



Segmentation of consumers based on awareness, attitudes and use of sustainability labels in the purchase of commonly used products

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ABSTRACT

Most of the previous studies that segment consumers based on the consideration of certifications and sustainability attributes in purchasing decision-making offer a limited vision, as focusing on specific labels or types of products, usually in the food sector. This paper aims to identify segments of Spanish consumers based on their awareness, attitudes and use of 28 certified sustainability labels linked to eight categories of common household products (food, clothing, paper and wood, cosmetics, electrical appliances, energy, computing and multi-sector). Likewise, it is intended to characterise the segments identified based on their environmental concern and socio-demographic characteristics. Data was collected from a survey study carried out with a sample of 3000 participants and the latent class analysis revealed seven typologies: *experts, convinced, interested, moderate, sceptical, neutral and unmotivated*. The segments differed in their awareness and attitudes towards different labels by product category, which was significantly associated with the purchase of certified products. The sectors in which a greater use of labels was appreciated were electrical, computing, and paper and wood. Young women with a high level of education and more environmental awareness were the most effective consumers when using certifications. In any case, it is concluded that sustainability labels do not provide added value for around half of Spanish consumers, who would benefit from measures such as legislative improvements, far-reaching advertising campaigns or high-order label systems to simplify the information on the packaging of the products.

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1. Introduction

Certified sustainability labels came into being with the clear purpose of serving as instruments that would facilitate sustainable consumption, since they would reduce the asymmetry of knowledge between producers and consumers and inform the latter of the environmental and social sustainability-related characteristics of the products (Apostolidis and McLeay, 2016; Caswell and Anders, 2011; Janssen and Hamm, 2012). As these characteristics generally involve invisible credence attributes (such as the method of production, local commerce, respect towards human rights, etc.), consumers often do not have the time and expertise required to evaluate them during their day-to-day purchasing activities (Blowfield, 1999; Branch et al., 2018; Manning and Kowalska, 2021). Thus, certified labels are symbols or seals that can be employed as simple clues by which to identify the ethical attributes of the products

of firms that voluntarily comply with standards established by a third-party certifying entity, thus allowing better-informed consumer choices (De Boer, 2003; Hartlieb and Jones, 2009; Van Loo et al., 2014).

Given their value for industry, labelling schemes have grown significantly in the last few years (Albayrak et al., 2010; Grunert et al., 2014; Sarti et al., 2018). According to the most recent counts, there are >450 certified sustainability labels, covering 199 countries and 25 industrial sectors (Ecolabel Index, 2022). In addition to this large number of labels, there is considerable heterogeneity as regards their underlying certification and monitoring systems, which can be promoted by different types of public or private entities (Castka and Corbett, 2016; Janßen and Langen, 2017; Kaczorowska et al., 2019). All these labels also differ from each other regarding the facets of sustainability addressed, and therefore the short of benefits which are provided to consumers (Balderjahn et al., 2018; Nikolaou and Kazantzidis, 2016; Prell et al., 2020; Sarti et al., 2018). In this sense, certified labels refer to those known as type I eco-labels, which imply a third-party assessment of a company's environmental standards (D'Souza et al., 2007), but also to other social labels that mainly verify compliance with social standards, such as the Fair Wear label or the label of the Network of Alternative

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and Solidarity Economy Networks. In any case, the existence of a certifying entity differentiates them from other type II eco-labels, self-declarations or advertising claims that often do not have sufficient scientific merit to inform consumers about the sustainability of products and companies (Ferrero et al., 2019; Hoek et al., 2013; Lanero et al., 2020).

The huge number of certified sustainability labels that have appeared in recent years may, paradoxically, put their real usefulness in danger by causing confusion and a lack of confidence in consumers (Burke et al., 2014; Dekhili and Achabou, 2015; Gadema and Oglethorpe, 2011; Grunert et al., 2014; Prell et al., 2020). These deficiencies as regards the functioning of certified sustainability labels show the need to clarify the profile of those consumers capable of recognising and feeling positive attitudes towards them, since these are vital conditions if the labels are to be used efficiently (De Boer, 2003; Grankvist et al., 2004; Grunert et al., 2014; Taufique et al., 2014; Thøgersen, 2000). At this purpose, segmentation studies have been endorsed by previous literature findings when they come to identifying consumer typologies based on their sustainable behaviour (Balderjahn et al., 2018; Funk et al., 2021; Niedermeier et al., 2021; Steiner et al., 2017).

Previous segmentation studies concerning the recognition and use of labels have tended to focus on the convenience purchasing of a specific type of product, usually in the food category (Broeckhoven et al., 2021; Janßen and Langen, 2017; Hinkes and Christoph-Schulz, 2020; Hoque, 2021; Liu et al., 2017; Owusu-Sekyere et al., 2020; Sogari et al., 2016), and have analysed consumer profiles associated with specific certified labels, such as carbon or water footprint labels (Broeckhoven et al., 2021; Gadema and Oglethorpe, 2011; Owusu-Sekyere et al., 2020; Peschel et al., 2016), the EU organic logo (Hinkes and Christoph-Schulz, 2020; Kaczorowska et al., 2019; Zander et al., 2015) or fair trade labels (Hinkes and Christoph-Schulz, 2020; Kaczorowska et al., 2019). Although this type of studies has been useful in order to better understand how the sustainable food market is segmented, very few studies have focused on other sectors (Niedermeier et al., 2021; Sarti et al., 2018; Steiner et al., 2017) or on more sporadic and specialised types of purchasing (Zha et al., 2020). In this respect, previous literature has barely focused on certified labels of considerable relevance in sectors other than that of food, such as the Global Organic Textile Standard label (clothing), the Ecocert label (cosmetics) or the Common Good Balance social sustainability label (multi-sector), to name but a few.

The specific nature of previous studies entails that they are limited because they provide answers only to particular sustainable attributes as regards the purchasing of a concrete product, but do not allow to make comparisons and generalisations in the case of different purchasing contexts (Balderjahn et al., 2018; Niedermeier et al., 2021). In this respect, it is necessary to highlight that the diversity of the consumers themselves is united with that of certified sustainability labels, signifying that previous literature has identified typologies of consumers with heterogeneous social and environmental concerns (Carrero et al., 2016; Janßen and Langen, 2017; Niedermeier et al., 2021). Attitudes towards sustainable products consequently vary significantly for different industries and quality attributes (Gladwin et al., 1995), in the same way that the profiles of sustainable buyers are not the same for all types of labels (Brenton, 2013; Carrero et al., 2016; Grunert et al., 2014). This way, market research into sustainable products would probably benefit from more global analyses that simultaneously consider different types and categories of products commonly used in homes, covering different certified labels and industrial sectors. Establishing a well-founded typology of consumers that recognise, accept and have recourse to sustainability labels and criteria in various habitual situations would, therefore, help to better understand the functionality of those certifications and take action by which to improve the knowledge of and confidence in them as a stimulus to sustainable consumption.

The objective of the present research is to use the aforementioned approach in order to contribute to the previous literature regarding

segmentation in Spain (Broeckhoven et al., 2021; Grymshi et al., 2022) by not only analysing the functionality of various sustainability labels, but also simultaneously considering different categories of products and types of purchase. We specifically analyse 28 sustainability certifications, which were selected on the basis of the criteria of a group of Spanish experts according to their importance and reliability. These labels cover categories from different sectors, including food, clothing, paper and wood, cosmetics, electrical appliances, energy, computing and multi-sector.

Within this multi-label and multi-sector framework, the main purpose of this study is to analyse how Spanish consumers can be segmented on the basis of label awareness and attitudes, which could help explain the purchase of different types of products with certified sustainability labels. Furthermore, the segmentation is used as the basis on which to analyse whether environmental concern and socio-demographic variables are suitable means to distinguish the segments, as these variables have frequently been employed in previous similar studies (Liu et al., 2017; Niedermeier et al., 2021; Owusu-Sekyere et al., 2020; Sogari et al., 2016; Zha et al., 2020). The specific objective is to provide a response to three research questions: i) are there different clusters of Spanish consumers based on label awareness and attitudes?; ii) do clusters differ as regards their purchase of labelled products?; and iii) do environmental concern and socio-demographic variables affect cluster membership? The responses to these questions may be useful for companies that market sustainable goods, as well as for certifying entities and policy makers, since they will make it possible to identify the profile of consumers that efficiently and transversally use sustainability labels when making their purchasing decisions, along with the dysfunctional nature of these labels for other market segments and possible means to deal with this.

This paper is organised as follows. Section 2 provides a summary of the main findings in relevant previous segmentation studies on the basis of variables related to label awareness, attitudes and use. Section 3 presents the survey methods employed in this study and the statistical methods used for data analysis, after which the results are reported in Section 4. Conclusions and implications are discussed in the final sections.

2. Literature review

2.1. Conditions required for the efficient functioning of certified sustainability labels

The efficient functioning of a label implies that the consumer is able to use it to obtain information regarding the sustainability of the product and employ this as a criterion in the decision to make a purchase (Thøgersen, 2000). The majority of experts agree that for certified sustainability labels to be used correctly, they must fulfil a series of previous conditions for the consumer that can be easily summarised in two related processes: label awareness and positive attitudes towards the label (De Boer, 2003; Grankvist et al., 2004; Grunert et al., 2014; Taufique et al., 2014; Thøgersen, 2000).

In this paper, we define label awareness in terms of the recognition of a particular certificate of sustainability when purchasing a product. A considerable number of authors consider that sustainability labels are useful only if they are noticed and understood by the consumer in the shopping situation (De Boer, 2003; Grankvist et al., 2004; Grunert et al., 2014; Janssen and Hamm, 2012; Samant and Seo, 2016; Taufique et al., 2014; Thøgersen, 2000; Thøgersen et al., 2010). Once consumers have noticed the label on the product packaging, they process its meaning and form an attitude towards it that guides their decision-making process (Grunert et al., 2014). These attitudes have been defined as the predisposition to respond to something favourably or unfavourably (Ajzen, 1991; Fishbein and Ajzen, 1975) and have proved to be a fundamental factor at explaining sustainable consumption (Barber, 2009; Laroche et al., 2001; Lee and Yun, 2015). Attitudes

are the combination of three components (McGuire, 1968): cognitive (beliefs), affective (sentiments) and conative (tendencies towards action), which have been mentioned frequently in the literature concerning the efficient functioning of sustainability labels. In this sense, previous works indicate that consumers will pay attention to and use a label in decision-making only if they trust the message it conveys (De Boer, 2003; Grankvist et al., 2004; Taufique et al., 2014; Thøgersen, 2000), if they evaluate it as being useful to attain certain goals (De Boer, 2003; Grankvist et al., 2004; Samant and Seo, 2016; Taufique et al., 2014; Thøgersen, 2000; Thøgersen et al., 2010) and if they have a tendency to seek certified products (Grolleaw and Caswell, 2006; Grunert and Wills, 2007; Thøgersen et al., 2010).

Previous literature has shown that the huge increase in the number of certified labels and other symbols that have appeared in the last few years supposes an obstacle to the fulfilment of both conditions owing to the confusion that they cause (Dekhili and Achabou, 2015; Grunert et al., 2014; Prell et al., 2020). Several studies have concluded that very few consumers have precise knowledge regarding companies' sustainable production practices, and that the majority have difficulty in understanding the meaning of the labels and distinguishing among so many symbols and facets of sustainability (Amos et al., 2019; Annunziata et al., 2019; Sirieix et al., 2013; Zander et al., 2015). Moreover, the overexposure to claims of sustainability leads to attitudes of mistrust and scepticism about their usefulness (Burke et al., 2014; Gadema and Oglethorpe, 2011; Thøgersen, 2000), which eventually translates into little inclination to purchase sustainable products when confronted with other more practical criteria such as quality or price (Annunziata et al., 2019; De Boer, 2003; Vermeir and Verbeke, 2006).

Given the limitations of the efficient functioning of certified sustainability labels explained above, it is necessary to identify the factors that differentiate those consumers who recognise and appreciate them, and to verify the extent to which this profile is associated with a greater use of them when making purchasing decisions. On this point, numerous studies have proposed the segmentation of consumers by considering variables related to label awareness, attitudes and use.¹ Much of the research carried out has analysed the typologies of the consumers of convenience goods, fundamentally in the food sector (Broeckhoven et al., 2021; Janßen and Langen, 2017; Hinkes and Christoph-Schulz, 2020; Hoque, 2021; Liu et al., 2017; Owusu-Sekyere et al., 2020; Sogari et al., 2016), and to a lesser extent as regards non-food grocery products (Niedermeier et al., 2021; Sarti et al., 2018; Steiner et al., 2017). To our knowledge, only a work by Zha et al. (2020) provided a segmentation of sustainable consumers based on the purchase of comparison products. Furthermore, with the exception of those that deal with this subject in general terms (Gadema and Oglethorpe, 2011; Grymshi et al., 2022; Sogari et al., 2016; Zander et al., 2015), the majority of these works have focused on one category or specific type of related products, considering only one label or a small number of them from the same spectrum (Broeckhoven et al., 2021; Gadema and Oglethorpe, 2011; Hinkes and Christoph-Schulz, 2020; Kaczorowska et al., 2019; Owusu-Sekyere et al., 2020; Peschel et al., 2016; Zander et al., 2015), often in the same environmental dimension, while little effort has been made to simultaneously analyse various certified labels (Hinkes and Christoph-Schulz, 2020; Hoque, 2021; Janßen and Langen, 2017; Kaczorowska et al., 2019; Sarti et al., 2018).

In short, previous studies offer a limited perspective that is not generalizable to different purchasing contexts (Balderjahn et al., 2018; Niedermeier et al., 2021) and is not sensitive to the great heterogeneity of consumers in terms of the evaluation of different facets of product

sustainability (Brenton, 2013; Carrero et al., 2016; Gladwin et al., 1995; Grunert et al., 2014). Therefore, this paper extends the aforementioned line of research by considering several categories of products and certified sustainability labels in the same study with the objective of providing a segmentation of the Spanish sustainable consumption market. The basic propositions of this study are presented in the following subsections.

2.2. Label awareness, attitudes and use in segmentation studies

When explaining the purchase of sustainable products, previous research generally stresses the importance of the awareness and knowledge of certified sustainability labels, along with attitudinal variables. The studies coincide in identifying classes (usually of a moderate size) of consumers that recognise the labels and claims analysed (Broeckhoven et al., 2021; Hoque, 2021; Grymshi et al., 2022; Liu et al., 2017), that tend to trust them and value their usefulness (Janßen and Langen, 2017; Niedermeier et al., 2021; Owusu-Sekyere et al., 2020; Sogari et al., 2016), or that are well predisposed to seek certified products (Gadema and Oglethorpe, 2011; Hinkes and Christoph-Schulz, 2020). For example, in a study on the consumption of ecological agricultural products conducted with 3000 consumers from six European countries, Zander et al. (2015) identified 25.1 % of consumers denominated as "committed organics" who had a good knowledge of the EU organic logo, appreciated their usefulness and stated that they consumed organic products with great frequency. Similarly, Kaczorowska et al. (2019) carried out a study focused on four categories of food products and three certified sustainability labels (Euro-leaf, PGI and Fairtrade labels). Of their sample of 423 Polish adults, 36.6 % were "mindful" consumers, who expressed good will towards sustainable products and labels, had no doubt about the reliability and usefulness of labels and displayed great willingness to buy labelled products.

On the contrary to this profile of consumers, the majority of the profiles found in the aforementioned segmentation studies are more similar to those shown in the literature that questions the usefulness of labels. The various works, therefore, show a high percentage of consumers who are unaware of or indifferent to the sustainability certificates of products (Broeckhoven et al., 2021; Gadema and Oglethorpe, 2011; Grymshi et al., 2022; Janßen and Langen, 2017; Sarti et al., 2018; Sogari et al., 2016). For example, the aforementioned study by Zander et al. (2015) identified 26.2 % of "pragmatic organics" who regularly or occasionally consumed organic products and trusted in organic farming and labelling but had little knowledge of organic principles. This profile was similar to that of the 29.2 % of "organic disinterested" consumers, who were not at all interested in EU organic standard settings and labelling.

In addition to consumers with low levels of label awareness and knowledge, the aforementioned segmentation studies continuously identified a significant percentage of consumers who mistrusted or were sceptical about sustainability labels (Gadema and Oglethorpe, 2011; Sogari et al., 2016; Zander et al., 2015). There are, therefore, many consumers who have a negative perception of sustainable products and do not seek them or tend to avoid buying them (Owusu-Sekyere et al., 2020; Sogari et al., 2016). For example, in the study conducted by Kaczorowska et al. (2019), 63.4 % of the sample analysed was included in the class of "sceptical" consumers, who do not pay much attention to sustainability labels because they have too little knowledge of them and perceive them as not very convincing.

Having observed the usefulness of label awareness and attitudes as segmentation variables shown in previous studies, including those conducted in Spain (Broeckhoven et al., 2021; Grymshi et al., 2022), in this paper, we propose that both conditions could be used in order to segment consumers from a more global point of view that simultaneously considers various categories of sustainability products and certifications, thus showing the dysfunctional nature of the labels and the factors that differentiate efficient consumers in habitual purchasing situations.

¹ The multidisciplinary database Web of Science served as the primary reference source to identify potentially relevant studies on which to base the research propositions. The search string was designed to include segmentation studies considering consumer behaviour in relation to certified sustainability labels. A total of 16 papers published between 2011 and 2022 were selected by considering segmentation variables directly related to label awareness, attitudes and use. See supplementary material (Appendix A) for a detailed synthesis of the studies.

Proposition 1. *There are different clusters of Spanish consumers according to their label awareness and attitudes towards certified sustainability labels associated with different types of products.*

As has occurred in the literature that recognises the role played by label awareness and attitudes as determinant factors in the efficient use of sustainability labels when making purchasing decisions (De Boer, 2003; Grankvist et al., 2004; Grunert et al., 2014; Taufique et al., 2014; Thøgersen, 2000), segmentation studies tend to conclude that the choice of products that have been certified as being sustainable is facilitated in those classes of consumers who know the labels and consider them to be believable and useful (Kaczorowska et al., 2019; Zander et al., 2015).

With regard to label awareness, a choice experiment study carried out by Steiner et al. (2017) on a sample of 1579 German consumers in order to analyse their preferences for products (yogurt and toilet paper) identified by carbon and water footprint labels found that one of the most important factors that contributed to profiling the segments was the stated attention paid to product label information. Likewise, Peschel et al. (2016) found that high knowledge levels as regards environmental issues drove environmentally sustainable food choices in a sample of 3130 consumers from Germany and Canada. However, Kaczorowska et al. (2019) concluded that when labels are unknown or their meaning is confusing, even consumers with positive attitudes towards sustainability certifications do not use them as guidance when shopping for food. Survey studies support the same type of association between label awareness and the purchase of certified products in the classes identified in several European countries such as Spain (Grymshi et al., 2022; Zander et al., 2015).

Segmentation studies complement those cited above in that they show that consumers' positive attitudes towards labels influence the choice of products certified as sustainable during shopping (Kaczorowska et al., 2019; Zander et al., 2015). The negative attitudes of indifference, confusion and scepticism towards environmental and ethical claims are similarly considered to hold back the purchase of sustainable alternatives (Albayrak et al., 2010; Burke et al., 2014). As an example of these tendencies, in an online survey of 495 Italian wine drinkers, Sogari et al. (2016) identified four attitudinal profiles of consumers in relation to topics concerning environmental sustainability and certification ("well-disposed", "not interested", "sceptical" and "adverse"), which were closely associated with various habits of buying wines certified as being sustainable.

Even so, we propose in this paper that the segmentation of Spanish consumers on the basis of their awareness and attitudes towards different labels in various situations concerning the purchase of products commonly used in homes will make it possible to explain differences in the degree to which these labels are used to purchase sustainable products.

Proposition 2. *Segmentation based on label awareness and attitudes is associated with differences in the label use by Spanish consumers.*

2.3. Determinants of heterogeneity in label awareness, attitudes and use

With regard to observed heterogeneity, several background factors have been found to be related the fact of belonging to different clusters of consumers. Of all of them, in this paper we focus on environmental concern and socio-demographic variables as being some of most relevant issues in the characterisation of consumers with different levels of awareness, attitudes and use of certified sustainability labels (Liu et al., 2017; Niedermeier et al., 2021; Owusu-Sekyere et al., 2020; Sogari et al., 2016; Zha et al., 2020).

Literature frequently defines environmental concern in terms of a positive attitude towards the protection of the environment (Chan and Lau, 2004; Crosby et al., 1981), reflecting individuals' awareness of environmental problems and their willingness to contribute to solving them (Dunlap and Jones, 2021). Several works have related environmental concern to the purchase of green products and to a change towards more responsible consumer habits (Gadema and Oglethorpe, 2011; Kim and Choi,

2005; Mishal et al., 2017). In this respect, it would appear that those consumers who are most conscientious about the environment tend to have more conscientious purchasing behaviour (Hinkes and Christoph-Schulz, 2020), which leads them to be more informed about those products that are distinguished from others by their ecolabels and other symbols of social sustainability (Grankvist et al., 2004; Samant and Seo, 2016). Many of the segmentation studies reviewed also indicate that consumers' concerns, beliefs and attitudes on environmental and sustainability-related issues help to establish profiles of consumers with different attitudes and preferences when choosing certified products (Hinkes and Christoph-Schulz, 2020; Niedermeier et al., 2021; Owusu-Sekyere et al., 2020; Sogari et al., 2016; Steiner et al., 2017; Zha et al., 2020). For instance, in a study on knowledge and preferences for organic food conducted with 435 Chinese consumers, Liu et al. (2017) identified three clusters ("eco-label preferred", "price sensitive" and "geographical origin") that revealed positive correlations between premiums for eco-labelled rice and consumers' concerns about food safety and the environment.

Furthermore, socio-demographic characteristics are frequently used to profile sustainable consumers, as they are usually identified as being major drivers of heterogeneity in terms of preferences and decisions (Aertsens et al., 2009; Carrero et al., 2016; D'Souza et al., 2007; Prell et al., 2020). In this sense, segmentation studies usually consider socio-demographic variables when categorising consumers, with the most frequent being gender and age. With regard to gender, there is a notable variation in the results obtained previously, in that some studies state a higher percentage of women in the segments of consumers who are most oriented towards buying certified products (Sogari et al., 2016; Zha et al., 2020), while others show a higher percentage of men (Liu et al., 2017; Owusu-Sekyere et al., 2020). What these studies do seem to coincide on is that there are higher levels of label awareness, attitudes and use in young and middle-aged consumers, while the higher levels of scepticism and attitudes of rejection towards the labels appear to be linked to the groups comprising older people (Gadema and Oglethorpe, 2011; Hinkes and Christoph-Schulz, 2020; Niedermeier et al., 2021; Sogari et al., 2016). Studies also suggest that consumers with better knowledge and positive attitudes and preferences for labelled products tend to be better educated and have a higher socioeconomic status (Grymshi et al., 2022; Hinkes and Christoph-Schulz, 2020; Liu et al., 2017; Owusu-Sekyere et al., 2020; Zha et al., 2020). Other socio-demographic variables found important to characterise different clusters of consumers are household size and composition (Liu et al., 2017; Owusu-Sekyere et al., 2020) and size of the living area, differentiating between consumers in urban and rural areas (Broeckhoven et al., 2021).

Using the results obtained from previous segmentation studies as a starting point, we propose that environmental concern and socio-demographic variables are a suitable means to distinguish segments of consumers on the basis of label awareness and attitudes.

Proposition 3. *Clusters of Spanish consumers based on label awareness and attitudes differ with regard to environmental concern and socio-demographic variables (gender, age, social class, level of studies, number of children and municipality size).*

3. Methods

3.1. Data collection and sample profile

The study sample consisted of 3000 Spanish consumers who are members of an online panel. The online panel provider has over 100,000 panellists, has an average response rate of 50–55 % and is ISO 20252 certified for market, opinion and social research, including insights and data analysis. The fieldwork was carried out in August and September 2019 (n = 1000) and December 2020 (n = 2000). Respondents with uniform response patterns or very short response times were filtered out so as to achieve data quality.

Table 1
Distribution of the population and sample by gender and age.

Variable	Population	Sample (n = 3000)
Gender		
Female	50.8 %	50.8 %
Male	49.2 %	49.2 %
Age		
16–24	14.3 %	14.1 %
25–34	17.4 %	17.4 %
35–44	22.6 %	23.5 %
45–54	22.0 %	22.0 %
55–64	15.7 %	15.5 %
65–74	8.0 %	7.6 %

In order to ensure that the sample was representative of Spanish Internet users, a quota sampling method was used to approximate the distribution of the sample to that of the population according to the following variables: gender, age, region and social class. The quotas for the first three variables were established on the basis of the data on Spanish people using the Internet at least once a day obtained from the Survey on Equipment and Use of Information and Communication Technologies in Households (Spanish National Statistics Institute, 2020). Table 1 shows the distribution of the population and sample by gender and age. The Socio-economic Index of the General Media Survey (Spanish Association for Media Research, 2020) was used to establish the quotas by social class. This index considers seven hierarchical groups on the basis of: (1) the level of studies and profession of the person principally responsible for maintaining the household; (2) the activity (working, retired, unemployed or inactive) of the person principally responsible for maintaining the household; and (3) the size of the household and the number of individuals in it.

3.2. Instrument

The study analysed 28 different labels that provide information on the sustainability of the product or service. All the labels included had to meet three requirements: (1) it provides information about a social and/or environmental attribute of product; (2) this information is certified, accredited or validated by an independent organisation, and (3) this information is communicated on the product by means of a logo and/or text that is representative of the label. The selection of the labels considered in this research was carried out by following *ex ante* and *ex post* procedures. First, 23 in-depth interviews with sustainability experts in different fields were carried out before the fieldwork was conducted. The interviews (in Spanish) have been published and can be found at [ClicKoala \(2020\)](#). Secondly, these labels were validated, *ex post*, in a complementary manner by means of a survey involving 65 sustainability experts from 25 universities and 162 experts from 42 universities. This took place in 2019 and 2020, respectively. The assessments provided by these sustainability experts made it possible to verify that the 28 labels analysed had a positive impact on the environment and/or social justice.

Table 2 shows the 28 labels used, grouped into eight different categories: food, clothing, paper and wood, cosmetics, electrical appliances, energy, computing, and multi-sector (those labels that are used in different sectors were grouped together in this last category).

Using the selected labels as a starting point, all the participants in the study responded to a questionnaire (the complete version is provided in Appendix B of supplementary material), which consisted of the following sections:

- Environmental concern. As has occurred in previous studies (Hinkes and Christoph-Schulz, 2020; Liu et al., 2017), four items were used to assess the importance of different environmental problems (climate change, pollution in cities, excess of plastic and disappearing

animals and plants). The environmental concern scale was measured on a three-point ordinal scale with the following response options: (1) not at all important, (2) somewhat important, and (3) very important.

- Socio-demographic variables. The questionnaire contained two questions related to gender and age. The information regarding social class, level of studies, number of children and size of municipality was requested from the provider of the panel using an identifier.
- Label awareness. The procedure employed in previous studies (Kaczorowska et al., 2019; Zander et al., 2015) was followed to show the participants the list of 28 logos selected for the study, and they were asked: “Of these logos, which do you know, although only by sight?”. The labels were grouped into the eight categories indicated previously, and the percentage of labels recognised in each category was then calculated.
- Label attitudes. The review of other works (Kaczorowska et al., 2019; Sogari et al., 2016; Zander et al., 2015; Zha et al., 2020) was used as the basis on which to formulate four items with which to measure the attitudes towards the sustainability labels, focusing on their three components (McGuire, 1968). The item used for the cognitive component was one concerning beliefs in the reliability of the labels (“I trust the information conveyed by this type of labels”). The affective component was evaluated using an item concerning feelings towards the usefulness of the label as regards the purchase decision (“The fact that a product is labelled encourages me to buy it”). The conative component was measured using two items concerning the tendency to deliberately seek labels (“I look at the social and environmental labels on the products I buy”) and to purchase certified products (“I have bought products labelled as being socially and/or environmentally responsible in the last month”). The label attitudes scale was measured on a three-point ordinal scale with the following response options: (1) disagree, (2) neither agree nor disagree, and (3) agree. The choice of a three-point scale was based on previous literature that used similar items and aimed to clearly discriminate between those individuals with favourable and unfavourable attitudes towards labels (Maloney et al., 1975).
- Label use in purchase behaviour. The respondents were once again shown the list of labels and asked the following question about each of them: “In the last three months, have you purchased any product in which you identified one of these logos or certificates?”. Some other previous studies have used similar approaches to measure consumption habits related to the purchase of products identified as sustainable (Gadema and Oglethorpe, 2011; Grymshi et al., 2022; Peschel et al., 2016). The labels were once more grouped into eight categories and the percentage of labels considered in purchase decisions was calculated for each category. A dichotomic variable related to the purchase or non-purchase of certified products in general was also included.

3.3. Data analyses

As a preliminary step, a confirmatory factor analysis (CFA) was conducted to assess the reliability and validity of the scales used to measure attitudes towards labels (four items) and environmental concern (four items). Moreover, the polychoric correlation matrix was used (Gademann et al., 2012) to account for the ordinal nature of the items used to measure these constructs. Following the recommendations of Viladrich et al. (2017): (1) the weighted least squares mean and variance adjusted (WLSMV) estimator was, therefore, used for the CFA; and (2) the ordinal alpha and omega coefficients (ordinal α and ω) were used to estimate internal consistency reliability of the scores. The Mplus 8.0 (Muthén and Muthén, 2017), R 4.1.2, and GPARotation (Bernaards and Jennrich, 2005), psych (Revelle, 2018), and Rcmdr (Fox and Bouchet-Valat, 2019) R packages were also used. The factor

scores of label attitudes and environmental concern were saved as new variables using the FSCORES option of the SAVEDATA command implemented in Mplus 8.0. These two variables were employed in the subsequent analyses.

The three propositions were tested by performing a latent class cluster analysis (LCCA), which has several advantages over other cluster-analysis methods (Vermunt and Magidson, 2002; Wedel and Kamakura, 2000) and has previously been used for market segmentation in this field (Scherer et al., 2017). The selection of the optimal number of clusters was based on the Bayesian Information Criterion (BIC) and the Consistent Akaike Information Criterion (CAIC). Specifically, the bias-adjusted three-step approach, proposed by Bakk et al. (2013) and Vermunt (2010), was employed. In this approach, the assignment of individuals to latent classes in the second step makes it possible to obtain an estimated amount of classification errors and correct

for it in the third step (Vermunt and Magidson, 2016). Fig. 1 shows the proposed analytical model.

Proposition 1 was tested by estimating the latent class model that included label awareness (eight variables) and attitudes (one variable) as indicators (first step), and the Spanish consumers were then assigned to latent classes using their subsequently attained class-membership probabilities (second step). In the third step, in order to test Propositions 2 and 3, respectively, the Step3 submodule implemented in Latent Gold® 5.1 (Vermunt and Magidson, 2016) was used with: (1) external outcome variables (purchase of labelled products and label use in purchase behaviour), which were predicted by class membership (dependent option); and (2) external concomitant variables (i.e. environmental concern and socio-demographic variables) in order to predict class membership (covariate option). In the dependent option, a bivariate analysis was conducted for each outcome variable,

Table 2
List of labels considered in the study.




























Logo	Name	Main area	Category
	Agriculture Biologique (Organic farming certification in France)		
	EU Organic Logo		
	Demeter		
	Marine Stewardship Council (MSC)	Environmental	
	Rainforest Alliance		Food
	Vegan		
	Animal Welfare		
	Fairtrade	Social	
	Global Recycled Standard		
	Global Organic Textile Standard (GOTS)	Environmental	
	OekoTex Standard 100		Clothing
	Organic 100		
	Fair Wear	Social	
	Forest Stewardship Council (FSC)	Environmental	Paper and wood
	Programme for the Endorsement of Forest Certification (PEFC)		

Table 2 (continued)

	Ecocert		
	BIO Vida Sana (BIO Healthy Life)	Environmental	Cosmetic
	EU energy label	Environmental	Electrical appliances
(Not available)*	Guarantee of Origin 100% renewable energy Spanish National Markets and Competition Commission (CNMC)	Environmental	Energy
	Energy Star	Environmental	Computing
	Blue Angel		
	ISO 14001 certification		
	Nordic Swan Ecolabel	Environmental	
	EU Ecolabel		Multi-sector
	Eco-Management and Audit Scheme (EMAS)		
	B Corp		
	Common Good Balance	Social	
	Network of Alternative and Solidarity Economy Networks (REAS)		

* Since no logo exists, the text states "Energy certified 100 % green", which is habitually used in the energy sector.

while in the covariate option, all the covariates were simultaneously entered into the logistic regression model for the latent classes (Vermunt and Magidson, 2016).

4. Results and discussion

4.1. Confirmatory factor analysis of label attitudes and environmental concern

As mentioned above, it was first necessary to evaluate the validity and reliability of the instruments employed to measure label attitudes and environmental concern. This was confirmed using a CFA. Table 3 shows that the two-factor model was adequately adjusted, since both the Comparative fit index (CFI) and the Tucker-Lewis fit index (TLI) were above 0.95, while the Root mean-square error of approximation (RMSEA) was below 0.08 (Kline, 2011). Moreover, all the factorial loadings were significantly different to zero ($p < 0.001$) and high (above 0.6, with the exception of item LA1 in the label attitudes scale). The ordinal α and ω coefficients were clearly > 0.7 . The correlation between the two factors was positive and significant ($r = 0.26, p < 0.001$), as expected. All these results provided evidence of the validity and reliability of the measurement instrument employed. The factor scores of label attitudes and environmental concern were, therefore, saved as new variables using the FSCORES option of the SAVEDATA

command implemented in Mplus 8.0. These two variables were used for the subsequent analyses.

4.2. Market segmentation based on label awareness and attitudes

With regard to Proposition 1, the first step in the LCCA was to select of the best number of clusters. Ten models were considered, each of which featured between one (sample homogeneity) and ten clusters. Table 4 shows the relative fit indices for the latent class cluster models tested.

The results indicate that there were, according to the BIC and CAIC (Wedel and Kamakura, 2000), seven clusters of Spanish consumers based on label awareness and attitudes. Furthermore, following the proposal of García (2017), we estimated all models 10 times with different random start values, and the superiority of the seven-cluster model was found to be consistent.

Table 5 shows that the robust Wald statistic was significant ($p < 0.001$) for the nine indicators, indicating that these made a significant contribution to distinguishing among the seven clusters considered. Meanwhile, the R^2 for the indicators ranged from 12.9 % (in the case of electrical appliance label awareness) to 58 % (for the variable related to food label awareness).

Therefore, as in the case of previous studies focused on specific sustainability labels in the food sector (e.g., Kaczorowska et al., 2019;

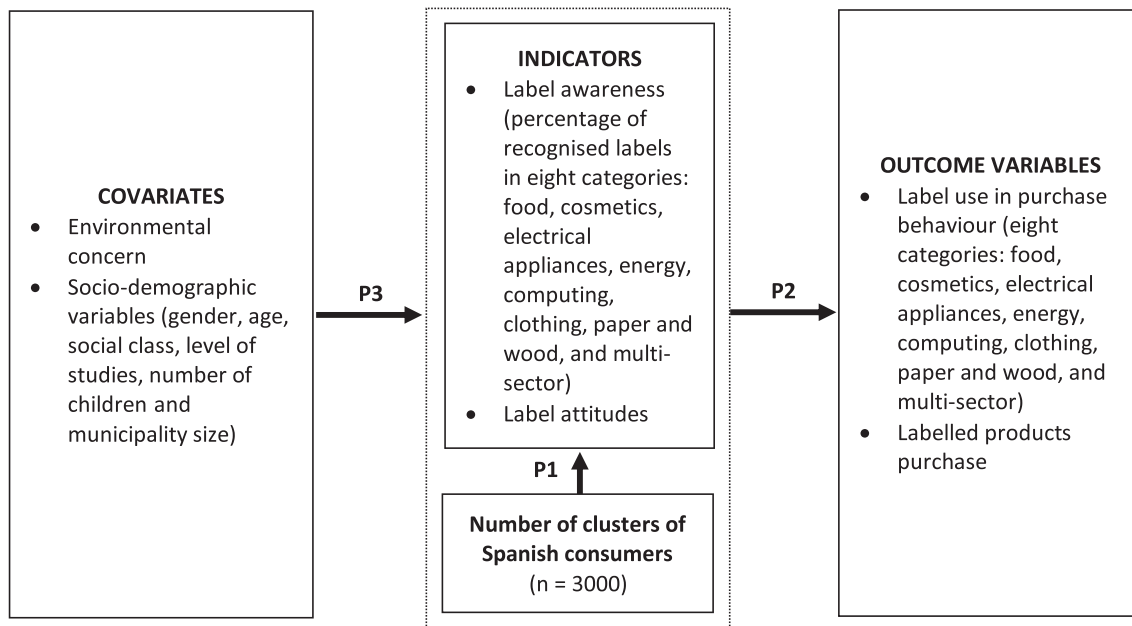


Fig. 1. Proposed analytical model.

Zander et al., 2015), the results of this research support our first proposition that the combination of label awareness and attitudes is useful to segment the market with a broader approach that considers the purchase of different types of products that are habitually found in homes. Fig. 2 presents the profiles of the seven clusters of Spanish consumers as regards the label awareness indicators considered and excluding the attitude towards the label (average factorial score), which are discussed below.

It is noted that acceptable levels of awareness and attitudes towards labels converge to define approximately half of Spanish consumers who know a significant percentage of certified sustainability labels in different productive sectors and tend to trust them and value their usefulness when making purchasing decisions. This profile matches the categories of “committed organics” identified by Zander et al. (2015) and of “mindful” consumers identified by Kaczorowska et al. (2019), although the percentages representing these categories were lower in the aforementioned contributions. The size differences may be due, at least partially, to the fact that the study considers a large number of labels and product categories, which supports the idea that responsible consumers do not comprise a homogeneous group for all types of labels and productive sectors (Brenton, 2013; Carrero et al., 2016; Gladwin et al., 1995; Grunert et al., 2014). Rather, consumers may recognise and trust the certified sustainability labels used in certain industries, but not necessarily those labels used in others.

Table 3
Confirmatory factor analysis: standardised factor loadings and reliability.

Construct/item	λ	t	p	Ordinal α	Ordinal ω
Label attitudes (LA)					
LA1	0.564	30.167	0.000	0.78	0.78
LA2	0.642	38.431	0.000		
LA3	0.686	40.559	0.000		
LA4	0.831	53.882	0.000		
Environmental concern (EC)					
EC1	0.881	94.052	0.000	0.90	0.90
EC2	0.823	77.137	0.000		
EC3	0.812	70.269	0.000		
EC4	0.804	72.955	0.000		

Model fit: $\chi^2(19) = 251.967$ ($p < 0.001$), CFI = 0.983, TLI = 0.974, RMSEA = 0.064, 90% CI RMSEA = (0.057, 0.071).

Particularly, the sectors for which all the segments stated most recognition of labels were those of electrical appliances (between 60.9 % and 99.9 %, possibly because the only label studied, the EU Energy label, is obligatory in Spain), computing (between 5.8 % and 88.1 %), and paper and wood (between 1.8 % and 82.5 %), while the least known labels corresponded to the clothing (between 2.3 % and 63.1 %) and the energy (between 1.1 % and 75.6 %) categories.

In accordance to this interpretation, the multi-label and multi-sector approach used in this study has made it possible to further explore the typology of consumers who recognise and have positive attitudes towards certified labels, and thus to distinguish four more specific segments according to their levels (high or more moderate) in both dimensions. Specifically, we found that only a small segment of 1 % of expert consumers (Cluster 7) widely recognised the labels in the eight categories studied. In the category for which there was least recognition (clothing), 63.1 % of labels were recognised on average, and in the category with the highest recognition (electrical appliances), 99.9 % recognised the only logo tested. This was also one of the two groups with the most positive attitude towards the labels ($M = 0.42$). These were followed by 11.5 % of convinced consumers (Cluster 5), whose attitude towards the labels was as positive as that of the others ($M = 0.42$), but who recognised them to a lesser extent. In categories such as energy, the difference was 45 percentage points. 13.4 % of consumers in the group of interested individuals (Cluster 3) showed positive –but more moderate– attitude levels ($M = 0.16$). They appeared as persons who widely recognised only the labels of the most usually recognised sectors (98.7 % for electrical appliances, 77.5 % for computing and 63.4 % for paper and wood), while the average recognition of labels in the remaining categories was between 30.1 % and 1.1 %. Finally, Cluster 1 of moderate consumers (28 %) had a fairly moderate level of recognition for all categories, despite their good predisposition ($M = 0.13$). Although 85.3 % recognised the mandatory logo of the electrical appliances sector (EU energy label), the level of recognition of the certifications from the other seven categories decreased and was between 39.4 % and 13.1 %.

The other three segments identified in the study are characterised by their low levels of recognition of certified sustainability labels and their neutral or negative attitudes towards them. As previously occurred in studies on food, the profile of the “pragmatic” consumer appeared (Zander et al., 2015), herein dominated as neutral (Cluster 4, 13.3 %),

Table 4
Relative fit indices for the latent class cluster models tested.

Model	Log-likelihood (LL)	BIC (LL)	CAIC (LL)	Number of parameters	Classification errors
1 cluster	-22,928.585	46,097.361	46,127.361	30	0.000
2 clusters	-21,491.534	43,311.330	43,352.330	41	0.082
3 clusters	-21,150.980	42,718.290	42,770.290	52	0.129
4 clusters	-21,014.140	42,532.681	42,595.681	63	0.198
5 clusters	-20,918.949	42,430.370	42,504.370	74	0.216
6 clusters	-20,851.227	42,382.995	42,467.995	85	0.238
7 clusters ^a	-20,792.213	42,353.037	42,449.037	96	0.276
8 clusters	-20,766.274	42,389.229	42,496.229	107	0.301
9 clusters	-20,752.964	42,450.680	42,568.680	118	0.288
10 clusters	-20,729.120	42,491.062	42,620.062	129	0.309

Note. BIC: Bayesian Information Criterion; CAIC: Consistent Akaike Information Criterion.
^a Best model according to BIC and CAIC.

who has an attitude of indifference ($M = -0.03$) associated with a very poor label recognition, even in the two best-known categories of computing and paper and wood. Two segments comprising an important percentage of consumers were found on the most negative side: the *unmotivated* individuals (Cluster 6, 9.2 %) and the *sceptical* consumers (Cluster 2, 23.6 %), and these typologies have been fairly recurrent in previous literature (Gadema and Oglethorpe, 2011; Kaczorowska et al., 2019; Sogari et al., 2016; Zander et al., 2015). *Unmotivated* consumers were the ones who recognised the lowest number of labels. Although 60.9 % recognised the label from the electrical appliances sector (EU energy label), which is mandatory in Spain, the level of recognition for the other seven categories was very low (between 18.4 % and 0.1 %). This was also the group that had the worst attitude towards labels ($M = -0.63$). For their part, the *sceptics* recognised more labels than the members of the *neutral* and *unmotivated* groups, particularly in the most popular sectors (64.9 % in the computing category and 95.5 % in the electrical appliances category). However, label awareness in the other categories was lower than that of *expert*, *convinced*, *interested* and *moderated* consumers. Moreover, this cluster was characterised by a fairly negative attitude towards labels ($M = -0.21$). By comparing the three profiles, it is possible to conclude that both extreme negative attitudes (*unmotivated*) and indifference towards labels (*neutral*) are associated with a low level of recognition of them, possibly because consumers with these characteristics are not interested and pay less attention to them. However, the more moderate negative attitude of the *sceptics* would appear to have more to do with a critical sense of mistrust which is compatible with their better knowledge of the sustainability labels.

4.3. Impact on label use in purchase behaviour

In the second step, the Spanish consumers were assigned to seven classes using their subsequently obtained class-membership probabilities. With regard to Proposition 2, the dependent option of the Step3 submodule was used to evaluate the differences among the seven clusters as regards label use in purchase behaviour. The results presented in Table 6 show that label use in purchase behaviour was predicted by cluster membership ($p < 0.001$). Thus, as in previous studies (De Boer,

2003; Grankvist et al., 2004; Grunert et al., 2014; Taufique et al., 2014; Thøgersen, 2000), it can be concluded that the segmentation according to the degree of label awareness and attitudes is significantly related to label use in decision-making.

There is generally, and for all the segments, a considerable reduction in the percentage of consumers who buy certified products in the different categories of sectors with respect to those who recognise the labels. The greatest purchasing indices are still for the electrical appliances category. It will be noted that *unmotivated* consumers (Cluster 6) and *experts* (Cluster 7), which are both smaller in relative size, had a completely opposite profile, being the least and most likely, respectively, to use the labels when purchasing each of the eight categories considered and in general.

More specifically, *experts* and *convinced* individuals (Clusters 7 and 5), who were those that recognised a higher percentage of labels in all the categories and who had more positive attitudes towards them, were also those who stated that they purchased more certified products in general (96.2 % and 92.9 %, respectively). Both segments also obtained the highest percentages for the purchase of certified products in all the categories studied, although they represent only 12.5 % of Spanish people. These two groups were followed by *moderate* and *interested* consumers (Clusters 1 and 3), in which three quarters stated that they purchased certified products in general. In the case of these segments, it is also possible to appreciate that the highest percentages of purchases are made in specific sectors (electrical appliances, computing, and paper and wood for the *interested* group, and electrical appliances, computing and cosmetics for the *moderate* group) and are quite a lot lower in the others. Thus, these people had a more selective sustainable purchase behaviour, probably according to the products that they use most frequently. As has occurred in previous research (Grymshi et al., 2022; Kaczorowska et al., 2019; Steiner et al., 2017; Zander et al., 2015), this pattern of results led to the conclusion that those consumers who recognise the labels and consider them trustworthy and useful are more likely to purchase certified products.

At the other extreme, the classes of *unmotivated*, *neutral* and *sceptical* consumers (Clusters 6, 4, and 2) showed significantly lower levels of label use when making purchase decisions. In these three groups, which account for 46.1 % of Spanish people, the tendency to purchase

Table 5
Estimated parameters for the solution obtained for the seven clusters: indicators.

Indicator	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7	Robust Wald statistic	p	R ²
Food label awareness	0.027	-0.064	0.077	-0.134	0.125	-0.244	0.213	290.864	0.000	58.0 %
Clothing label awareness	0.046	-0.030	0.003	-0.065	0.091	-0.213	0.167	178.508	0.000	40.8 %
Paper and wood label awareness	-0.003	-0.003	0.033	-0.050	0.024	-0.052	0.051	127.355	0.000	36.2 %
Cosmetics label awareness	0.014	-0.021	-0.017	-0.018	0.030	-0.063	0.076	243.878	0.000	28.1 %
Electronic appliance label awareness	-0.012	0.001	0.014	-0.022	0.000	-0.025	0.043	195.455	0.000	12.9 %
Energy label awareness	0.013	-0.019	-0.019	-0.008	0.018	-0.023	0.037	63.912	0.000	16.8 %
Computing label awareness	-0.005	0.006	0.012	-0.028	0.010	-0.015	0.020	142.861	0.000	24.7 %
Multi-sector label awareness	-0.003	-0.051	0.019	-0.110	0.100	-0.166	0.212	212.094	0.000	43.2 %
Label attitudes	0.094	-0.245	0.121	-0.069	0.380	-0.666	0.385	1051.199	0.000	36.6 %

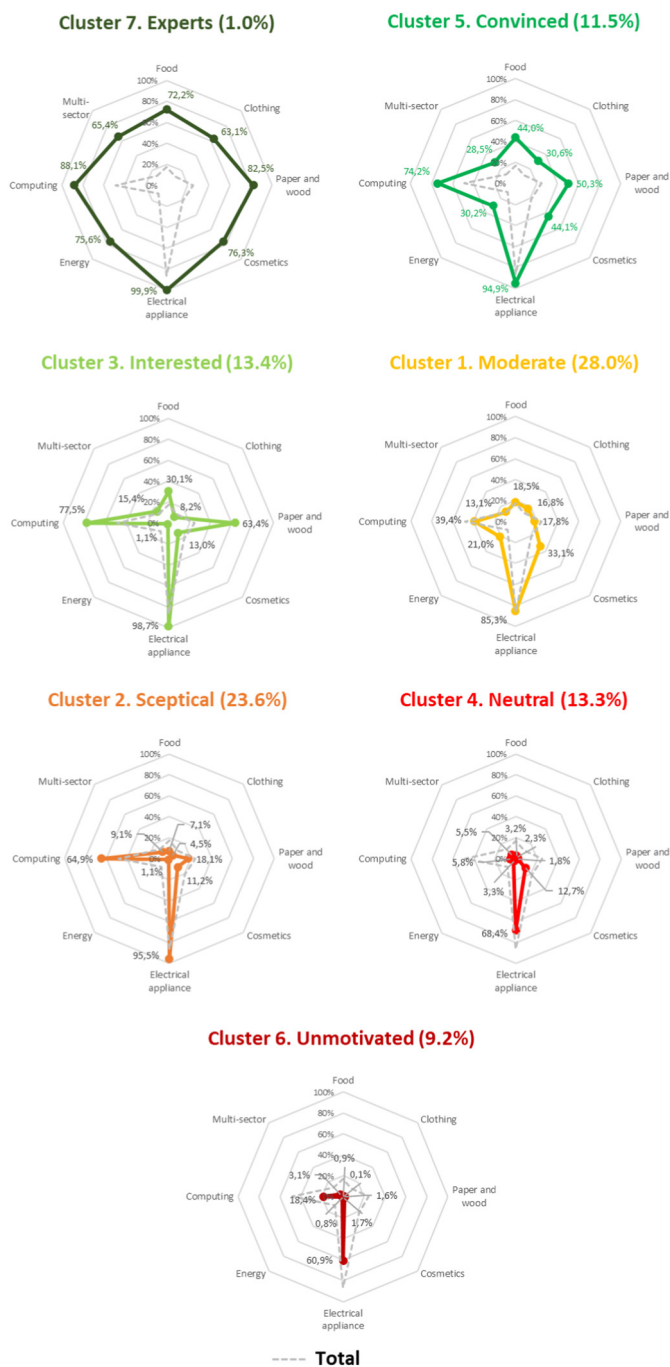


Fig. 2. Profiles of Spanish consumers clusters: label awareness (n = 3000). Note. *Percentage of labels recognised in each category. Discontinuous lines refer to the total sample.

certified products is 0 % in almost all categories with the exception of that of electrical appliances, probably due to the fact that the EU energy label is mandatory in Spain and it is very visible in the electrical appliances of all homes. This pattern generally coincides with that found in previous studies, which conclude that a lack of knowledge and attitudes of indifference and scepticism significantly slow down the purchase of sustainable products (Albayrak et al., 2010; Burke et al., 2014; Kaczorowska et al., 2019; Sogari et al., 2016). The clearest case of this is that of the *unmotivated* group, in which 92.2 % of the consumers indicated that they did not purchase this type of products, which coincides with their lower level of label awareness and attitudes when compared to those of the other clusters. With regard to the *neutral* consumers, 64.8 % stated that they did not purchase certified products, which

would appear to be clearly connected to their indifference towards the labels. Finally, in spite of their negative attitude towards them, the majority of the labels recognised by the *sceptical* consumers were associated with a higher level of purchase of certified products in general than those in the *unmotivated* and *neutral* clusters (41.9%). These differences are especially noticeable in the case of the aforementioned EU Energy Label (38.1 %) and in the computing category (10.7 %), in which most monitors and laptops bear the Energy Star logo. This result is also consistent with the higher level of label recognition by *sceptics*, and could indicate that *neutral* and *unmotivated* consumers are simply less aware of purchasing certified products than *sceptics*. Furthermore, since the two labels mentioned do not imply that the product costs more, it could be interpreted that *sceptical* consumers know that some of the products that they purchase have sustainability certificates, but they do not trust them and probably would not be prepared to pay more for them.

4.4. Differences in environmental concern and socio-demographic variables

Finally, the Step3 submodule was used to evaluate the significance of the covariates. Table 7 shows that significant effects were observed for environmental concern, gender, age, level of studies, number of children and municipality size ($p < 0.01$). The variable social class did not significantly affect cluster membership ($p = 0.17$). Hence, the results of the study support our third proposition, so that both environmental concern and the socio-demographic variables analysed, with the exception of social class, make it possible to differentiate between groups of consumers.

According to the results shown in the table, the highest levels of environmental concern were in the segments of greatest label awareness and attitudes, particularly in *convinced* (Cluster 5), followed by *experts* (Cluster 7) and *interested* (Cluster 3), with means of 0.37, 0.28 and 0.16, respectively. These groups were also characterised by a higher number of women, which reached 68.7 % in the *convinced* group. The *experts* and *interested* clusters were also those in which there was a greater presence of consumers under 35 years of age, without children and with a high level of studies, at over 50 %. In the case of the segment of the *experts*, which was that with the highest level of label awareness and attitudes, there was also a very high percentage of consumers with doctorates when compared to the other groups (25.3 %). This was also the segment with the highest percentage of people who lived in large municipalities, of >500,000 inhabitants (20.6 %). The *convinced* cluster was the third group as regards the number of younger consumers (34.9 %) with university studies (37.9 %).

The segments with least label awareness and attitudes were, meanwhile, characterised by significantly less environmental concern, especially *unmotivated* (Cluster 6) and *sceptical* (Cluster 2) individuals, in which the mean values for this last variable were negative (-1.10 and -0.36, respectively). These two groups were associated with a profile of men over 45 with a secondary or post-secondary but not higher education, although in the case of the *sceptics* the percentage of consumers with university studies (32.9 %) was higher than that of the *unmotivated* group (23.8 %).

Segments of *moderate* (Cluster 1) and *neutral* (Cluster 4) consumers, which were characterised by their attitudes of greater indifference towards the labels, were in some respects similar to each other, and this differentiated them from the segments that were more closely related to each other as regards label awareness and use. Both groups attained intermediate levels for environmental concern (0.08 and 0.03, respectively) and had more balanced percentages of men and women, with the latter predominating slightly, which differentiated the *neutral* group from the *sceptical* and *unmotivated* groups. Moreover, the *neutral* and *moderate* groups were the two containing the highest percentage of consumers of over 45 years of age (56.3 % and 57.2 %, respectively) and were, together with the *unmotivated* group, those with the lowest level of university education and the highest level of incomplete secondary

Table 6
Impact of clusters on label use in purchase behaviour (n = 3000).

Outcome ^a	Cluster 7. Experts (1.0 %)	Cluster 5. Convinced (11.5 %)	Cluster 3. Interested (13.4 %)	Cluster 1. Moderate (28.0 %)	Cluster 2. Sceptical (23.6 %)	Cluster 4. Neutral (13.3 %)	Cluster 6. Unmotivated (9.2 %)	Total	Robust Wald statistic	p
Food label purchase	22.8 %	17.4 %	9.9 %	2.8 %	0.4 %	0.5 %	0.1 %	4.5 %	350.958	0.000
Clothing label purchase	18.8 %	8.7 %	0.7 %	2.5 %	0.0 %	0.0 %	0.0 %	2.0 %	1269.670	0.000
Paper and wood label purchase	37.6 %	16.6 %	20.8 %	1.2 %	0.8 %	0.0 %	0.0 %	5.6 %	195.609	0.000
Cosmetics label purchase	25.4 %	16.7 %	0.0 %	11.2 %	0.0 %	1.4 %	0.0 %	5.5 %	509.690	0.000
Electrical appliance label purchase	84.5 %	60.6 %	45.5 %	48.1 %	38.1 %	24.6 %	6.3 %	40.2 %	141.026	0.000
Energy label purchase	22.2 %	2.8 %	0.0 %	2.0 %	0.0 %	0.4 %	0.2 %	1.2 %	294.494	0.000
Computing label purchase	39.7 %	33.2 %	18.2 %	7.1 %	10.7 %	0.0 %	0.0 %	11.1 %	793.786	0.000
Multi-sector label purchase	17.4 %	6.0 %	1.8 %	2.3 %	0.6 %	0.6 %	0.1 %	2.0 %	218.566	0.000
Labelled product purchase									372.136	0.000
Yes	96.2 %	92.9 %	77.6 %	75.0 %	41.9 %	35.2 %	7.8 %	58.3 %		
No	3.8 %	7.2 %	22.4 %	25.0 %	58.1 %	64.8 %	92.2 %	41.7 %		

^a Percentage of labels considered in purchase decisions for each category and percentage of consumers that have purchased labelled products in general (Yes/No).

education. They were also among the groups with higher percentages of consumers with children and who lived in small municipalities of <20,000 inhabitants.

In summary, as has occurred in previous segmentation studies (e.g., Liu et al., 2017), it can be concluded that the segments with the highest levels of label awareness, attitudes and use (*experts, convinced and interested*) are those with the highest levels of environmental concern, compared to the opposite extreme of *sceptical and unmotivated* consumers. Regarding the socio-demographic characteristics, the results of this study coincide with those of the previous literature that associate high levels of label awareness, attitudes and usage with the profile of young women with university studies, as opposed to the predominance of elderly men with a lower level of education in

the group of consumers with less knowledge or with more indifference or rejection of labels and the purchase of certified products (Grymshi et al., 2022; Hinkes and Christoph-Schulz, 2020; Sogari et al., 2016; Zha et al., 2020). However, it was not possible to discover that socio-economic status helps to differentiate between these segments, unlike what has occurred in previous studies carried out in Spain in which income level was taken as an indicator (Grymshi et al., 2022). Furthermore, despite the fact that the variables number of children and municipality size were significant when differentiating between clusters, as has occurred in previous studies (Liu et al., 2017; Owusu-Sekyere et al., 2020; Broeckhoven et al., 2021), their differentiating capacity was lower than that of the variables environmental concern, gender, age and educational level.

Table 7
Differences in environmental concern and socio-demographic variables among clusters (n = 3000).

Covariate	Cluster 7. Experts	Cluster 5. Convinced	Cluster 3. Interested	Cluster 1. Moderate	Cluster 2. Sceptical	Cluster 4. Neutral	Cluster 6. Unmotivated	Total	Robust Wald statistic	p
Environmental concern (M = 0)	0.28	0.37	0.16	0.08	-0.36	0.03	-1.10	0	161.516	0.000
Gender									49.739	0.000
Female	41.1 %	68.7 %	56.6 %	57.7 %	33.4 %	58.1 %	36.3 %	49.20 %		
Male	58.9 %	31.3 %	43.5 %	42.3 %	66.6 %	41.9 %	63.7 %	50.80 %		
Age									63.528	0.000
16-24	25.5 %	18.4 %	19.1 %	14.1 %	9.3 %	13.9 %	14.8 %	14.10 %		
25-34	28.4 %	16.5 %	30.9 %	15.9 %	18.9 %	7.4 %	10.2 %	17.40 %		
35-44	19.4 %	25.1 %	29.3 %	13.7 %	26.7 %	21.5 %	25.7 %	23.50 %		
45-54	11.5 %	21.5 %	13.8 %	21.4 %	27.1 %	28.6 %	15.8 %	22.00 %		
55-64	5.5 %	12.5 %	5.8 %	21.7 %	15.4 %	15.1 %	19.6 %	15.50 %		
65-74	9.8 %	6.0 %	1.1 %	13.2 %	2.6 %	13.5 %	13.8 %	7.60 %		
Social class									16.581	0.170
High	64.1 %	49.7 %	58.8 %	40.2 %	42.8 %	22.6 %	40.4 %	42.70 %		
Middle	15.5 %	28.6 %	26.5 %	28.7 %	28.7 %	27.6 %	29.4 %	28.20 %		
Low	20.5 %	21.8 %	14.7 %	31.1 %	28.5 %	49.8 %	30.2 %	29.10 %		
Level of studies									133,075.822	0.000
Without any formal education	0.0 %	0.6 %	0.0 %	0.5 %	0.6 %	2.6 %	0.0 %	0.70 %		
Primary education	0.0 %	0.8 %	1.6 %	2.0 %	1.4 %	9.1 %	0.7 %	2.40 %		
Incomplete secondary education	0.0 %	5.0 %	0.0 %	15.4 %	3.7 %	15.0 %	9.2 %	8.40 %		
Complete secondary education	37.7 %	34.5 %	26.0 %	42.8 %	46.1 %	45.6 %	52.6 %	41.40 %		
Post-secondary non-tertiary education	11.7 %	21.2 %	17.7 %	12.7 %	15.4 %	14.4 %	13.7 %	15.40 %		
University degree	25.3 %	16.1 %	29.7 %	17.6 %	23.7 %	8.8 %	17.0 %	19.60 %		
Master's degree	0.0 %	18.2 %	22.2 %	9.0 %	7.6 %	3.0 %	5.6 %	10.50 %		
PhD	25.3 %	3.6 %	2.8 %	0.0 %	1.6 %	1.5 %	1.2 %	1.70 %		
Number of children									25.841	0.011
None	52.9 %	47.3 %	71.8 %	38.0 %	48.0 %	47.5 %	55.2 %	49.20 %		
One	34.1 %	34.3 %	14.1 %	50.3 %	34.3 %	39.9 %	31.8 %	36.30 %		
At least two	13.0 %	18.4 %	14.1 %	11.7 %	17.6 %	12.6 %	13.0 %	14.60 %		
Municipality size									2389.082	0.000
< 5001 inhabitants	11.8 %	2.9 %	10.6 %	7.7 %	4.6 %	5.6 %	3.9 %	6.20 %		
5001-20,000 inhabitants	0.0 %	19.2 %	10.0 %	16.7 %	15.8 %	21.1 %	18.6 %	16.40 %		
20,001-50,000 inhabitants	38.6 %	14.8 %	17.8 %	15.9 %	15.4 %	12.1 %	14.4 %	15.50 %		
50,001-100,000 inhabitants	6.3 %	4.6 %	3.9 %	1.0 %	2.4 %	1.6 %	3.2 %	2.50 %		
100,001-500,000 inhabitants	22.6 %	40.9 %	40.0 %	36.0 %	38.8 %	45.3 %	32.2 %	38.50 %		
> 500,000 inhabitants	20.6 %	17.7 %	17.7 %	22.7 %	22.9 %	14.3 %	27.8 %	20.90 %		

4.5. Managerial and policy implications

From a practical point of view, this segmentation study will be useful to improve the management and marketing practises of certifying entities and companies that sell sustainable products, as well as for the development of regulations and policies to promote sustainable consumption. In this respect, it shows that sustainability labels are dysfunctional for almost half of *sceptical*, *neutral* and *unmotivated* Spanish consumers. The negative or indifferent attitudes identified in these groups, together with their poor ability to identify sustainability certificates on products, suggest that these individuals suffer from both a lack of motivation and opportunities to behave sustainably. According to several authors (Nilsson et al., 2016; Verplanken, 2018), the main way to change the attitudes of these segments involves “nudging” them towards the acceptance of the desired behaviour through large-scale interventions aimed at restricting consumer choice or forcing alternative courses of action, such as legislation and regulation, fiscal measures, infrastructure improvements and the adoption of technical solutions. Despite the low initial acceptance of such measures, they have proved to be useful in the past to promote sustainable attitudes and behaviours, such as the gradual substitution of plastic bags, traditional light bulbs or leaded gasoline (Thomas et al., 2016; Verplanken, 2018). Hence, the application of legislation and measures that seek to encourage the purchase of certified products (e.g., financial rewards or discounts for sustainable choices) or penalize the negative impact caused by the consumption of less sustainable alternatives (e.g., tax measures, ban of unsustainable products) could be interesting ways of intervention to explore.

Complementarily, our results suggest that increasing consumers' awareness of sustainability is a priority for both *sceptical*, *neutral* and *unmotivated* individuals and an additional 40 % of *interested* and *moderate* consumers, despite their more positive attitude towards certification. Companies and certifiers could undertake this task by making advances in a greater visibility of official sustainability labels and their meaning. In this respect, there have been hardly any far-reaching advertising campaigns in Spain that have adopted a didactic approach in order to help consumers to correctly identify labels and certifications during their habitual shopping activities. Even if this type of campaigns had only a relative usefulness as regards stimulating the eventual purchase of sustainable products (Abrahamse and Steg, 2013; White et al., 2019), they would help to foment more positive attitudes towards the usefulness of labels, along with a greater sense of control with which to judge their credibility.

In addition to information campaigns, many other practical supports are needed for those people who are limited in the way they are able to use labels because of the huge number of them (Burke et al., 2014; Dekhili and Achabou, 2015; Gadema and Oglethorpe, 2011; Grunert et al., 2014; Prell et al., 2020). Given that, according to the results obtained in this work, the profiles of consumers that experience most difficulty in this respect are older and with a lower level of education, it would appear to be appropriate to develop tools that would help them to identify sustainable products quickly and easily, without the need for precise knowledge of the meaning of the different symbols on the packaging. This challenge could be tackled by means of facilitating projects that integrate the different certifications into a single and independent system to qualify the sustainability of the product, and to communicate it through the use of reliable clues that would be simple to interpret, such as sustainability semaphores or similar tools (Dekhili and Achabou, 2015; Lanero et al., 2021; Nikolaou and Kazantzidis, 2016). It is, in fact, necessary to recall that the label most frequently recognised in the study was the EU energy label, which is obligatory in Spain and provides information on the efficiency of electrical appliances and facilitates their comparison by means of a system of letters and colours. In the case of the *interested* and *convinced* consumers, who are characterised by their greater concern for the environment, and the greater presence of young people with university studies and

who are, therefore, more adept in the use of new technologies as tools with which to seek information, it might also be interesting to develop computing applications or sustainable label and product searchers that would stimulate the active search for reliable information with which to make purchasing decisions.

To support these efforts, greater involvement of political authorities is required in the review and development of regulations that guarantee the transparency of sustainability certification procedures and control the use of non-certified sustainability claims and self-declarations (“natural”, “hand-crafted”, etc.), which are often displayed on packaging in order to lead consumers to erroneously infer certain properties of products (Ferrero et al., 2019; Hoek et al., 2013; Lanero et al., 2020). In this sense, it is worth pointing out the example of the EU organic label, backed by official European and national regulations that establish clear communication guidelines regarding the packaging of the products and restrict the use of ambiguous claims to prevent greenwashing.

4.6. Limitations and future research

This study has certain methodological limitations that should be addressed in future research. First, the survey procedure could be criticised, as members of online panels are experienced in answering questionnaires and their familiarity may influence the data quality (Callegaro et al., 2014). This effect was minimised by excluding respondents with uniform response patterns and very short response times.

Secondly, the study was focused on a sample of Spanish consumers and on a selection of sustainability labels considered relevant according to the criteria of a group of experts from that country. Although the results obtained complement the other segmentation studies carried out previously in Spain in the food sector (Broeckhoven et al., 2021; Grymshi et al., 2022), it would be advisable to repeat this work in other countries, both within and outside Europe, in order to discover the extent to which the segments identified can be generalised to other contexts.

Thirdly, it is necessary to point out that the measures of label awareness and use were fundamentally subjective, so it is not possible to ascertain whether the participants who indicated they recognised the certified labels and had purchased products identified by them really had an accurate knowledge of their meaning or had made the purchase decision for reasons other than the sustainability of the product. Although the measures used in this research for these variables are similar to those reported in previous studies (Gadema and Oglethorpe, 2011; Grymshi et al., 2022; Kaczorowska et al., 2019; Peschel et al., 2016; Zander et al., 2015), new lines of research that would differentiate between the recognition of sustainability symbols and the understanding of them in terms of objective knowledge for their deliberate use in consumer decision-making are, therefore, required (De Boer, 2003; Grankvist et al., 2004; Grunert et al., 2014; Taufique et al., 2014; Thøgersen, 2000). These measures would facilitate a more precise understanding of the level of confusion experienced by different types of consumers when explaining their purchase attitudes and behaviour as regards products with sustainability labels and non-certified sustainability advertising claims.

Finally, despite the fact that the results obtained in this work indicate a positive relationship among the variables studied, it is also possible to appreciate a significant lack of correspondence between the consumers' levels of label awareness and positive attitudes and their eventual purchase of certified products. This difference indicates the need to complete the proposed segmentation with the analysis of other variables that would permit a better explanation of the use of signs of sustainability in habitual purchase decision-making. In this respect, it would be interesting to analyse how label awareness and attitudes interact with the perception of price and other attributes linked to the quality of the product (Janssen and Hamm, 2012; Lanero et al.,

2021; Nuttavuthisit and Thøgersen, 2017). Given that self-reporting studies are often limited as regards understanding how the evaluation of a product works in real purchasing situations, it would be appropriate to carry out choice studies by means of experimental designs that would analyse the efficiency of sustainability labels according to the presence or absence of other attributes in different types of products.

5. Conclusions

Unlike previous studies focusing on the analysis of specific sustainability labels in the food sector, the research carried out herein contributes to literature with a segmentation of Spanish consumers, dealing with their label awareness of and attitudes towards 28 sustainability labels employed in eight productive sectors and associated with different types of purchases of products habitually used in homes. The results obtained support the association of both dimensions with the purchase of certified products and make it possible to estimate that approximately half of the Spanish population are in the category of *convinced*, *interested* and *moderate*, and are acceptably predisposed to recognise, evaluate and purchase products distinguished by sustainability labels. Among them, the most effective consumers when using certifications are characterised as being women under 35 with university studies who are concerned about the environment. However, it was possible to detect only 1 % of *expert* consumers with a high level of knowledge of the labels analysed, which was associated with having a Doctorate level of studies. At the opposite end of the scale, the sustainability labels do not appear to be important for the other half of the consumers, denominated as *sceptical*, *neutral* and *unmotivated*, who have notable deficiencies as regards recognising, evaluating and using these labels in their habitual purchasing activities. Of these typologies of consumers, those who predominate are males of over 45 who are less concerned about the environment and do not have university studies.

In the context of the aforementioned typologies, this reaffirms the idea that rather than fomenting the pursued intention of responsible consumption, the huge number and diversity of sustainability labels is causing confusion and a lack of confidence in consumers. It is, therefore, necessary to reflect on the small amount of added value that official certification provides to companies as regards differentiating their sustainable products in a transparent and trustworthy manner. This rather leads to the problem that certified labels are confused with other self-declarations and advertising claims, including those that state the responsible nature of the product without it having been regulated or verified by an independent third party. If consumers are not able to distinguish between products, there is a question as to whether engaging in sustainable production really brings the same competitive advantage as simply appearing to do so from the consumer's view.

As a possible solution to this problem, it would appear necessary to work to ensure that the labels really do fulfil the function for which they were intended, i.e. to act as clues with which to identify sustainable attributes that are easy for consumers to understand. In this respect, it seems that the incorporation of certifications into a high order system that would facilitate the easy identification of the dimensions in which the products are sustainable by means of a language that is common to different industries and categories of products would be a promising project by which to attain the objectives of sustainable development. This should be complemented with legislative improvements that encourage the purchase of certified products and promote honesty in the use of sustainability symbols on products.

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.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.spc.2023.03.025>.

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