., 2016). Social pressure significantly impacts the CE readiness of the ready-made garments sector in a developing country (Islam et al., 2021). Self-image concerns, perceived adverse effects, and salvage value can induce consumers to contribute to e-waste recycling (Yadav et al., 2022). These social levers are part of the cultural dimension. Findings indicate that the consumers' involvement in the production-consumption loop, their social and spatial relations, and the institutions and policies that govern their economic activities can change their habits (Beaurain et al., 2023). Norms, values, and ethical concerns are part of social consumer backgrounds that can be influenced by suitable business models that encourage dematerialization, product life extension, and sufficiency (Gomes et al., 2023).

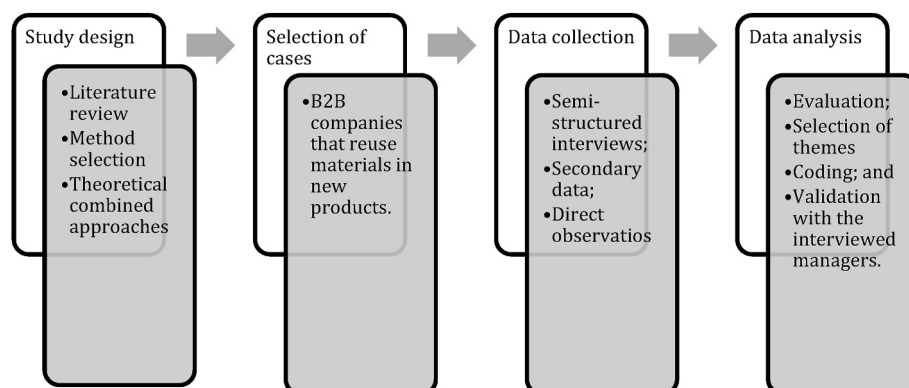
Social digital pressures are related to the extensive use of communication apps among users who use communication apps extensively (Herrero et al., 2023). Social media platforms can spread content and messages that induce consumers to review their behaviors. A survey carried out by Farida et al. (2023) in Indonesia on post-consumption behavior related to plastic (PET) bottles has shown that digital social media is more effective in reaching consumers with information to deliver back the bottles (more than 57% of scope) than TV advertisements (11%) and even than schools campaigns (9%). Higher education institutions can help companies to improve the knowledge of their supply chain partners acting as a type of institutional social pressure.

Table 1 presents the summary of barriers and levers presented in the literature.

3. Research methodology

To investigate how companies and academics can collaborate to improve consumer awareness and engagement with the circular economy, we initially analyzed previous studies that could support the research theoretically. The exploratory multiple case study method was selected with B2B companies that reuse materials in manufacturing new products. As theoretical approaches, we have combined (i) the social network (Ratsimandresy and Miemczyk, 2023); (ii) CE learning as a type of civic policy learning engaging individuals and collective actors (Pinyol Alberich and Hartley, 2023), (iii) and circularity brokerage as an emerging set of activities (Ciulli et al., 2020) that envisages closing the holes that hinder the adequate adoption and dissemination of CE activities in a network of actors.

The strengths of case studies lie in their rich descriptions and investigations of new phenomena (Ridder, 2017). The method allows us to address the "what" and "how" questions - thus expanding knowledge about the topic under analysis (Meredith, 1998). The case study allows

**Fig. 1.** Research steps.

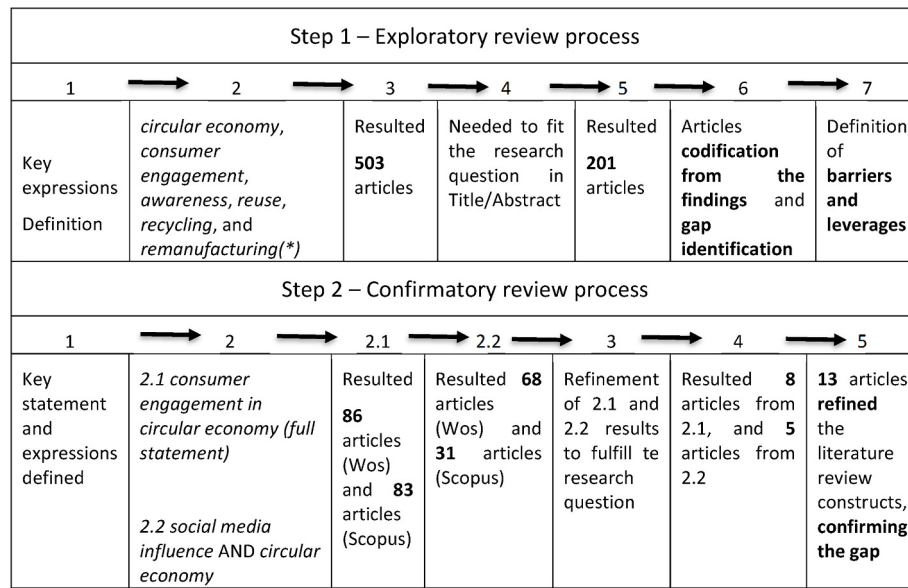


Fig. 2. Literature review: exploratory and confirmatory steps

(*)Subject to scientific journals with a percentile above 87.5% (according to Scopus).

Source: Elaborated by the authors

for a detailed examination of company phenomena. They offer flexibility in the design phase (Merriam and Tisdell, 2015; Yin, 2009), and enable to articulate a large amount of enlightening data of enlightening data (Yin, 2009). The method's definition guided the selection of the investigated cases, interviews, data collection, and data analysis. Fig. 1 presents the adopted research steps.

3.1. Study design

In order to define the main constructs of this study, there were carried out a literature review in two steps. The first one – exploratory – was performed in August 2023, and considered the following key expressions: *circular economy, consumer engagement, awareness, reuse, recycling, and remanufacturing*. This research, in Web of Science (Wos) and Scopus data bases, focused on the last three years and gathered only scientific journals with a percentile above 87.5% (according to Scopus). There

were found 503 articles – amount reduced to 201 after the reading of the titles and abstracts in the perspective of fitting the research question. Coding the findings from these 201 articles suggested the existence of opposing forces - constraints and levers for improving CE and engaging practices with the CE. The literature review also suggested that improvements in CE require simultaneously reducing barriers and increasing CE levers.

Further analyses of the coded literature indicated the possibility of cooperation between academics and company executives for improving CE. However, the literature is practically silent about this possible cooperation. In the attempt of refining the review, stressing the subject of study, another strategy of review was adopted – confirmatory - using the full statement *consumer engagement in circular economy*, and the expressions *social media influence* and *circular economy*. This step, performed in December 2023, captured articles scheduled for publication in 2024 (preprints and online available studies) besides papers from 2021

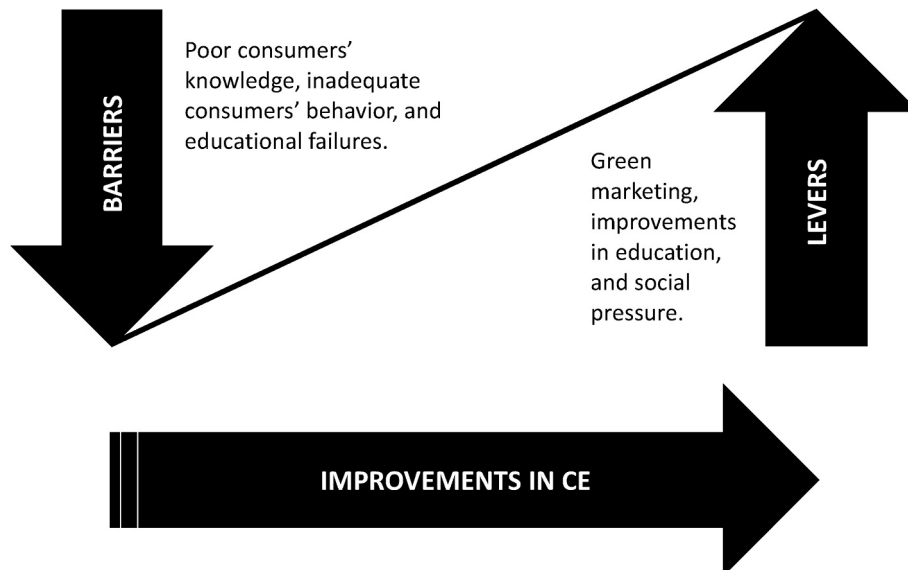


Fig. 3. Descriptive research design.

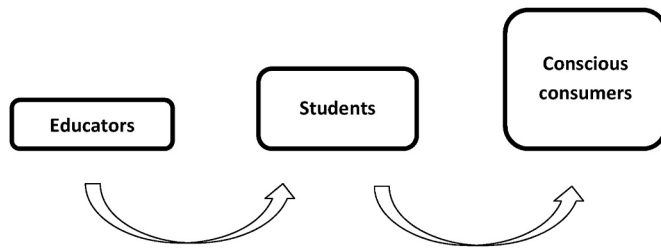


Fig. 4. How academics help to engage consumers with CE.

to 2023. For the statement, 86 results were found in WoS, and 83 in Scopus – from which 9 were deemed suitable to the research question, and one was repeated, resulting 8 useful records. For the last search, there were found 68 results in WoS, and 31 in Scopus – with 5 records considered eligible. This second review ratified the scarcity of specific studies about cooperation between academics and companies. The outcomes of these reviews are represented in Fig. 2 and are described in subsections 2.1 to 2.2.

The opposing forces seem to be constraints and leverages to CE improvement and CE practices adoption by consumers, at the same time. Improvements in the CE require simultaneously reducing the barriers while increasing the CE levers. These opposing forces are presented in Fig. 3.

