



## Consumers' awareness and attitudes in circular fashion

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### ABSTRACT

Circular fashion is a new concept shift towards a more sustainable fashion industry. Consumers' awareness of the fashion industry's environmental and social damage is increasing, along with the transformation of their purchasing habits. Circular economy appears to be a solution to these issues. Nonetheless, users' awareness of the principles of circular economy might benefit their application in real life. This research studies the relationships between awareness and attitudes towards the principles of circular economy as well as the mediators, which are namely, benefits and enablers. The main purpose of this study is to test a hypothesised model through structural equation modeling with Partial Least Squares. The results show that the principles have a positive relationship to the attitudes, benefits, and enablers of circular economy. Additionally, the effect of gender on consumers' attitudes towards sustainable fashion is worth analysing since it seems to play a significant role.

### 1. Introduction

The fashion and textile sector is estimated to represent more than 2% of the world's gross domestic product, which embodies a sum of \$3000 billion (Shirvanimoghaddam et al., 2020). At the same time, however, it is one of the most polluting industries (Jacometti, 2019). Additionally, according to the report of the European Environment Agency (Duhoux et al., 2022), it is the fourth-largest user of raw materials and water. Furthermore, the annual consumption of textiles has increased from 7 to 13 kg per person (Shirvanimoghaddam et al., 2020) as consumers are focused on buying more clothes at cheaper prices, an approach that is based on the linear economy and the "take–make–use–throw away" system (Ki et al., 2021). Traditionally, the fashion sector has adhered to a linear economy (LE) model, commonly known as the "take, make, use, and throwaway" approach (Ki et al., 2020). Under this system, non-renewable resources are utilised by consumers for a limited period before being discarded and sent to landfills, resulting in significant waste. This linear model stems from an industrial mindset that perceives resources as inexhaustible (Ki et al., 2020). Correspondingly, a report by the National Institute of Standards and Technology (Thomas, 2022) reveals that a mere 15% of textiles are recycled, while over two-thirds of them ultimately find their way into landfills.

In Spain, the fashion sector specifically contributes 2.7% to the country's GDP, as stated in the Economic Report of the Fashion Sector in Spain (Modaes, 2022). This sector represents 3.9% of the Spanish labour market and 8.5% of its exports. Furthermore, there has been a significant

increase in e-commerce within the fashion sector. In 2021, 8.4% of total e-commerce sales in Spain were attributed to the fashion industry. Spain is home to globally renowned fast-fashion brands such as Inditex and Mango, which dominate the country's fashion landscape. Additionally, Spain is among the European Union countries with the lowest price indexes for clothing and footwear, according to the Index of Prices for Clothing and Footwear (Eurostat, 2022). These factors have likely contributed to a Spanish culture characterised by highly price-sensitive consumers.

Moreover, the survey conducted by IPSOS (2020) on behalf of the World Economic Forum revealed that Spain ranks eighth among countries where individuals have altered their daily routines to combat climate change, with 76% of Spanish consumers actively engaged in such efforts. In terms of the intersection between environmental awareness and the fashion industry, a survey carried out by IBM (2020) in Spain highlighted that 81% of participants expressed concerns regarding textile waste, with 68% emphasizing the importance of sustainable fashion (particularly women). Furthermore, 37% of Spanish consumers stated their willingness to pay a premium of 1%–5% for sustainable fashion products (Blas Riesgo et al., 2023). This market has witnessed growth in recent years, thanks to the emergence of brands like Ecoalf, which has gained international recognition. Additionally, a Sustainable Fashion Week has been taking place annually in Madrid since February 2020, further bolstering the sustainability movement in the fashion industry (Blas Riesgo et al., 2023).

Given the aforementioned circumstances, there has been a consensus

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among governments and academia regarding the imperative to address the detrimental consequences of the linear economy (LE), leading to a collective shift towards a circular economy (CE) (Ki et al., 2020). The CE framework acknowledges the finite nature of resources and promotes an economic system that is restorative in nature, characterised by the principles of taking, making, using, reusing, and repeated reuse. The purpose of this system is to facilitate the reuse of resources in order to create a closed loop for material flows and, thereby, eliminate waste (Doppelt, 2003).

Considering all these data, it is clear that the current buy–use–dispose culture is unsustainable in the long run due to all its environmental, health, social, and economic impacts. Consequently, a shift towards a sustainable fashion industry through circular economy (CE) is urgently needed. Within the realm of fashion, the circular economy (CE) is frequently denoted as Circular Fashion, building upon the principles of the CE framework. Embracing these CE principles enables companies to enhance their sustainability practices, as their ultimate objective is to minimise waste through resource reuse. CE includes every activity involved in the production, distribution, and consumption of a product.

The R framework represents a vital component of the circular economy (CE) paradigm, offering insights into the optimal utilisation and reuse of materials to maximise their value while minimizing waste and environmental harm. Numerous authors consider the various R frameworks as practical guidelines for implementing CE principles (“how-to”), making them a fundamental aspect of CE itself. Although the 3 R (reduce, reuse, and recycle) principle is the best-known solution to the current unsustainable pollution level, it is a less complete solution for the environment than the 9 R framework (Prendeville et al., 2014; Potting et al., 2017). As claimed by Potting et al. (2017), is a more complete and environmental-friendly model to be implemented, and includes the principles (reduce, repair, reuse, refurbish, recycle, recover, rethink, restorative and regenerative by design and redesign). Thus, the 9 Rs should be investigated as a whole, as there is a lack of research. The primary advancement of the 9 R framework over the 3 R model lies in its approach towards waste management. In the 3 R model (Refuse, Rethink, and Reduce), waste elimination occurs during the design phase through strategies that reject the initial harmful product, prompt a re-evaluation of waste as a resource, and reduce the necessary input quantities. Conversely, the 9 R framework extends the waste management process by incorporating the last two Rs: Recycle and Recover. These additional steps are applied to products that have been categorised as “waste” by their respective industry and necessitate specialised technical equipment and innovative energy processes to restore their value. While conventional practice involves disposing of waste materials in landfills, fashion brands that prioritise recycling contribute to product lifespan extension. The 9 R strategy ensures that materials and products retain their utmost value and remain relevant even at the conclusion of their service life (Kirchherr et al., 2017).

