

IDENTIFICATION OF THE FACTORS AFFECTING CONSUMER BEHAVIOR  
IN THE SELECTION OF SUSTAINABLE PACKAGING

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## DECLARATION OF ORIGINALITY

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## ABSTRACT

### Identification of the Factors Affecting Consumer Behavior in the Selection of Sustainable Packaging

Packaging features of the products are crucial elements in consumer purchasing decisions. The need for sustainable packaging and the awareness of the consumers are growing each day. However, consumers' environmental attitudes and behavior may occasionally be disturbed by various factors.

The aim of this study is to "Identify the Factors Affecting Consumer Behavior in the Selection of Sustainable Packaging." Since the factors influencing consumer behavior in choosing sustainable packaging must first be revealed in order to finally design a model for it, a mixed research approach must be used. For this purpose, the exploratory method of mixed research method has been used. In this research, first, the qualitative method is used to identify the main components, and then the quantitative method is applied in order to test the final model or answer the research questions. In the qualitative section, library or documentary methods were used to collect information. In the quantitative part, a survey method and a questionnaire were used to collect information. The questionnaire was designed based on the identified open codes.

In this study, we propose a comprehensive model for consumer behavior in choosing sustainable packaging and review the validity of the proposed model using a qualitative model.

## ÖZET

### Sürdürülebilir Ambalaj Seçiminde Tüketici Davranışını Etkileyen Faktörlerin Belirlenmesi

Ürünlerin ambalaj özellikleri, tüketicilerin satın alma kararlarında önemli unsurlardır. Sürdürülebilir ambalaj ihtiyacı ve tüketicilerin farkındalığı her geçen gün artıyor. Ancak tüketicilerin çevresel tutum ve davranışları zaman zaman çeşitli faktörlerden etkilenebilmektedir.

Bu çalışmanın amacı "Sürdürülebilir Ambalaj Seçiminde Tüketici Davranışını Etkileyen Faktörlerin Belirlenmesi"dir. Sürdürülebilir ambalaj seçiminde tüketici davranışını etkileyen faktörlerin nihai olarak buna yönelik bir model tasarlamak için öncelikle ortaya çıkarılması gerektiğinden, karma bir araştırma yaklaşımı kullanılmalıdır. Bu amaçla karma araştırma yöntemi olan keşfedici yöntem kullanılmıştır. Bu çalışmada, ana bileşenleri belirlemek için önce nitel yöntem, ardından modeli test etmek veya araştırma sorularını yanıtlamak için nicel yöntem kullanılmıştır. Nitel bölümde bilgi toplamak için kütüphane veya belgesel yöntemleri kullanılmıştır. Nicel kısımda ise bilgi toplamak için anket kullanılmıştır. Anket, belirlenen açık kodlara göre tasarlanmıştır.

Bu çalışmada, sürdürülebilir ambalaj seçiminde tüketici davranışı için kapsamlı bir model öneriyoruz ve nitel model kullanarak önerilen modelin geçerliliğini gözden geçiriyoruz.

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# CHAPTER 1

## INTRODUCTION

The topic of sustainable consumption includes a wide range of distinct issues, and consumers show a great deal of behavioral diversity in choosing issues with which they feel close and consider in their consumer behavior. Some may prefer socially oriented ethical consumption issues such as fair trade, while others will prefer environmental issues such as organic production or reducing carbon emissions. Some consumers may prioritize a wide range of socio-biological issues (Rokka & Uusitalo, 2008).

Improving the commercial performance of manufactured products will be possible only by adhering to the principles of sustainability in the presentation of the final product, which is embodied through packaging. Development and social and environmental considerations are among the most important aspects of sustainable packaging that are often neglected, and this leads to weakness in the packaging of products offered in the consumer market. Achieving this goal is directly related to the level of consumer awareness and knowledge of environmental issues (Borden, 1977; Cornelissen, Pandelaere, Warlop, & Dewitte, 2008). Therefore, recognizing the insight and behavior of consumers as the final arbiter in sustainability is a priority and is the focus of the present study.

### 1.1 Problem statement

Environmental degradation and sustainability are one of the most serious problems facing the world today and there is a growing awareness in various areas of the environment (Qi, Yu, & Ploeger, 2020).

Various studies have shown that people rank environmental problems as one of the top challenges today after economics, health care, unemployment, and crime (Dagher & Itani, 2014).

In modern times, green marketing is associated with sustainability and biodiversity. So environmental concerns have been considered as one of the main considerations in consumer behavior (De oliveira & Sousa, 2020).

Tukker, Cohen, Hubacek, and Mont (2010) noted that there are still significant ambiguities in how consumers choose products and services. O'Rourke and Ringer (2016) found that even consumers with a high level of awareness do not always make sustainable purchases and found that their purchasing decision depends on their perception of the environment and attention to different product features. Therefore, it cannot be said that the consumer's positive perception of sustainable products will lead to sustainable behavior. (O'Rourke & Ringer, 2016; Devinney, Auger, & Eckhardt, 2010). This gap between perception and behavior is an important barrier to behavioral change that leads to sustainable production (Rausch & Kopplin, 2021).

The solution to sustainability issues is often in product innovation. If products and services are environmentally friendly, sustainability is no longer an issue. However, this approach needs a solid infrastructure in terms of investment level, consumer acceptance, and political support (Antonides, 2017; Blake, 1999).

In this regard investigating consumer behavior is critical in order to promote sustainable actions (Nguyen & Johnson, 2020).

Packaging is considered one of the most important components of food or non-food products, which is considered a communication tool between businesses

and end consumers and has the ability to attract consumer attention (Wandosell, Parra-Meroño, Alcayde, & Baños, 2021).

At the same time, due to the new orientations for environmental protection, packaging must not only protect the product well, but also be environmentally friendly (Zeng, Durif, & Robinot, 2021).

Packaging is an important marketing tool that, although underestimated in most companies, has had a major impact on consumer behavior, to the point that even some academic research has suggested the classic 4P strategy by changing packaging to 5P (Brouwers, 2018)

Research has shown that sustainable packaging, in particular, is an important element in consumer purchasing decisions, and packaging features are important to at least one-third of consumers (Moorthy et al., 2021).

Although consumption seems to be an individual phenomenon, it is in fact a process that occurs in a large system of investment, production, and trade which can be affected by different factors such as cultural, institutional, economic, and infrastructural factors (Reisch & Gersen 2015).

In addition to the factors already mentioned, the outbreak of corona has also affected consumer behavior in purchasing suitable packaging (Kitz, Walker, Charlebois, & Music, 2021). With the outbreak of the Corona virus, consumers were worried that if a person infected with the virus touched a reusable package, healthy people might re-touch the infected package and make hand-to-eye or nose contact and get infected. Thus, many programs to use sustainable packaging were stopped or slowed down. As a result, the United States and several other countries have lifted the ban on the use of plastics in packaging and even temporarily banned the use of reusable packaging (Feber Lingqvist, & Nordigården, 2020)

As a result, in order to reduce the destructive human effects on the environment, due to the increase in online sales following the Covid-19 pandemic, it is necessary to prioritize the identification of factors influencing consumer behavior in the choice of sustainable packaging. Identifying the factors affecting consumer behavior in the selection of sustainable packaging and providing a comprehensive model in this field will lead to sustainable development in the long run and help consumers to consider the packaging as a tool of sustainability, an effective role in building a sustainable future for future generations.

## 1.2 Importance and necessity of research

Consumer purchasing behavior has a major role in the success level of the products and services based on their sustainable performance. The success of a sustainable business depends on understanding consumer behavior so that sustainability marketers can develop a marketing strategy that meets the needs of consumers more efficiently (and more sustainably) than competitors (Müller, Acevedo-Duque, Müller, Kalia, & Mehmood, 2021)

The value of many goods today is measured packaging included. Packaging is now considered part of the product and is one of the most important factors influencing consumers during the purchasing process (Boz, Korhonen, & Koelsch Sand, 2020).

Sustainable packaging leads to improved sustainability. These include increasing the reuse of materials and reducing waste, which reduces environmental impact. Sustainable packaging contributes not only to environmental problems but also to social and economic wellbeing (Brouwers, 2018); Therefore, according to the limited research conducted in the field of consumer behavior in the selection of

sustainable packaging, providing a comprehensive model in this field and recognizing consumer behavior in the selection of sustainable packaging, it may be possible to provide the necessary information to consumers in this area and pave the way for sustainable development and environmental protection

### 1.3 Research objectives

- Identifying factors affecting consumer behavior in choosing sustainable packaging
- Providing a comprehensive model for consumer behavior in choosing sustainable packaging and reviewing the validity of the proposed model
- Investigating the effect of identified factors on consumer behavior on the choice of sustainable packaging (confirmation of the existing relationships in the proposed model)

### 1.4 Research questions

- What factors affect consumer behavior in choosing sustainable packaging?
- What is the comprehensive model of factors affecting consumer behavior in choosing sustainable packaging and what is its validity?
- Do the identified factors related to consumer behavior influence the choice of sustainable packaging?

## CHAPTER 2

### LITERATURE REVIEW

The basis of the research is to answer the questions or testing of the hypotheses that are presented in the expression of the problem under study. Since this is not the first or only research in this particular field, it should always be assumed that there may be other researchers who have addressed an issue similar to this one. Thus, this study is based on the theories and studies of previous scientists. Reaching the beginning of the formation of each phenomenon helps the researcher to better understand the subject. This speeds up the research process and helps him/her to get to the core of the subject when faced with a subject he/she does not know. Therefore, in this chapter, in the two sections of theoretical background and experimental background, the existing literature in the field of consumer behavior in the environment with sustainable packaging has been reviewed.

#### 2.1 Theoretical background

##### 2.1.1 The concept of sustainable packaging

In many cases, sustainable packaging refers to materials with a sustainable source, recyclable or degradable material; While other criteria such as affordability or social impact are often not taken into account, which can be misleading for consumers. (Boz et al., 2020).

Discussing the definition and historical background of sustainability makes a path for better communication with the customer. The basic concept of sustainability was unknown for centuries. In the case of food packaging, sustainability term was

used in early and modern civilizations as food protection until the next harvest season. The advanced definition of sustainability has been developed by organizations, companies, NGOs, and politicians in various fields. There are over 300 definitions of sustainability (Geissdoerfer, Savaget, Bocken, & Hultink, 2017). The true origin of the word sustainability goes back to the 1987 United Nations Report on Sustainable Development; That is, “development that meets current needs without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development, 1987).

Achieving a sustainable world is among the most significant principles for the global development policies and includes environmental protection and economic and social development as core values (Kuhlman & Farrington, 2010). Sustainable packaging is defined as the development and usage of packaging that contributes to Sustainability, which involves the use of existing life cycle (LCI) and life cycle assessment (LCA) helps to reduce environmental impacts and ecological footprints (Jedlicka, 2009). Agreeing on a measurable definition of sustainable packaging was necessary to assess the relative stability of one package versus the other.

To evaluate the limitations of predicting consumer behavior in the field of sustainable and environmentally friendly packaging, we must first address its theoretical foundations. As research on environmentally friendly packaging is in its infancy, existing models in the field of environmentally friendly behavior by the consumer can be summarized in 5 theoretical perspectives as follows: attitude perspective, responsible perspective, altruistic perspective, sociological perspective and finally environmental awareness perspective (Popovic, Bossink, & van der Sijde, 2019).

In all the models there are at least three sets of factors that motivate an individual to be environmentally friendly: 1) demographic factors; 2) external factors (i.e., institutional, economic, social, and cultural); 3) Internal factors (such as motivation, environmental knowledge, awareness, values, attitudes, excitement, control center, responsibilities and purchasing priorities, for example, being functional).

#### 2.1.2 Performance value gap

Some environmentally friendly packaging may require consumers to focus on quality, performance, and cost, which leads to an attitude-behavioral difference called the performance value gap (Olson, 2013). Even if consumers prioritize the surveys, they may not buy real goods from the store for economic, socioeconomic, and demographic reasons (She & MacDonald, 2013). So sustainable packaging features may not always lead to a willingness to pay. However, when there is no difference between options, consumers prefer environmentally friendly goods (Goucher-Lambert & Cagan, 2015).

#### 2.1.3 Factors affecting consumer behavior in sustainable selection

The number of studies that have evaluated the impact of sustainable packaging on consumer decisions is relatively rare. This lack of information may be the reason for failing sustainable packaging to meet market forecasts. In addition, the product with sustainable packaging may not be the consumer choice or the consumer may not be willing to change their choice to purchase sustainable packaging (Boz et al., 2020). In this section, several factors affecting consumer perception are reported:

#### 2.1.3.1 Demographic characteristics

Demographic characteristics including age, gender, education, and income level may have both positive and negative effects on promoting sustainable shopping behaviors. Education level also affects the tendency to buy green products due to ecolabels and environmental attitudes. Gender also influenced the purchasing desire due to ecolabels and the human tendency to nature (Chekima, Wafa, Igau, Chekima, & Sondoh, 2016).

Environmental studies showed that environmental attitudes and ecolabels had an effect on the purchasing intention of consumers with higher education. The impact of environmental attitudes and human orientation on nature on the purchase of green products was more common among women than men. (Di Martino, Nanere, & DSouza, 2019).

#### 2.1.3.2 Country of origin

Differences in sustainable consumption behaviors depend on the country of origin (Di Martino et al., 2019). Perception of the word sustainability varies between countries and regions. For example, environmental protection is common in Germany, France, Spain, and the United Kingdom; While maintaining a standard of living is relevant to Dutch consumers (Grunert, Hieke, & Wills, 2014). Similarly, South African respondents described environmentally friendly packaging in three terms: non-harmful, biodegradable, and recyclable (Scott & Vigar-Ellis, 2014). There are also differences between consumers based on country of origin regarding views on waste disposal after consumption. For example, consumer attitudes about the characteristics of environmentally friendly packaging vary according to the

importance of recyclability, reusability, and biodegradability depending on the country of origin (Herbes, Beuthner, & Ramme, 2018).

#### 2.1.3.3 Norms and values

The role of personal or social identity is also considered a determining factor in explaining sustainable behaviors. For example, under the theory of planned behavior, participants tend to recycle behavior if recycling is an essential part of their personal identity (Terry, Hogg, & White, 1999).

Thøgersen (1999) studied the effect of ethical norms on the preference for environmentally friendly packaging in the purchasing process. The personal concerns of the individual were ethical reasons for the purchase. Ethical reasoning and compliance with customer expectations make waste reduction packaging preferred. In addition, personal norms depend on perceived social norms.

Onel (2017) examined the impact of personal and subjective norms on the shopping intentions of eco-shoppers. They realized that personal norms (i.e., self-expectations about the environment) were more important than subjective norms.

#### 2.1.3.4 Package design

More than 95% of customers' purchasing decisions are emotional or semi-conscious. Visual elements of packaging communicate with the customer, evoke their emotions and connect them with the brand, and finally attract their attention and make them buy the product. Through proper packaging, it is possible to create a fully functional and step-by-step method to attract the customer (Boz et al., 2020).

Numerous studies have shown that distinctive packaging can play an active role in improving the approach of customers and buyers. Optimally designed

packaging can increase the value of a product and deepen the customer's relationship with it (Bou-Mitri, Abdessater, Zgheib, & Akiki, 2020). Packaging signs for consumers include: verbal, structural and graphical features. Graphics and colors are symbols that are widely used for packaging design and are a signal of sustainability. Graphics and green colors, for example, are considered directly environmentally-friendly (Lindh, Williams, Olsson, & Wikström, 2016).

#### 2.1.3.5 On-label claims

Magnier and Schoormans (2015) evaluated visual and verbal claims about the compatibility of detergents and packaging of mixed nuts with the environment and its impact on consumers' purchasing attitudes and intentions from two different countries (Netherlands and France). They suggested that when buying products with higher carbon footprints, consumers' priorities should not be the only consideration; Rather, the idea of effective initiatives between politicians and food suppliers should be pursued.

#### 2.1.3.6 Cost (price)

In the case of purchasing green and environmentally friendly packaging, the price was often cited as a barrier and an influential factor in the purchase (Chekima et al., 2016). The impact of price, product quality, packaging performance and packaging design, between purchasing sustainable packaging and recycling, was first assessed on consumers who considered themselves aware of environmental issues and neutral to such issues. Studies have shown that price is one of the primary determining factors in purchasing (Van Birgelen, Semeijn, & Keicher, 2009). According to survey responses, consumers in China, India, and Indonesia are more concerned

about environmental sustainability problems than in other countries. They claim that they are most willing to pay more for sustainable packaging with the aim of less harming the environment (green cost) (Boz et al., 2020).

#### 2.1.3.7 Product factors

Research has shown that consumer perceptions of sustainable packaging are influenced by material selection rather than product protection. (Lindh et al., 2016). In their study, metals and plastics are not considered environmentally friendly; While paper materials were selected as environmentally friendly materials (Barker, 2018).

Cardboard boxes are considered to be the most versatile type of primary packaging for use in complex and inverted distribution channels, which are placed after flexible packaging. The main reason for choosing flexible cardboard boxes and packages is their ability to match different products, applications, sizes, and cuts. Easier shipping, lighter weight, and lower shipping costs are also important. Italy and Spain have the lowest level of satisfaction and justification for using cartons in distribution channels.

#### 2.1.4 The effect of packaging on improving post-consumption behaviors

Packaging also leads to sustainable consumer behaviors, including post-consumption behaviors and an increase in perceived packaging value; Because such behaviors are influenced by factors related to consumers and packaging. The existing literature focuses mainly on changing consumer payment costs in relation to improving recyclability and evaluating the overall attitude to post-consumption behaviors (Boz et al., 2020). The growing popularity of sustainability principles has not always been closely linked to ecological behaviors, including recycling habits (Arain et al., 2020).

The U.S. Environmental Protection Agency (EPA) stated that the rate of total recycling and composting of packaging and containers created increased from about 53% in 2015 as it was 10% in 1960 and this recycling rate was in high-income economies.

## 2.2 Empirical background

Popovic et al. (2019) studied the factors influencing the decision of consumers to buy food in environmentally friendly packaging. The purpose of this paper was to provide a systematic review of the literature on all studies predicting consumer purchases of food in environmentally friendly packaging, published between 1994 and 2019. A review of the available literature showed that the most important factors influencing consumer shopping behavior were: consumer attitude, knowledge about the environmental impact of packaging, visual design, functionality, intercultural differences, and cost-effectiveness.

Boesen, Bey, and Niero (2019) examined how young consumers educated in Denmark perceive the environmental sustainability of 5 different packaging for liquid foods (milk, beer, soft drinks, olive oil, and tomato sauce). Online surveys and qualitative interviews with 197 Danish consumers were used for the study. The results showed that consumers understand the environmental sustainability of all types of packaging in the first place based on the type of material and what they personally do in the waste disposal phase. Consumers had limited knowledge of environmental labels related to package sustainability.

Hao et al. (2019) examined the factors affecting consumer willingness to pay for green packaging in China. In this study, data collected from 781 respondents were used in a carefully designed survey to analyze the factors affecting consumer

willingness to pay for green packaging. Using principal factor analysis, four main factors were identified: environment, green packaging quality, commodity, and packaging price. According to the results, even consumers who did not have enough knowledge about green packages were very willing to pay to buy these packages. In addition, it was observed that consumers pay more attention to convenience, reusability, and product protection compared to the appearance and price of packaging.

Herbes et al. (2018) in a study of 948 German consumers, 160 American consumers, and 440 French consumers examined how the interaction of environmentally friendly packaging features and the overall assessment of environmental compatibility by consumption Affects people with different cultures. The results showed that consumers focused more on closed lifetime features. However, cultural differences also affected their relative weight in recyclability, reusability, and degradability; They paid less attention to renewable sources and did not focus at all on activities related to production, transportation, and partial use.

Tüzemen and Kuru (2018) surveyed 371 consumers in Gerson State about the effects of packages given to consumers as green food packaging, taking into account environmental, health, quality, reusing, and recycling benefits. The results showed that consumers with low levels of education and income were more price-oriented than paying attention to the type of packaging. In contrast, consumers with higher levels of education and income paid more attention to the type of packaging and had more environmental sensitivities.

Orzan, Cruceru, Bălăceanu, and Chivu (2018) in a study analyzed the behavior of Romanian consumers regarding sustainable packaging. In this study, a survey of 268 consumers was conducted. The results showed that two motivating

factors - recycling and environmental protection - were able to influence the decision to purchase environmentally friendly packaging. The high cost of these packages and the lack of information about the benefits of using durable packages were introduced as factors influencing the consumer not to buy.

Kumar and Ghodeswar (2015) conducted a study entitled "Factors influencing the decision to buy green consumer". The researchers used a survey-based method to test the hypotheses. Data were collected from 403 Indian respondents working in Mumbai using a 38-item questionnaire and snowball sampling method. Data were analyzed using confirmatory and exploratory factor analysis. Structural equation modeling was used to test the hypotheses. The results showed that respondents were more inclined to protect the environment, fulfill environmental responsibilities, and seek information about green products. The combination of environmental protection, striving for environmental responsibility, green product experience, corporate compatibility with the environment, and social attractiveness was introduced as the most important factors influencing the decision to buy green products.

### 2.3 Summarizing theoretical and empirical background

According to the theoretical foundations and empirical background of the research, it can be seen that most of the proposed models have developed their model according to the planned theory of Ajzen and Fishbein (1980), which has been cited in many studies. Empirical background also showed that several factors have influenced consumer behavior in choosing sustainable packaging, but none of these studies has provided a comprehensive classification and prioritization of consumer behavior over sustainable packaging. On the other hand, most of the researchers in their research

method have used polls and quantitative methods alone in collecting data and in only one case, Boesen et al. (2019) have used interviews and polls at the same time. Therefore, one of the innovations of the present study is, firstly, the research method used, which examines the factors affecting consumer behavior in the selection of sustainable packaging in a mixed (qualitative-quantitative) way, which increases the reliability of the results, and secondly. Uses all the studies and scientific documents in the field of sustainable packaging to identify factors affecting consumer behavior in the selection of sustainable packaging and provides a comprehensive model that has not been addressed in studies in this field.

## CHAPTER 3

### METHODOLOGY

In this chapter, the research process is reviewed. The aim of this study is to "Identify the Factors Affecting Consumer Behavior in the Selection of Sustainable Packaging." Since the factors influencing consumer behavior in choosing sustainable packaging must first be revealed in order to finally design a model for it, a mixed research approach must be used. For this purpose, the exploratory method of mixed research method has been used. In the exploratory mixed research method, first, the qualitative method is used to identify the main components, and then the quantitative method is used to test the model or answer the research questions. In this chapter, according to each stage of qualitative and quantitative research, the study population, sample size, sampling method, data collection tools, and validity and reliability of tools and data analysis methods are introduced.