Analyzing the barriers and levers suggests reflections on the traditional way of engaging consumers with CE. On one hand, the lack of knowledge could be mitigated through formal education. However, some elements seem to limit formal education efficiency. First, the content taught in formal education does not seem engaging. In addition, the number of consumers engaged with CE by formal education is negligible. Only students and former students have access to the knowledge taught by educators. Despite their small number, these students can act as brokers to CE dissemination (Ciulli et al., 2020), and may help to spread the knowledge to other consumers. Consumers that were convinced on the practical benefits of CE by engaged students were labeled in this study as “conscious consumers”. Regardless the educators and students efforts, the number of conscious consumers is also minimal (considering the size of the population). Such a possibility suggests that the traditional way of engaging consumers with CE may not be efficient, as already found by Aagari and Aagari (2023). According them, traditional ways to convince individuals to adopt circular habits fail because circularity is a property of the system not of the individuals. Circularity implementation requires breaking the usual vision of CE as steered by formal institutions only, and shift this vision for the perspective of knowledge flows (Alonso-Muñoz et al., 2021). Fig. 4 represents how academics help to engage consumers with CE.

3.2. Cases: selection and description

Eight case studies were conducted with medium-sized B2B companies that recycle PET bottles or metals in Brazil. The criteria for selecting the companies for this research were based on the need to reuse materials in new products. All the selected companies use recycled items to reduce the use of virgin materials in their products. The choice for middle-sized companies aimed to understand the reality of companies that cannot invest in large green marketing campaigns.

In the beginning of the study, there were identified 31 Brazilian middle-sized companies in the LinkedIn social network. These companies were invited to participate in the investigation (through e-mail). Two weeks after the invitation, eight companies agreed to participate in the study anonymously. It means that the companies did not allow us to mention their brands, products, or the names of the interviewed professionals.

Before the interviews, a draft of the manuscript was sent to the interviewees (Merriam and Tisdell, 2015; Yin, 2009). This draft presented

Table 2

Characterization of companies and interviewees.

Code	Company	Interviewee
M1	Manufacturer of plastic containers for kitchens and bathrooms. These containers use PET to reduce the amount of virgin materials.	Marketing manager with 14 years of experience (4 years in the company and ten years in other similar companies)
M2	Manufacturer of metallic components for the home appliances industry. The company uses recycled metals due to its production process.	Marketing manager with 17 years of experience (6 years in the company and 11 years in other similar companies).
M3	Manufacturer of plastic containers for warehouses and transport of parts. These containers use PET to reduce the amount of virgin materials.	Marketing manager with seven years of experience in the company.
M4	Manufacturer of polymeric materials. The company uses PET to reduce the amount of virgin materials (in their products).	Marketing manager with 9 years of experience (5 years in the company and four years in other companies)
M5	Manufacturer of repair parts. The company uses recycled metals due to its production process.	Marketing manager with 20 years of experience in the company.
M6	Manufacturer of metallic components for the auto industry. The company uses recycled metals due to its production process.	Marketing manager with 12 years of experience (7 years in the company and seven years in the steel companies).
M7	Manufacturer of brushes for household cleaning. The company uses PET to reduce the amount of virgin materials.	Marketing manager with 13 years of experience (9 years in the company and four years in other similar companies)
M8	Manufacturer of plastic containers for the food industry. These containers use PET to reduce the amount of virgin materials.	Marketing manager with five years of experience in the company.

the introduction section, the literature review, the research question, and the semi-structured questions of the case study. This document was sent to the companies' general managers. Some days later, the companies indicated their marketing managers as respondents (due to the focus on green marketing).

Table 2 presents the codes of the participating companies. As arranged, the specific details were omitted to protect privacy and confidentiality. So, letters and numbers were used in the study to indicate the respondents of each company.

The units of analysis are the marketing departments of the selected companies. In these departments, we investigated how academics could help companies to improve their green marketing actions or campaigns. We also explored what the interviewed managers suggest academics could do to enhance their contribution to CE. These questions were based on the following constructs: marketing, education, and social pressure. The questions employed in the interviews are available in Appendix 1.

3.3. Data collection

Three types of sources were used to gather information: (i) semi-structured interviews with marketing managers; (ii) secondary data (i. e., documents and reports about the recycled materials); and (iii) direct observation of the company and its partners in the supply chain. The open questions proposed to the interviewees aimed to induce reflections on the requested data. Such reflections help to improve the information gathered (Merriam and Tisdell, 2015; Yin, 2009).

The questions proposed to interviewees were previously checked by three market specialists (pilot testing). These specialists analyzed if the questions were easy to understand and if the questions were related to the investigation objectives. All analyses were performed through online meetings (since these meetings facilitate contact with busy professionals). Visits were also made to four partners in the supply chain of the selected companies. These companies were suggested by the

specialists participating in the pilot test.

Interviews started with open-ended questions (Yin, 2009). Depending on the answers provided by the interviewed managers, new and more specific questions were presented to them. All questions proposed were based on the two groups of constructs (barriers and levers) and complemented with secondary materials (company documents, websites, and social network data).

Eight interviews were conducted, with an average duration of 1.5 h each. All interviews were digitally transcribed immediately after the meeting, and notes and impressions that emerged during data collection were also documented. The interviews took place from September 2023 to January 2024.

3.4. Data analysis

The research team performed the thematic analysis. This analysis aimed to check the information gathered in the interviews (Bardin, 2011; Braun and Clarke, 2006). In the first step, the researchers interpreted the interviewees' responses. Following Yin's (2009) recommendations, the relevant information was codified manually (after each interview was finished). The following process was applied in his codification: (i) textual data evaluation; (ii) selection of themes that allow the gathering, interpretation, and comparison of similar findings in the different interviews; and alignment of themes with the constructs under analysis (to improve the analysis of results); (iii) coding and identification of inductive themes that resulted from the data generated, and of themes deduced from the literature review; and (iv) validation with the interviewed managers. All managers interviewed approved the codification performed by the researchers.

Once approved, the information gathered in each case and between cases was organized into group findings (Gioia et al., 2013). Three groups emerged from this analysis: campaign management, materials, and posts. After that, a check of the data was performed. This check verified if the research objectives have been met (Yin, 2009). The check conducted by the researchers also sought to ensure that it would be possible to explain identifications, evidence, and support for the study's conclusions. In the next step, triangulations were performed using secondary data (to validate and justify the findings). The research rigor was assured by considering various sources of evidence (e.g., interviews, secondary data, and observation notes). Finally, a database was structured to store the interview transcripts, notes, and secondary documents. The managers interviewed also approved the analysis performed by the researchers.

4. Findings

Findings indicate that companies are aware of their limitations regarding their active role in promoting CE in their B2B field. The managers recognize that consumer lack of knowledge on product returns and recycling, which leads to inappropriate behavior concerning the waste destination, is somehow their responsibility – assuming that there is a void with respect of effective communication with both their direct consumers (intermediary companies) and the final consumers of B2C firms. The answers reveal that it is necessary to narrow down strategies to capture consumer engagement in CE. Overall campaign management and means to monitor and measure the effectiveness of such campaigns must consider the types of adequate materials to be produced (content, size) and the social media details (social network choice according to the demographic profile of targeted consumers).

4.1. Campaign management

The first group of findings suggests that academics could help companies better understand successful green marketing campaign management. To this end, academics must increase their interaction with companies, which is detailed as follows.

The managers indicated by the companies helped us to better understand the B2B green marketers' challenges and how these marketers can interact with academics. Even not having contact with the final consumer, the B2B companies want to know how their customer (the B2C companies - companies that sell to the final consumers) may improve sustainability in the whole supply chain. Such an understanding also aims to enhance the efforts of the B2B and B2C companies in the definition of environmental and social governance (ESG) goals and materiality.

The findings suggest that B2B and B2C companies are interested in knowing the aspects considered in successful campaigns in the environmental area. Among the proposed focuses for academic studies are the target audience, delivery channels, types of content, influencers' profiles, performance indicators, duration of campaigns, days and times of dissemination, targets to be measures (KPIs), budgets, etc. The interviewees also suggested that non-scientific information available in the internet be considered in these studies. As found, these sources can indicate the best campaign options used by other companies. The results of these surveys can help to build a knowledge base that improves companies' future campaigns. Some comments are reproduced below.

"Academics have an admirable research capacity. Imagine using this capability to investigate successful campaigns. (M3)."

"Understanding best practices must come from analyzing the campaigns run by companies. (M6)."

"Company professionals only have a little time to research the best digital campaign options or innovations. (M1)."

Changing how companies manage their relationships with academics would help educators improve their teaching and research tasks. This change takes work to be implemented and could help to remove the educational inertia characteristic of the majority of higher education programs, that are focused on theoretical information. The findings reveal that managers recognize that their B2B companies must interact more with the academic environment, considering that the distance between them can be attributed to the secrecy surrounding marketing campaigns. Professionals also agree that this distance harms both parties. According to some managers (M1, M4, and M6), less interaction between companies and academics can reduce companies' in-house innovation capacity. This distance could be reduced if companies proposed or evaluated research on consumer engagement through green marketing campaigns. As declared, reducing the distance would constitute a win-win relationship. Companies would benefit from updating their human resources and involving some academics on the problems currently experienced by their companies. Academics could strengthen their ties with the companies and simultaneously improve their tasks:

"We must accept our guilt in the distancing. We also must think about the losses that distancing can cause us. (M1)."

"If there is no cooperation, neither party will obtain better results in their activities. (M4)."

