Review

The circular economy and consumer behaviour: Literature review and research directions

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ARTICLE INFO	ABSTRACT
	The circular economy (CE) has emerged as a sustainable alternative to the linear model of production and consumption of products and services. Consumers are key actors in the circular economy loop, yet consumer behaviour and decision-making remain at the periphery of research in this area. To close this gap and to promote related academic research we perform a systematic literature review, analysing the main areas of research in the CE relating to consumer behaviour and decision-making. The results show that there are six main areas that link consumer and CE: consumer behaviour, purchase intention and sustainable consumption; lifetime and reparability; recycled plastics, upcycling, e-waste and innovation. These areas seem incomplete and focused on a relatively small number of sectors. Further, while attitude and knowledge are the most influential elements in the consumer's buying decision-making process, our analysis shows significant gaps in current research in this regard. A key element of consumer behaviour, the post-purchase phase relating to "use", "recycle" and "upcycle" was found to still be obscure. We provide recommendations on how this gap can be filled.

1. Introduction

The circular economy (CE) has been gaining increasing attention in recent years from society, companies and public bodies (Korhonen et al., 2017). The best-known economic model until now was the linear model, based on continuous growth and the use of many resources (Kirchherr et al., 2017; Ness, 2008). The CE has emerged as an alternative to this model, due to the fundamental positive role it plays in the environment, its functions and its interactions with the economic system (Ghisellini et al., 2016). The concept of CE has been reformulated and analysed several times in recent years (Geissdoerfer et al., 2017; Ghisellini et al., 2016; Kirchherr et al., 2017; MacArthur et al., 2013; Prieto-Sandoval et al., 2018), with researchers agreeing that it is a regenerative production and consumption model. However, it cannot be regarded as an individual process, as the CE involves a change in companies, industries and the economy through shifts in values, norms, behaviours and attitudes in society (Chizaryfard et al., 2021).

To this effect, the concept of CE is being analysed from different fields such as economics, strategy, engineering and resource consumption (Clube and Tennant, 2020; Demirel and Danisman, 2019; Machado et al., 2019; Perez-Castillo and Vera-Martinez, 2021), although there are still few studies concerned with the impact of consumers on the CE loop. Consumers must be involved in the whole process and be aware of the value of CE-based products and services. However, as stated by (Kirchherr et al., 2017), the reasons why consumers do or do not take part in CE processes have not been sufficiently analysed (Camacho-Otero et al., 2018). established that although there is increasing research on consumption, the contributions often refer to possible solutions relating to the nature or meaning of CE or the consumption progress, but do not focus on the relationship between the CE and the consumer. In turn (Wastling et al., 2018), argued that the role of the consumer in the CE needs to be questioned and has not yet been fully explored. To this end, there is a need to analyse the role of consumers to resolve the existing gaps in the current literature. However, not only is the relationship between CE and consumer essential to understand, but so are the behaviours and attitudes that consumer may have regarding this process, considered a hot topic due to the wealth of information it brings to both companies and society (Stankevich, 2017). The consumer can be analysed effectively through the decision-making process, wherein the consumer is at the centre (Zhang and Benyoucef, 2016).

There are several alternative models that outline a different number of stages in the purchasing process (Herhausen et al., 2019; Liang and

Huang, 1998), but most correspond to and can be sorted into three phases: (1) the pre-purchase experience, relating to searching, comparing and negotiation; (2) the purchasing phase, in which the agreement is settled and confirmed and the payment process is established; and (3) the post-purchase support phase, relating to post-sale services (Liang and Huang, 1998; Wigand, 1997). In the CE, the third stage extends to include additional phases: "shared use", "repair", "recycle", "upcycle" and so on. With this in mind, the consumer behaviour models should be revisited to include and explore these new phases, which are core to achieving circularity and to keeping things in the loop. However, the traditional three-step models are still applied in circular economy research (Herhausen et al., 2019; Liang and Huang, 1998; Wigand, 1997).

Further, consumer decision-making is an important process that forms the backdrop to behaviour. It is important to know what drives consumers towards engaging in more circular types of behaviours, given that the burden of change may even involve important lifestyle changes.

With this main objective in focus, the research questions addressed by this article are:

1. What are the main areas of research on the CE relating to consumer behaviour?
2. What is the basis of consumer decision-making in the CE?

The purpose of research question 1 is to make a clear and in-depth identification of the most important areas of research on the relationship between CE and consumer. The objective of the second research question is to group and detail the factors affecting consumer decision-making.

In doing so, the paper makes three important contributions to the field. First, it highlights the different areas relating to the CE and the consumer currently being addressed, detecting the areas in which the consumer is most involved. Second, it sheds light on the factors that positively and negatively affect the consumer's purchase intention (PI) by following the decision-making process. And third, it was observed that there is a need to study the last phase of the decision-making process, the post-purchase, especially if the focus is on CE issues wherein the consumer is essential to continue with the CE loop.

The paper is structured as follows. Following this introduction, Section 2 describes the method for performing the review. In Section 3, the first research question is resolved, analysing the entire database. The second research question is addressed in Section 4, and in Section 5 possible future research is detailed. Last, the paper concludes with Section 6, which contains the final comments on the contributions and limitations of the study.

2. Methodology

2.1. Protocol development and sampling

Prior to performing the systematic literature review, previous literature reviews on the topic were collected and reviewed. The documents were found by searching in Scopus using the keywords "literature review" and "circular economy". The aim of this pre-stage is to find out what has been studied about CE up to now, and to identify the possible gaps that hinder the development of the area. Most of them analyse the concept of the CE and the similarities and differences with sustainability (Farooque et al., 2019; Geissdoerfer et al., 2017; Merli et al., 2018; Prieto-Sandoval et al., 2018). However, others go further and evaluate business models to design and innovate ones for the CE transition (Centobelli et al., 2020; Pieroni et al., 2019), considering the high importance of technology to accelerate it (Centobelli et al., 2020; Rosa et al., 2020). Moreover, to measure CE progress and performance, it is necessary to consider circular indicators (Saidani et al., 2019), most of them based on environmental and economic benefits, corresponding to the micro level (Kristensen and Mosgaard, 2020).

Despite these studies, focused on the concept of CE, its assessment

and progression, there is a concept that remains largely unexplored, which is the consumer (Farooque et al., 2019). This is highly surprising given that it is one of the central elements of the micro level indicators (Merli et al., 2018). Furthermore, the consumer plays an active role in the CE loop (Lieder et al., 2017; Machado et al., 2019).

The following steps outline the protocol used for the article search:

- Scopus database, and not Web of Science (WOS), was used because Scopus is a well -established bibliographic database (Paul and Criado, 2020) and the largest curated one, with especially good coverage of the social sciences compared to WOS (Mongeon and Paul-Hus, 2016). This means that content is selected for inclusion via a rigorous process, ensuring not only high-quality content and trustworthiness but also good representation of research in the relevant field.
- To trace back the emergence and progress of the research (Geissdoerfer et al., 2017), the generic keyword "circular economy" was taken as a research criterion in the database (Merli et al., 2018), as was the generic keyword "consumer", with the intention of analysing this currently unexplored field (Farooque et al., 2019). Therefore, the two keywords used were circular economy and consumer. Our approach to search for and select terms was based on the other literature reviews analysed in the pre-stage (as recommended by Paul and Criado, 2020).
- Only articles published in the Social Science Citation Index (SSCI) were considered to ensure quality.

2.2. Inclusion decisions

The screening of the documents was carried out using the PRISMA Model, the Preferred Reporting Items for Systematic reviews and Meta-Analyses, used for addressing the reporting of systematic reviews (Page et al., 2021). A total 907 documents were identified in this database. In the first step, books, book chapters and conference publications were excluded, leaving 583 academic articles, which usually contain significant research work aiming to contribute to knowledge that has been validated by the scientific community (Murray, 2013). In the second step, articles from the areas of business, management and economics were filtered and retained. In the third step, documents written in a language other than English were excluded and last, in the fourth step, a manual screening was carried out, which was when documents not relating to the main research topics but focused on other fields such as engineering were removed. After screening the documents, following the process by means of the PRISMA model (Fig. 1), the final number of documents included was 232.

2.3. Descriptive analysis

Fig. 2 shows the publishing trend in the number of studies on the CE and the consumer between 2008 and July 2021. From 2008 to 2016 the number was very low, between 0 and 9 publications per year, with this figure increasing from 2017 onwards. More specifically, during the past 30 months approximately 75% of all articles on this topic have been published. It can be stated that in the last years, the relevance of both topics has increased.

Regarding the journals in which the selected papers were published, the total number of journals was 79. However, more than 55% of them were published in three journals: *Journal of Cleaner Production* (84), *Resources, Conversation and Recycling* (41), and *Business Strategy and the Environment* (9). Fig. 3 shows the ten most productive journals.