The main aim of this paper is to study consumers’ awareness of the principles and benefits of circular economy, their attitudes towards those principles and benefits and the main enablers to adopt green products. As highlighted by Soyer and Dittrich (2021) and Sinha et al. (2022), there is a pressing need for research on consumption behaviour in the circular fashion industry that delves into the distinctions between awareness and attitudes, on the one hand, and the principles of circular fashion, on the other. In light of this, the present article aims to bridge the gap between these two aspects by examining consumers’ awareness of the 9 R principles in the circular fashion.

In CE literature, enablers are those factors that promote consciousness of circular economy in consumers for them to adopt green products (Nath et al., 2013). In fact, environmental awareness of consumers is usually considered as one of the main enablers (Nath et al., 2013). However, there might be other factors influencing CE adoption, such as placement of products within store and companies’ social media strategies (Nath et al., 2013). The effect of gender will be also incorporated

into the study, since there is evidence in previous literature that women are usually more willing to participate in CE (Gazzola et al., 2020).

As far as the main managerial implication is concerned, focusing on the fashion industry, our paper can serve as a comprehensive business guide on how to effectively implement and communicate circularity in textile companies. In addition, the adoption of circular business models can create new opportunities for growth and innovation and to attract new consumers, and thus, can enhance brand image and reputation.

To reach the objective, this paper will investigate what the awareness of circular economy is, by the exploring the 9 R principles, and it will analyse its benefits and enablers. With this purpose, first, a conceptual model will be proposed with the development of hypotheses regarding awareness of the principles of circular economy, its benefits, main enablers, consumers’ attitudes toward them, and the moderating effect of gender. Subsequently, the methodology will be explained and the results will be analysed. The final section will present the discussion, limitations, and suggestions for future research.

## 2. Conceptual model and developing hypotheses

The 9 R principles provide a comprehensive framework for sustainable resource management and are a set of guidelines that promote sustainable waste management practices. These principles defined by Potting et al. (2017) and Kirchherr et al. (2017) and redefined by Carvalho et al. (2020) and Aramendia-Muneta et al. (2022) include reducing, repairing, reusing, refurbishing, recycling, recovering, rethinking, restorative and regenerative design and redesigning.

The first principle is *reduce*, which involves minimizing waste generation by using fewer resources and reducing our consumption patterns. The second principle is *repair*, which encourages the restoration of damaged or broken products instead of disposing of them. The third principle is *reuse*, which involves finding new ways to use products and materials instead of disposing of them. This principle includes practices such as donation, resale, and rental, among others. The fourth principle is *refurbish*, which involves restoring products to their original condition and upgrading them to improve their performance and extend their lifespan. The fifth principle is *recycle*, which involves the processing of waste materials into new products or materials. The sixth principle is *recover*, which involves the extraction of energy from waste materials through various methods such as incineration and gasification. The seventh principle is *rethink*, which encourages us to reconsider our consumption habits and make more conscious choices. The eighth principle is *restore and regenerate by design*. Involve designing products and systems that are restorative and regenerative to the environment. This can be achieved through strategies such as biomimicry, cradle-to-cradle design, and closed-loop systems. Finally, the ninth principle is *redesign* the product, providing a different appearance (Aramendia-Muneta et al., 2022; Kalmykova et al., 2018; Kim et al., 2021; Kirchherr et al., 2017; Potting et al., 2017).

Nevertheless, consumers need to understand these principles and what the fashion market offers to contribute to a more sustainable fashion environment. With a greater understanding, consumers may alter their attitudes and perceive themselves as fundamental to enhancing well-being and a crucial integrator of circular fashion.

### 2.1. Awareness of attitudes toward the principles of CE

The interest in sustainable fashion and sustainability, in general, is increasing. Nevertheless, consumers’ purchasing decisions do not always match their values (Vehmas et al., 2018). One of the main reasons for this discrepancy between consumers’ beliefs and their actual behaviour is price. Sustainable clothes are usually more expensive; however, sustainability is based on convincing consumers that the higher price comprises the complexity of clothing sustainability, the diversity of consumer ethical concerns and the fact that clothing purchase is not philanthropy (Harris et al., 2016). The main targets for the

sustainable fashion market are those concerned with the environment, who are mainly young people. Nonetheless, most youths (such as Generation Z) do not have the required purchasing power to afford it. Hence, price represents an issue in consumers' purchasing decisions.

The lack of information regarding the production process is another problem that affects consumers' attitudes. A large amount of clothes is produced in developing countries, about which clients have no knowledge of the working conditions of the supply chain (Joergens, 2006). Additionally, clients' unwillingness to compromise in other aspects of their daily life prevents them from changing their purchasing behaviour.

Next, culture is another factor that endogenously drives consumers' habits (Schrettle et al., 2014). For instance, according to Shen et al. (2013), for Americans, making a profit is the main aspect of businesses, whereas, in European countries, such as France or Germany, consumers are more concerned about the environment (Shen et al., 2013). Therefore, attitudes towards circular fashion might vary between countries.

Some demographic characteristics, such as age, can also affect consumers' attitudes. For example, consumers are increasingly opting to donate their clothes to charities or second-hand shops rather than disposing of them (Vladimirova et al., 2022). However, younger consumers prefer to swap their clothes with their friends, which enables them to wear trendy clothes without the need to buy them (Vehmas et al., 2018).

Overall, previous literature based on the Theory of Planned Behaviour (Ajzen, 1985) has claimed that to produce desired outcomes, individuals should be well-informed in terms of knowledge. As revealed by Sharma and Foropon (2019), environmental knowledge is a subcategory of environmental awareness, which consists of being aware of the impact of human behaviour on the environment. Amoako et al. (2020) and Mostafa (2007) state that sometimes knowledge can be predictive of attitude and behaviour. Sharma and Foropon (2019) and Han (2021) postulate that environmental knowledge predicts attitudes such as purchase intention. Similarly, Nath et al. (2013) and Lavuri (2022) argue that environmental awareness is also considered a precursor of green product adoption.

Based on the above, the next hypotheses will be tested.

**H1.** Awareness of principles is positively associated with attitudes.

## 2.2. Benefits of CE

CE is based on the idea of using fewer resources by redesigning the production process and implementing the ethical consumer concept in society (Murray et al., 2017). This new model of production and consumption brings new opportunities and benefits. In this section, the competitiveness, innovation, environment and employment benefits of CE will be studied.

One of the primary economic benefits of CE pertains to its positive impact on economic growth through enhanced competitiveness and innovation. As per the European Commission (2014), efficient utilisation of raw materials can result in savings of up to 630 billion euros annually for the European industry. This, in turn, could translate into a 3.9% increase in the European Gross Domestic Product, accompanied by the creation of several million new job opportunities. Additionally, these new jobs would necessitate a highly skilled workforce, thereby reducing the demand for less specialised roles.

Another key advantage of CE lies in its ability to reduce raw material costs. According to the fundamental principles of CE, which are centred on reuse and reduction, the extraction of fresh raw materials is likely to decline significantly since CE emphasises prolonging the lifespan of materials and using fewer of them (Duhoux et al., 2022). A critical objective of CE is to extract the maximum value from products and extend their lifespan, thereby fostering the development of innovative and sustainable solutions to existing and emerging challenges. Furthermore, the adoption of CE principles is expected to lead to the emergence of novel technologies and business models. This, in turn, can

facilitate the creation of four different sources of value-added generation (Korhonen et al., 2018).

The first source of value creation in CE is the "inner circle" approach, where preserving the value of a product's components through reuse is preferred over recycling when repair is no longer feasible. This not only helps maintain the integrity and complexity of the product but also sustains the workforce and energy involved in its creation (Duhoux et al., 2022). The second source of value creation is the extension of a product's life cycle through reuse, thereby obviating the need for new raw materials, energy, and workforce required to create a new product (Koszevska, 2018). Another approach to value creation is "cascading," which involves diverse reuse of the product along the value chain (Hultberg and Pal, 2021). This helps avoid the introduction of new resources into the value chain and ensures that once the full potential of the resources has been extracted, they can be reincorporated into the biosphere. The final source of value creation is "pure inputs," where the use of clean raw materials enhances efficiency and effectiveness of their extraction (Reike et al., 2018). This, in turn, sustains product quality, extends their useful life, and increases productivity in the production process.

Redesigning products to last longer is the key to implementing CE (Murray et al., 2017). This new way of thinking opens opportunities for a great deal of creative and innovative solutions. The boost in innovation leads to technological development, new raw materials, a high-skilled workforce, energy efficiency, competitiveness, and new profit opportunities for businesses (Astakhov et al., 2020). Businesses that adopt CE will gain a competitive advantage due to the increasing awareness among consumers.

CE not only enhances competitiveness but also promotes collaboration between companies. In a circular system, waste generated by one production process is utilised by another process, resulting in a more collaborative approach (Korhonen et al., 2018). This, in turn, leads to increased collaboration between companies and public administrations. According to the Ellen MacArthur Foundation (2012, 2013, 2014), CE stimulates the demand for new services, including logistics companies that collect, transport, repair, and redistribute products after use in a manner that enables their reintroduction into the market, sales platforms that facilitate longer product life and higher utilisation rates, and experts in remanufacturing and product repair, who encourage reuse and repair.

Eventually, CE is expected to generate higher employment levels for society as a whole. The jobs created will predominantly require a high-skilled workforce, as CE leads to increased digitalisation and automation (Duhoux et al., 2022). Additionally, local employment is likely to increase, especially in low-skilled jobs. This will help to mitigate the issue of unemployment and poor-quality jobs. By promoting creativity, product and process innovation, and developing new skills, CE offers new opportunities for employment and development (Dissanayake and Weerasinghe, 2021).

Having studied all the benefits of CE, this paper posits that consumers' awareness of the benefits of CE is positively associated with consumers' attitudes towards the 9 R principles of CE: refuse, rethink, reduce, reuse, repair, refurbish, remanufacture, recycle, and recover (Potting et al., 2017). Awareness of the benefits of CE is an essential aspect of consumers' environmental knowledge (Amoako et al., 2020; Han, 2021) and contributes to their overall environmental awareness (Grob, 1995). Moreover, Hartmann and Apaolaza-Ibañez (2012) revealed that consumers' environmental concerns and perceived benefits also influence consumers' attitudes. Based on the above, the next hypothesis will be tested.

**H3.** Benefits is positively associated with attitudes.

The last main argument for the adoption of CE is its environmental benefits (Hall and Dickson, 2011). CE has the chance to have a positive impact on the planet by reducing greenhouse gas emissions. This aim can be achieved with this production model, since renewable energy is

less polluting than fossil fuels, fewer production processes are required through reuse, waste is reused in other processes, and energy-efficient and non-toxic materials and manufacturing and recycling processes are chosen (Korhonen et al., 2018). The Ellen MacArthur Foundation (2015) suggests that CE can potentially reduce CO<sub>2</sub> emissions by 48% by 2030 and 83% by 2050. Additionally, CE can help reduce negative externalities such as air and water pollution, land use, and soil degradation, preserving the ecosystem by avoiding raw material extraction and waste dumping.

Waste reduction is a fundamental principle of CE, and several practices, such as upcycling, can be employed to achieve it. Upcycling involves recycling waste materials and transforming them into new, higher-value products (Sandvik and Stubbs, 2019). Other techniques to reduce waste include utilising waste-to-energy technologies such as waste incineration and plastic-to-fuel conversion through pyrolysis (Bastein et al., 2013; Dangelico and Pontrandolfo, 2010).

Furthermore, CE creates and maintains essential ecosystems comprising soil, air, and water bodies, which offer valuable services, such as cleaning and products, including fertile farmland, pollination, and clean drinking water (Bastein et al., 2013). By utilising these products in a cycle and avoiding the burden of toxic substances on these services, these ecosystems can remain resilient and productive. Additionally, returning waste to the soil not only results in fewer residues to deal with but also contributes to a healthier and more resilient soil, promoting greater balance in the surrounding ecosystems.

Authors such as Salmela and Varho (2006) claim that to enhance perception of benefits of green products, consumers need a certain amount of information about the environmental impact of those products. In the context of consumer behaviour, the significance of environmental concerns cannot be overlooked, as it may influence the purchase decision of consumers towards environmentally friendly products (Follows and Jobber, 2000). As claimed by Nath et al. (2013), the effects of consumption on the environment lead consumers to assess as well the consequences and benefits after the purchase. In this line, this paper suggests that, if consumers are aware of the principles of CE they might be more likely to be aware of the benefits of CE. Thus, the following hypothesis is thus formulated.

**H2.** Awareness of CE principles is positively associated with benefits.

### 2.3. CE enablers

In recent years, consumers are showing an increasing interest in moving toward CE because of a higher awareness of sustainability issues. However, sustainability itself is not the only factor to affect consumer purchasing behaviour (Nath et al., 2013). There are quite a large number of enablers to adopting green products in circular fashion. Ki et al. (2020) review and group the different enablers identified in previous literature.

Consumers do not have sufficient knowledge about the environmental impact of their clothes, and therefore, educating them is the main requirement in increasing consumer participation in circular fashion activities. Thus, environmental-related information of the product and the recycling potential should be communicated to the consumer (Vehmas et al., 2018). This information should be transmitted to the consumer at the point of sale, and this might be a factor enhancing consumer green behaviour (Dissanayake and Weerasinghe, 2021).

Cohen (1973) has revealed that green advertisements help to shape consumer's environmental knowledge and transform that knowledge into the purchase of green products. As pointed out by Nath et al. (2013), green advertisements can play a positive role in influencing consumers, so that they become more environmentally oriented and are more likely to adopt green products.

The role of visual merchandising is also important when dealing with fashion products, whether they are related to circular economy processes or not. For instance, according to Jain et al. (2012), the use of

mannequin displays in stores can influence women's purchasing behaviour. Madhavi and Leelavati (2013) found that elements of visual merchandising, such as colours, window displays, music or lighting, increase interest toward those elements being displayed. Product display in retail stores is also a stimulus which attracts consumers to buy. It has been revealed that product display has a strong impact on consumer's purchase intention and customer's perception about the product.

Eco-labelling is another important factor leading to buy green products and affects positively consumer behaviour toward the purchase of green products (Teisl et al., 2002). Consumers are demanding eco-friendly products, hence the presence of eco-labels on the products might be a source of differentiation for manufacturers, which might become an incentive to sell their products and services complying with the environmental characteristics (Dissanayake and Weerasinghe, 2021; Nath et al., 2013; Teisl et al., 2002). Likewise, Thøgersen (2002) contends that a significant number of consumers are attentive to eco-labels, while Grankvist et al. (2004) underscore that consumers' product preferences are influenced by the environmental impact information conveyed by eco-labels.

Another important factor that might act as an enabler is peer influence. Lee (2009) pointed out that peer influence was found to be one of the most important predictors of green products' purchase behaviour. Peer influence has the power to affect a group of followers (Nath et al., 2013). In this line, Goworek et al. (2012) claim that consumers' decisions on clothing purchases are influenced by information at the point-of-sale, as well as by the media. Therefore, the following hypothesis was formulated.

**H5.** Enablers are positively associated with attitudes.

Since environmental awareness is claimed to influence consumer behaviour, having a higher awareness of the principles of CE, is likely to make consumers more receptive to the enablers of CE and more likely to consider enablers important to them.

In addition, several studies have investigated the relationship between circular fashion awareness and behaviour, as well as the factors that facilitate or impede circular fashion practices. For instance, Barquete et al. (2022) found that consumers who had higher awareness of circular fashion principles were more likely to engage in sustainable consumption behaviours, such as repairing and recycling clothing, and were also more likely to be motivated by environmental concerns. Similarly, Harmsen et al. (2021) explored the role of circular fashion awareness in promoting recycling options, and discovered that consumers who were more aware of circular fashion principles were more likely to participate in sustainable fashion behaviours, such as purchasing second-hand clothing and repairing garments.

Finally, Papadopoulou et al. (2022) identified that circular fashion practices were influenced by a range of factors, including circular fashion awareness, access to sustainable fashion options, and personal values and beliefs about sustainability, in order to comprehend the fundamental principles of circular fashion. The study also highlighted the importance of enablers, such as access to information and support for circular fashion practices, in promoting circular fashion behaviour. Thus, it is hypothesised that.

**H4.** Awareness of CE principles is positively associated with enablers.

Enablers such as advertising campaigns, sales personnel communication or social media allow consumers to be better informed about environmental issues and thus, about the benefits of CE (Goworek et al., 2012; Nath et al., 2013). When these two factors, namely enablers and benefits, are combined, it becomes evident that the enablers operate in a circular fashion and are positively correlated with the circular benefits. By embracing circular fashion enablers, businesses can reap the benefits of a more sustainable and resilient industry while also contributing to the circular economy in the fashion industry. Therefore, the following hypothesis was formulated.

H6. Enablers are positively associated with benefits.

2.4. Gender in CE

Eventually, in the field of the demand for sustainability, the role of gender assumes importance and will be relevant to understanding the differences in attitudes. Several studies have proved that women, mainly young women and those with higher education or high qualification occupations, are more informed about and willing to participate in CE (Gazzola et al., 2020).

Other research has shown that women’s sensitivity and altruism can reinforce the gap between men’s and women’s behaviours (Brough et al., 2016; Hwang and Choi, 2018). A psychological connection exists between sustainability and femininity. Hence, men are used to avoiding eco-friendly behaviours since they are seen as feminine (Brough et al., 2016). Thus, the following hypotheses are proposed.

H7. Female gender is positively associated with attitudes.

H8. The positive relationship between awareness of principles and attitudes is stronger for women than for men.

2.5. Conceptual model

Fig. 1 shows the conceptual model proposed in this research. The main objective is to analyse the effect of consumers’ awareness of the principles of CE on their attitudes toward CE. Additionally, the impact of two mediators: benefits and enablers will be incorporated to the model.

3. Methodology

The questionnaire, based on Carvalho et al. (2020) and the previous literature review, contains questions concerning consumers’ awareness and attitudes to the 9 principles of CE in the fashion industry (Prendeville et al., 2014; Potting et al., 2017), the main enablers for CE in the fashion sector: marketing and communication campaigns (Cohen, 1973; Nath et al., 2013), visual merchandising (Jain et al., 2012; Madhavi and Leelavati, 2013), sales personnel (Dissanayake and Weerasinghe, 2021; Vehmas et al., 2018) and social media (Goworek et al. (2012); Lee (2009); Nath et al. (2013); the main benefits for the implementation of this approach: competitiveness (Astakhov et al., 2020; Dangelico and Pontrandolfo, 2010; Korhonen et al., 2018), innovation (Astakhov et al., 2020; Korhonen et al., 2018), employment (Dissanayake and Weerasinghe, 2021; Leal Filho et al., 2019) and environment (Bastein et al., 2013; Hall and Dickson, 2011; Korhonen et al., 2018; Sandvik and Stubbs, 2019).

The self-administered questionnaire on the Google Forms platform has different types of questions regarding freedom to answer. The research was carried out in October of 2021. Firstly, a section of closed-ended questions (multiple-choice) addresses awareness, enablers, benefits and attitudes using a 5-point Likert scale (Appendix 1). Secondly,

questions about their personal profile such as gender, birth, education and expenditure on fashion. The quantitative approach is considered more objective and it relies on numerical data and gains insights into consumers’ attitudes and behaviours towards circular fashion.

3.1. Sample

To get a greater response rate quickly, a self-administered questionnaire-based survey was conducted in Spain during September 2021. It has long been believed that convenience sampling is the most effective and quick method of gathering information (Sekaran and Bougie, 2016). A power analysis was conducted using G × Power 3.1.9 (Faul et al., 2009; Ringle et al., 2014), assuming a medium effect size of 0.15, alpha error probability of 0.05, and power of 0.95, and the suggested sample size is 119. Our total sample consists of 153 respondents and is larger than the suggested sample size. This test to show the appropriateness of the sample is already used in a variety of researches (e.g.: Nunkoo et al., 2020; Sheehan et al., 2020).

Table 1 shows the respondents’ demographic profile. As can be observed, most of the users surveyed are female (62.09%), only 37.91% being male. In addition, concerning their year of birth, most of them (65.36%) belong to Generation Z (1995–2010). Millennials or Generation Y (1980–1994) represent 7.19% of the sample and Generation X (1965–1979) represents 17.65% of the sample. Finally, Baby Boomers (<1964) accounts for 9.8% of the total respondents. It is also possible to differentiate consumers according to study courses that they are currently attending. Those currently following a bachelor’s degree course represent 67.97% of the sample, while, 3.92% and 1.31% of

Table 1 Demographic profile of the respondents.

Sample Data	Demographic Characteristics	Frequency	Percentage (%)
Gender	Male	58	37.91
	Female	95	62.09
Year of birth	1995–2010	100	65.36
	1980–1994	11	7.19
	1965–1979	27	17.65
	<1964	15	9.80
Current course studies	Bachelor’s	104	67.97
	Master’s	6	3.92
	PhD	2	1.31
	Other	41	26.80
Expenditure on fashion	€50–€200	113	73.9
	€200–€400	36	23.5
	€400–€700	4	2.6
	>€700	0	0

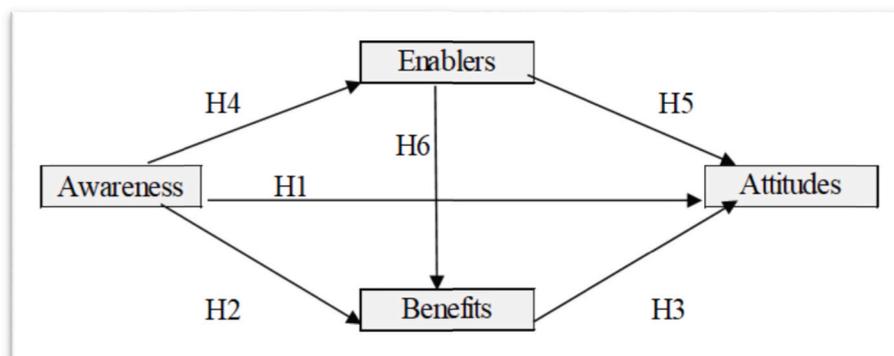


Fig. 1. Conceptual model.

respondents are studying for a master’s degree or PhD, respectively. Finally, 26.8% of respondents are either at high school or working.

The survey also separates respondents depending on the amount that they spent on fashion on average in a season. Based on the results, 73.9% of them spend between €50 and €200 on average in a season. In contrast, 23.5% and 2.6% spend between €200 and €400 and between €400 and €700, respectively. Finally, none of the respondents affirmed that they spend more than €700 on average in a season.

### 3.2. Empirical analysis

Firstly, using SPSS, the mean and frequencies of each question in the questionnaire were computed. Then, a structural equation model (SEM) was used to measure the model shown in Fig. 1, using the SmartPLS 3.0 program (Ringle et al., 2015). The SmartPLS software is utilised in this study because of its high precision and robustness against small sample sizes and violations of normality assumptions in the data (Hair et al., 2009, 2017; Sarstedt et al., 2016). The Partial Least Squares Structural Equation Modeling (PLS-SEM) approach employed by the software enables researchers to accurately estimate the target construct of interest through a structural model (Richter et al., 2015).

In the model, a mediation effect and a moderation effect were tested. In this research, the moderating variable is gender, and the way in which it affects the correlation between principles and attitudes is evaluated. To analyse this effect, a new latent variable was added to the model, linked to attitudes and gender. Further, H8 was tested using the product indicator approach proposed by Chin et al. (2003). This method multiplies each indicator of the exogenous construct (principles) by each indicator of the moderator (gender).

## 4. Results

First of all, the mean and frequencies of each question are discussed. It is worth highlighting that 102 respondents, representing 66.7% of the sample, had knowledge of the meaning of circular economy. The mean of the results is 3.699, implying that they were aware of CE being an industrial economy made to be restorative by intention and design. Besides, most of the respondents assigned a 4 on the Likert scale to this question, indicating their high level of awareness.

Among the basic CE principles —reduce, repair, reuse, refurbish, recycle, recover, rethink, restorative, and regenerative through design and redesign— the one that respondents are most aware of is recycle, which shows the highest mean (3.954). As mentioned previously, recycling is at the bottom of the 9 R principles of circularity, while reduce and reuse are at the top. However, according to the results of the questionnaire, those principles are less valued by consumers, obtaining means of 3.824 and 3.497, respectively.

With respect to the benefits of CE, the main advantage observed by users is the environmental one, with a mean of 4.261 on the Likert scale, indicating a high level of awareness. Other benefits of this circularity model, such as competitiveness, innovation, and employment, are less considered by consumers, employment being the least valued (3.438).

As regards the challenges involved in implementing circularity, those mainly noticed by the sample are lack of commitment of the whole society, lack of recycling behaviour among consumers, and lack of governmental incentives and support. Conversely, respondents do not consider the difficulties of product design to be a challenge when adopting CE. Based on these results, it should be emphasised that those surveyed see the main barriers to the adoption of CE in their own attitudes and behaviour rather than in companies’ actions.

Concerning the enablers of CE in the fashion industry, the most important ones for respondents when buying products made through a circularity process are marketing and communication campaigns as well as social media, although all the enablers obtained a mean above 4, indicating that they are all considered in purchasing decisions. At the same time, the respondents suggested additional enablers, including

competitive prices, more information regarding advantages and disadvantages, incentives, and accessible locations.

When those surveyed were asked about their attitudes when applying the 9 R principles, the most frequently applied was *repair*. The principles that are less applied by consumers are recovery, restorative and regenerative, and redesign. These results were to be expected as, for instance, redesign is performed by firms rather than consumers. Besides, 72.5% of the sample were willing to pay a higher price for sustainable fashion products. In fact, 32% of them were amenable to paying up to 10% more and 19.6% were ready to pay up to 15% more. Finally, 93.5% of the surveyed people had increased their knowledge about the importance of CE in the fashion industry after completing the questionnaire.

Next, using the SmartPLS 3.0 program, the SEM was analysed by using reflective measurement models. Firstly, the PLS algorithm was computed to analyse indicator reliability. This represents the proportion of the variance explained by the latent variable. According to Hair et al. (2014), the outer loadings must exceed 0.7 to be significant. In this case, three are below that number, E4 (0.527), AT2 (0.605), and AT5 (0.666). Even though these amounts are below 0.7, they are close enough to accept the model, having checked that, when removing the variables, the model worsened, leading the Cronbach’s alpha to fall below 0.7. As a result, it is not worth eliminating them since, although the effect is not strong enough, these variables proved to be relevant to the overall model.

Regarding the internal consistency of the model, the results are valid for all the constructs since the Cronbach’s alpha and the composite reliability (CR) are above 0.7 for all of them (Hair et al., 2014) (see Table 2). Therefore, the sample is free of biases and the results are reliable. At the same time, the average variance extracted (AVE) for all the latent variables is greater than 0.5, as Fornell and Larcker (1981) proposed. The AVE describes the portion of data explained by each latent variable or the extent to which the variables have a positive correlation with their constructs. Hence, it can be affirmed that the model converges with a satisfactory result.