"We could support academics in their research or in assembling educational materials. This support will benefit both parties. (M6)."

4.2. Campaign materials

The second group of findings revealed problems with the materials released by the companies (in campaigns). Academics can cooperate with companies developing better engaging materials. Success in this cooperation will allow academics to produce and sell content for the green marketing campaigns.

Educational materials support a green marketing campaign for B2B and B2C companies. As a green marketing action, the B2B companies try to contribute to their partners in the supply chain and with final

customers (the B2C companies) in producing materials as electronic folders or e-books, that present a greater volume of information compared to an advertisement in the media or in social networks. Some interviewees stated that they needed help regarding how to prepare educational pieces. It was also found that the preparation of educational materials needs some clarification: content that must offer depth, planned amount of information per published material, presentation format, time for the consumer to consume the material etc. Another issue related to the campaign pieces preparation is the need for tested and approved instructions for producing content aimed at consumers with respect the specific companies' profiles or sector of activity. Interviewees understand that academics can help elucidate these doubts:

"We need to improve the production of specific materials. Generic things do not work. (M2)."

"Academics are a group that knows how to produce educational material. But we learn little from them. (M7)."

B2B companies prefer a very transactional way when interacting with academics: purchasing an educational product rather than interacting with academics to develop new pieces. This position of the managers increases the distance between the company and most academics. On the other hand, such perspective opens space for academics to sell their materials to companies (which can strengthen the relationship between the parties). However, companies understand that academics also have their share of blame for this distancing. As ascertained, academics do not have deliverables aligned with the companies' demands. Furthermore, most academics are little known by business managers. Some interviewees confessed that they did not know which academics could produce or sell material that meet the demands of their organization. The interviewees also declared that they did not know the media where academics would publish their work:

"Instead of creating an interaction program, it would be easier to justify purchasing material from a recognized academic. (M3)"

"I do not know where to find an academic to help us create materials suited to our needs. (M4)."

4.3. Campaign posts

The third group of results indicates that companies want to use social networks to induce consumers to adopt a more environmentally conscious stance. This focus opens up space for academics to become influencers. However, success in this influence demands a better understanding of content and formats that can be successfully used in social networks.

All marketing professionals agree that the pressure exerted through social media can induce the population to adopt positions more aligned with the CE. Nevertheless, these professionals indicated some questions that academics could answer. For example, which content and formats are most suitable for exerting this pressure on social networks (considering the consumers' profile or the company's sector of activity)? In terms of the profile of the audience, these professionals would like to understand how to influence the behaviors of people with a lower educational level and less purchasing power. This focus considers that most of the population comprises this demographic profile. Therefore, improving people's posture with this profile can significantly boost CE:

"If there is one thing that works on a large scale, it is the pressure exerted by social networks. (M5)."

"I would like to see a study on using social pressure to change the habits of less favored sections of the population. (M8)."

Here again, companies have a transactional stance. Some of those interviewed understand that academics could be more active in raising consumer awareness. This understanding is based on the analysis of the

Table 3
Summary of findings.

Code	Summary
Campaign management	Companies would like to know how to structure successful green marketing campaigns (target audience, delivery channels, content types, influencers' profiles who can raise awareness and engage, performance indicators, campaign duration, disclosure days and times, and goals and budgets). A better relationship can improve companies' in-house innovation capacity and the studies developed by academics.
Campaign materials	Companies would like to know how to improve the educational materials of their green marketing campaigns (content that must offer depth, planned amount of information per published material, presentation format, time for the consumer to consume the material etc). Companies prefer transactional interaction with academics, thus opening space for academics to sell materials to them. Academics must become more "visible" to strengthen their relationship with companies.
Campaign posts	Companies would like to know the persuasive content and formats most suitable for exerting pressure on social networks. Companies would like to know how to influence the behaviors of people with a lower educational level and less purchasing power. Companies understand that academics can influence a particular segment of consumers (but they need to know which one). Companies want to contract academics who can raise consumer awareness using social media.

image that the population keeps of academics: trustworthy, competent, up-to-date, and well-intentioned people. Other interviewees mentioned that academics have the best profile for teaching, researching, or exerting social pressure through social media. These differences can enable academics to produce and disseminate materials through social networks. This would be an expansion of the educators' current activities. Another interviewee stated that academics more active in the social media (with high amounts of posts, views and likes) could receive sponsorship from companies or business associations. This compensation would constitute a new revenue source to support these academics' research:

"Why don't academics take a more active role in raising awareness among the population? (M2)."

"Dear academic, you enjoy a great image among the population! (M1)."

"Some companies or business associations may sponsor academic influencers with the highest number of views. (M6)."

Table 3 summarizes the information gathered.

5. Discussion

This section presents some debates and highlights on the relationships between the results and the barriers and leverages for CE implementation identified in the literature review. First, an analysis of the contribution of each finding to reduce the barriers or to improve the levers is presented. Other contributions not related to the barriers and levers presented in the literature are also posed in this section. Finally, a synthesis of these contributions is shown at the end of this section.

5.1. Campaign management

The findings suggest that academics can contribute to companies in improving consumer awareness campaigns about CE. Success in these campaigns could mitigate the population's lack of knowledge (Jangre et al., 2022; Mathew et al., 2023; Thukral et al., 2023) or help to change unpleasant consumption habits (Winterstein et al., 2024). The study

Table 4
Research avenues on campaigns not yet released on social media.

Code	What we should know
Elements of a campaign	What are the target audience, delivery channels, types of content, influencers, performance indicators, duration, days, times, and budgets used in successful campaigns designed to engage consumers?
Influence of each element	How much does each element contribute to the success of a campaign (under each consumer profile and type of product)?
Companies and academics interactions	How do researchers responsible for successful interaction projects with companies assess their relationship with the market? How do researchers who do not interact with companies assess the roles of the content producer or “academic influencer?”

contributes by suggesting that the actions to be developed could be based on successful campaigns in the environmental area. Among the elements to be considered are the target audience, delivery channels, types of content, influencer profile, performance indicators, campaign duration, days and times of dissemination, goals, and budgets. The analysis of these elements will also need to consider the consumption habits of the different audiences that make up the population (Neves and Marques, 2022) and the necessary phases of the CE (Islam et al., 2021; Vidal-Ayuso et al., 2023). A better understanding of the elements that could lead to campaign success will help to improve green marketing (Prieto-Sandoval et al., 2022) or help to guide the definitions of the 7Ps of the marketing mix or the use of nudges (Rainatto et al., 2024).

A more significant interaction between the parties could focus on the means used by academics to disseminate their knowledge of CE (Leal et al., 2024). This activity of CE networking was observed through knowledge brokerage in both the business and community contexts (Gutierrez-Bucheli et al., 2022; Sinakou et al., 2022; Spada et al., 2022). This study suggests that companies also constitute a barrier to more significant interaction between parties (due to the secrecy surrounding campaigns). Despite this barrier, companies could help focus research on green marketing campaigns. More significant interaction is supposed to benefit both parties: companies could improve their green marketing strategy (Behroozeh et al., 2022; Cai et al., 2022; Prieto-Sandoval et al., 2022), and academics could help to find environmentally friendly ways to address the consumers' hedonic tendencies (Tolppanen et al., 2022).

The analysis of the discussions enables to highlight actions that can improve campaigns released in traditional media, opening further research avenues. Table 4 presents these opportunities.

5.2. Campaign materials

B2B companies that use recycled materials in their products usually do not have direct access to the final consumer. Thus, they depend on strong inter-organizational relationships (Korhonen et al., 2018) to succeed in CE initiatives. So, these companies need to learn how to produce or support the production of educational materials that help engage consumers with CE. B2C companies could use such information in their materials to engage consumers with CE. This research suggests the need for more studies about what content should be conveyed in-depth, how much information should be shared by published material, what is the best format for presenting this content, what the consumer's time limit for consumption of the material should be, etc. The analysis of these media aspects adds inputs to the literature on the information that could improve consumers' awareness and engagement with CE: scientific facts, straightforward product and packaging information, and nudging (Otto et al., 2021). Doubts about such aspects may limit companies' contribution to changing consumer habits and attitudes (Mies and Gold, 2021; Vidal-Ayuso et al., 2023).

The findings suggest that the lack of knowledge on better developing educational materials may be related to insufficient research on

Table 5
Future research avenues on companies materials.

Code	What we should know
Types of materials	What material can be used to convince consumers to change their habits in non-environmental campaigns? What material can be used to convince consumers to change their environmental postures and habits? (Including content conveyed, amount of information per material, presentation format, and time for the consumer to consume the material).
Importance of each material	How could we measure the impact of each educational material on consumer engagement?
Dissemination of materials	What educational materials should be created by companies, business associations, or universities to engage consumers with CE?

producing materials that promote changing habits. This problem seems to occur in the academic environment, where more articulation is needed to engage the least committed students. Therefore, this study suggests that a lack of knowledge about promoting different people's engagement can limit the circularity of supply chains. (Souza Piao et al., 2023), prevent building strategies that better inform consumers (Shevchenko et al., 2023), or help to improve their awareness and care on CE practices (van Bueren et al., 2023).

Despite the lack of contact with the final consumer, B2B managers must help to improve consumer engagement with CE. To do this, these professionals could develop new collaborations with diverse actors in the system. The success of these collaborations can increase the percentage of recycled materials used in their products, thus improving circularity (Mostaghel et al., 2023). Cooperating with academics seems to be a good alternative identified in this study. However, some barriers may hinder such collaboration. This study also suggests that companies' transactional stance is a significant barrier (since managers could prefer purchasing educational materials to interact with academics). This stance may also hinder a more comprehensive collaboration among all stakeholders in the chain (Fatimah et al., 2023).