Although there is a wide variety of journals worldwide publishing on this topic, it could be established that approximately 90% of the publications were from the UK (42), the US (34) and China (32). On examining the data used in the documents by country (Fig. 4), the most analysed countries were still the UK and China, followed by Germany, Italy, Sweden, Belgium and the US.

Identification of studies via databases and registers

Identification

Documents identified from Scopus:
(n = 907) → Keywords: "Circular Economy" AND "Consumer"

Screening

Documents screened (step 1)
(n = 616) → Documents removed: Document type ≠ Peer-reviewed journal articles (n = 291)

Documents screened (step 2)
(n = 271) → Documents removed: Subject area ≠ Business, Management and Accounting; Economics, Econometrics and Finance (n = 345)

Documents assessed for eligibility (step 3)
(n = 265) → Documents excluded due to the language (only English documents) (n = 6)

Documents assessed for eligibility (step 4)
(n = 232) → Documents manually excluded due to subject matter not relevant to items of interest (n = 33)

Included

Documents included in review
(n = 232)

Fig. 1. PRISMA model process.
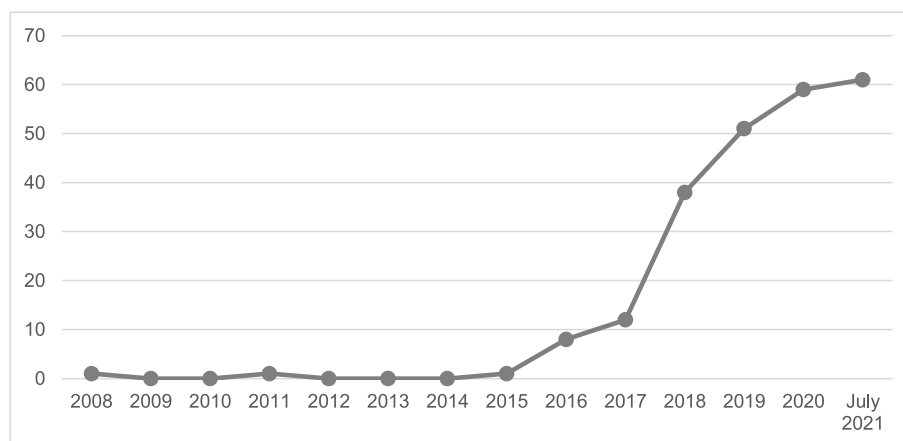
Fig. 2. Total selected documents by year.

2.4. Study design – framework-based review

A literature review is a research methodology used with the aim of providing an overview and evaluating the state of knowledge of a specific topic (Snyder, 2019). The main objectives of this literature review were to (1) understand the research topic through the state-of-the-art; (2) identify research gaps; and (3) suggest future research lines (Paul and Criado, 2020). This article was produced by conducting a hybrid review based on integrating two different frameworks to provide an in-depth analysis of the documents obtained in the systematic literature
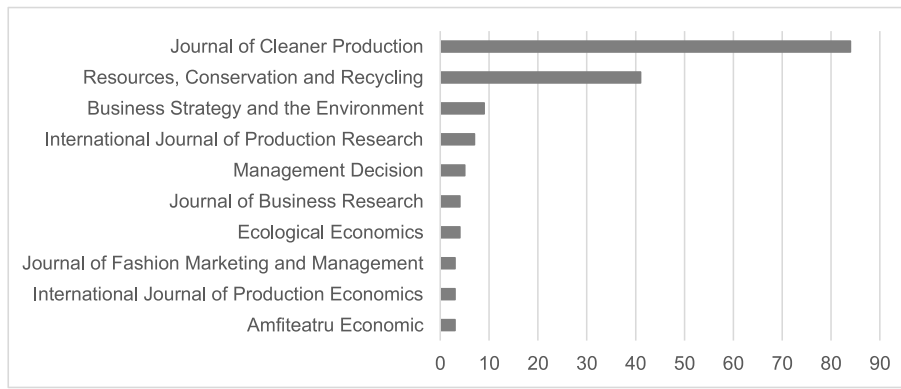
Fig. 3. Documents by Journal (Top 10 journals with the largest number of published articles).
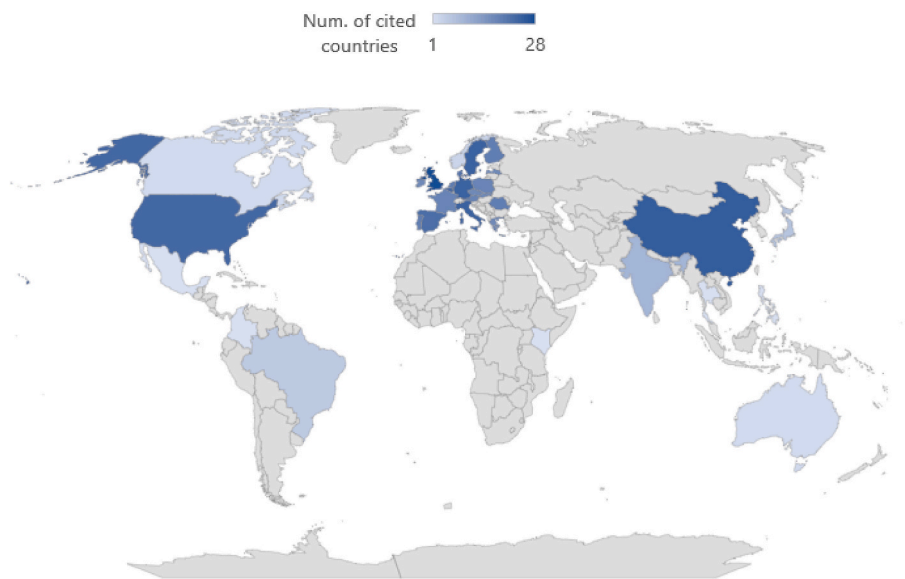
Fig. 4. Countries analysed in the documents; number of times cited.

review. The two frameworks used were the TCCM (Theory, Construct, Context, Methods) Framework (Paul and Rosado-Serrano, 2019) and the ADO (Antecedents, Decisions, Outcomes) Framework (Paul and Benito, 2018). The benefit of this combination is that it overcomes the weaknesses of each, allowing gaps to be mapped in a more structured way (Akhmedova et al., 2021; Lim et al., 2021).

The first research question was addressed from the basis of the TCCM Framework, with the objective of detecting the areas relating to consumer behaviour in CE. A bibliometric approach was used to present the analysis of the data obtained in a more graphical and statistical way,

analysing trends by year, country and journal to provide an overview of the context (Paul and Criado, 2020; Rialp et al., 2019). Given that it is an excellent scheme for organising findings (Lim et al., 2021), the second research question was addressed using the ADO Framework. To this effect, based on a systematic literature review, the aim was to present the results obtained by means of a thorough analysis of the data on consumers and their behaviour in the CE. Fig. 5 shows the different goals of each stage (Paul and Benito, 2018).
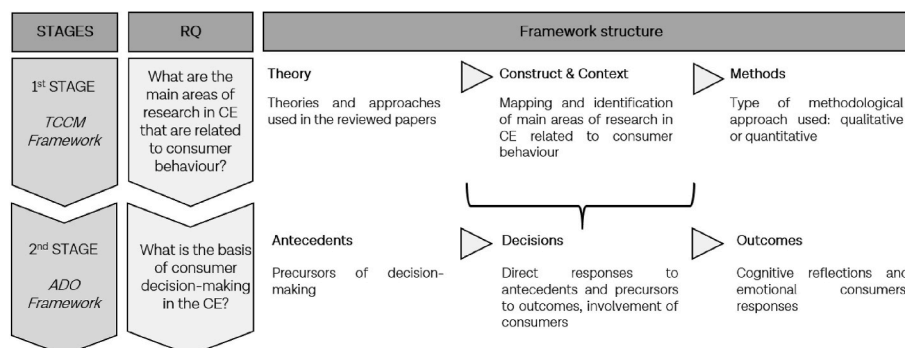
Fig. 5. Review stages.

3. TCCM framework: What are the main areas of research in the CE relating to consumer behaviour and decision-making?

In this section, an in-depth analysis of the data collected is presented through a TCCM (Theory, Context, Characteristics and Methods) Framework (Paul and Rosado-Serrano, 2019). We merged the construct and context sections because some relevant constructs were seen to go hand in hand with the contexts.

3.1. Theory

The theories and frameworks found in the extracted documents were analysed. Due to the large number of documents selected, there were many different theories (Table 1). The most frequently repeated theories were based on those relating to consumer behaviour (15%), product (7%) and Life Cycle Assessment (6%), with a total of 65 documents, corresponding to over 25% of the sample. Among the theories relating to consumer behaviour the following theories were found: Theory of Planned Behaviour (15), Consumer Behaviour Theory (4), Consumption theories (3), Consumer decision-making-progress (3), Fogg's behaviour model (2) and Purchase Intention theory (2), Consumer Acceptance (1), Attitude-Intention-behaviour Theory (1), Migration Theory (1) and Consumer Awareness (1). The theories relating to the product included the following: Product Lifetime Extension (8), Product-service System (5), Product obsolescence (1), Product Design (1), Product Durability (1) and Product Quality (1). The third most mentioned theory was Life Cycle Assessment, which was included in 14 documents.