**Table 2**  
Reliability and convergent validity of the model.

Factor	Indicator	Loading	Cronbach’s α	CR	AVE
<b>Awareness</b>	AW1: Reduce	0.817	0.918	0.932	0.606
	AW2: Repair	0.793			
	AW3: Reuse	0.815			
	AW4: Refurbish	0.797			
	AW5: Recycle	0.752			
	AW6: Recover	0.721			
	AW7: Rethink	0.825			
	AW8: Restorative and regenerative by design	0.795			
	AW9: Redesign	0.733			
<b>Benefits</b>	B1: Competitiveness	0.890	0.859	0.905	0.705
	B2: Innovation	0.871			
	B3: Environment	0.801			
	B4: Employment	0.791			
<b>Enablers</b>	E1: Store distribution	0.787	0.729	0.811	0.523
	E2: Placement	0.753			
	E3: Communication	0.791			
	E4: Social media	0.527			
<b>Attitudes</b>	AT1: Reduce	0.726	0.887	0.909	0.529
	AT2: Repair	0.605			
	AT3: Reuse	0.700			
	AT4: Refurbish	0.704			
	AT5: Recycle	0.666			
	AT6: Recover	0.713			
	AT7: Rethink	0.793			
	AT8: Restorative and regenerative by design	0.729			
	AT9: Redesign	0.822			

According to the Fornell–Larcker criterion (1981), a construct must explain the variance of its own indicator well. Thus, the square root of each latent variable’s AVE should have a greater value than the correlations with other latent constructs (Table 3). [Insert Table 3 near here]

The off-diagonal numbers are the estimated correlation between the factors. The on-diagonal numbers are the square roots of the AVE. Additionally, the model complies with the Heterotrait–Monotrait ratio (HTMT) criterion, as proved in Table 4. According to Henseler et al. (2015), values higher than 0.9 indicate a lack of discriminant validity.

After calculating the bootstrapping with 5000 re-samples (Hair et al., 2009) to determine whether the hypotheses are statistically significant, four of the six hypotheses were accepted (see Table 5). H3 and H5 were rejected. These results imply that principles are positively associated with attitudes, enablers, and benefits. Moreover, enablers are positively associated with attitudes. However, benefits are not positively related to attitudes and enablers are not positively related to benefits.

#### 4.1. Mediation effect

In Table 6, the mediation effect of benefits and enablers in the relationship between consumers’ awareness of the principles of CE and attitudes is assessed. After computing the specific indirect effect using SmartPLS, five different indirect effects can be observed. Nonetheless, only one can be accepted, having a p-value of 0.028. This indirect effect is the one between awareness, enablers, and attitudes. This result implies that enablers have not only a direct positive effect on attitudes but also an indirect effect that strengthens the positive relationship between awareness and attitudes. This result is statistically significant at  $p < 0.05$ . Conversely, the indirect effects that consider benefits are not significant since H3 and H5 were rejected.

#### 4.2. Moderating effect

The way in which gender affects the correlation between principles and attitudes is evaluated as moderating effect. First of all, the reliability of the model was tested (see Table 7). The model’s results are valid and reliable as the CA and CR are greater than 0.7 and the AVE is above 0.5.

The R2 should be examined before and after adding the moderating effect. Comparing the R2 without the moderating effect with the one including the moderating effect, a slight increase from 0.312 to 0.331 can be observed, indicating that, with the addition of the interaction term (principles  $\times$  gender), 2% more of the variance in consumers’ attitudes is explained by the model.

Additionally, we determined whether the hypotheses are statistically significant by computing the bootstrapping. As shown in Table 8, both H7 and H8 are accepted, meaning that gender is positively associated with users’ attitudes and that the relationship is stronger for females.

### 5. Conclusions and implications

#### 5.1. Academic contribution

So far, previous literature has mainly focused on studying the impact of consumers’ environmental concerns on attitudes, mainly on purchasing behaviour and product adoption (Hartmann and Apaolaza-Ibáñez, 2012; Nath et al., 2013; Sharma and Foropon, 2019). Our findings corroborate previous research, revealing a positive impact of

**Table 3**  
Discriminant validity: Fornell–Larcker criteria.

	Attitudes	Benefits	Enablers	Awareness
<b>Attitudes</b>	0.727			
<b>Benefits</b>	0.429	<b>0.840</b>		
<b>Enablers</b>	0.316	0.206	<b>0.723</b>	
<b>Awareness</b>	0.522	0.758	0.254	<b>0.788</b>

**Table 4**  
Discriminant validity: HTMT criterion.

	Attitudes	Benefits	Enablers	Awareness
<b>Attitudes</b>				
<b>Benefits</b>	0.495			
<b>Enablers</b>	0.352	0.259		
<b>Awareness</b>	0.569	0.848	0.273	

**Table 5**  
Hypothesis testing.

	Path Coefficient	Standard Deviation	T statistics	p-value	Supported
H <sub>1</sub> : Awareness-> attitudes	0.418	0.106	3.946	0.000*	Yes
H <sub>2</sub> : Awareness-> benefits	0.754	0.056	13.51	0.000*	Yes
H <sub>3</sub> : Benefits-> attitudes	0.072	0.113	0.540	0.523	No
H <sub>4</sub> : Awareness-> enablers	0.254	0.079	0.079	0.001*	Yes
H <sub>5</sub> : Enablers-> benefits	0.015	0.059	0.249	0.803	No
H <sub>6</sub> : Enablers-> attitudes	0.195	0.086	2.281	0.023**	Yes

Notes: \*p < 0.001 and \*\*p < 0.05 level.

**Table 6**  
Mediation effect.

	Path Coefficient	Standard Deviation	T statistics	p-value	Supported
<b>awareness-benefits-attitudes</b>	0.004	0.086	0.226	0.528	no
<b>awareness-enablers-benefits-attitudes</b>	0.001	0.002	0.121	0.904	no
<b>awareness-enablers-attitudes</b>	0.104	0.022	1.124	0.028**	yes

Notes: \*\*p < 0.05.

**Table 7**  
Reliability and convergent validity of the moderating effect.

Factor	Indicator	Loading	Cronbach’s $\alpha$	Composite reliability	AVE
<b>Principles <math>\times</math> gender</b>	AT1*gender	0.000	0.990	0.991	0.928
	AT2*gender	0.000			
	AT3*gender	0.000			
	AT4*gender	0.000			
	AT5*gender	0.000			
	AT6*gender	0.000			
	AT7*gender	0.000			
	AT8*gender	0.000			
	AT9*gender	0.000			

awareness of the principles of CE on consumers’ attitudes.

Unlike previous literature, this research also incorporates the role of enablers and benefits of CE in the relationship between awareness of the principles of CE and attitudes. Firstly, the results reflect a high level of awareness and knowledge of CE among consumers. These results are also in line with previous scholars, such as Gazzola et al. (2020), who claim there is an increase on the degree of attention paid to sustainability issues by consumers. Nevertheless, consumers might have the

**Table 8**  
Moderating effect hypothesis testing.

	Path Coefficient	Standard Deviation	T statistics	p-value	Supported
H <sub>7</sub> : gender- > attitudes	-0.613	0.298	2.056	0.040**	yes
H <sub>8</sub> : moderating effect- > attitudes	0.326	0.165	1.982	0.048**	yes

Notes: \*\*p < 0.05.

wrong perception of the meaning of circularity since, as discussed earlier, recycling represents the least sustainable alternative and should be the last option of CE. Instead of focusing on recycling, the spotlight ought to be placed on reusing and reducing people's current consumption. These results corroborate the findings from Vehmas et al. (2018), who found that consumers felt apparel businesses could communicate better the ethical or environmental aspects of their operations because the information currently available is viewed as being too generic and lacking in specific messaging.

The results imply that awareness of the principles is positively associated with enablers and benefits. As claimed by (Amoako et al., 2020), environmental awareness influences consumer behaviour, thus consumers' awareness of the principles of CE makes them more likely to adopt enablers and consider them important in their final attitude. In fact, this research reveals that enablers are positively associated with attitudes, as claimed by scholars such as Nath et al. (2013) and Teisl et al. (2002). It also corroborates the findings of Nath et al. (2013), consumers who are aware of the principles of CE, are also more likely to be aware of the consequences or benefits associated with their decisions. However, benefits are not positively related to attitudes and enablers are not positively associated with benefits. These results could be explained by the fact that, according to the questionnaire's responses, consumers are mainly aware of the environmental benefits and not the rest of the advantages that CE encompasses. This might be owing to a lack of communication from institutions and firms or the newness of this field.

Additionally, it has been proved that gender plays a significant role in the area of sustainable fashion. The results show that the female gender is positively associated with attitudes and that the positive relationship between awareness and attitudes is stronger for women than for men. These findings are in line with authors such as Gazzola et al. (2020) or Musova et al. (2021) who also claim that women are more willing to participate in CE.

### 5.2. Practical implications

After undertaking this study, few excuses can be found for not being willing to participate in CE in the fashion industry. Despite the high level of awareness of this issue, consumers seem to need a nudge to change their approaches. This could come from institutions and governments and lead to pressure on firms to grow their contribution to sustainability, leading to a new avenue for investigation. This approach was also suggested by Prendeville et al. (2014), with implications for a variety of stakeholders from governments to business managers. Overall, there is a lack of clear communication of the meaning of CE by institutions and companies. Communication from sales personnel and media should be more precise and should be based on clear messages. In general, consumers associate CE to recycling, that notwithstanding, greater effort should be made to increase reuse of clothes and to reduce people's current consumption, which are key points in fashion sustainability.

The benefits of CE are connected to the ethical belief in achieving individual or collective improvements (Niinimäki, 2009). Therefore, circular fashion should follow both directions and accomplish well-being as a whole, reducing negative factors, like for example the perception that circular fashion products are more expensive, which

affect the individual rather than the collective benefit.

In terms of gender, and to unify the perception among genders, campaigns might be developed to spread different perceptions among consumers. According to Smith (2010), some marketing techniques are more effective for one gender than for the other. Therefore, companies could pay special attention to capturing the attention of men and to increase their concern about circular economy.

## 6. Limitations and future research

This study suffers from some limitations that could mitigate the reliability of the results. The first one is the small size of the sample. In addition, this sample is not representative in terms of gender or age. Besides, generations such as X or Baby Boomers compose a smaller proportion of the sample. Therefore, a further line of research would be to determine whether the knowledge of CE depends on the generation and may connect awareness to an age group that is more concerned about environmental issues. As specified by Schrettle et al. (2014), consumer culture is a driver of circular economy. Thus, cross-cultural studies might lead to differences regarding the conducting of marketing campaigns to investigate each culture in depth rather than limiting research to one single country.

Additionally, our study has found no connection between benefits and their effects. Therefore, future research should focus on finding which specific benefits might affect awareness and attitudes regarding CE in the fashion industry after campaigns through different means of communication and conducting further tests to reveal additional possible benefits.

### Declaration of competing interest

The authors declare no conflict of interest.

### 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.clrc.2023.100144>.

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