Furthermore, purchasing ready-made materials seems to face practical problems. The preference of academics for scientific forums to release new knowledge appears to burden their identification by companies interested in contracting professionals to produce awareness materials aligned with the company's circularity effort. The preference of academics regarding their knowledge production and exchange could incline managers to purchase educational materials instead of interacting with them. Therefore, this study suggests that academics need to improve their research groups' marketing. Better scientific marketing could help companies identify the most suitable academics for producing educational materials. Success in this cooperation can help to improve the companies' green marketing (Prieto-Sandoval et al., 2022).

The discussions about educational materials released by the companies suggest gaps that hinder the creation of better materials. These gaps guided the proposal of the future studies presented in Table 5.

5.3. Campaign posts

Social media marketing has a strong and positive association with the intention to purchase green products (Nekmahmud et al., 2022). Such a conclusion suggests that B2B companies could use this marketing to engage consumers with the CE. However, B2B companies do not have contact with consumers; consumers have direct contact with companies that are customers of B2B firms (B2C companies). Therefore, the B2B green marketing initiatives should aim to promote actions that interest their customers (due to their market specificities). In such a context, the managers interviewed recognize that social media could engage most consumers with CE, thus helping them to increase the percentage of recycled items in their products. Furthermore, a higher engagement of consumers with CE could improve the marketing efforts of B2C companies (the producers of goods for the consumers). An increase in the

B2C companies' sales could generate new sales for the B2B companies investigated, thus creating a win-win condition for companies and the environment. The analysis of the abovementioned situation suggests that, as B2B companies do not have access to consumers, social media constitutes an excellent alternative to promote this engagement and to change consumers' behaviors. Therefore, supporting other actors in the supply chain could allow B2B companies to create a win-win situation (for the companies and the environment).

However, the lack of content knowledge may overshadow the success of pressure through social media. For instance, we do not know which content is most persuasive when engaging consumers with CE. In fact, we only know that messages of warmth can positively influence consumers' engagement with pro-environmental actions (Gerrath et al., 2024) and that positive messages are more effective than negative messages in inducing young adult consumers' sustainable fashion consumption (Grappi et al., 2024), or that the perceived value and social interaction significantly impacts customer engagement behavior in social commerce platforms (Busalim et al., 2021). So, this study suggests that we need to better understand the elements, contents, and formats capable of exerting pressure on consumers (considering the product's or waste's specificities). A clearer unveiling of these drivers would likely improve actions to raise awareness - as identified in the fashion products (Islam et al., 2021; Yadav et al., 2022). These actions' success could also help promote e-waste disposal as a social norm (Jabbour et al., 2023).

The profile of virtual influencers constitutes another critical topic to ensure the success of pro-environmental causes (Gerrath et al., 2024). Since the interviewees perceive academics as trustworthy influencers, this study suggests a new role for academics. We named this role as "academic influencer." This suggestion considers the importance of trust as a vital persuasion mechanism in influencer-follower relationships (Kim and Kim, 2021). The success of this influence could generate new sources of research funding.

Individuals with pro-social solid attitudes are more aware of the need to recycle e-waste (Jabbour et al., 2023). Besides, sustainable behavior strongly depends on consumers' socio-demographic characteristics (Dangelico et al., 2022). Such aspects could be related to the consumer's culture (Korhonen et al., 2018). Therefore, this study suggests cultural elements could be considered when defining sustainable actions (Beaurain et al., 2023).

The cultural aspects involve the analysis of the consumers' electronic word-of-mouth: negative comments, consumer behavior and trust, brand loyalty, and user-generated content (Donthu et al., 2021). This study suggests that it is necessary to sharply understand how to persuade distinct groups of consumers (based on the cultural aspects and socio-demographic characteristics). Better persuasion approaches could be dedicated to people with lower educational levels and purchasing power since this profile covers most of the population of any country, whose attitudes, once improved, can significantly boost CE. Given the enormous number of people who need to be persuaded, this study reinforces the suggestion that this pressure could be exerted through social networks. This suggestion is supported by the contribution of digitalization in waste management (Jiang et al., 2021).

Usually, academic knowledge seems limited to the educational environment (Leal et al., 2024). Such a limited release of findings significantly reduces the number of people benefiting from the knowledge generated. This study brings novelty by suggesting that companies or business associations could financially support academics that successfully raise awareness amongst a particular segment of consumers. The resources rising to consumer-engaging activities could finance new scientific studies through the "academic influencers." These benefits could help remove some barriers to reviewing current educational practices (Gutierrez-Bucheli et al., 2022; Spada et al., 2022).

Success as influencers seems to require that academics perform as market mavens, i.e., they should know the here and now. Some elements can help create an image of an expert. According to the literature (Harrigan et al., 2021), an expert (compared to non-experts) has more

Table 6

Research avenues on the environmental influence.

Code	What should we know
Persuasive contents	What persuasive approaches could be used in social media to convince consumers to change their habits in campaigns designed to change non-environmental postures and habits? What persuasive approaches could be used to convince consumers to change their environmental postures and habits? Including content conveyed, amount of information per material, presentation format, and time for the consumer to consume the material).
Importance of the contents	How could we measure the impact of each persuasive piece of content on consumer engagement? What approach is best suited to pressure consumers on social media and for how long?
Successful postures	What are the postures adopted by different successful influencers? What influencers are best suited to persuade a particular group of consumers (including consumers with a lower educational level and purchasing power)?

Table 7

Future research on academics' reluctance/interest in becoming influencers.

Code	What we should know
Academics' perceptions	How do academics evaluate the possibility of becoming influencers or producers of educational materials? How do academics perceive the creation of social media posts based on their scientific knowledge? What are the benefits and problems that academics see when producing content?
Drivers of postures' change	Which academics already developed actions to influence consumers (in partnership with companies or not)? What can assure the success of academics as an influencers? Which audiences can be influenced by academics? How much money could an academic who acts as an influencer get for their posts that help consumers engage with CE?

Table 8

Contributions to the consumers' engagement with CE on each barrier and lever.

Findings		Literature					
		Barriers			Levers		
Code	Group	B1	B2	B3	L1	L2	L3
Campaign management	Elements of a campaign	X	X		X		
	Influence of each element	X	X		X		
	Companies and academics interactions			X	X	X	
Campaign materials	Types of materials	X	X		X	X	
	Importance of each material	X	X		X	X	
	Dissemination of materials				X		
Campaign posts	Persuasive contents	X	X		X		X
	Importance of the contents	X	X		X		X
	Successful postures				X		X
	Academics' perceptions			X		X	
	Drivers of postures' change	X	X		X		X

(B1) Poor consumers' knowledge; (B2) Inadequate consumers' behavior; (B3) Educational failures; (L1) Green marketing; (L2) Improvements in education; and (L3) Social pressure.

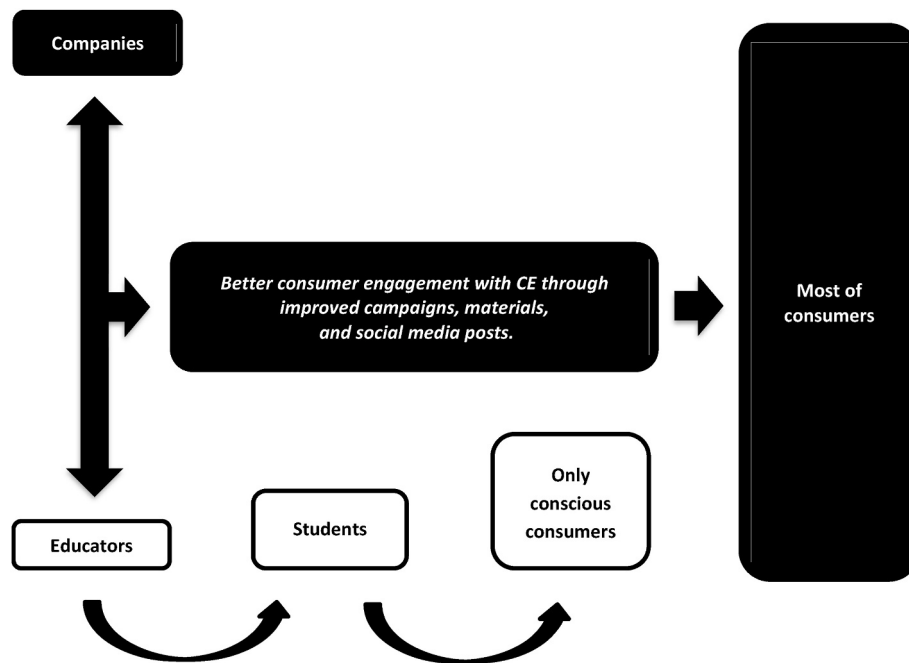


Fig. 5. An improved way of engaging consumers with CE.

followers, posts more frequently, and has more readers to their posts. So, the social media influencer marketing strategies could be adjusted based on personal attributes, characterizations, and influencer types.

Future research could investigate what academics must do to succeed as an environmental influencer in social media and as a broker in the business context. Other studies can investigate policies that induce B2B and B2C companies to support consumers' engagement with CE financially. These studies need to indicate which instruments and resources should be destined to fill the different gaps indicated in this study. It is about expanding some of the suggested policies for the civil construction sector to other activities (Bucci Ancapi et al., 2022). Table 6 presents the gaps that hinder this success.

Since some academics may be reluctant to become influencers, we should understand how they see this new role. So, future research could investigate the questions presented in Table 7.

5.4. Barriers and levers

Comparing findings with the reviewed literature suggests that greater consumer engagement with the CE demands new studies on campaigns, materials, and social media posts. These studies could focus on the gaps shown in Tables 4–7. The discussion section also reveals how filling the identified gaps can help to reduce barriers to most consumers' engagement with CE or increase the effectiveness of the levers for this engagement. It is essential to mention that the same improvement action can simultaneously reduce a barrier and improve a lever. A summary of the relationships between the findings and the barriers and levers listed is presented in Table 8.

6. Conclusion

To close this study we present the academic and managerial contributions as follows.

6.1. Academic contributions

This study investigated how companies and academics can cooperate to improve consumer awareness and engagement with the CE in the B2B context. The findings contribute to reinforce the recent studies that

adopt a network approach (Lim et al., 2024; Ratsimandresy and Miemczyk, 2023) combined with CE learning (Pinyol Alberich and Hartley, 2023) and brokerage action (Ciulli et al., 2020). Such approaches aim to describe the adoption and dissemination of the CE within and abroad the firms.

Findings suggest actions related to managing green marketing campaigns through educational materials and networks targeting social media as a massive way to gain knowledge and educate consumers. Details about these findings can be found in Table 3. With the insights provided in the study, it seems possible to observe advancements in how both academic literature and action can open new windows for CE adoption. These new windows do not focus solely on the traditional reverse logistics processes (Gold et al., 2010; Seuring and Müller, 2008) and the internal processes of the companies (Asgari and Asgari, 2023; Greene et al., 2024), but on the collaborative processes oriented to pluralistic governance (Cramer, 2022). This cooperation seems to be an alternative to deal with the current void in CE public policies until the Brazilian government approves a good Circular Economy Policy (Brazilian Senate, 2022).

Fig. 5 represents the proposals of this study (in black background). It is estimated that more meaningful interaction between academics and companies could help to develop better campaigns, printed materials, and posts on social media. Improving these elements could help increase consumer engagement with CE. As suggested by Fig. 5, this improvement could enable the engagement of most consumers (as the proposed engagement modality would go beyond the academic environment, engagement would not be restricted to conscious consumers). Thus, the figure suggests an evolution in the number of engaged consumers (see the representation size of conscious and most consumers). Increased interaction between academics and companies could also improve educators' classes or guide better scientific research. These benefits could help enhance the traditional way of engaging consumers with CE. The conventional way academics engage consumers is shown at the bottom of Fig. 5.

6.2. Managerial contributions

Increasing the quantity and quality of recycled materials that B2B companies use in their products requires that these companies support

actions to promote greater consumer engagement with the CE. To this end, B2B companies can support actions developed by academics, B2C companies, or social media influencers. Success in this support requires a better understanding of the structuring of green marketing campaigns, educational materials, and posts on social media. To minimize the costs incurred in raising consumer awareness, B2B companies can support the business entities they belong. With resources from different B2B companies that use recycled materials in their products, these entities can finance the production and placement of campaigns and materials in diversified media.

6.3. Limitations

The findings of this research were interpreted predominantly under inductive procedures. They mirror results of the literature review about the topic of CE and its successful adoption by B2B companies, taking in account barriers and leverages for this adoption as well as empirical investigation with selected companies. Therefore, the results are limited to the authors' perceptions and interpretations. This study used a qualitative methodology to analyze the answers individually in each case, thus more cases to be assessed could deliver additional results.

CRedit authorship contribution statement

Giancarlo Medeiros Pereira: Writing – original draft, Project administration, Formal analysis, Data curation, Conceptualization. **Miriam Borchardt:** Supervision, Project administration, Formal analysis, Data curation. **Claudia V. Viegas:** Writing – original draft, Supervision, Methodology, Formal analysis, Data curation. **Alan J. Bond:** Writing – original draft, Supervision, Methodology, Data curation. **Oduvaldo Vendrametto:** Writing – original draft, Supervision, Project administration, Methodology, Formal analysis, Conceptualization. **Gabriel Sperandio Milan:** Project administration, Investigation, Formal analysis.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

Giancarlo Medeiros Pereira reports financial support was provided by CAPES. Miriam Borchardt reports financial support was provided by CAPES. Gabriel S. Milan reports financial support was provided by CAPES. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data that has been used is confidential.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jclepro.2024.142765>.

References

- Agrawal, D., Dwivedi, A., Patil, A., Paul, S.K., 2023. Impediments of product recovery in circular supply chains: implications for sustainable development. *Sustain. Dev.* 31, 1618–1637.
- Aguilar-Morales, S.Y., Negrete-Cardoso, M., Rosano-Ortega, G., Sánchez-Ruiz, F.J., Sánchez-Baltasar, L.B., Vega-Lebrún, C.A., Schabes-Retchkiman, P.S., 2023. Marketing strategies for waste recycling: a bibliometric analysis towards the circular economy. *Environ. Sci. Pollut. Control Ser.* 30 (25), 67565–67581. <https://doi.org/10.1007/s11356-023-27040-y>.
- Alonso-Almeida, M. del M., Rodríguez-Antón, J.M., Bagur-Femenías, L., Perramon, J., 2020. Sustainable development and circular economy: the role of institutional promotion on circular consumption and market competitiveness from a multistakeholder engagement approach. *Bus. Strat. Environ.* 29 (6), 2803–2814. <https://doi.org/10.1002/bse.2544>.
- Alonso-Muñoz, S., González-Sánchez, R., Siligardi, C., García-Muñiá, F.E., 2021. New circular networks in Resilient supply chains: an external capital perspective. *Sustainability* 13 (11), 6130. <https://doi.org/10.3390/su13116130>.
- Ananda, J., Karunasena, G.G., Pearson, D., 2023. A comparison of online and in-store grocery shopping behaviour and its effects on household food waste. *Technol. Forecast. Soc. Change* 194 (122698). <https://doi.org/10.1016/j.techfore.2023.122698>.
- Asgari, A., Asgari, R., 2023. Designing circular innovation ecosystems: insights from stakeholders, values, and investment policies. *Frontiers in Sustainability* 4. <https://doi.org/10.3389/frsus.2023.1197688>.
- Ayati, S.M., Shekarian, E., Majava, J., Wæhrens, B.V., 2022. Toward a circular supply chain: understanding barriers from the perspective of recovery approaches. *J. Clean. Prod.* 359, 131775. <https://doi.org/10.1016/j.jclepro.2022.131775>.
- Bacelar-Nicolau, Paula, Mapar, Mahsa, Caeiro, Sandra, Moreno Pires, Sara, Nicolau, Mariana, Madeira, Catarina, Ferreira Dias, Marta, Gomes, Ana Paula, Lopes, Myriam, Nadas, Helena, Malandrakis, G., 2023. Empowering non-academic staff for the implementation of sustainability in higher education institutions. *Sustainability* 15 (20), 14818. <https://doi.org/10.3390/su152014818>.
- Baptista, F., Lourenço, P., Fitas da Cruz, V., Silva, L.L., Silva, J.R., Correia, M., Picuno, P., Dimitriou, E., Papadakis, G., 2021. Which are the best practices for MSc programmes in sustainable agriculture? *J. Clean. Prod.* 303, 126914. <https://doi.org/10.1016/j.jclepro.2021.126914>.
- Bardin, L., 2011. *Content Analysis*, third ed.
- Barros, M., Caeiro, S., Disterheft, A., Madeira, A.C., Manteigas, V., Martins, A.G., Teixeira, M.R., Soares, A.M., 2023. The Portuguese Sustainable Campus Network: A Knowledge Collaboration for Sustainability Transformation in Higher Education Institutions 1–34. https://doi.org/10.1007/978-3-031-28793-0_1.
- Beaurain, C., Chembessi, C., Rajaonson, J., 2023. Investigating the cultural dimension of circular economy: a pragmatist perspective. *J. Clean. Prod.* 417, 138012. <https://doi.org/10.1016/j.jclepro.2023.138012>.
- Behroozeh, S., Hayati, D., Karami, E., 2022. Determining and validating criteria to measure energy consumption sustainability in agricultural greenhouses. *Technol. Forecast. Soc. Change* 185, 122077. <https://doi.org/10.1016/j.techfore.2022.122077>.
- Bocken, N.M.P., Harsch, A., Weissbrod, I., 2022. Circular business models for the fastmoving consumer goods industry: Desirability, feasibility, and viability. *Sustain. Prod. Consum.* 30, 799–814. <https://doi.org/10.1016/j.spc.2022.01.012>.
- Braun, V., Clarke, V., 2006. Using thematic analysis in psychology. *Qual. Res. Psychol.* 3 (2), 77–101. <https://doi.org/10.1191/1478088706qp0630a>.
- Brazilian Senate, 2022. Proposes the Brazilian National Circular Economy Policy. Bill 1874/2022. <https://www25.senado.leg.br/web/atividade/materias/-/materia/153918>.
- Bucci Ancapi, F., Van den Berghe, K., van Bueren, E., 2022. The circular built environment toolbox: a systematic literature review of policy instruments. *J. Clean. Prod.* 373, 133918. <https://doi.org/10.1016/j.jclepro.2022.133918>.
- Bucur, L.-M., 2023. Exploring the role of consumers in promoting a circular economy: increasing awareness and engagement. *Proceedings of the International Conference on Business Excellence* 17 (1), 38–47. <https://doi.org/10.2478/picbe-2023-0006>.
- Busalim, A.H., Ghabban, F., Hussin, A.R.C., 2021. Customer engagement behaviour on social commerce platforms: an empirical study. *Technol. Soc.* 64 (101437). <https://doi.org/10.1016/j.techsoc.2020.101437>.
- Cai, J., Chen, Y., Hu, R., Wu, M., Shen, Z., 2022. Discovering the impact of farmer field schools on the adoption of environmental-friendly technology. *Technol. Forecast. Soc. Change* 182 (121782). <https://doi.org/10.1016/j.techfore.2022.121782>.
- Chew, S., Armstrong, N., Martin, G.P., 2022. Understanding knowledge brokerage and its transformative potential: a Bourdieusian perspective. *Evidence & Policy* 18 (1), 25–42. <https://doi.org/10.1332/174426421X16149632470114>.
- Chiappetta Jabbour, C.J., Seuring, S., Lopes de Sousa Jabbour, A.B., Jugend, D., De Camargo Fiorini, P., Latan, H., Izeppi, W.C., 2020. Stakeholders, innovative business models for the circular economy and sustainable performance of firms in an emerging economy facing institutional voids. *J. Environ. Manag.* 264, 110416. <https://doi.org/10.1016/j.jenvman.2020.110416>.
- Ciulli, F., Kolk, A., Boe-Lillegraven, S., 2020. Circularity brokers: digital platform organizations and waste recovery in food supply chains. *J. Bus. Ethics* 167 (2), 299–331. <https://doi.org/10.1007/S10551-019-04160-5/TABLES/9>.
- Conke, L.S., 2018. Barriers to waste recycling development: evidence from Brazil. *Resour. Conserv. Recycl.* 134, 129–135. <https://doi.org/10.1016/j.resconrec.2018.03.007>.
- Cramer, J., 2022. Effective governance of circular economies: an international comparison. *J. Clean. Prod.* 343, 130874. <https://doi.org/10.1016/j.jclepro.2022.130874>.
- Crome, C., Graf-Drasch, V., Hawlitschek, F., Zinsbacher, D., 2023. Circular economy is key! Designing a digital artifact to foster smarter household biowaste sorting. *J. Clean. Prod.* 423 (138613). <https://doi.org/10.1016/j.jclepro.2023.138613>.
- Cruz, E.F., Rosado da Cruz, A.M., 2023. Digital solutions for engaging end-consumers in the circular economy of the textile and clothing value chain - a systematic review. *Cleaner and Responsible Consumption* 11 (100138). <https://doi.org/10.1016/j.clrc.2023.100138>.
- Dangelico, R.M., Alvino, L., Fraccascia, L., 2022. Investigating the antecedents of consumer behavioral intention for sustainable fashion products: evidence from a large survey of Italian consumers. *Technol. Forecast. Soc. Change* 185 (122010). <https://doi.org/10.1016/j.techfore.2022.122010>.

- De Silva, M., Al-Tabbaa, O., Khan, Z., 2021. Business model innovation by international social purpose organizations: the role of dynamic capabilities. *J. Bus. Res.* 125, 733–744. <https://doi.org/10.1016/j.jbusres.2019.12.030>.
- Di Iorio, V., Testa, F., Korschun, D., Iraldo, F., Iovino, R., 2023. Curious about the circular economy? Internal and external influences on information search about the product lifecycle. *Bus. Strat. Environ.* 32 (4), 2193–2208. <https://doi.org/10.1002/bse.3243>.
- Dixit, S., Badgaiyan, A.J., 2016. Towards improved understanding of reverse logistics – Examining mediating role of return intention. *Resour. Conserv. Recycl.* 107, 115–128. <https://doi.org/10.1016/j.resconrec.2015.11.021>.
- Donthu, N., Kumar, S., Pandey, N., Pandey, N., Mishra, A., 2021. Mapping the electronic word-of-mouth (eWOM) research: a systematic review and bibliometric analysis. *J. Bus. Res.* 135, 758–773. <https://doi.org/10.1016/j.jbusres.2021.07.015>.
- Elzinga, R., Reike, D., Negro, S.O., Boon, W.P.C., 2020. Consumer acceptance of circular business models. *J. Clean. Prod.* 254, 119988 <https://doi.org/10.1016/j.jclepro.2020.119988>.
- Farida, Y., Siswanto, N., Vanany, I., 2023. Analysis of consumer behavior in reverse logistic Polyethylene Terephthalate in Indonesia towards a circular economy. <https://doi.org/10.3233/ATDE230035>.
- Fatimah, Y.A., Kannan, D., Govindan, K., Hasibuan, Z.A., 2023. Circular economy e-business model portfolio development for e-business applications: impacts on ESG and sustainability performance. *J. Clean. Prod.* 415 (137528) <https://doi.org/10.1016/j.jclepro.2023.137528>.
- Flygvansvør, B., Samuelsen, A.G., Støyle, R.V., 2021. The power of nudging: how adaptations in reverse logistics systems can improve end-consumer recycling behavior. *Int. J. Phys. Distrib. Logist. Manag.* 51 (9), 958–977. <https://doi.org/10.1108/IJPDLM-12-2020-0389>.
- Genovesi, A., Pansera, M., 2021. The circular economy at a Crossroads: Technocratic eco-Modernism or Convivial technology for social Revolution? *Appl. Econ. Lett.* 32 (2), 95–113. <https://doi.org/10.1080/10455752.2020.1763414>.
- Gerrath, M.H.E.E., Olya, H., Shah, Z., Li, H., 2024. Virtual influencers and pro-environmental causes: the roles of message warmth and trust in experts. *J. Bus. Res.* 175, 114520 <https://doi.org/10.1016/j.jbusres.2024.114520>.
- Gioia, D.A., Corley, K.G., Hamilton, A.L., 2013. Seeking qualitative rigor in inductive research. *Organ. Res. Methods* 16 (1), 15–31. <https://doi.org/10.1177/1094428112452151>.
- Gold, S., Seuring, S., Beske, P., 2010. Sustainable supply chain management and inter-organizational resources: a literature review. *Corp. Soc. Responsib. Environ. Manag.* 17 (4), 230–245. <https://doi.org/10.1002/csr.207>.
- Gomes, G.M., Moreira, N., Ometto, A.R., 2023. Consumer engagement in circular consumption systems: a Roadmap structure for Apparel Retail companies. *Circular Economy and Sustainability*. <https://doi.org/10.1007/s43615-023-00332-8>.
- Gonella, J., dos, S.L., Godinho Filho, M., Ganga, G.M.D., Latam, H., Chiappetta Jabbour, C.J., 2024. A behavioral perspective on circular economy awareness: the moderating role of social influence and psychological barriers. *J. Clean. Prod.* 441, 141062 <https://doi.org/10.1016/j.jclepro.2024.141062>.
- Govindan, K., Hasanagic, M., 2018. A systematic review on drivers, barriers, and practices towards circular economy: a supply chain perspective. *Int. J. Prod. Res.* 56 (1–2), 278–311. <https://doi.org/10.1080/00207543.2017.1402141>.
- Grappi, S., Bergianti, F., Gabrielli, V., Baghi, I., 2024. The effect of message framing on young adult consumers' sustainable fashion consumption: the role of anticipated emotions and perceived ethicality. *J. Bus. Res.* 170, 114341 <https://doi.org/10.1016/j.jbusres.2023.114341>.
- Greene, M., Hobson, K., Jaeger-Erben, M., 2024. Bringing the circular economy home – insights from socio-technical perspectives on everyday consumption. *Cleaner and Responsible Consumption* 12, 100157. <https://doi.org/10.1016/j.clrc.2023.100157>.
- Greenwood, R., Raynard, M., Kodeih, F., Micelotta, E.R., Lounsbury, M., 2011. Institutional complexity and organizational Responses. <https://doi.org/10.5465/1.9416520.2011.590299>.
- Guarnieri, P., Bianchini, A., Rossi, J., Câmara e Silva, L., Trojan, F., Lizot, M., de Oliveira Vieira, B., 2023. Transitioning towards a circular economy under a multicriteria and the new institutional theory perspective: a comparison between Italy and Brazil. *J. Clean. Prod.* 409, 137094 <https://doi.org/10.1016/j.jclepro.2023.137094>.
- Gutierrez-Bucheli, L., Kidman, G., Reid, A., 2022. Sustainability in engineering education: a review of learning outcomes. *J. Clean. Prod.* 330, 129734 <https://doi.org/10.1016/j.jclepro.2021.129734>.
- Hankammer, S., Brenk, S., Fabry, H., Nordemann, A., Piller, F.T., 2019. Towards circular business models: Identifying consumer needs based on the jobs-to-be-done theory. *J. Clean. Prod.* 231, 341–358. <https://doi.org/10.1016/j.jclepro.2019.05.165>.
- Harrigan, P., Daly, T.M., Coussemont, K., Lee, J.A., Soutar, G.N., Evers, U., 2021. Identifying influencers on social media. *Int. J. Inf. Manag.* 56, 102246 <https://doi.org/10.1016/j.jinfomgt.2020.102246>.
- Herrero, J., Rodríguez, F.J., Urueña, A., 2023. Use of smartphone apps for mobile communication and social digital pressure: a longitudinal panel study. *Technol. Forecast. Soc. Change* 188, 122292. <https://doi.org/10.1016/j.techfore.2022.122292>.
- Hobson, K., Holmes, H., Welch, D., Wheeler, K., Wieser, H., 2021. Consumption Work in the circular economy: a research agenda. *J. Clean. Prod.* 321, 128969 <https://doi.org/10.1016/j.jclepro.2021.128969>.
- Islam, M.T., Huda, N., Baumber, A., Shumon, R., Zaman, A., Ali, F., Hossain, R., Sahajwalla, V., 2021. A global review of consumer behavior towards e-waste and implications for the circular economy. *J. Clean. Prod.* 316, 128297 <https://doi.org/10.1016/j.jclepro.2021.128297>.
- Jabbour, C.J.C., Colasante, A., D'Adamo, I., Rosa, P., Sassanelli, C., 2023. Comprehending e-waste limited collection and recycling issues in Europe: a comparison of causes. *J. Clean. Prod.* 427, 139257 <https://doi.org/10.1016/j.jclepro.2023.139257>.
- Jangre, J., Prasad, K., Patel, D., 2022. Analysis of barriers in e-waste management in developing economy: an integrated multiple-criteria decision-making approach. *Environ. Sci. Pollut. Control Ser.* 29 (48), 72294–72308. <https://doi.org/10.1007/s11356-022-21363-y>.
- Jiang, P., Zhou, J., Fan, Y., Klemes, J.J., Zheng, M., Varbanov, P.S., 2021. Data analysis of resident engagement and sentiments in social media enables better household waste segregation and recycling. *J. Clean. Prod.* 319, 128809 <https://doi.org/10.1016/j.jclepro.2021.128809>.
- Kelleci, A., Yıldız, O., 2021. A guiding framework for levels of sustainability in marketing. *Sustainability* 13 (4), 1644. <https://doi.org/10.3390/su13041644>.
- Kim, D.Y., Kim, H.Y., 2021. Trust me, trust me not: a nuanced view of influencer marketing on social media. *J. Bus. Res.* (134), 223–232. <https://doi.org/10.1016/j.jbusres.2021.05.024>.
- Kirchherr, J., Piscicelli, L., Bour, R., Kostense-Smit, E., Muller, J., Huibrechtse-Truijens, A., Hekkert, M., 2018. Barriers to the circular economy: evidence from the European union (EU). *Ecol. Econ.* 150, 264–272. <https://doi.org/10.1016/j.ecolecon.2018.04.028>.
- Kirchherr, J., Reike, D., Hekkert, M., 2017. Conceptualizing the circular economy: an analysis of 114 definitions. *Resour. Conserv. Recycl.* 127, 221–232. <https://doi.org/10.1016/j.resconrec.2017.09.005>.
- Korhonen, J., Honkasalo, A., Seppälä, J., 2018. Circular economy: the concept and its limitations. *Ecol. Econ.* 143, 37–46. <https://doi.org/10.1016/j.ecolecon.2017.06.041>.
- Kunamaneni, S., Jassi, S., Hoang, D., 2019. Promoting reuse behaviour: challenges and strategies for repeat purchase, low-involvement products. *Sustain. Prod. Consum.* 20, 253–272. <https://doi.org/10.1016/j.spc.2019.07.001>.
- Kutaula, S., Gillani, A., Leonidou, L.C., Christodoulides, P., 2022. Integrating fair trade with circular economy: Personality traits, consumer engagement, and ethically-minded behavior. *J. Bus. Res.* 144, 1087–1102. <https://doi.org/10.1016/j.jbusres.2022.02.044>.
- L'Abate, V., Raimo, N., Albergo, F., Vitolla, F., 2024. Social media to disseminate circular economy information. An empirical analysis on Twitter. *Corp. Soc. Responsib. Environ. Manag.* 31 (1), 528–539. <https://doi.org/10.1002/csr.2583>.
- Lakshmi, G., Nguyen, K., Mazhikeev, A., Hack-Polay, D., Anafiyayeva, Z., 2022. Nudging student recycling behaviour: an experimental study in Kazakhstan and UK higher education. *J. Clean. Prod.* 377, 134164 <https://doi.org/10.1016/j.jclepro.2022.134164>.
- Leal Filho, W., Amaro, N., Avila, L.V., Brandli, L., Damke, L.I., Vasconcelos, C.R.P., Hernandez-Diaz, P.M., Frankenberger, F., Fritzen, B., Velazquez, L., Salvia, A., 2021. Mapping sustainability initiatives in higher education institutions in Latin America. *J. Clean. Prod.* 315, 128093 <https://doi.org/10.1016/j.jclepro.2021.128093>.
- Leal Filho, W., Raath, S., Lazzarini, B., Vargas, V.R., de Souza, L., Anholon, R., Quelhas, O.L.G., Haddad, R., Klavins, M., Orlovic, V.L., 2018. The role of transformation in learning and education for sustainability. *J. Clean. Prod.* 199, 286–295. <https://doi.org/10.1016/j.jclepro.2018.07.017>.
- Leal, S., Azeiteiro, U.M., Aleixo, A.M., 2024. Sustainable development in Portuguese higher education institutions from the faculty perspective. *J. Clean. Prod.* 434, 139863 <https://doi.org/10.1016/j.jclepro.2023.139863>.
- Lehner, M., Mont, O., Heiskanen, E., 2016. Nudging – a promising tool for sustainable consumption behaviour? *J. Clean. Prod.* 134, 166–177. <https://doi.org/10.1016/j.jclepro.2015.11.086>.
- Lehtokunnas, T., Mattila, M., Näränen, E., Mesiranta, N., 2022. Towards a circular economy in food consumption: food waste reduction practices as ethical work. *J. Consum. Cult.* 22 (1), 227–245. <https://doi.org/10.1177/1469540520926252>.
- Leonidou, C.N., Katsikeas, C.S., Morgan, N.A., 2013. “Greening” the marketing mix: do firms do it and does it pay off? *J. Acad. Market. Sci.* 41 (2), 151–170. <https://doi.org/10.1007/s11747-012-0317-2>.
- Lieder, M., Asif, F.M.A., Rashid, A., Mihelić, A., Kotnik, S., 2018. A conjoint analysis of circular economy value propositions for consumers: using “washing machines in Stockholm” as a case study. *J. Clean. Prod.* 172, 264–273. <https://doi.org/10.1016/j.jclepro.2017.10.147>.
- Lim, B.T.H., Oo, B.L., McLeod, C., Yang, P., 2024. Institutional and actor network perspectives of waste management in Australia: is the construction industry prepared for a circular economy? *Sustainability* 16 (2), 617. <https://doi.org/10.3390/su16020617>.
- Long, J.C., Cunningham, F.C., Braithwaite, J., 2013. Bridges, brokers and boundary spanners in collaborative networks: a systematic review. *BMC Health Serv. Res.* 13 (1), 158. <https://doi.org/10.1186/1472-6963-13-158>.
- Lopes, J.M.M., Gomes, S., Trancoso, T., 2024. Navigating the green maze: insights for businesses on consumer decision-making and the mediating role of their environmental concerns. *Sustainability Accounting, Management and Policy Journal*. <https://doi.org/10.1108/SAMPJ-07-2023-0492>.
- Machado, M.A.D., Almeida, S. O. de, Bollick, L.C., Bragagnolo, G., 2019. Second-hand fashion market: consumer role in circular economy. *J. Fash. Mark. Manag.: Int. J.* 23 (3), 382–395. <https://doi.org/10.1108/JFMM-07-2018-0099>.
- Maiurova, A., Kurniawan, T.A., Kustikova, M., Bykovskaia, E., Othman, M.H.D., Singh, D., Goh, H.H., 2022. Promoting digital transformation in waste collection service and waste recycling in Moscow (Russia): Applying a circular economy paradigm to mitigate climate change impacts on the environment. *J. Clean. Prod.* 354, 131604 <https://doi.org/10.1016/j.jclepro.2022.131604>.
- Mangla, S.K., Luthra, S., Mishra, N., Singh, A., Rana, N.P., Dora, M., Dwivedi, Y., 2018. Barriers to effective circular supply chain management in a developing country context. *Prod. Plann. Control* 29 (6), 551–569. <https://doi.org/10.1080/09537287.2018.1449265>.

- Mathew, G., Teoh, W.H., Wan Abdul Rahman, W.M.A., Abdullah, N., 2023. Survey on actions and willingness towards the disposal, collection, and recycling of spent lithium-ion batteries in Malaysia. *J. Clean. Prod.* 421, 138394 <https://doi.org/10.1016/j.jclepro.2023.138394>.
- Meredith, J., 1998. Building operations management theory through case and field research. *J. Oper. Manag.* 16 (4), 441–454. [https://doi.org/10.1016/S0272-6963\(98\)00023-0](https://doi.org/10.1016/S0272-6963(98)00023-0).
- Merli, R., Preziosi, M., Acampora, A., 2018. How do scholars approach the circular economy? A systematic literature review. *J. Clean. Prod.* 178, 703–722. <https://doi.org/10.1016/j.jclepro.2017.12.112>.
- Merriam, S.B., Tisdell, E.J., 2015. *Qualitative Research: A Guide to Design and Implementation*. John Wiley & Sons.
- Mies, A., Gold, S., 2021. Mapping the social dimension of the circular economy. *J. Clean. Prod.* 321, 128960 <https://doi.org/10.1016/j.jclepro.2021.128960>.
- Milovanovic, J., Shealy, T., Godwin, A., 2022. Senior engineering students in the USA carry misconceptions about climate change: implications for engineering education. *J. Clean. Prod.* 345, 131129 <https://doi.org/10.1016/j.jclepro.2022.131129>.
- Minárová, M., Smutný, F., Gundová, P., 2019. The importance of influencers in online marketing. *International Scientific Conference on Marketing Identity - Offline Is the New Online*.
- Mondal, S., Singh, S., Gupta, H., 2023. Assessing enablers of green entrepreneurship in circular economy: an integrated approach. *J. Clean. Prod.* 388, 135999 <https://doi.org/10.1016/j.jclepro.2023.135999>.
- Mostaghel, R., Oghazi, P., Lisboa, A., 2023. The transformative impact of the circular economy on marketing theory. *Technol. Forecast. Soc. Change* 195 (122780). <https://doi.org/10.1016/j.techfore.2023.122780>.
- Nekmahmud, Md, Naz, F., Ramkissoon, H., Fekete-Farkas, M., 2022. Transforming consumers' intention to purchase green products: role of social media. *Technol. Forecast. Soc. Change* 185 (122067). <https://doi.org/10.1016/j.techfore.2022.122067>.
- Neves, S.A., Marques, A.C., 2022. Drivers and barriers in the transition from a linear economy to a circular economy. *J. Clean. Prod.* 341, 130865 <https://doi.org/10.1016/j.jclepro.2022.130865>.
- Novela, S., Novita, K., Hansopaheluwakan, S., 2018. Analysis of green marketing mix effect on customer satisfaction using 7p approach. *Pertanika J. Soc. Sci. Human.* 26, 131–144.
- O'Shaughnessy, J., O'Shaughnessy, N.J., 2004. *Persuasion in Advertising*. Routledge.
- Otto, S., Strenger, M., Maier-Nöth, A., Schmid, M., 2021. Food packaging and sustainability – consumer perception vs. correlated scientific facts: a review. *J. Clean. Prod.* 298 (126733) <https://doi.org/10.1016/j.jclepro.2021.126733>.
- Partidario, M.R., Sheate, W.R., 2013. Knowledge brokerage - potential for increased capacities and shared power in impact assessment. *Environ. Impact Assess. Rev.* 39, 26–36. <https://doi.org/10.1016/j.eiar.2012.02.002>.
- Pinyol Alberich, J., Hartley, S., 2023. The Circular Economy in <sc>European Union</sc> Policy: Explaining an idea's success through policy learning. *Environmental Policy and Governance*. <https://doi.org/10.1002/eet.2088>.
- Prieto-Sandoval, V., Torres-Guevara, L.E., García-Díaz, C., 2022. Green marketing innovation: opportunities from an environmental education analysis in young consumers. *J. Clean. Prod.* 363 (132509) <https://doi.org/10.1016/j.jclepro.2022.132509>.
- Rainatto, G.M., Lopes de Sousa Jabbour, A.B., Cardoso Machado, M., Chiappetta Jabbour, C.J., Tiwari, S., 2024. How can companies better engage consumers in the transition towards circularity? Case studies on the role of the marketing mix and nudges. *J. Clean. Prod.* 434, 139779 <https://doi.org/10.1016/j.jclepro.2023.139779>.
- Ratay, C., Mohnen, A., 2022. Motivating consumer-to-business smartphone returns: evidence from a factorial survey experiment. *J. Clean. Prod.* 369, 133114 <https://doi.org/10.1016/j.jclepro.2022.133114>.
- Ratsimandresy, A., Miemczyk, J., 2023. Conceptualising collaborations beyond industrial Boundaries: a literature review and a theoretical Proposition to understand Cross-industrial collaborations in the circular supply network. *Sustainability* 15 (11), 8850. <https://doi.org/10.3390/su15118850>.
- Ridder, H.-G., 2017. The theory contribution of case study research designs. *Business Research* 10 (2), 281–305. <https://doi.org/10.1007/s40685-017-0045-z>.
- Romero-Luis, J., Carbonell-Alcocer, A., Levratto, V., Gertrudix, M., Gertrudis Casado, M. del C., Hernandez-Remedios, A., 2023. Design and assessment of an experimental model for evaluating the effectiveness of audiovisual products on the circular economy aimed at promoting environmental awareness. *J. Clean. Prod.* 423 (138820) <https://doi.org/10.1016/j.jclepro.2023.138820>.
- Sajjad, A., Zhang, Q., Asmi, F., Anwar, M.A., Bhatia, M., 2024. Identifying the motivating factors to promote socially responsible consumption under circular economy: a perspective from norm activation theory. *J. Retailing Consum. Serv.* 76, 103544 <https://doi.org/10.1016/j.jretconser.2023.103544>.
- Salmenperä, H., Pitkänen, K., Kautto, P., Saikkun, L., 2021. Critical factors for enhancing the circular economy in waste management. *J. Clean. Prod.* 280 (124339) <https://doi.org/10.1016/j.jclepro.2020.124339>.
- Seuring, S., Müller, M., 2008. From a literature review to a conceptual framework for sustainable supply chain management. *J. Clean. Prod.* 16 (15), 1699–1710. <https://doi.org/10.1016/j.jclepro.2008.04.020>.
- Shevchenko, T., Saidani, M., Ranjbari, M., Kronenberg, J., Danko, Y., Laitala, K., 2023. Consumer behavior in the circular economy: developing a product-centric framework. *J. Clean. Prod.* 384, 135568 <https://doi.org/10.1016/j.jclepro.2022.135568>.
- Sinakou, E., Donche, V., Van Petegem, P., 2022. Action-orientation in education for sustainable development: teachers' interests and instructional practices. *J. Clean. Prod.* 370, 133469 <https://doi.org/10.1016/j.jclepro.2022.133469>.
- Sousa, P.M., Moreira, M.J., de Moura, A.P., Lima, R.C., Cunha, L.M., 2021. Consumer perception of the circular economy concept applied to the food Domain: an exploratory approach. *Sustainability* 13 (20), 11340. <https://doi.org/10.3390/su132011340>.
- Souza Piao, R., de Vincenzi, T.B., da Silva, A.L.F., de Oliveira, M.C.C., Vazquez-Brust, D., Monteiro Carvalho, M., 2023. How is the circular economy embracing social inclusion? *J. Clean. Prod.* 411, 137340 <https://doi.org/10.1016/j.jclepro.2023.137340>.
- Spada, I., Chiarello, F., Barandoni, S., Ruggi, G., Martini, A., Fantoni, G., 2022. Are universities ready to deliver digital skills and competences? A text mining-based case study of marketing courses in Italy. *Technol. Forecast. Soc. Change* 182 (121869). <https://doi.org/10.1016/j.techfore.2022.121869>.
- Stål, H.L., 2015. Inertia and change related to sustainability – an institutional approach. *J. Clean. Prod.* 99, 354–365. <https://doi.org/10.1016/j.jclepro.2015.02.035>.
- Testa, F., Iovino, R., Iraldo, F., 2020. The circular economy and consumer behaviour: the mediating role of information seeking in buying circular packaging. *Bus. Strat. Environ.* 29 (8), 3435–3448. <https://doi.org/10.1002/bse.2587>.
- Thaler, R.H., Sunstein, C.R., 2008. Nudge: improving decisions about health, wealth, and happiness. *Choice Reviews Online* 46 (2). <https://doi.org/10.5860/CHOICE.46-0977>.
- Thukral, S., Shree, D., Singhal, S., 2023. Consumer behaviour towards storage, disposal and recycling of e-waste: systematic review and future research prospects. *Benchmark Int. J.* 30 (3), 1021–1072. <https://doi.org/10.1108/BJ-12-2021-0774>.
- Tolppanen, S., Kang, J., Riuttanen, L., 2022. Changes in students' knowledge, values, worldview, and willingness to take mitigative climate action after attending a course on holistic climate change education. *J. Clean. Prod.* 373, 133865 <https://doi.org/10.1016/j.jclepro.2022.133865>.
- Torma, G., Aschemann-Witzel, J., Thøgersen, J., 2018. I nudge myself: Exploring 'self-nudging' strategies to drive sustainable consumption behaviour. *Int. J. Consum. Stud.* 42 (1), 141–154. <https://doi.org/10.1111/ijcs.12404>.
- Tsironis, G., Daglis, T., Tsagarakis, K.P., 2022. Social media and EU companies' engagement in circular economy: a LinkedIn approach. *Sustain. Prod. Consum.* 32, 802–816. <https://doi.org/10.1016/j.spc.2022.06.006>.
- van Bueren, B.J.A., Leenders, M.A.A.M., Iyer-Raniga, U., Argus, K., 2023. How eco-champions solve the triple-bottom-line challenge. *J. Clean. Prod.* 427, 139068 <https://doi.org/10.1016/j.jclepro.2023.139068>.
- Vidal-Ayuso, F., Akhmedova, A., Jaca, C., 2023. The circular economy and consumer behaviour: literature review and research directions. *J. Clean. Prod.* 418, 137824 <https://doi.org/10.1016/j.jclepro.2023.137824>.
- Warmington-Lundström, J., Laurenti, R., 2020. Reviewing circular economy rebound effects: the case of online peer-to-peer boat sharing. *Resour. Conserv. Recycl.* X–5 (100028) <https://doi.org/10.1016/j.rccr.2019.100028>.
- Winterstein, J., Zhu, B., Habisch, A., 2024. How personal and social-focused values shape the purchase intention for organic food: Cross-country comparison between Thailand and Germany. *J. Clean. Prod.* 434, 140313 <https://doi.org/10.1016/j.jclepro.2023.140313>.
- Yadav, R., Kumar Panda, D., Kumar, S., 2022. Understanding the individuals' motivators and barriers of e-waste recycling: a mixed-method approach. *J. Environ. Manag.* 324 (116303) <https://doi.org/10.1016/j.jenvman.2022.116303>.
- Yin, R.K., 2009. *Case Study Research: Design and Methods*, vol. 5. Sage.
- Zhang, D., Shi, L., Liu, G., 2024. Supply chain in transition navigating economic growth and environmental sustainability through education. *Environ. Sci. Pollut. Control Ser.* 31 (8), 12321–12339. <https://doi.org/10.1007/s11356-024-31856-7>.