There were also other less cited theories such as Circular Economy Theory (11), Recycling Methods Theory (7), Material Flow Analysis Theory (5) and Circular Business Models Theory (4). Other theories were reported, each appearing just once, in a total of 71 documents. Some of them were B2B Servitisation Theory (1), Stakeholder Theory (1), Cognitive Dissonance Theory (1) and Jobs-to-be-done Theory (1). Notably, 69 documents, representing 30% of the sample, did not correspond to any theory.

3.2. Construct and context

Consumer behaviour has been studied from different lenses and applied to specific contexts. The aim of this part of the analysis was to carry out an in-depth analysis using a viewer software programme to identify existing topics or clusters that link the CE and consumer behaviour. The program used was the VOSViewer software. This is an open-access software available at www.vosviewer.com, which allows networks of important items extracted from the scientific literature to be constructed and visualised, and is widely used to carry out bibliometric reviews in diverse subject areas, including business (Paul and Criado, 2020; Rialp et al., 2019). The visualisation of the data through networks helps the fields and subfields to be clarified and understood, while also explaining the relationship between mapping similarities and patterns (McCain, 1983). There are different bibliometric study techniques, and in this case we used bibliographic coupling (Kessler, 1963). Bibliographic coupling is based on the association between two documents that reference the same set of cited documents (Boyack and Klavans, 2010; Weinberg, 1974). The technique is capable of clustering very recent papers (Boyack and Klavans, 2010), which is useful in this case due to the recent publication of most of the articles analysed. Fig. 6 shows the bibliographic coupling map obtained using the selected data, in which seven different clusters can be seen (the citations are given in the reference section).

Moreover, considering that the economic model based on continuous growth and the high use of resources, also known as "take, make and dispose" (Kirchherr et al., 2017; Ness, 2008), has reach its limits, we present a circular economic model based on the review carried out. It contains the following consumer behaviours, "take, make, distribute, purchase, use and dispose", also adding other actions such as recycle,

Table 1
Detected theories distribution among the literature review.

| Theories mentioned	Definition	Total documents
Consumer Behaviour theories (15%)	Consumer behaviour theories refer to the academic discipline that examines the psychological and social processes involved in the selection, acquisition, utilisation and disposal of products, services, ideas or experiences by individuals or groups to satisfy their needs and desires.	34
Product theories (7%)	Product theories include theories such as product lifetime extension theory (emphasises the importance of extending the useful life of products); product design theory (focuses on the design of products and how it can impact their environmental and social performance); and product-services system theories (refers to the shift towards service-based business models, where products are offered as services)	17
Life Cycle Assessment (6%)	Life cycle assessment refers to a methodical and structured approach to assess the environmental impacts of a product or service throughout its entire life cycle.	14
Circular Economy Theory (5%)	Circular economy theory aims to create a regenerative and restorative economic system by prioritising the use of renewable resources, minimizing waste and pollution and extending the lifespan of products and materials. Some theories related to this main theory are cradle-to-cradle and industrial symbiosis.	11
Recycling Methods Theory (3%)	Recycling methods theory encompasses both the technical methods used for recycling and the behaviours that drive recycling practices, focused on the social, psychological and economic factors.	7
Material Flow Analysis Theory (2%)	Material flow analysis theory entails the methodical and structured tracking and analysis of the physical movement and transformation of materials from their origin through their various uses, and the fate of disposal or recycling.	5
Circular Business Model Theory (2%)	Circular business model theory refers to the set of principles and practices that guide the development of business models that prioritise the principles of the circular economy. These models aim to maximise the value of resources, reduce waste and promote sustainable practices.	4
Documents without theories mentioned (30%)	–	69
Other theories (not repeated) (31%)	–	72

upcycle, and innovate (Fig. 7). However, as can be seen in Fig. 7, there are two actions that were excluded from the analysis, namely "take and make", because the consumer has no direct involvement in them, as stages in which only companies take part.

The role of the consumer and the implications for consumer research are acknowledged to varying degrees in each cluster. Nowadays, the circular economy model has changed due to the inclusion and participation of the consumer in the different processes. The consumer is not only involved in the "dispose" stage, as in the linear model, but aims to take part in all stages between the "make" and "dispose" stages, which are "distribute", "purchase", "use", "recycle" and "upcycle". However, to do so, it is necessary to know what the CE is and what the innovations that take place or should be developed in it are, with the aim of
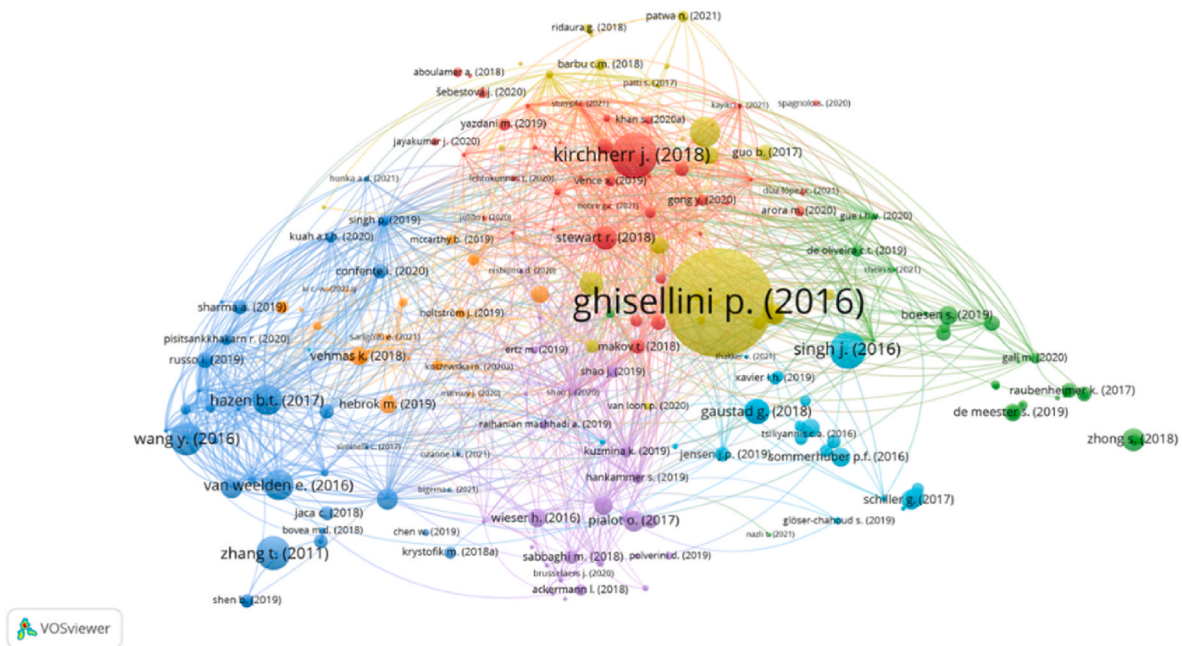
Fig. 6. Results of cluster mapping analysed using bibliographic coupling.
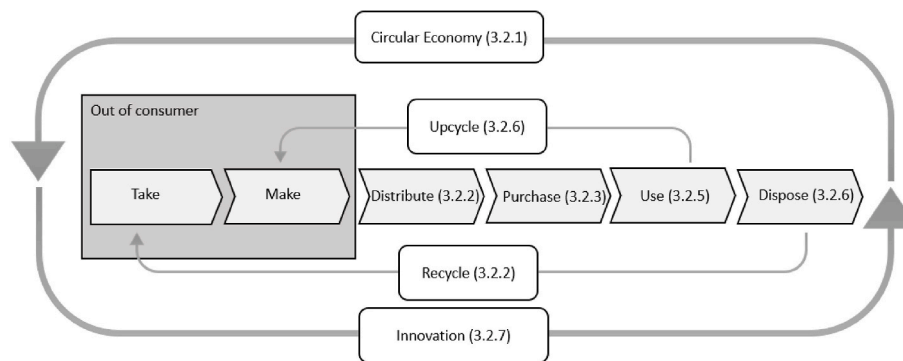
Fig. 7. Summary of the interactions between the circular economy and consumers.

achieving constant improvement. Innovation, improvement, and development processes are necessary to reduce and try to remove existing barriers with CE-based products. Because of the importance of innovation, it can be considered a transversal area, which affects all the stages mentioned above given that there should be innovation in each of them.

3.2.1. Yellow cluster: circular economy – new business models and the role of the consumer (34 documents)

The CE and its global adoption are now more important than ever to efficiently maintain the rate of production of goods and services to meet growing consumer demand, which is currently burdening the environment and societies (Esposito et al., 2018; Ghisellini et al., 2016; Kopnina, 2019; Patwa et al., 2021). The CE and Cradle-to-Cradle represent unique opportunities to rethink the current system of production (Kopnina, 2019). Further, the implementation of the CE implies increased consumer responsibility and awareness, due to the fact that the transition towards CE comes from the involvement of all the actors in society, thereby including consumers (Ghisellini et al., 2016).

This cluster focuses in very general terms on the CE-consumer relationship, providing a broad perspective of the need to involve the consumer in the loop and in the different forms and business models relevant to it. Among these emerging new forms of sustainable

consumption and business models, we want to outline the Sharing Economy (SE). The SE is associated with the CE because it provides the opportunity to bring about deep changes in consumer behaviour (Barbu et al., 2018; J. Khan and Rundle-Thiele, 2019; Mathews, 2020). Consumer behaviour is necessary to encourage CE practices, but there is still a lot of work to be done because consumers' increasing demands are an obstacle to a sustainable production (Patti, 2017). To this effect, it is essential to analyse consumer needs to adapt demand and production (Kreye and van Donk, 2021; Peronard and Ballantyne, 2019), and to assure consumer acceptance (Mishra et al., 2018).

3.2.2. Green cluster: distribute and recycle - packaging and recycled plastic (38 documents)

In terms of distribution and recycling, most of the articles focused on packaging and plastic recycling. Plastic packaging is a very studied item because it is extremely important for consumers and citizens to be able to recognise environmentally sustainable packaging, and in some cases they have limited knowledge of this concept (Boesen et al., 2019; Civancik-Uslu et al., 2021; Di et al., 2021; Lombardi et al., 2021).

However, to improve plastics management, which is one of the main sectors responsible for environmental and health effects (Lombardi et al., 2021), not only is a technical standardisation of plastics and supportive legislation necessary, but so is consumer training and

involvement (Bianchini and Rossi, 2021). In this regard, consumer education is a key factor to be analysed (Kakadellis et al., 2021). It can be improved through consumers' own efforts and involvement with other participants in the CE loop such as retailers (Borrello et al., 2020; Paletta et al., 2019), and through packaging (Steenis et al., 2018), thereby empowering consumers to make choices based on information (Boesen et al., 2019). Regarding packaging, consumers are more positive towards packaging that follows a circular design strategy rather than a linear redesign one, due to its perception as more sustainable (Reckinger, 2018; Steenis et al., 2018).

3.2.3. Blue cluster: purchase - consumer behaviour, purchase intention (PI) and sustainable consumption (37 documents)

The development of CE is dependent on consumers' attitudes and behaviours, both being very relevant due to their high importance in the PI of the consumer (Gaur et al., 2019; Hazen et al., 2017; Kongarchapatara and Hanpanit, 2021; Magnier et al., 2019; Mugge et al., 2017; Singhal et al., 2019) and in switching intention toward green products (Musova et al., 2021; Perez-Castillo and Vera-Martinez, 2021; Sharma and Foropon, 2019; Wang and Hazen, 2016). Further, there are other factors aside from attitudes and behaviours that can affect the development of CE in terms of consumers. On the one hand, we can observe aspects linked to what for consumers is perceived as environmental and personal benefits (Krystofik et al., 2018; Mugge et al., 2017; Perez-Castillo and Vera-Martinez, 2021; Singhal et al., 2019), perceived value (Agostini et al., 2021; Confente et al., 2020; Wang and Hazen, 2016) and even perceived functionality (Magnier et al., 2019); and on the other, factors such as price (Hunka et al., 2021; Pisitsankkhakarn and Vassanadumrongdee, 2020; Shen et al., 2019) and value for money (Magnier et al., 2019) can be observed.

However, for these elements to impact on the development of the CE, factors such as information and education should be considered. Both are relevant because the decisions that consumers are going to take depend strongly on the information and education they receive. Consumers consider information as necessary due to the crucial role it plays in the development of the CE (Bigerna et al., 2021; Musova et al., 2021; Ozanne et al., 2021), and includes knowing where the product has come from and the materials used. One way to transfer this knowledge to consumers is through education (Bigerna et al., 2021) and labelling and packaging information (Gåvertsson et al., 2020). This is because demand depends on consumer perceptions, and these perceptions are related to communication to create links between products and consumers (Bovea et al., 2018), and also because perception is directly related to market acceptance (Confente et al., 2020).

3.2.4. Purple cluster: use - lifetime extension and reparability (29 documents)

Product lifetime extension is a relevant concept relating to the CE. Organisations are attempting to introduce lifetime extension strategies in their processes (Ertz et al., 2019). An increasingly used strategy nowadays in this regard is product reparation, which is considered as an essential aspect of the CE (Bracquené et al., 2021; Brusselaers et al., 2019; Cordella et al., 2021; Jaeger-Erben et al., 2021; Rogers et al., 2021). In this regard, consumers can be active contributors to the CE though their actions, by taking the decision to repair products (Mak and Terryn, 2020). A product that is often related to reparability and that consumers tend to accept is the mobile phone (Cordella et al., 2021; Sabbaghi and Behdad, 2018; Wieser and Tröger, 2016). However, this concept can also be applied to other products such as clothing, household appliances and other devices (Laitala et al., 2021; Lieder et al., 2018). Consumers are looking for the quality of products (Laitala et al., 2021). If this quality can be increased in repaired, reused and upgraded products, consumer motivation will also be boosted (Khan et al., 2018; Laitala et al., 2021).

Furthermore, consumers are generally encouraged to take care of their products and appreciate functionality (Ackermann et al., 2018).

However, they should be more aware of the expected lifetime extension of products (Brusselaers et al., 2019), given its importance to the environment and the economy (Khan et al., 2018). Studies point out that although consumers play a significant and active role in the CE loop (Hankammer et al., 2019), they should be more involved in the process as a whole (Ertz et al., 2019; Hankammer et al., 2019).

3.2.5. Sky-blue cluster: dispose - E-waste (27 documents)

Disposing behaviour is mainly studied in the context of e-waste. The rapid development of the consumer electronics industry has brought about new resource and waste challenges, which are poorly managed in the current linear product system (Althaf et al., 2019; Glöser-Chahoud et al., 2019; Ryen et al., 2018; Sommerhuber et al., 2016). This is why it is crucial to shift the linear production system to a circular one. The consumer has an essential role because of the decision to replace the electronic device or extend its lifetime, and how to do so (Glöser-Chahoud et al., 2019; Gu et al., 2017). However, there are also consumer products, such as electronic devices, that are used for short periods and many have sufficient value to be resold, reused or repurposed, reducing or delaying e-waste as far as possible (Althaf et al., 2019; Coughlan et al., 2018; Glöser-Chahoud et al., 2019). In relation to devices, it is considered that consumers tend to pay a higher price when there is an environmental concern (Dokmai, 2018), which is partly due to a product design focused on new economic and environmental challenges (Singh and Ordoñez, 2016). Moreover, it must be noted that e-waste and electronic device challenges are highly analysed concepts in China (Althaf et al., 2019; Chen et al., 2020; Gu et al., 2017; Hao et al., 2017; Xiao et al., 2018).

3.2.6. Orange cluster: upcycle (27 documents)

Upcycling is a concept that constitutes an important sustainability-oriented innovation practice, due to used or wasted products and materials being reinserted into the cycle in a creative way to add value to the previous product, and includes reusing, repurposing, refurbishing and remanufacturing the product (Aschemann-Witzel and Stangherlin, 2021; Peschel and Aschemann-Witzel, 2020; Singh et al., 2019; Vehmas et al., 2018). One sector that is well known for this is the clothing sector, related to which researchers have investigated the factors and conditions of acceptance and adoption of circular offerings, as well as consumers' perceptions and motivations (Camacho-Otero et al., 2018; Hur, 2020; Koszewska et al., 2020; Kovacs, 2021; Machado et al., 2019).

Moreover, this cluster also involves the behaviour of the consumer in terms of upcycled products. Analysing this behaviour is also relevant due to the role of consumer motivation in the context of the CE, and includes consumers' attitudes, perceptions and acceptance (Machado et al., 2019; Testa et al., 2020; Vehmas et al., 2018; X. Zhang and Dong, 2021). While consumer interest is increasing towards recycling and sustainable solutions (Aschemann-Witzel and Stangherlin, 2021; Vehmas et al., 2018), consumers are also asking to be clearly informed about the CE and how their behaviour can affect the environment as they consider this very relevant as a guide to consumption (Testa et al., 2020; Vehmas et al., 2018).

3.2.7. Red cluster: innovation (40 documents)

Innovation is a way to reduce barriers to the adoption of the CE and to contribute to a more sustainable economy (Demirel and Danisman, 2019; Huynh, 2021; Jesus and Jugend, 2021; Wang and Hazen, 2016). However, innovations do not have to be technological. There are also non-technological innovations such as those that include social and ecological improvement, adding value to the economic model. Both types of innovation must bring about changes, without their necessarily being radical ones (Vence and Pereira, 2018). Since innovation can reduce barriers to CE adoption (Jesus and Jugend, 2021), consumer-focused strategies should be developed (Dutta et al., 2021; Farooque et al., 2019) because consumers are vital to implementing circular initiatives (Khan et al., 2020). Although consumers are relevant

and necessary for the transition to the CE, their initiatives have been set aside by companies, who focus on their own initiatives such as improving energy consumption and waste recovery (Stewart and Niero, 2018). To this effect, strategies must be implemented to increase consumer interest (Kirchherr et al., 2018), support and commitment (Khan and Haleem, 2020). Innovation is essential for consumers to find the products they demand (Sehnem et al., 2020), and consumer perceptions and recommendations must be considered (Julião et al., 2020; Khan and Haleem, 2020).

3.3. Methods

The analysis of the methods used aims to explain how the work reviewed was carried out. All 232 documents (Fig. 8) were sorted into qualitative (103), quantitative (62) and mixed (51) methods. Regarding the first, the five most used methods, present in over 60% of the documents in this category, were Case Study (26), Literature Review (21), Semi-Structured Interviews (14), Material Flow Analysis (4) and Exploratory Study (3). The other methods, used in the remaining 35 documents in this category, were not repeated in other documents.

Regarding the quantitative methods, the five most used were Structural Equation Modelling (8), Material Flow Analysis quantitatively (7), Empirical Case Study (5), Exploratory Factor Analysis (5) and Experimental Study (3), representing almost 40% of the documents in this category.

Last, the documents based on mixed methods tend to be based on the Literature Review, complemented by quantitative methods such as Empirical Case Studies and Structural Equation Modelling. The other methods, used in the remaining 35 documents in this category, were not repeated in the rest of the studies.

4. ADO framework: what is the basis of consumer decision-making in the CE?

In the section on TCCM relating to construct and context, different stages of consumer behaviour stood out, namely distribution (packaging and recycled plastic), purchasing (of green and recycled products), prolonged use and shared, disposal and upcycling. The next step was to scrutinise the basis for consumer decision-making to answer the questions as to what makes consumers engage with the CE in different ways, what the decisions consumers make are, and what are the corresponding outcomes. The results obtained are shown using the ADO Framework,

which stands for antecedents, decisions, and outcomes. This framework was chosen because of its great utility in synthesising and summarising findings in a simple and comprehensive way, as they are through these constructs (Paul and Benito, 2018). Information directly relating to consumer decision-making in the CE was drawn from this analysis. The consumer decision-making process is divided into five stages: need recognition, search, evaluation, purchase and post-purchase (Engel et al., 1968). However, to follow the ADO Framework, only three statements were included, considering "need recognition, search and evaluation", or the pre-purchase stage, as a single stage. Considering these five statements, *Antecedents* represent the pre-purchase stage through the recognition, search and evaluation stages; *Decisions* deal with the purchase and consumers' involvement and proactivity; and *Outcomes* focus on the post-purchase stage and consumers' cognitive reflection and emotional responses. Fig. 9 is a summary of the results obtained using the ADO Framework. The main topics contain the theories and actors involved in each phase, while characteristics and factors contain the elements that really affect each stage of the PI.

4.1. Antecedents

Antecedents are the precursors of decision-making (Paul et al., 2018). Consumer decision-making usually encompasses specific steps: it begins with need awareness and continues through to the information search and the evaluation of alternatives to decide whether or not to buy a particular product or service. As was noted, in the case of CE decisions may be related not only to purchase behaviour, but also to other actions that the consumer might decide to do, such as prolonged use, shared use, disposal and upcycling. There are factors or elements that can positively and negatively affect a consumer's decision to enter and stay in the loop.

4.1.1. Need recognition

Need arousal can be triggered internally (personal identity, aspirations) or externally (marketing, media). Internal sources were widely studied throughout the sample of articles and were based on the theory of planned behaviour and the theory of perceived self-identity.

Planned behaviour theory is based on three elements: attitudes, subjective norms and perceived control behaviour (Ajzen, 1991). Since the three of them can influence a consumer's PI, we decided to analyse them together. Attitudes can be defined as a person's mental state, which shows the overall positive or negative way they perform certain behaviours (Paul et al., 2016). Consumers' attitudes can positively affect

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Qualitative methods

Case study (26), Literature Review (21), Semi-structured interviews (14), Material Flow Analysis (4), Exploratory study (3) and others no repeated (35) – Qualitative Comparative Analysis (1), Content Analysis (1), Game-theoretical model (1), among others.

Quantitative methods

Structural Equation Modelling (8), Material Flow Analysis (7), Empirical Case Study (5), Exploratory Factor Analysis (5), Experimental studies (3), ANOVA (2), Techno-economic assessment (2), others no repeated (46) – Migration test (1), Multinominal Regression Models (1) and Dynamic Computational framework (1), among others.

Mixed methods

Literature Review and Quantitative methods (14) such as Structural Equation Modelling or Empirical Case studies, Case Study and Structural Equation Modelling (2) and others no repeated (35) – Qualitative and quantitative interviews (1), Content Analysis and Semi-structured reviews (1), among others.

Fig. 8. Main methods detected through the literature review.
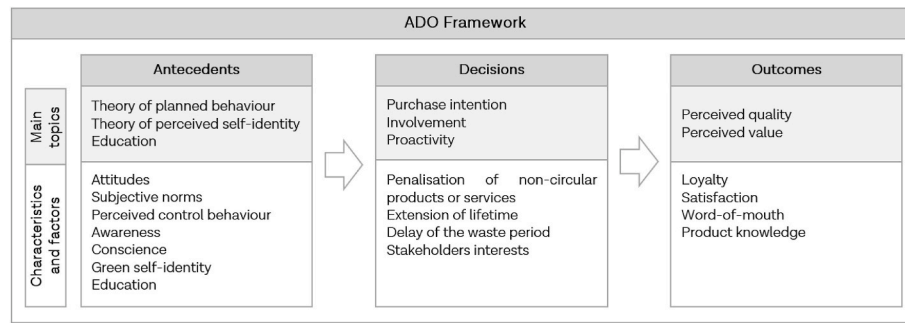
Fig. 9. Summary of the results obtained using the ADO Framework.

PI when consumers have enough information about the benefits, characterisics and specifications of the product and these are aligned with the environment (Pisitsankkhakarn and Vassanadumrongdee, 2020; Singhal et al., 2019; Van Weelden et al., 2016). It is crucial to note that the provision of this information is essential to enable consumers to make informed decisions. Furthermore, these attitudes can be shaped to positively affect product knowledge, benefits, and awareness (Singhal et al., 2019). Therefore, attitudes are the most impactful variable affecting PI (Kongarchapatara and Hanpanit, 2021). In addition to influencing PI, consumers' attitudes help moderate market stimulating factors, which can also enhance PI development (Pisitsankkhakarn and Vassanadumrongdee, 2020). The market stimuli consider the price of the product, which can moderate consumers' PI through price sensitivity (Kongarchapatara and Hanpanit, 2021; Pisitsankkhakarn and Vassanadumrongdee, 2020).

Subjective norm is another positive influential factor on PI and is defined as the social pressure exerted on a person to perform or not a certain behaviour, which can be changed by the behaviours of other people or groups important in one's life (Singhal et al., 2019; Yadav and Pathak, 2016). Companies should work cohesively with governments to set strategies to enhance the perceived subjective norm level and to provide more knowledge about the CE (Kongarchapatara and Hanpanit, 2021; Pisitsankkhakarn and Vassanadumrongdee, 2020; Singhal et al., 2019; Singhal et al., 2019) to create awareness about CE products. The more pressure around and awareness of CE products, the more positive the effect on consumers' PI.

Perceived control behaviour is used to analyse the behaviours and PI of environmentally conscious consumers and is described as a measure of a person's confidence in purchasing unconventional items due to the availability of resources such as time and money. Consumers with positive attitudes and resources tend to have a strong desire for this behaviour (Echegaray and Hansstein, 2017; Yadav and Pathak, 2016). Moreover, perceived control behaviour is the ease with which consumers perform their purchases of CE products (Kongarchapatara and Hanpanit, 2021). In this case, affectation it is not as decisive as attitudes or subjective norms, but it does affect consumers' PI in a moderate and positive way (Kongarchapatara and Hanpanit, 2021; Singhal et al., 2019). Therefore, as shown in the literature review, all three items positively affect consumers' PI. So do attitudes and subjective norms, and perceived control behaviour, but to a lesser degree.

For its part, the perceived self-identity theory can be related to awareness, conscience and green self-identity. Perceived self-identity means that people are able to cognitively, emotionally and behaviourally form a coherent interpretation of themselves, the environment and other factors affecting society (Ersanlı and Şanlı, 2015). Awareness and conscience are two very similar items that tend to positively affect consumers' PI. It has been demonstrated that ethical and sustainable products, such as CE products, activate a moral evaluation in consumers, creating huge awareness of the situation and the environment. This then positively affect consumers' PI (Magnier et al., 2019). Green awareness has the same effect on PI, indicating the importance of creating

consumer knowledge of the environment and the impact they can have on it (Mugge et al., 2017; Singhal et al., 2019).

Meanwhile, green self-identity refers to an individual's overall cognitive identification with typical green consumers, which is a recognised antecedent of various eco-friendly behaviours (Oliver and Rosen, 2010), mediating in the relationship between attitudes toward CE products and consumers' PI. This mediation has a positive effect on consumers' PI (Russo et al., 2019), which means that the greener self-identity the consumer has, the more likely they are to buy a product based on this. The attitudes the consumer has create this self-identity, which is why it also contributes to increasing PI based on CE products (Russo et al., 2019). Hence why attitudes are such an important item to analyse when talking about PI (Hazen et al., 2017; Kongarchapatara and Hanpanit, 2021; Pisitsankkhakarn and Vassanadumrongdee, 2020; Singhal et al., 2019; Singhal et al., 2019; Van Weelden et al., 2016).

Education belongs to the external antecedents of need awareness and, therefore, is positively related to participation in the CE. The acceptability of CE products depends on consumers' participation and awareness, and the only way to change these is through education and attitude aspects (Patwa et al., 2021). Industry has spent most of the last century educating consumers that new is best (Hopkinson et al., 2018). However, this must now change, so consumers must be re-educated, and the way to do this is through information, transfer of knowledge and education (Hopkinson et al., 2018; Mugge et al., 2017). The fact that consumer education is supported by legislation leads to a clearer set of terminology to help them increase their knowledge of the CE (Kakadellis et al., 2021). The government has a relevant role to play (Guo et al., 2017; Ozanne et al., 2021; Pisitsankkhakarn and Vassanadumrongdee, 2020; Yang and Shan, 2021; T. Zhang et al., 2011) in terms of countries' development in education, innovation and consumption patterns and initiatives (Patwa et al., 2021). To this effect, cooperation between governments, industries and consumers will enhance the current system (Zhang et al., 2011) and consumer PI through CE knowledge (Pisitsankkhakarn and Vassanadumrongdee, 2020).

4.1.2. Search

Once a need has been recognised, customers are motivated to search for solutions to satisfy that need. Nowadays, having information about products and services is crucial for the consumer due to its importance in CE development (Bigerna et al., 2021). Moreover, to understand what CE is from the consumer's point of view, it is very relevant to have information and to be informed (Van Weelden et al., 2016). Consumers want to have information not only about the products and services bought, but also about the material composition of them and the effect the purchase can have on the environment (Boesen et al., 2019; Gåvertsson et al., 2020; Wang et al., 2020). The chance to acquire information can be through labels, which build consumer confidence and reliability (Gåvertsson et al., 2020), giving then the opportunity to make decisions based on information (Boesen et al., 2019). In some cases, consumers use this information to find consistency between personal attitudes, environmental behaviours and circular attributes of packaging

(Testa et al., 2020). Whatever the case, labels and packaging are a way to inform consumers about the products given that there is limited knowledge of the understanding of them (Boesen et al., 2019; Hopkinson et al., 2018; Mugge et al., 2017). Consumers are very sensitive to the information given, so a misunderstanding can lead to their rejecting the product (Van Weelden et al., 2016). To this effect, companies must involve the consumer in the transformation of information – in most cases given via labels – into knowledge (Boesen et al., 2019; Hopkinson et al., 2018; Mugge et al., 2017). An investment in communication and marketing is therefore required (Kakadellis et al., 2021; Ozanne et al., 2021), because to make the switch to the CE from the linear economy there must be a change in the consumer's culture (Hopkinson et al., 2018), which can be related to education.

4.1.3. Evaluation

Several studies focus on the pre-purchase evaluation of products, and on the barriers that hinder the decisions relating to entering the loop. Negative effects are directly related to perceived risk, which can be associated with different factors such as quality and contamination (Magnier et al., 2019), misunderstanding, lack of awareness and financial risk (Van Weelden et al., 2016).

Negative effects detected can be related to the EKB model process theory (Engel et al., 1968), which characterises consumer decision-making as a problem-solving process that is developed in different phases (Van Weelden et al., 2016); and to the prospect theory, a model of economic behaviour that describes how people make decisions in situations where there are alternatives that involve risk (Tversky and Kahneman, 1992). Moreover, perceived risk is defined as a function of uncertainty about both the outcome and the assumption of possible losses associated with a purchase. It sometimes acts as a blockage to purchase behaviour (Peter and Ryan, 1976). When a product is at risk, it can be reflected as a negative influence on PI, due to the factors affecting this influence (Wang and Hazen, 2016). The factors that can contribute to perceived risk, increasing its negative effect on PI, are based on qualitative concepts regarding products such as value for money, limited attractiveness, quality, functionality, contamination, safety (Magnier et al., 2019), financial risk, performance risk, obsolescence risk and time risk (Van Weelden et al., 2016); and to concepts related to perceived benefits and perceived quality. Some of these qualitative concepts were analysed in the previous section when talking about factors positively influencing PI, and include value for money, quality and even functionality. Depending on the effect consumers generate, it can be attributed as a direct effect on risk and therefore lead to a lower PI (Magnier et al., 2019; Singhal et al., 2019; Singhal et al., 2019; Van Weelden et al., 2016; Wang and Hazen, 2016).

4.2. Decisions

Decisions act as direct responses to antecedents and as precursors to outcomes (Paul and Benito, 2018). Decisions can vary from low or passive involvement to high and active involvement (Fig. 10). Decisions might also be taken at individual level or require the participation of other interested actors.

PI is the first and most studied decision that a consumer entering the loop can make. Consumers may at least decide to purchase only recycled or green products and try to reduce the packaging they use, especially plastics (Steenis et al., 2018). In a similar vein, consumers might decide to penalise non-circular products and services or purchase products that can be repaired, reused, upgraded (Khan et al., 2018; Laitala et al., 2021) or disposed of correctly (Cordella et al., 2021; Sabbaghi and Behdad, 2018; Wieser and Tröger, 2016). However, to make decisions of this type, it is essential that the consumer has information on the products or services they want to acquire. This decision set belongs to the area of low involvement as it minimally alters a consumer's lifestyle.

The next set of decisions will require the consumer to slightly increase their involvement and proactivity, becoming active contributors to the CE. These decisions refer to the extension of the lifetime of the product and delaying the waste period (Althaf et al., 2019; Coughlan et al., 2018; Glöser-Chahoud et al., 2019). Extension of useful life can take different forms: (1) careful use (Ackermann et al., 2018); (2) decisions to repair (Mak and Terryn, 2020); and (3) decision to share underutilised assets (Barbu et al., 2018; Khan and Rundle-Thiele, 2019; Mathews, 2020). Because it is in the best interest of consumer to extend the useful life of their assets, this set of decisions still does not require a major motivational effort by the consumer.

Last, the decisions category involves the highest level of engagement, and proactivity relates to choices that are made in the best interest of other stakeholders, such as society and nature, and do not yield any direct economic benefit for consumers. Examples of such decisions include, but are not limited to, the proper disposal of goods (Althaf et al., 2019; Glöser-Chahoud et al., 2019; Ryen et al., 2018; Sommerhuber et al., 2016) and the process of upcycling (Camacho-Otero et al., 2018; Hur, 2020; Koszewska et al., 2020; Kovacs, 2021).

4.3. Outcomes

Once the decision to take part to some extent in the CE has been made, the outcome of interaction with the CE model comes about in the form of cognitive reflection and emotional response. Satisfaction is a judgment following a series of consumer product interactions. Most customer satisfaction studies are based on the expectancy-disconfirmation model of satisfaction. In this model, confirmation or disconfirmation of expectations is the essential determinant of satisfaction. During and after consumption, consumers experience the
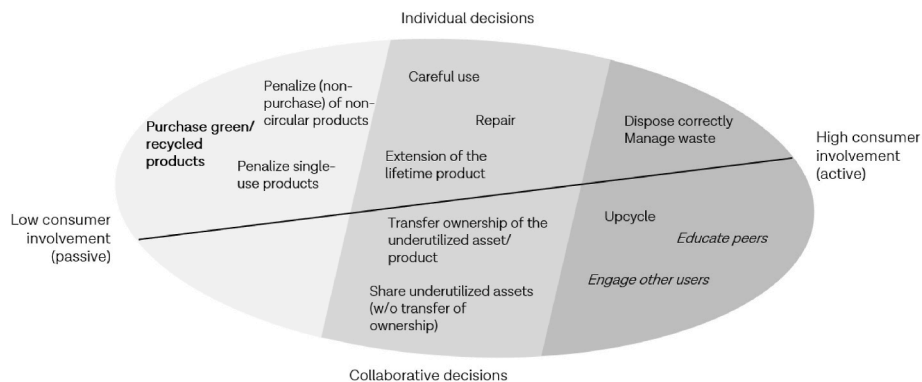
Fig. 10. Map of consumer decisions in the CE.
Note: topics that are extensively studied in bold; topics that have received little attention in italics.

service performance and compare it to their expectations. Satisfaction judgments are then formed based on this comparison. Perceived quality is directly related to satisfaction, loyalty and even trust. Loyalty is a customer's willingness to continue patronising a firm over the long term, preferably on an exclusive basis. Customer loyalty extends beyond behaviour and one-time decisions and includes preference, liking and future intentions.

Therefore, the result obtained for perceived quality and the expected performance of products or services represents the quality value, otherwise called perceived value, which is positively related to re-purchase (Lee et al., 2021; Sweeney and Soutar, 2001). The existence of benefits, not only personal but also environmental, has a positive influence on consumers' return purchase and positive word-of-mouth (Hsu and Chen, 2021). This is because consumers seek common bene-fits among themselves, as well as environmental benefits (Hazen et al., 2017; Mugge et al., 2017; Singhal et al., 2019; Singhal et al., 2019). To this effect, both personal and environmental benefits have a positive effect on consumers' PI. Consumers try to buy more sustainable prod-ucts, and therefore CE-based ones, when they can obtain the same quality and functionality as when they purchase products made using more traditional and conventional methods. In this case, value for money positively affects consumers' PI (Magnier et al., 2019).

Value is one of the most potential drivers of consumers' willingness to switch to greener products and PI. But for this to happen, consumers need to be informed not only about the product but also about the impact on the environment (Zhang et al., 2011). Furthermore, (Yacan Wang and Hazen, 2016) state that perceived value is directly influenced by product knowledge, which is created by knowledge about quality, cost and sustainability. Therefore, the more knowledge consumers have about green products, the more positive the effect on their PI(Hazen et al., 2017; Wang and Hazen, 2016). Quality knowledge strives to have the strongest effect on perceived value and is therefore also one of the most important predictors of consumer PI. Green and cost knowledge likewise play a determinant role in both, but with less impact (Wang and Hazen, 2016).

Table 2 shows the relationships between influencing PI element groups, the theories applied to each group and the authors.

5. Future research

This section presents the future research agenda, obtained by means of the literature review carried out in relation to the two concepts "circular economy" and "consumer", and analysed using the TCCM and ADO frameworks. The possible lines of future research detected are summarised in Table 3. The section is divided into two groups to present the results more clearly. The first group of future research points is composed of item 5.1 to 5.5, where the focus is on deepening the research areas detected through the TCCM Framework. The second group contains item 5.6 to 5.12, where further exploration of the knowledge about decision-making is suggested.

5.1. Innovation in companies – How important are consumers for industries to innovate?

Innovation is seen to reduce barriers to the adoption of the CE. However, most companies operate on an individual basis without considering consumers, causing them to work on process improvements and energy issues. While consumers are essential to companies, they do not work directly together. Resultantly, it is crucial to conduct a thor-ough analysis of the rationale behind the need for consumer participa-tion in the innovation process within organisations. Furthermore, it is essential to examine the benefits of involving consumers in these pro-cesses to attain superior innovations. Involving consumers in the inno-vation process can have many benefits for companies seeking to adopt circular economy principles. By gaining a better understanding of their customers' needs, preferences and expectations, companies can design more sustainable products and services. Additionally, involving con-sumers can help reduce waste, resource optimisation and the develop-ment of a sense of accountability and responsibility for the environment.

Table 2
Relationship between influencing PI element groups and authors.

Influencing group elements	Theories applied	Authors
Attitudes, subjective norms, and perceived control behaviour *(Positive effect)*	Theory of planned behaviour (TPB)	(Kongarchapatara and Hanpanit, 2021), (D. Singhal et al., 2019), (D. Singhal et al., 2019), (Russo et al., 2019), (Pisitsankkhakarn and Vassanadumrongdee, 2020)), (Van Weelden et al., 2016)
Awareness, conscience, and green self-identity *(Positive effect)*	Perceived self-identity	(Magnier et al., 2019), (Mugge et al., 2017), (Russo et al., 2019), (D. Singhal et al., 2019)
Product knowledge *(Positive effect)*	Perceived value	(Yacan Wang and Hazen, 2016)
Others (environmental benefits, personal benefits, value for money, information) *(Positive effect)*	Perceived quality	(B.T. Hazen et al., 2017), (Magnier et al., 2019), (Mugge et al., 2017), (Singhal et al., 2019), (D. Singhal et al., 2019)
Perceived risk, perceived benefits, and quality *(Negative effect)*	EKB Model and prospect theory	(Magnier et al., 2019), (Mugge et al., 2017), (Singhal et al., 2019), (Singhal et al., 2019) (Van Weelden et al., 2016), (Yacan Wang and Hazen, 2016)

Table 3
Summary of possible future research agenda.

	Topic – Problem	Future Research
1	Innovation in companies	Relationship between companies and consumer in the CE loop. Study the impact of consumers on companies and how their involvement can affect companies' processes.
2	Innovation and consumers	Analysis of consumers' opinions on innovation processes and improvements and how can these changes affect consumers' attitudes.
3	New consumption models	Examine the consumer implications of new market trends in the CE. Analyse the consumption models such as second-hand products and upcycled products.
4	Missing sectors	Extension of the products that are analysed in the decision-making process. The vast majority analyse remanufactured products. There is now a wide variety of products related to the CE.
5	Countries	Inclusion of consumer analysis in other countries
6	Consumers education	The re-education of consumers in new CE consumption models.
7	Perceived quality in CE	Analysis of perceived quality in CE-based products.
8	Consumer involvement in the CE loop	Investigates what benefits consumer involvement can generate if they actively take part in the CE loop. They do not only take part in the purchase statement, but they also go beyond it, and this should be thoroughly analysed.
9	Lifetime extension	Consumer insights to detect which products consumers are most likely to want to extend the life of, and what elements or factors affect this decision
10	Post-purchase stage	Post-purchase analysis. Define post-purchase considering the CE model.
11	Consumers in post-purchase stage	Post-purchase consumer analysis. Investigate what happens after the purchase and how it affects the consumer, and whether there is any possibility of repurchasing and how this is influenced.
12	Satisfaction	Affectation of satisfaction in CE consumption models. Analyse factors and elements that affect consumers' satisfaction.

5.2. Innovation and consumers – What innovations concerning the CE have the greatest effect on consumers and their behaviours?

In this regard, it is also necessary to focus on consumers to verify what really affects them and what attitudes they have towards various CE products. It is crucial to know the effects that innovations have on consumers. Once the consumers are known, the aim is to adapt innovation to them. To date, as the literature has shown, innovations are being considered, but not how they can affect consumer behaviour or change attitudes.

5.3. New consumption models – Which are the new consumption models regarding the CE?

The emergence of consumption models based on the CE implies the development of new or renewed consumption models. The SE appears in the literature, a model closely linked to the CE due to its high degree of sustainability, which has transformed the current economy. However, this model is not the only one that can be linked to the CE. There are other new models where the focus is on consumers, but which have not yet been analysed. Some of the renewed consumption models can be associated with second-hand products, hired products or even upcycled products. To this effect, investigating consumer implication in the new models can shed light on whether they are increasingly involved in the processes, whether companies consider this and, indeed, whether consumers perceive this involvement and paradigm shift.

5.4. Missing sectors – How influenced is the consumer in other sectors, such as the textile sector, regarding the CE?

Many of the documents were based on remanufactured products, in particular technology products. There is a wide variety of products on the market based on the CE, so future studies could analyse the decision-making process for products focused on sectors such as textiles, construction, food and urban management. For example, the textile sector is highly relevant given that it contributes 2–10% of the environmental impact of consumption in Europe. In a few decades, the amount of clothing purchased has increased by 40%, due to its affordability and rapidly changing trends. However, it is estimated that in Europe only half the clothes are destined for reuse and recycling, and only 1% is actually recycled. Additionally, for every kilo of clothing that is reused or recycled and therefore not destined for incineration avoids the emission of 3.17 kgs of CO2 (European Commission, 2019; Lisca et al., 2021).

5.5. Countries

To date, most studies are based on data coming from a handful of countries, generally the UK, the USA and China. Given the global nature of the phenomenon, we call for studies from other regions and countries.

5.6. Consumers education

Consumer education is vital, because if consumers are considered essential for the shift towards the CE, they must also necessarily know what these changes entail. It is important to assess how consumers are educated and how to re-educate them towards this new type of consumption, which is more sustainable not only for the environment but also for society. This education can lead consumers to want to be and to being better informed, which can help in making decisions about sustainable products. Not only does this information include the characteristics of the product, but also the region where it was made and the materials used, among other information. Analysing consumers' knowledge, how they perceived CE-based products and what impact they generate both on the environment and in society is relevant.

5.7. Perceived quality in CE – How can the quality of a CE product or service be measured?

Perceived quality is a factor that has been analysed since the early 80s. Parasumaran was a pioneer in this regard, studying quality in offline services (Parasuraman et al., 1985). With the modernisation of markets, other scales have emerged to measure on- and offline services (Parasuraman et al., 2005), and even services provided in relation to collaborative consumption (Marimon et al., 2019). However, no research has been done through CE services, so the understanding of perceived quality in the CE sector is key to discovering the drivers of consumer satisfaction and loyalty. These outcomes are notable because the more people that use CE products or services, the better it will be for the planet and the more accessible they will become.

5.8. Consumer involvement in the CE loop – Do consumers go beyond purchase statement, and how do they affect the CE loop?

Most studies have concluded that the consumer is very analysed in relation to purchase statement, but when considering the CE loop and based on the results of the literature review carried out, it can be established that there are more statements in which the consumer takes part. The consumer is relevant in different stages, but there is still a lack of research in this regard. The understudied stages include innovation, distribution usage and recycling, among others. With the new consumption model, knowing all aspects of the consumer can be beneficial not only for companies, but also for society.

5.9. Lifetime extension of products – Which effect does product life extension have on consumers?

As discussed in Section 3, one of the main areas relating to the CE is the lifetime and reparability of products. This line of research is of interest if it focuses on the consumer. Future research could include detecting the factors or elements consumers consider indispensable to extend the lifetime of products before buying a new ones, and the identification of which type of products consumers would most like to have the product lifetime extended for.

5.10. Post-purchase stage – What can be described as a post-purchase stage in terms of the CE?

Based on the five stages of the decision-making process, there is a gap in the last, the post-purchase stage. It is important to know, analyse and investigate what this stage is comprised of for its later assessment. The post-purchase stage changes depending on the consumption model being analysed, considering that if a sustainable product based on the CE consumption model is examined it may be different from one based on the linear consumption model.

5.11. Consumers in the post-purchase stage – What elements affect the consumer post-purchase?

Throughout the literature review, there is a broad analysis of consumer PI for the CE and sustainable products. However, all the analyses focus on considering the pre-purchase and purchase phases, leaving aside post-purchase. It may not have been incorporated because the figure of the consumer disappears in the linear consumption model once the purchase had been made. However, in the CE field, the consumer plays a very important role, since the involvement of all actors is necessary if the circle is to be closed. Therefore, if consumers are analysed in the post-purchase stage, it will be possible to detect the behaviours and attitudes they present, as well as their concerns and worries once the purchase has been made, for the purpose of improving this stage.

5.12. Satisfaction – How does consumer satisfaction affect CE consumption models?

Considering that satisfaction is a consequence of perceived quality (Lassar et al., 2000), and that the analysis of perceived quality is essential since this has not yet been done, it is considered important to analyse consumer satisfaction with CE-based products or services and how this can affect new consumption models.

6. Discussion and conclusions

Based on this literature review, it was found that interest in the relationship between the CE and the consumer has increased in the last two and a half years, when 75% of the documents analysed were published. This reflects the fact that it is a new topic that has a long way to go, and one that is important not only at European but also at global level. This literature review provided an overview of and revealed the deep research in the existing literature regarding the CE and the consumer, in terms of consumer behaviour and consumers' PI.

To answer the first research question – *What are the main areas of research in the CE relating to consumer behaviour?* – this paper summarises and interrelates the different main areas of the CE with the consumer. Notably, seven different main areas were detected, all of them interrelated, as shown in Fig. 7. A circular economic model is presented, composed of "take, make, distribute, purchase, use and dispose", adding "recycle, upcycle and innovate". The CE was the main concept analysed, from which six different main areas were obtained that can be connected to the circular chain in terms of consumer behaviour. They were (1) the elements that affect consumers' behaviour, PI and sustainable consumption; (2) lifetime extension and reparability; (3) packaging and recycled plastic; (4) e-waste; and (5) upcycling. Moreover, it was identified that process improvement and involvement depend on (6) innovation, as a way to reduce barriers to CE adoption and to contribute to a more sustainable economy, and so is considered a key factor within the CE loop. Each of the areas mentioned, except for the "purchase" area, which deals with the key concepts of consumer behaviour and attitudes, analyse consumers in a superficial manner, focusing more on the product or service than on consumer reactions or behaviours. To this effect, an important gap is detected in the literature, and that is the lack of knowledge of consumers in actions such as decisions to extend the life of a product, how consumers perceive the changes in new consumption models, and even how they can be re-educated in relation to concepts based on the CE.

This paper also addressed a second research question – *What is the basis of consumer decision-making in the CE?* Focusing this question on the existing purchase phases, the ADO Framework allowed us to detect that there are three main stages regarding decision-making.

The first stage, analysed in *Antecedents,* is the precursor to decision-making. Therefore, it presents the pre-purchase phase and the different stages of it. The pre-purchase phase is divided into need recognition, search and evaluation. Need recognition is related to two types of sources: internal and external. The first are based on elements within the planned behaviour theory and perceived self-identity theory, such as attitudes, subjective norms, perceived control behaviour, awareness, conscience and green self-identity. For their part, external sources are based on educational behaviours and the education that consumers receive and how they are affected by it. The search focused on the type of information consumers need to purchase the product or service. In this case, the need for consumers to be informed about product materials and processes and their sensitivity is highlighted, as well as the involvement they may have in the purchase of a product or service. The last stage of the pre-purchase stage can be considered as the evaluation and barriers that prevent the purchase from taking place. The elements that negatively affect the purchase or make the evaluation harder are elements that can be related to perceived risk, such as functionality, contamination, financial risk and even performance risk.

The second stage, analysed in *Decisions*, is the response to antecedents and the precursor to outcomes. The purchase stage has essential significance among all the decision-making phases, given that it is the stage when the consumer buys the product/service. It involves different actions, which depend on the level of consumer involvement and proactivity. The decisions that have the least consumer involvement are those relating to the type of products purchased: encouraging the purchase of green products and penalising the purchase of non-green or single-use products. When looking at the actions that have higher involvement and proactivity, the following actions can be detected: the decision to repair products or to make proper use of them, with the aim of strengthening extension of the product lifetime. Last, if a high level of consumer involvement and proactivity is considered, decisions based on consumer participation in waste disposal and waste management can be found. However, at this stage, some decisions were also detected that have an individualistic impact on consumers, but must also go hand in hand with companies, thereby creating a collaborative union between company and consumer. Some of these are the transfer of ownership of assets and products, sharing underutilised assets and consumer education and engagement.

Last, the third stage is dealt with in *Outcomes,* and refers to post-purchase once the purchase has been made. One of the most important gaps in the literature is detected at this stage, since there is no specific literature relating the post-purchase stage to the decision-making process for CE products. However, we did detect some issues of relevance. Among them were perceived quality, which positively and directly affects repurchase, an existing action within the post-purchase stage; and value, one of the most potential drivers of consumers' willingness to switch to greener products.

In addition, through these three stages we could detect which factors positively and negatively affect consumers' decision-making. Among the positive factors were attitudes, subjective norms and perceived control behaviour, awareness, conscience and green self-identity, perceived value, and other less relevant factors among which we can highlight environmental benefits, personal benefits, value for money and information. However, there is also a clear negative effect, the perceived risk. This perceived risk can be related to concepts such as limited attractiveness, quality, functionality, contamination, safety, financial risk, performance risk, obsolescence risk and time risk. This analysis shed light on the positive and negative effects when purchasing a CE-based product.

The academic community can benefit from this literature review as it is an in-depth analysis of the main areas between the CE and the consumer, focused on consumer behaviour and decision-making processes in CE products and services. The results are useful for researchers who want to focus on an area relating to the CE and the consumer that is relevant but not yet extensively studied, such as the interaction, behaviours and attitudes of consumers in the lifetime extension process, involvement in innovative processes and consumer education. This is in addition to the need for research on the final stage of the decision-making process in terms of the CE, since in this case consumer participation and involvement are essential.

Practitioners could use the findings of this literature review to focus their efforts on improving consumer knowledge and the decision-making process, due to the extensive detailing of the factors that positively and negatively affect this decision.

Like any research, this paper has limitations. First, the data was obtained from just one database, in this case Scopus. No other database was searched, nor was any other type of documentation added. Furthermore, only the documents relating to our field, business, and management, were considered, so our study did not include the technological facet. Second, the data used for the literature review were up to July 2021.

Declaration of competing interest

The authors 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

No data was used for the research described in the article.

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