#### 3.1 Research method

Since the purpose of this study is to identify the factors affecting consumer behavior in sustainable packaging; Therefore, the research is mixed exploratory in terms of research approach and descriptive in terms of how to collect descriptive information.

Mixed research has emerged in the study of the humanities and behavioral sciences with researchers and methodologists who believe that the use of quantitative and qualitative perspectives together in a single research study is useful. According to researchers, the combination of quantitative and qualitative research methods strengthens and validates these methods, provides richer data, and new theories

emerge according to the paradoxes in data sources and in a project, two types of research methods can be used effectively (Strauss & Corbin, 1999).

A Mixed research method is a method for collecting and analyzing quantitative and qualitative data in a study or set of studies that are based on the precedence and sequence of information. In fact, the purpose of using mixed research methods is not to replace one with the other, but to enhance the strengths and reduce or minimize the weaknesses of both methods in one study (Creswell, 2003).

The present study was conducted in 3 phases as described in Figure 1. In the first phase, library studies were used to collect qualitative data for the research "Identification of factors affecting consumer behavior in the selection of sustainable packaging". At this stage, qualitative data were extracted from the text of valid scientific sources (articles and dissertations and valid scientific sites) and classified according to three codings: open, axial, and selective. In the second step, a researcher-made questionnaire was prepared based on the data of the qualitative section and after confirming the main factors, the final research model was designed and presented. Finally, in the third step, the relationships within the model (research hypotheses) were confirmed by modeling structural equations.

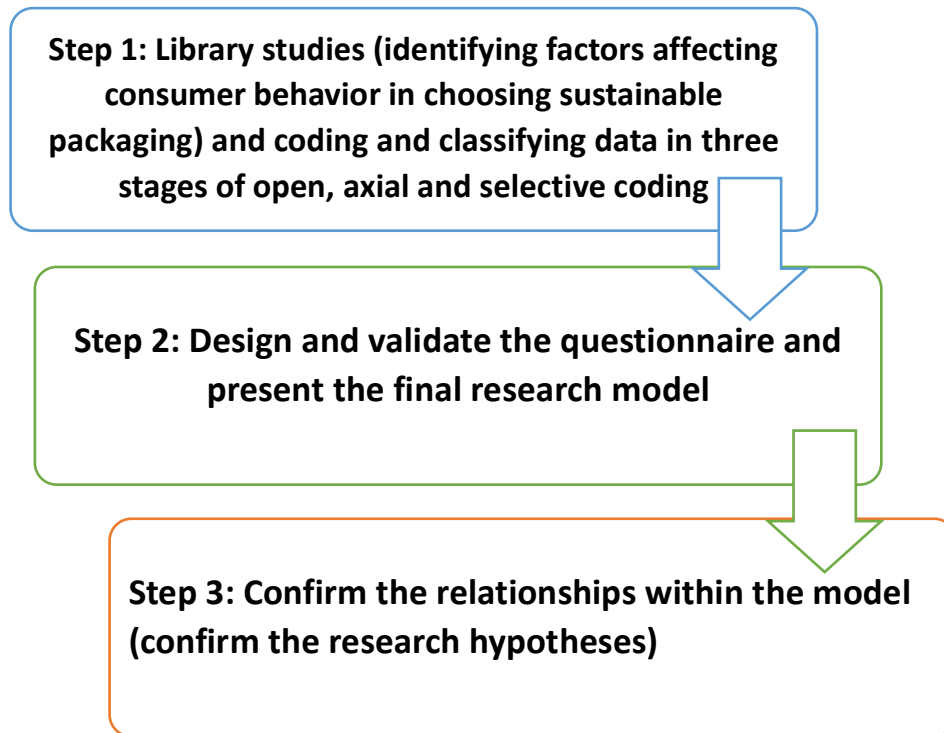


Fig. 1 Steps of conducting the research

### 3.2 Statistical population

The statistical population of the research in the qualitative and quantitative parts is as follows:

In the qualitative part, the statistical population included all authentic scientific sources, including articles, dissertations, and valid scientific websites in the field of sustainable packaging.

In the quantitative part, the statistical population includes all consumers who have used sustainable packaging.

### 3.3 Statistical sample and sampling method

In the qualitative part, the statistical sample included authentic scientific articles and dissertations, and reputable websites in the field of consumer behavior regarding sustainable packaging usage, which was selected in a purposeful manner. The

selection criteria were: the article or dissertation should have a complete structure (abstract, research literature, research method, results and discussion, and conclusion), and the selected scientific source should be related to the research topic.

In the quantitative section, statistical samples were selected online and available, and 150 people who had used sustainable packaging in their consumption, formed a statistical sample.

### 3.4 Data collection method

In the qualitative section, library or documentary methods were used to collect information. In this way, first, reputable domestic and foreign scientific websites were identified and then keywords (consumer behavior, packaging, sustainable packaging) were searched on each of these websites. Finally, authentic scientific articles and dissertations were extracted from these websites. Then, according to the structure of the scientific source and its relationship with the research topic, filtered articles and a number of scientific articles and dissertations remained, which were used to extract data.

In the quantitative part, a survey method and a questionnaire were used to collect information. The questionnaire was designed by the researcher based on the identified open codes.

### 3.5 Validity and reliability of qualitative data

#### 3.5.1 Validity of qualitative data

The following methods were used to validate the results of the qualitative section:

- Consensus of researchers: In different stages of research, research findings have been reviewed with a research colleague.

- Consensus of methods: In this study, after modeling in the qualitative method, the model was tested in the quantitative method.

- Organ control: In this research, in different stages of the research, the research findings have been reviewed by knowledgeable people.

- The acceptance index was also confirmed through the researcher's involvement during the research as well as the review of the supervisors and advisors.

### 3.5.2 Reliability of qualitative data

To calculate the open reliability of the test, usually from the selected scientific sources, 3 sources were selected for the sample. Then each of these sources is coded twice in a short and specific period of time; In order to evaluate the coding stability, the specified codes are then compared with each other. In each text, codes that are similar in time interval are labeled "agreement" and dissimilar codes are labeled "disagreement." The method of calculating the reliability of the retest is as follows:

$$\text{Percentage of intra-subject agreement} = (\text{number of agreements} \times 2 / \text{total number of codes}) \times 100$$

## 3.6 Validity and reliability of the questionnaire

### 3.6.1 Validity of the questionnaire

The concept of validity (validity) focuses on the accuracy of the measurement tool to determine how well it measures the desired trait. There are numerous methods to

determine the validity of the questionnaire, one of which is the validity of the content. The content validity of a measurement tool depends on the questions that make it up. The questionnaire has content validity if the questions represent specific features and skills that the researcher intends to measure. The validity of the content of a test is usually determined by experts in the subject matter. In this study, the content of the questionnaire was confirmed by the professor. Therefore, the questionnaire had the necessary validity. The validity of the questionnaire structures (conceptual model obtained from the qualitative part) was also confirmed using the construct validity (confirmatory factor analysis). The results are given in Chapter 4.

### 3.6.2 Reliability of the questionnaire

The reliability concept deals with the extent to which measuring tools produce the same results under the same conditions. The reliability coefficient ranges from zero (no relation) to +1 (full relation). Various methods are used to calculate the reliability of the questionnaire. In this study, in order to evaluate the reliability of the questionnaire, the combined reliability coefficient and Cronbach's alpha coefficient were used using Smart-PLS software. The results related to the reliability of the questionnaire are mentioned in Chapter 4.

### 3.7 Data analysis

In this research, according to the application of the design of mixed exploratory methods, the methods of qualitative and quantitative analysis of data according to research needs were used. In the qualitative part, the theoretical coding method (derived from the Grounded Theory method) was used and in the quantitative part, structural equation modeling was used to test and validate the model. In the

qualitative part for data coding in addition to manual coding by the researcher, Atlas.ti software was also used and in the quantitative part to confirm the main factors and test the model, first-order and second-order confirmatory factor analysis was applied using Smart-PLS software.

### 3.8 Grounded theory for encoding data

In regard to the qualitative part of this research, the Grounded Theory was used, which has determined the main direction of the research. Qualitative research is in fact any kind of research whose findings are obtained by methods other than statistical methods or any quantification. Grounded theory Database theory is an exploratory research method and allows the researcher to formulate a new hypothesis in cases where it is not possible to use predefined hypotheses. In other words, fundamental data theory is a way of gaining knowledge about a subject under study, a subject in which there is limited knowledge available. The foundation's data theory dates back to 1967, when two researchers in nursing and paramedical studies, Glears and Strauss, researched the ideas and attitudes of hospitalized patients (Strauss & Corbin, 1999).

Data analysis in this method is based on three main elements (codes, concepts, and categories). The research process takes place in three steps: open coding, axial coding, and selective coding.

Open coding: The process of shredding, comparing, conceptualizing, and categorizing data is called open coding.

Axial Coding: A set of open coding output concepts, categories, attributes, and subcategories. The relationship between each category and its subcategories is done in the axial coding stage.

Selective coding: After defining the central category by re-coding the data, the types of conditions affecting the central category (causal, contextual and intervening factors), strategies, and their consequences are also defined.

Causal factors: categories related to conditions that affect the central category;

Underlying factors: specific conditions that affect strategies;

Intervening conditions: general contextual conditions that affect strategies;

Strategies: specific actions or interactions that result from a central phenomenon;

Consequences: Outputs from hiring strategies.

The process of open and axial coding leads to the creation of a set of categories that have a specific pattern of relationship between each category and its subcategories. Now we have to connect the categories and present a special theoretical system. Linking categories together is called selective coding (Strauss & Corbin, 1999).

## CHAPTER 4

### FINDINGS

#### 4.1 Descriptive statistics

##### 4.1.1 Demographic characteristics of the participants

Tables 1 to 5 show the demographic characteristics of the participants. According to Table 1, 54% of the participants were Iranian and 46% were Turkish. 71% Of these participants were male and 29% were female. 1.5 percent were 15 to 20 years old; 35 percent were 21 to 30 years old; 58.5 percent were 31 to 40 years old; 4 percent were 41 to 50 years old, and 1 percent were over 51 years old. The level of education was 5% high school graduate, 12% university experience (student or dropped out), 46.5% bachelor's degree, and 36.5% higher than bachelor's degree. Income levels were 11% low, 67.5% average, and 21.5% higher than average.

Table 1. Frequency and Frequency Percentage of Participants by Accommodation

Country					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	IRAN	108	54.0	54.0	54.0
	TURKEY	92	46.0	46.0	100.0
	Total	200	100.0	100.0	

Table 2. Frequency and Frequency Percentage of Participants by Gender

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Man	142	71.0	71.0	71.0
	Woman	58	29.0	29.0	100.0
	Total	200	100.0	100.0	

Table 3. Frequency and Frequency Percentage of Participants by Age

Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	15-20	3	1.5	1.5	1.5
	21-30	70	35.0	35.0	36.5
	31-40	117	58.5	58.5	95.0
	41-50	8	4.0	4.0	99.0
	Over 50	2	1.0	1.0	100.0
	Total	200	100.0	100.0	

Table 4. Frequency and Frequency Percentage of Participants by Level of Education

Education					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High school graduate	10	5.0	5.0	5.0
	University student or dropped out	24	12.0	12.0	17.0
	Bachelor degree	93	46.5	46.5	63.5
	Above bachelor degree	73	36.5	36.5	100.0
	Total	200	100.0	100.0	

Table 5. Frequency and Frequency Percentage of Participants by Income Levels

Income Level					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Low	22	11.0	11.0	11.0
	Average	135	67.5	67.5	78.5
	Above average	43	21.5	21.5	100.0
	Total	200	100.0	100.0	

#### 4.2 Identify the main factors of the model

In order to identify the main factors of the model, first-order confirmatory factor analysis was used using smart-PLS software. This software was used for the purpose that it is not sensitive to both the small number of statistical samples and the abnormality of the data. Figure 2 shows the factor loads of each variable. Variables with a factor load less than 0.4 are removed from the model. According to Figure 2, the factor loads of variables 1, 4, 14, 41, and 24 are lower than 0.4, which are thus removed from the model.

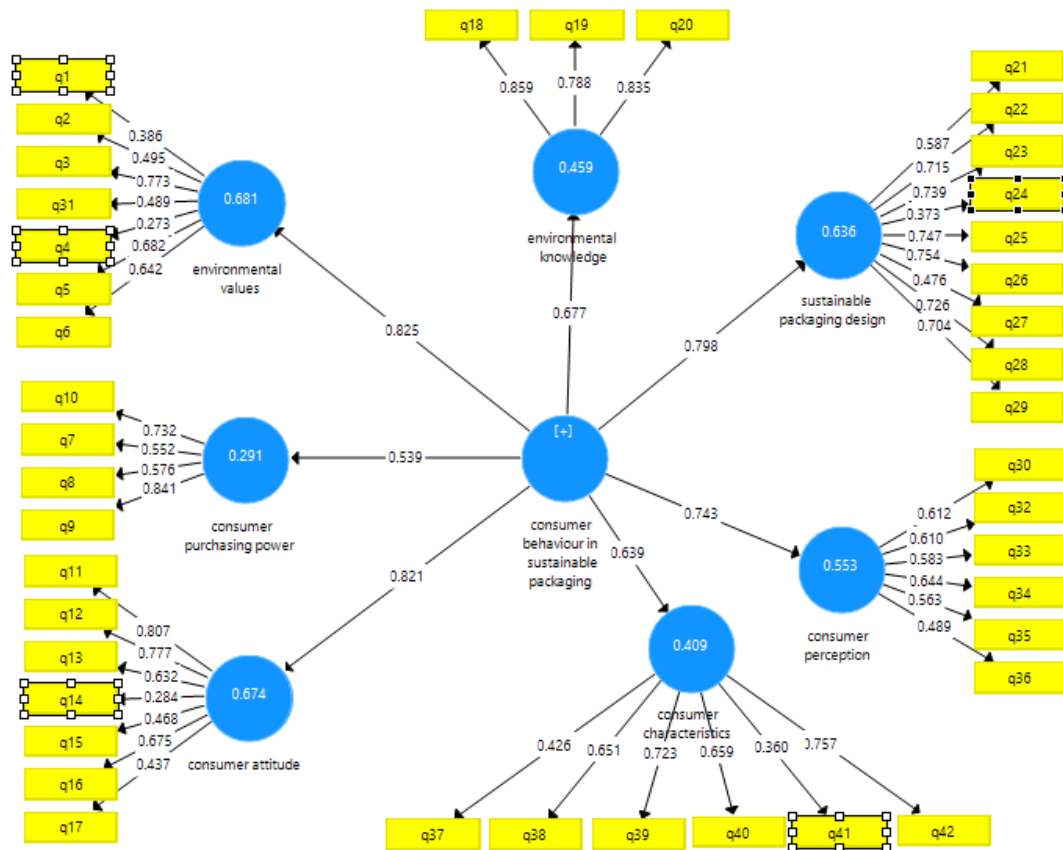


Fig. 2 Factor analysis test of the first order to identify the main factors of the model

After removing the variables with factor loads less than 0.4, the final research model was presented in Figure 3. In this model, as it is obvious, the factor loads of all variables are higher than 0.4.

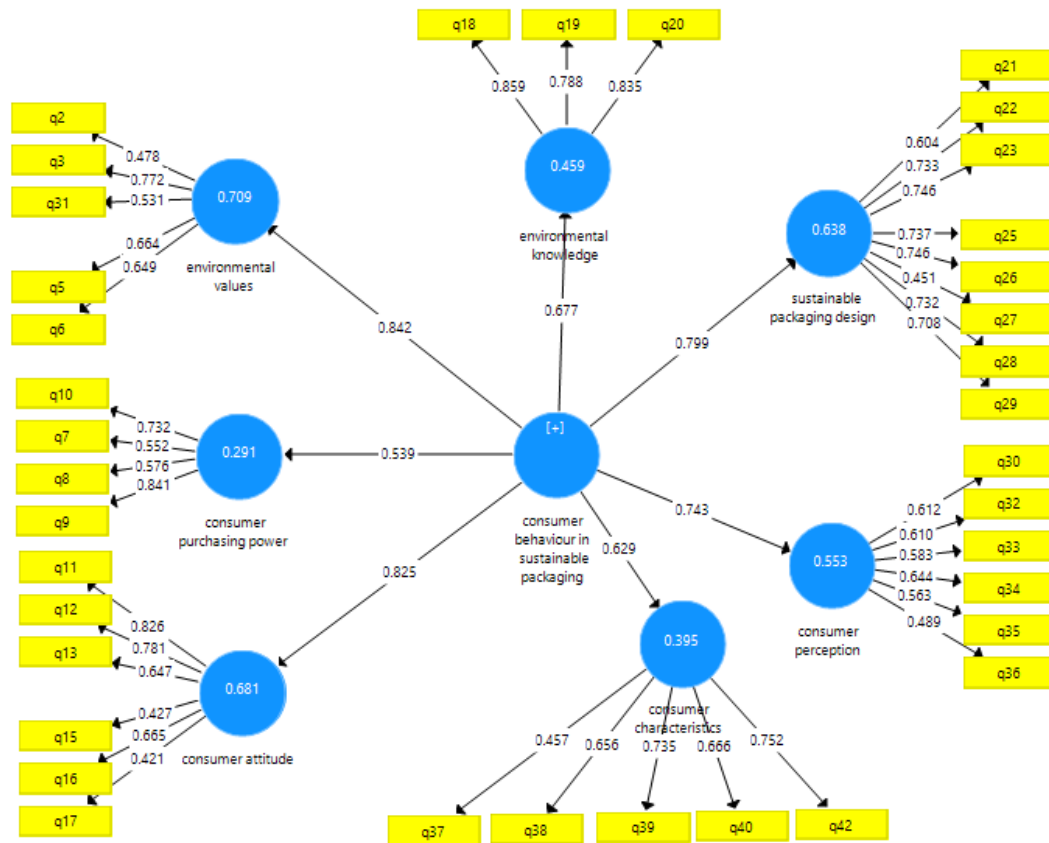


Fig. 3 The final model of the research after eliminating the factor loads less than 0.4

#### 4.3 Testing the final research model

##### 4.3.1 Checking the validity and reliability of the model

The mean value of variance (AVE) was used to evaluate the convergent validity and Cronbach's alpha coefficient and combined reliability were used to evaluate the reliability of the questionnaire. If Cronbach's alpha value and combined reliability are higher than 0.7 and the mean-variance extracted is more than 0.5, the validity and reliability of the model are acceptable (Davari and Rezazadeh, 2014). Table 6 shows the results of the questionnaire reliability (Cronbach's alpha coefficient and combined reliability) and convergent validity. The AVE results were greater than 0.5 for latent variables and greater than 0.7 for Cronbach's alpha and combined

reliability; Therefore, it can be said that the research model has good reliability and validity.

Table 6. Convergent Reliability and Validity of Research Structures

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Consumer Perception	0.716	0.757	0.543
Environmental Values	0.705	0.759	0.594
Environmental Knowledge	0.773	0.867	0.685
Consumer Behavior in Sustainable Packaging	1.000	1.000	1.000
Sustainable Packaging Design	0.838	0.876	0.575
Consumer Purchasing Power	0.731	0.775	0.570
Consumer Attitude	0.722	0.803	0.519
Consumer Characteristics	0.767	0.791	0.538

#### 4.3.2 Fitting structural research model

To measure the fit of the model, fit indices including R<sup>2</sup> criterion, impact size criterion f<sup>2</sup>, Q<sup>2</sup> criterion, communality, and overall fit of the model were used using GOF.

The results are listed in Table 7. The basic criterion for evaluating endogenous latent variables is the coefficient of determination (R<sup>2</sup>). R<sup>2</sup> values equal to 0.19, 0.33, and 0.67 in PLS route models are described as weak, medium and strong, respectively (Davari and Rezazadeh, 2014). The Q<sup>2</sup> index measures the quality of the structural model for each endogenous block by considering the measurement model. Positive values of these indicators indicate the appropriate and acceptable quality of the measurement and structural model. If this value is greater than zero for a latent endogenous variable, it indicates that the relationships between the other structures and the model structure are well explained and the model has a good fit. The values of 0.02, 0.15, and 0.35 show the relationship between low,

medium, and strong predictors of a latent variable, respectively. The GOF criterion is related to the general part of structural equation models. This means that by this criterion the researcher can control the fit of the general part after examining the fit of the measurement part and the structural part of his general research model. The GOF criterion was is calculated according to the following equation.

$$\text{GOF} = \sqrt{\text{average (Commonality)} \times \text{average (R}^2\text{)}}$$

Three values of 0.01, 0.25, and 0.36 have been introduced as a weak, medium, and strong values for GOF (Davari and Rezazadeh, 2014). According to Table 7, the values of 0.649 have been obtained, which indicates a good fit for the model.

Table 7. Results Related to Model Fitting

	R Square	F Square	Q Square	Communality	GOF
Consumer Perception	0.553	1.235	0.156	0.088	0.322
Environmental Values	0.709	2.434	0.211	0.113	
Environmental Knowledge	0.459	0.847	0.266	0.353	
Sustainable Packaging Design	0.638	1.765	0.269	0.317	
Consumer Purchasing Power	0.291	0.410	0.095	0.145	
Consumer Attitude	0.681	2.138	0.240	0.211	
Consumer Characteristics	0.395	0.654	0.113	0.146	

Bootstrap test was used to test the final model. Table 8 and Figure 4 show the results of this test including path coefficients, t-statistic, and significance level of each path. According to the results of Table 8, if in the research model for each path the value of the t-statistic is more than 1.96 and the significance level is more than 0.001, the model is approved. According to the results, all identified components had a t-statistic greater than 1.96 and a significance level higher than 0.001, which indicates their impact on consumer behavior in the use of sustainable packaging.

According to the path coefficients, respectively, environmental values (0.842) have the most power to explain consumer behavior in the use of sustainable packaging, followed by the components of consumer attitude (0.825), respectively. Sustainable packaging design (0.799), consumer perception (0.743), environmental knowledge (0.677), consumer characteristics (0.629), and consumer purchasing power (0.539).

Table 8. Results of Bootstrap Test of the Final Research Model

			Path Coefficient	T Statistics	(P-Value)
Consumer Behavior in Sustainable Packaging	→	Consumer Perception	0.743	26.715	0.000
	→	Environmental Values	0.842	55.779	0.000
	→	Environmental Knowledge	0.677	17.738	0.000
	→	Sustainable Packaging Design	0.799	33.676	0.000
	→	Consumer Purchasing Power	0.539	14.475	0.000
	→	Consumer Attitude	0.825	30.868	0.000
	→	Consumer Characteristics	0.629	13.586	0.000

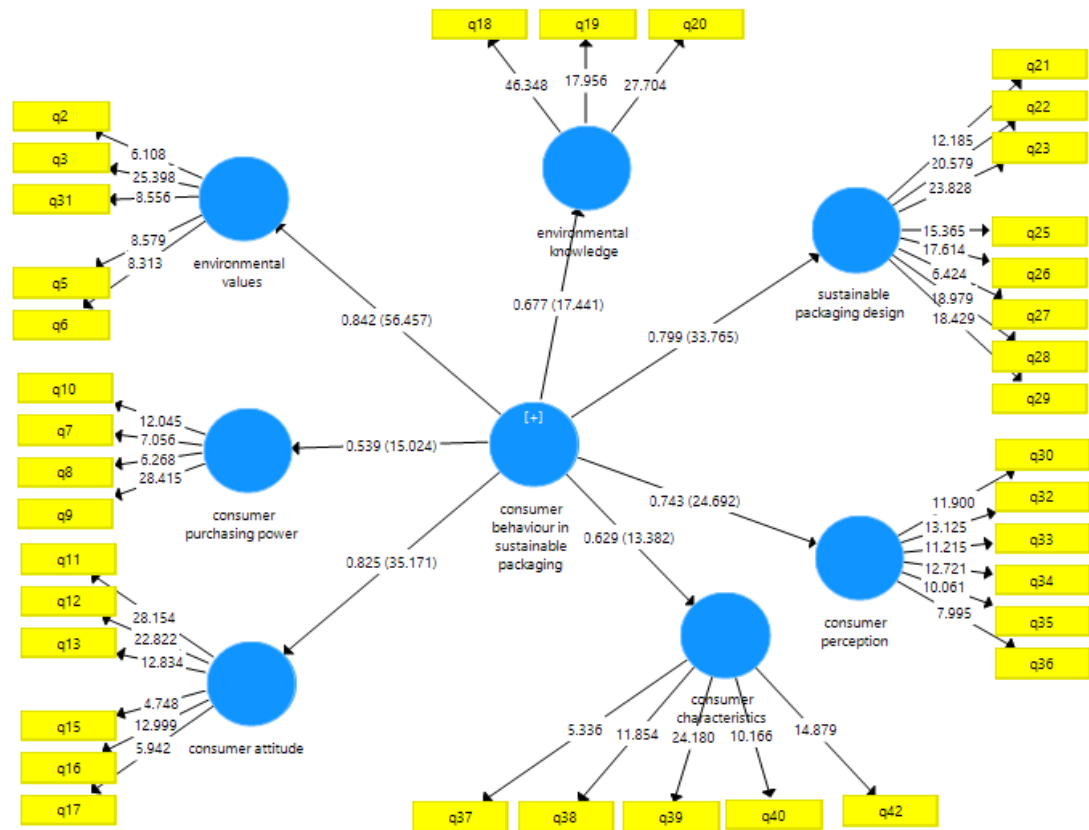


Fig. 4 Bootstrap test results to test the final model of consumer behavior in the use of sustainable packaging

#### 4.4 Comparison of consumer behavior between Iran and Turkey

In order to compare the behavior of consumers in the two countries in the use of stable packaging, the normal distribution of data was first examined using the Kolmogorov-Smirnov test. If the significance level of the indicators is higher than 0.05, the data have a normal distribution and parametric tests can be used, otherwise, non-parametric tests should be used. The Kolmogorov-Smirnov test (Table 9) showed that the variables did not have a normal distribution (sig <0.05). As a result, the non-parametric Kruskal-Wallis test was used.

Table 9. Results of the Kolmogorov-Smirnov Test to Investigate the Normal Distribution of Data

Variables	Kolmogorov-Smirnov Test
Use of Renewable Materials	Kolmogrov-Smirnov Z: 3.228 Asymp. Sig. (2-Tailed): 0.000
Use of Recycled Materials	Kolmogrov-Smirnov Z: 3.319 Asymp. Sig. (2-Tailed): 0.000
Waste Reduction	Kolmogrov-Smirnov Z: 4.371 Asymp. Sig. (2-Tailed): 0.000
Performance Optimization	Kolmogrov-Smirnov Z: 3.069 Asymp. Sig. (2-Tailed): 0.000
Transport Efficiency	Kolmogrov-Smirnov Z: 3.942 Asymp. Sig. (2-Tailed): 0.000
Willingness to Pay More	Kolmogrov-Smirnov Z: 4.431 Asymp. Sig. (2-Tailed): 0.000
Distance Traveled to Purchase the Product	Kolmogrov-Smirnov Z: 4.244 Asymp. Sig. (2-Tailed): 0.000
Time Spent to Find the Product	Kolmogrov-Smirnov Z: 4.279 Asymp. Sig. (2-Tailed): 0.000
Product Price	Kolmogrov-Smirnov Z: 4.003 Asymp. Sig. (2-Tailed): 0.000
Green Trust	Kolmogrov-Smirnov Z: 3.583 Asymp. Sig. (2-Tailed): 0.000
Advertising and Marketing Style	Kolmogrov-Smirnov Z: 3.907 Asymp. Sig. (2-Tailed): 0.000
Environmental Laws and Regulations	Kolmogrov-Smirnov Z: 3.937 Asymp. Sig. (2-Tailed): 0.000
The Severity of Environmental Issues	Kolmogrov-Smirnov Z: 3.459 Asymp. Sig. (2-Tailed): 0.000
Environmental Concerns	Kolmogrov-Smirnov Z: 3.586 Asymp. Sig. (2-Tailed): 0.000
Sense of Responsibility Towards the Environment	Kolmogrov-Smirnov Z: 2.597 Asymp. Sig. (2-Tailed): 0.000
Knowledge Of Climate Change and Global Warming	Kolmogrov-Smirnov Z: 2.942 Asymp. Sig. (2-Tailed): 0.000
Knowledge Of a Sustainable Logo or Brand	Kolmogrov-Smirnov Z: 2.937 Asymp. Sig. (2-Tailed): 0.000
Ability to Read Labels	Kolmogrov-Smirnov Z: 4.397 Asymp. Sig. (2-Tailed): 0.000
Packaging Production Technology	Kolmogrov-Smirnov Z: 3.929 Asymp. Sig. (2-Tailed): 0.000
Relation to Consumer Health	Kolmogrov-Smirnov Z: 3.905 Asymp. Sig. (2-Tailed): 0.000
Producer Environmental Claims	Kolmogrov-Smirnov Z: 3.788 Asymp. Sig. (2-Tailed): 0.000
Shape of Packaging	Kolmogrov-Smirnov Z: 3.845 Asymp. Sig. (2-Tailed): 0.000
Packaging Color	Kolmogrov-Smirnov Z: 3.194 Asymp. Sig. (2-Tailed): 0.000
Type of Material Used	Kolmogrov-Smirnov Z: 3.338 Asymp. Sig. (2-Tailed): 0.000
Information on the Label	Kolmogrov-Smirnov Z: 3.663 Asymp. Sig. (2-Tailed): 0.000
Graphic Signs	Kolmogrov-Smirnov Z: 4.669 Asymp. Sig. (2-Tailed): 0.000
Easy Storage at Home	Kolmogrov-Smirnov Z: 3.388 Asymp. Sig. (2-Tailed): 0.000
Ease of Transportation	Kolmogrov-Smirnov Z: 4.014 Asymp. Sig. (2-Tailed): 0.000
Re-Seal the Package	Kolmogrov-Smirnov Z: 3.785 Asymp. Sig. (2-Tailed): 0.000

According to the results of Table 10, in the variables of transport efficiency, time spent to find the product, and green trust. Advertising and marketing style, the severity of environmental issues, knowledge of sustainable logo or brand, relationship with consumer health, graphic signs, ease of transportation, perceived quality, level of economic development, cultural differences, and level of income, there was no significant difference in participants of Turkey and Iran. For other variables, the difference was significant.

Table 10. Results of Kruskal-Wallis Test

Variables	Kruskal-Wallis Test	Mean Rank
Use of Renewable Materials	Chi-Square: 31.209/Asymp. Sig: 0.000	Iran: 120.90/ Turkey: 76.55
Use of Recycled Materials	Chi-Square: 78.869/Asymp. Sig: 0.000	Iran: 68.87/ Turkey: 137.64
Waste Reduction	Chi-Square: 28.792/ Asymp. Sig: 0.000	Iran: 81.96/ Turkey: 122.26
Performance Optimization	Chi-Square: 27.973/Asymp. Sig: 0.000	Iran: 77/ Turkey: 128.09
Transport Efficiency	Chi-Square: 1.792/Asymp. Sig: 0.181	-
Willingness to Pay More	Chi-Square: 63.593/Asymp. Sig: 0.000	Iran: 72.43/ Turkey: 133.46
Distance Traveled to Purchase the Product	Chi-Square: 29.866/Asymp. Sig: 0.000	Iran: 81.11/ Turkey: 123.26
Time Spent to Find the Product	Chi-Square: 2.242/Asymp. Sig: 0.134	-
Product Price	Chi-Square: 6.338/Asymp. Sig: 0.012	Iran: 109.24/ Turkey: 90.24
Green Trust	Chi-Square: 0.892/Asymp. Sig: 0.345	-
Advertising And Marketing Style	Chi-Square: 0.12/Asymp. Sig: 0.913	-
Environmental Laws and Regulations	Chi-Square: 14.468/Asymp. Sig: 0.000	Iran: 86.37/ Turkey: 117.09
The Severity of Environmental Issues	Chi-Square: 2.652/Asymp. Sig: 0.103	-
Environmental Concerns	Chi-Square: 15.586/Asymp. Sig: 0.000	Iran: 85.19/ Turkey: 118.47
Sense of Responsibility Towards the Environment	Chi-Square: 87.642/Asymp. Sig: 0.000	Iran: 135.06/ Turkey: 59.93
Knowledge of Climate Change and Global Warming	Chi-Square: 6.875/Asymp. Sig: 0.009	Iran: 90.98/ Turkey: 111.67
Knowledge of a Sustainable Logo or Brand	Chi-Square: 0.011/Asymp. Sig: 0.916	-
Ability to Read Labels	Chi-Square: 7.690/Asymp. Sig: 0.006	Iran: 90.98/ Turkey: 111.67
Packaging Production Technology	Chi-Square: 49.720/Asymp. Sig: 0.000	Iran: 75.35/ Turkey: 130.02
Relation With Consumer Health	Chi-Square: 0.993/Asymp. Sig: 0.319	-
Producer Environmental Claims	Chi-Square: 27.981/Asymp. Sig: 0.000	Iran: 81.78/ Turkey: 122.48
Shape of Packaging	Chi-Square: 0.973/Asymp. Sig: 0.324	Iran: 97.03/ Turkey: 104.58
Packaging Color	Chi-Square: 9.221/Asymp. Sig: 0.002	Iran: 89.59/ Turkey: 113.31
Type of Material Used	Chi-Square: 33.202/Asymp. Sig: 0.000	Iran: 79.88/ Turkey: 124.70
Information on the Label	Chi-Square: 75.833/Asymp. Sig: 0.000	Iran: 69.81/ Turkey: 136.552
Graphic Signs	Chi-Square: 0.493/Asymp. Sig: 0.482	-
Easy Storage at Home	Chi-Square: 4.426/Asymp. Sig: 0.035	Iran: 107.92/ Turkey: 91.79
Ease of Transportation	Chi-Square: 8.526/Asymp. Sig: 0.004	-
Re-Seal the Package	Chi-Square: 22.837/Asymp. Sig: 0.000	Iran: 110.87/Turkey: 88.33
Easy Opening of Packaging	Chi-Square: 8.083/Asymp. Sig: 0.004	Iran: 83.78/ Turkey: 120.12
Environmental Compatibility	Chi-Square: 19.497/Asymp. Sig: 0.000	Iran: 106.30/ Turkey: 93.70
Perceived Quality	Chi-Square: 2.587/Asymp. Sig: 0.108	-
Level of Economic Development	Chi-Square: 0.060/Asymp. Sig: 0.806	-
Cultural Differences	Chi-Square: 1.588/Asymp. Sig: 0.208	-
Income Level	Chi-Square: 0.889/ Asymp. Sig: 0.346	-
Level of Education	Chi-Square: 0.096/Asymp. Sig: 0.756	-
Age	Chi-Square: 0.512/Asymp. Sig: 0.474	-

## CHAPTER 5

### CONCLUSIONS AND SUGGESTIONS

The aim of this study was to investigate consumer behavior regarding sustainable packaging. The research consisted of two stages: qualitative and quantitative. In the qualitative stage, through library studies, valid scientific texts (articles and dissertations) related to the field of research were extracted. After extracting the factors and classifying them, a questionnaire based on the identified factors was prepared.

In the quantitative stage, the collected data were analyzed through structural equation modeling with partial least squares approach. First, the main factors were identified and then the final model of the research was tested and explained. Finally, the data obtained from the participants' responses in Iran and Turkey were compared. In the following, research questions are answered and the results are explained.

#### 5.1 The first research question

What factors affect consumer behavior in choosing sustainable packaging?

In order to answer this question, a literature review was done. Open codes were extracted from the text of valid sources. Then the similar codes were classified into separate categories (axial codes) and finally the communication network of the extracted concepts was drawn. Based on the results of qualitative content analysis in this section, 42 factors and 7 main categories were extracted. Factors of consumer behavior in sustainable packaging were: environmental knowledge (including knowledge of climate change and global warming, knowledge of sustainable logo or brand, ability to read labels), environmental values (including use From renewables,

use of recycled materials, waste reduction, efficiency optimization, transportation efficiency), consumer purchasing power (including willingness to pay more, distance traveled to purchase product, time spent to find product, product price ), Consumer attitudes (including green trust, advertising and marketing style, environmental laws and regulations, severity of environmental issues, environmental concerns, sense of responsibility towards the environment), consumer characteristics (level of economic development, Cultural differences, income level, education level, age), consumer perception (easy storage at home, ease of transportation, re-sealing of packaging, easy opening of packaging, perceived quality, environmental compatibility), and package design Stable packaging (packaging shape, packaging color, material used, information on the label, graphic signs, environmental claims, relationship with the health of consumers).

The results of this study were consistent with the findings of Antonides (2017), Nguyen and Johnson (2020), Brouwers (2018), Boz et al. (2020). Di Martino et al. (2019) found that gender, environmental awareness, concern about public opinion, a positive attitude toward green shopping, and an understanding of consumer behavior are factors that influence consumers' choice of sustainable packaging. In addition to these factors, they believe, features such as price are necessary to change consumer behavior by encouraging the use of sustainable packaging. Steenis, Lans, Herpen, and Trijp (2018) and also Steenis, Herpen, Lans, Ligthart. And Trijp (2017) stated that product packaging redesign can affect consumers' reactions and perceptions of the product. In fact, when the goal is to make packaging more sustainable, consumers develop a higher sense of sustainability and thus change their purchase intentions. They also showed that

packaging design has a strong effect on the shopping intentions of the customers, which was consistent with the results of the present study.

Hao et al. (2019) also found that green packaging quality, packaging price, environment, and product are factors that affect consumers' willingness to pay. Comfort, protective performance, and reusability of durable packaging are more important than other factors such as price or visual appearance. These findings become apparent when consumers actually have little knowledge of environmentally friendly packaging. