The circular economy business model supports the transformation of the linear consumption model into a closed-production model to achieve economic sustainability with the consumers’ acceptance of circular products being one of the major challenges. Further one important aspect of product circularity remains unexplored such as the consumers’ purchase intention of recycled circular goods. In this context the present study proposes and tests a conceptual model on consumers acceptance of recycled goods through PLS Structural Equation Modeling (PLS-SEM) based on the data obtained from 312 respondents. Results indicate that the positive image of circular products is the most important driver of consumers’ acceptance followed by the product perceived safety. This study provides an empirical foundation for the important role of consumers in circular economy business models through the examination of consumers’ acceptance of recycled goods.

Keywords: circular economy; sustainability; recycled products; consumer acceptance

Article History:
Received: 12 April 2020
Accepted: 30 April 2020

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Laperche (2016) since their choices can support or hamper the circular economy and their decisions determine whether products are consumed through circular consumption processes. However important aspects related to the role of consumers remain unexplored in product circularity. The focus of a circular economy has widely been on the company side of circularity instead of focusing on the market side and accordingly the literature offers few insights into consumers’ acceptance of recycled circular goods. In this context the main purpose of this study is providing an empirical investigation on consumers’ acceptance and purchase intention of recycled circular goods and to examine what are the most important variables driving consumers’ behavior towards these circular products.

Finally the present research is structured as follows. Firstly a literature review is provided in Section 2. Secondly the research hypotheses development is formulated and the methodology is described in Sections 3 and 4 respectively. Next the results are presented and discussed in Sections 5 and 6; Section 7 reports some conclusions implications and the research limitations.

2. LITERATURE REVIEW

2.1. The Sustainable Model of Circular Economy

The basic philosophy of the circular economy is that natural resources are considered to be finite; and consequently the circular economy is a pathway towards a more sustainable economic development. More precisely the concept of circular economy originates in the inability of linear production models to reconcile current levels of production and consumption with the limited availability of resources (Bradley et al. 2018).

Nowadays the dominant economic model is based on a linear consumption model of “consume–use–waste” (Figure 1) where natural resources and raw materials are extracted processed into final goods and then become waste after they have been consumed (Su et al. 2013). Conversely the circular economy provides an alternative model of consumption which is a closed production model (Figure 2) where resources are reused and kept in a loop of production and usage allowing the generation of more value (Su et al. 2013; Urbinati et al. 2017). Therefore in a circular economy products and materials continuously circulate in so-called loops as long as they can provide value.

Figure 1. The linear consumption model.

The circular economy strategy aims to transform in depth the traditional economic model replacing the existing linear production model with a closed production model. In fact the shift from today’s predominantly linear “consume–use–waste” business model to a circular economy model has a great potential to reduce the associated negative environmental impacts (Selvenfors et al. 2019). For this reason the circular economy is perceived as a business model that implements sustainability (Brennan et al. 2015).

Figure 2. The closed production model.
Similarly authors such as Kirchherr et al. (2017) indicate that circular economy could be understood as using post-consumption products materials and resources to create new value through the exchange of linear flows of energy and materials for “closed-loop” systems of production and consumption. For this purpose the circular economy aims to keep components and materials in “closed loops” for as long as possible and promotes the return of the waste to the economy and the minimization of resource consumption (Tunn et al. 2019). Consequently circular products positively contribute to the environment through the reduction of consumption of energy materials and resources (Jena and Sarmah 2015).

2.2. The Principles of Circular Economy

The circular economy could be defined as covering the activities of reduce reuse and recycle in the process of production circulation and consumption. As a consequence prior studies highlight the “3R” principles of circular economy reduce reuse and recycle as the main actions leading to circular economy and that focus on recapturing value from waste materials by circulating them across supply chains (Ghisellini et al. 2016).

The reduce principle supports the minimization of the overall amount of materials resources and waste generated in the economic model through the increase of efficiency in production and consumption while reducing waste and the environmental impact (Ghisellini et al. 2016). Secondy the reuse principle supports that materials products and components that are not wasted are used again for the same purpose that they were conceived (European Parliament and the Council of the European Union 2008). The reason is that reusing materials and products requires fewer resources and less energy than producing new ones (Castellani et al. 2015). Third the recycle principle refers to any recovery operation by which waste materials are reprocessed into products materials or components whether for the original or for other purposes (European Parliament and the Council of the European Union 2008). Therefore recycling entails a process through which used or discarded materials as treated to make them appropriate for reuse. Consequently the circular economy treats waste and discarded materials as a valuable resource (Hazen et al. 2017) since this sustainable business model promotes waste valorization recovering materials otherwise wasted yielding multiple environmental economic and social benefits (Coderoni and Perito 2020).

2.3. Sustainable Consumption for a Sustainable Business Strategy

Sustainable consumption behavior is a complex phenomenon that was first conceptualized as “the use of goods and services that respond to basic needs and bring a better quality of life while minimizing the use of natural resources toxic materials and emissions of waste over the life cycle so as not to jeopardize the needs of future generations” (Olstad 1994). Other authors indicate that sustainable consumption entails satisfying consumer needs while reducing negative impacts caused in resource extraction production and consumption (Cooper 2013). Similarly Tunn et al. (2019) report that sustainable consumption means shaping and satisfying consumer needs to reduce the negative impacts of consumption on the environment and social and economic life.

The business model offers a holistic approach to analyze how companies create and capture value (Zott et al. 2011); and further the sustainable business models integrate the sustainability impact of the model considering societal costs and benefits and the circulation of materials (Dewulf 2010). Similarly the sustainable business model translates circularity into value and to sustainable business strategies that deal with the products’ design manufacturing processing distribution and products’ marketing. In addition the sustainable business models have been considered as key drivers of the transition towards a circular economy. Circular economy represents a strategy that entails economic growth without increasing consumption of resources deeply transforming production chains and consumption habits (European Commission 2014). Therefore it can be stated that the circular economy strategy supports the transformation of traditional consumption models to achieve economic sustainability.

In this context the circular economy and sustainable business models are potential enablers of sustainable consumption through the modification of production processes and consumption patterns (Bocken 2017) such as for example the recovery and reuse of materials and components at the end of product life such as wastage.

However consumers play a critical role in circular economy (Gallaud and Laperche 2016) and for this reason it is crucial to understand their acceptance towards circular products. Most consumers are willing to consume environmentally sustainable products but the real incorporation of these products into their regular purchases is less evident (Cronin et al. 2011). What are the reasons for this behavior? Prior research indicates that some consumers tend to perceive environmentally sustainable products as deficient in salient product attributes (Luchs et al. 2010) or perceive these products as having poor quality performance or safety (Wang et al. 2018). Some other authors point out that consumers may have options to shift to circular consumption patterns but these options are often considered impractical and inconvenient (Selvefors et al. 2019). In addition the lack of consumer interest and awareness is one of the major barriers in the transition from linear business models to circular business strategies (Kirchherr et al. 2018). Therefore to make circular consumption preferable it is essential to increase the understanding of what circular consumption entails.
3. RESEARCH HYPOTHESES

3.1. Perceived Quality of Recycled Products

The concept of perceived quality could be defined as the individual’s subjective judgment regarding a product’s superiority or excellence (Zeithaml1988). However what happens with recycled products? Previous research has demonstrated that when a product is recycled this fact can decrease consumers’ quality expectations of the product (Lin and Chang2012; Wang et al.2013). Furthermore even though some consumers could perceive that recycled products contribute to environmental issues these products may appear to be of lower quality or more contaminated (Baxter et al.2017). This feeling of contamination occurs because individuals feel uncomfortable and disgusted when using specific products that contain recycled materials. The reason that could explain the lower quality perception of recycled products is that consumers might feel uncertain about the quality because they are unaware or have a lack of knowledge of the steps followed by the manufacturer to return waste materials to a like-new product condition (Hazen et al.2017; Jena and Sarmah2015). Therefore a lack of understanding of recycled products manufacturing process fosters low-quality perceptions and reduces consumers’ purchase intention.

In this context manufacturers should not have the idea that recycled products developed from recovered materials or from wastage will be preferred over new products. Conversely manufacturers need to make recycled products attractive enough to compensate for the prejudice about the low quality associated with products made from discarded materials in order to compete with new products in the marketplace (Singh and Ordoñez2016).

On the other hand the purchase intention could be defined as the willingness of an individual to buy a specific product or service and perceived quality has been found to influence consumer purchase intention (Dodds et al.1991). Consequently if a product is perceived to have low quality then purchase intention is expected to be low; and consumers may be reluctant to purchase recycled products if they doubt the quality of these products. Therefore the following research hypothesis is presented:

Hypothesis 1 (H1). The perceived product quality of recycled products has a negative influence on consumers’ purchase intention.

3.2. The Image of Recycled Products

Recycled products can be positioned in consumers’ minds as environmentally friendly and “green products” thus having a positive image among consumers. The reason is that recycling and remanufacturing processes reduce waste reuse discarded material and require less energy and natural resources than the manufacturing processes of new products (Michaud and Llerena2011). Similarly the image of “green products” represents the beliefs that individuals hold regarding how effective these products are in reducing threats to the environment (Chang2011). The positive image of such products as well as the growing sensitivity to environmental issues has shifted consumer behavior including an increased demand and a greater acceptance of recycled products (Tsen et al.2006) and a greater willingness to pay more for these products (Laroche et al.2001).

One factor influencing the positive image of recycled products is consumers’ favorable attitude towards them. Prior studies highlight that consumers’ attitudes towards recycled products are generally positive (Anstine2000) and that they may develop a positive attitude towards recycled products to express social responsibility through their purchase (Hamzaoui and Linton2010). Therefore it can be assumed that consumers who are aware of the possibilities of recycling and turn wastage and used materials into new products will be more positive about recycled products (Magnier et al.2019). Therefore considering all the above the following hypothesis is posed:

Hypothesis 2 (H2). The positive/favorable image of recycled products has a positive influence on consumers’ purchase intention.

3.3. Sustainability/Environmental Benefits of Recycled Products

The sustainability awareness and environmental concern of individuals may influence their behavior. More precisely the environmental concern could be defined as the extent to which consumers are worried about threats to the environment (Lee et al.2014) influencing pro-environmental behaviors such as recycling purchasing. Similarly the sustainable consumption behavior is the result of considering not only consumers’ needs but also social and environmental responsibility (Vermeir and Verbeke2006). Therefore consumers tend to engage in sustainable behaviors when they believe they can make a difference for solving environmental issues (Park and Lin2018).

Similarly previous research reports that perceived sustainability product circularity and a recycled appearance have a positive effect on perceived environmental benefits (Michaud and Llerena2011) influencing the behavior of consumers with a high level of environmental concern (Magnier et al.2019).
What are the major causes driving this environmental concern? The literature highlights the existence of an ethic responsible consumer who expresses responsibility towards environment through purchase decision making. In this context authors such as Tan(2011) report that the environmental knowledge is the factor leading to the development of attitudes and a behavioral pattern of environmental concern. We can therefore expect that consumers with a high level of environmental concern may be willing to support recycled products due to their environmental benefits.

On the other hand previous studies indicate consumers prefer purchasing recycled products because of their concern and awareness of environmental issues (Wang et al.2013; Hazen et al 2017 ) and when they are strongly involved with the environment. That is consumers are prone to purchase recycled products when they are aware of the environmental benefits provided by them (Wang et al.2016). Thus the following research hypothesis is posed:

**Hypothesis 3 (H3).** The sustainability of recycled products has a positive influence on consumers’ purchase intention.

3.4. **Safety of Recycled Products**

Following Grewal et al.(1994) the product safety is related with the risks that encompass the potential negative consequences associated with purchasing a specific product; and accordingly the reduction of the perceived safety could play a negative role in the adoption of products. For this reason attention should be paid to consumers’ perception about the safety of recycled or “waste-to-value” products given the relevance of the consumer thoughts about the safety of circular recycled products.

Prior studies on consumers’ evaluations of recycled products shed light on the perceived risks that could hamper the adoption of these products (Anstine2000;Michaud and Llerena2011). In this vein the consumer evaluation of a recycled product is closely related to the perceived risk associated with the product (Hamzaoui and Linton2010) reflecting the risks associated with the outcome and consequences of the “circular” purchase. More precisely a higher perceived risk reduces consumers’ willingness to purchase recycled products (Hamzaoui and Linton2010).

One factor related with recycled products’ safety is contamination. Products that are intended to be sustainable and environmentally responsible may not be accepted by consumers because of their contamination. More precisely some consumers perceive products made from used and wastage materials as contaminated decreasing their purchase intentions (Meng and Leary2019).

Another factor related with product perceived safety is uncertainty. In general terms consumers face some level of uncertainty when making purchase decisions and such uncertainties may act as inhibiting the purchase decision (Sweeney et al.1999). Regarding recycled products these uncertainties involve the unknown processes used to manufacture the product the lack of previous experience with recycled products or the lack of knowledge about product safety (Hazen et al.2017). Consequently the uncertainty regarding recycled products negatively influences their safety perception (Hazen et al.2017). Therefore considering all the explained above it can be stated that recycled products can have a negative impact on perceived safety negatively influencing consumers’ purchase intention (Magnier et al.2019) and in turn the following hypothesis is posed:

**Hypothesis 4 (H4).** The perceived safety of recycled products has a negative influence on consumers’ purchase intention.

4. **METHODOLOGY**

4.1. **Variables and Measurement Scale**

To the authors’ knowledge there are no previous surveys on the consumers’ acceptance of recycled products; and for this reason research participants were asked to evaluate these products on different measurement scales and indicators validated in the previous literature. The descriptive measures of means and standard deviations are shown in Table1. Firstly the recycled product perceived quality was measured on a three-item scale adopted from Dodds et al.(1991). Then the product image was examined using three items adopted from Netemeyer et al.(2004). The recycled product’s sustainability and environmental benefits were gauged with a two-item scale adapted from Chang(2011) and Mugge et al.(2017 ). For measuring the product safety three items proposed by Magnier et al.(2019) were adopted; while consumers’ purchase intention was examined using three items proposed by Mugge et al.(2017). Participants indicated their level of agreement with the proposed items on a 5-point Likert-type scale (1 = “strongly disagree”; 5 = “strongly agree”).

4.2. **Sampling and Fieldwork**

A structured questionnaire was developed based on an extensive literature review on sustainability. Then an internet based self-administered questionnaire was used to collect data in March 2019 among consumers residing
in Spain on a random basis. More precisely participants were reached through different social media networks such as Facebook and Whatsapp. Prior to answering the questions the research topic was introduced to participants explaining the case of the Spanish company Ecoalf which uses garbage as a valuable resource and transforms plastic debris into fashion products and accessories. Therefore in the introduction we explained to research participants that this company collects plastic from the Mediterranean Sea and converts it into fashion garments through a process of reverse logistics. After this brief introduction participants were briefly informed about the research purpose.

Table 1. Measurement scale indicators and descriptive measures.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Indicators</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived quality</td>
<td>Qual1: Recycled products have good quality</td>
<td>3.810</td>
<td>0.744</td>
</tr>
<tr>
<td></td>
<td>Qual2: Recycled products give me the quality that I expect</td>
<td>3.510</td>
<td>0.806</td>
</tr>
<tr>
<td></td>
<td>Qual3: Recycled products have a quality similar to that of products that are not sustainable</td>
<td>2.860</td>
<td>1.217</td>
</tr>
<tr>
<td>Product Image</td>
<td>Img1: I have a positive image of recycled products</td>
<td>3.990</td>
<td>0.889</td>
</tr>
<tr>
<td></td>
<td>Img2: Consumers of recycled products know how to buy (buy intelligently)</td>
<td>3.250</td>
<td>1.004</td>
</tr>
<tr>
<td></td>
<td>Img3: Recycled products have a positive/favorable image in the market</td>
<td>4.100</td>
<td>0.781</td>
</tr>
<tr>
<td>Sustainability/ environmental benefits</td>
<td>Sust1: Recycled products respect the environment/are good for the environment</td>
<td>4.020</td>
<td>0.774</td>
</tr>
<tr>
<td></td>
<td>Sust2: Recycled products offer significant environmental benefits</td>
<td>3.960</td>
<td>0.882</td>
</tr>
<tr>
<td>Safety</td>
<td>Saf1: Recycled products are safe for consumers</td>
<td>3.790</td>
<td>0.739</td>
</tr>
<tr>
<td></td>
<td>Saf2: The production process of recycled products is safe and reliable</td>
<td>3.530</td>
<td>0.818</td>
</tr>
<tr>
<td></td>
<td>Saf3: Recycled products are benign and no harmful</td>
<td>3.400</td>
<td>1.030</td>
</tr>
<tr>
<td>Intention to purchase</td>
<td>Int1: I will buy recycled products in the future</td>
<td>3.830</td>
<td>0.917</td>
</tr>
<tr>
<td></td>
<td>Int2: I am likely to buy recycled products</td>
<td>3.790</td>
<td>0.962</td>
</tr>
<tr>
<td></td>
<td>Int3: I will continue buying recycled products</td>
<td>3.800</td>
<td>0.959</td>
</tr>
</tbody>
</table>

Next participants were asked to rate the variables related to their acceptance and purchase intention of recycled products. The last section of the questionnaire gathered socio-demographic and economic information. A total amount of 386 questionnaires were sent out gathering 312 valid questionnaires yielding a sampling error of 5.7% at a confidence level of 95%. This sample size exceeds the recommended minimum given the size of the model (Hair et al.2017).

Regarding the sample profile 52.3% of the participants were female while 47.7% were men. A percentage of 28.1% of the participants were between the ages of 31 to 40 while 21.1% were between 41 and 50; and 18.2% were between 20 and 30 years old. In terms of education level 26% of participants had primary education while 33.6% had secondary education and more than 34.2% of the participants had university studies. Regarding the household income the majority of participants (32.8%) had an income of 30,000-42,000 €.

5. RESULTS

5.1. Results of the Measurement Model

Partial Least Squares (PLS) path modelling was applied for the analysis and estimation using the Smart PLS 3.0. software (Ringle et al.2015) to examine the proposed model and to test the research hypotheses (Table2). Before testing the paths and their coefficients the measurement model was tested for reliability validity and internal consistency. First the internal consistency and reliability were examined through Cronbach’ alpha and composite reliability (CR). The results show that constructs achieve composite reliability higher than 0.70 and the values of Cronbach’s alpha for the constructs was greater than 0.70 (Hair et al.2017) indicating an adequate internal consistency. In addition standardized loadings indicate the need to remove item Qual3 from the initial measurement scale. Then convergent validity was examined through the analysis of the factor loadings that achieve values higher than the commonly accepted threshold of 0.70 (Fornell and Larcker1981) and through the values of the average variance extracted (AVE) that are higher than 0.50 (Fornell and Larcker1981); thus indicating adequate values.

Finally the discriminant validity of the scale was examined by assessing all possible paired combinations of constructs (Table3). Since the square root values of AVE for all constructs were higher than the inter-construct correlations the discriminant validity of all constructs was established (Fornell and Larcker1981).
Table 2. Factor loadings and indicators of internal consistency and reliability.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Items</th>
<th>Cronbach Alpha</th>
<th>Standardized Loadings</th>
<th>CR</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Quality</td>
<td>Qual1</td>
<td>0.732</td>
<td>0.884</td>
<td>0.844</td>
<td>0.731</td>
</tr>
<tr>
<td></td>
<td>Qual2</td>
<td></td>
<td>0.866</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Image</td>
<td>Img1</td>
<td>0.713</td>
<td>0.882</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Img2</td>
<td></td>
<td>0.808</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Img3</td>
<td></td>
<td>0.703</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainability/Environmental benefits</td>
<td>Sust1</td>
<td>0.865</td>
<td>0.947</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sust2</td>
<td></td>
<td>0.929</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety</td>
<td>Saf1</td>
<td>0.876</td>
<td>0.886</td>
<td>0.923</td>
<td>0.800</td>
</tr>
<tr>
<td></td>
<td>Saf2</td>
<td></td>
<td>0.876</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Saf3</td>
<td></td>
<td>0.921</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intention to purchase</td>
<td>Int1</td>
<td>0.886</td>
<td>0.915</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Int2</td>
<td></td>
<td>0.881</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Int3</td>
<td></td>
<td>0.912</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Correlations and discriminant validity values.

<table>
<thead>
<tr>
<th>Constructs</th>
<th>PQ</th>
<th>IMG</th>
<th>SUST</th>
<th>SAF</th>
<th>INT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Quality</td>
<td>0.855</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Image</td>
<td>0.530</td>
<td>0.798</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustainability/Environmental benefits</td>
<td>0.525</td>
<td>0.567</td>
<td>0.938</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety</td>
<td>0.619</td>
<td>0.600</td>
<td>0.572</td>
<td>0.894</td>
<td></td>
</tr>
<tr>
<td>Intention to purchase</td>
<td>0.535</td>
<td>0.803</td>
<td>0.519</td>
<td>0.655</td>
<td>0.903</td>
</tr>
</tbody>
</table>

Note: Correlations between different constructs are in the off-diagonal and bold numbers in the diagonal correspond to the square roots of AVE for each construct.

5.2. Results of the Structural Model

The structural model and the relationship between the constructs are analyzed through the coefficients of determination R2 (explained variance) and f 2 (effect size) according to Hair et al. (2017) as shown in Table 4. The coefficient of determination (R2 value) represents a measure of in-sample predictive power (Hair et al. 2017) and the obtained findings indicate an R2 value of 0.693 meaning that 69% of recycled products’ purchase intention is explained by the independent variables. In addition the f 2 effect size measures the strength of each variable in explaining endogenous variables (Hair et al. 2017); and our results show that the f 2 effect size of the constructs are above the 0.02 accepted threshold. Finally the collinearity analysis tests for variance inflation factor (VIF) values are below 5 (Hair et al. 2017) thus indicating an adequate structural model.

Table 4. Structural model evaluation.

<table>
<thead>
<tr>
<th>Constructs</th>
<th>VIF Collinearity Assessment</th>
<th>Confidence Intervals</th>
<th>Level of R2</th>
<th>f2 Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Quality</td>
<td>1.801</td>
<td>−0.087−0.214</td>
<td>0.040</td>
<td></td>
</tr>
<tr>
<td>Image</td>
<td>1.827</td>
<td>0.478−0.760</td>
<td>0.708</td>
<td></td>
</tr>
<tr>
<td>Sustainability/Environmental benefits</td>
<td>1.749</td>
<td>−0.164−0.147</td>
<td>0.100</td>
<td></td>
</tr>
<tr>
<td>Safety</td>
<td>2.069</td>
<td>0.088−0.524</td>
<td>0.099</td>
<td></td>
</tr>
<tr>
<td>Intention to purchase</td>
<td></td>
<td></td>
<td>0.693</td>
<td></td>
</tr>
</tbody>
</table>

6. DISCUSSION

Table 5 shows the path coefficients of the relationship between variables and consumers’ purchase intention corresponding t-values and the level of significance. The obtained results indicate that consumers’ intention to purchase recycled products is significantly influenced by their positive and favorable image and by their perceive safety. More precisely when examining consumers’ acceptance of recycled products the product image was found to have the highest impact on purchase intention (β4 = 0.630 **; p = 0.000). Similarly a direct significant impact was found for product safety on purchase intention (β1 = 0.251 **; p = 0.003) with its influence on purchase intention being slightly lower than image. Therefore the positive image and the product safety is the
stepwise order of the influence of the attributes of recycled products on purchase intention. Therefore it can be stated that the better product image understood as positive favorable image and the greater product perceived safety the greater the consumer purchase intention.

Table 5. Model resolution using PLS algorithm and bootstrapping.

<table>
<thead>
<tr>
<th>Path Analysis</th>
<th>Path Coefficients</th>
<th>t-Value</th>
<th>p-Value</th>
<th>Hypotheses Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Quality → Purchase intention</td>
<td>β₁ = 0.049 ns</td>
<td>0.762</td>
<td>0.649</td>
<td>H1: No Supported</td>
</tr>
<tr>
<td>Image → Purchase intention</td>
<td>β₂ = 0.630 **</td>
<td>8.547</td>
<td>0.000</td>
<td>H2: Supported</td>
</tr>
<tr>
<td>Sustainability/Environmental benefits → Purchase intention</td>
<td>β₃ = −0.008 ns</td>
<td>0.105</td>
<td>0.917</td>
<td>H3: No Supported</td>
</tr>
<tr>
<td>Safety → Purchase intention</td>
<td>β₄ = 0.251 **</td>
<td>2.892</td>
<td>0.003</td>
<td>H4: Supported</td>
</tr>
</tbody>
</table>

R² (Intention to purchase) = 0.693

On the other hand the perceived quality of recycled products does not show a significant influence on consumers’ purchase intention (β₄ = 0.049 ns; p = 0.649). One potential explanation is that as reported in the previous literature the strong quality concerns regarding recycled products influence consumers’ acceptance and purchase intention of such products (Hazen et al.2017). Similarly product sustainability or environmental benefits of recycled products showed no statistical significance on purchase intention (β₄ = −0.008 ns; p = 0.917) since this relationship failed to reach statistical significance. This result could suggest that as long as customers have a positive image of recycled products in their minds and perceive an adequate product safety the product environmental benefits are not relevant for consumers regarding their purchase decision.

Finally our findings provide support for two of the proposed research hypotheses since hypotheses H2 and H4 were supported. Figure 3 shows the results obtained for the path analysis.

Figure 3. Results of the path analysis.

7. CONCLUSIONS

Some companies participate in the circular economy through the production of recycled products however these initiatives will only be successful if consumers are willing to adopt these circular products. Therefore consumers acceptance of recycled products is a key factor for ensuring the success of circular business models. In this context this research aims to gain understanding of the determinants of consumers acceptance for recycled products. The obtained findings indicate that product image followed by safety are the main drivers of consumers
purchase intention of recycled circular products. Therefore research has identified the positive image and safety of the product as the important issues when deciding whether or not to purchase recycled products. Contrary to the initial expectations the present research does not support the influence of perceived quality and product environmental benefits on consumers acceptance of recycled products. Therefore this research contributes to the theory building in sustainable business models providing an empirical foundation for the importance of the role of consumers in circular economy models and their acceptance of recycled circular goods.

This research provides useful insights for managers into consumers’ acceptance of recycled products. The reason is that only when companies fully understand the acceptance of consumers toward circular goods can better strategies developed for in order to meet the market demand. In general terms companies following sustainable business strategies should engage consumers through awareness-raising communication campaigns and education on the consumption of circular goods providing consumers with adequate information about recycled products and their characteristics. Similarly companies should promote product safety such as presenting objective proofs of the innocuousness of recycled products and develop strategies to eliminate the risk of perceived contamination. In addition and considering the lack of influence of the perceived product quality of these products managers should also develop educational and awareness campaigns in order to help consumers mitigate the poor perception about the quality of recycled products.

This research nonetheless has limitations representing avenues for future research. In the first place the research sample size is sufficient for an exploratory study to gain insights into this field of knowledge but future research could develop larger samples in order to allow further generalizations.

Secondly future research could include other relevant product-related and consumer-related variables that were not included in this study such as for example consumer involvement with circularity consumer attitude price of circular products products functionality or even the convenience of circular goods. Third this study did not investigate the effect of brands on responses to recycled products; and in turn future research could research the influence of product brands on consumers’ acceptance of circular goods. Finally some limitations could derive the social media networks used in order to gather consumers’ information.

Conflicts of Interest:

The authors declare no conflict of interest.

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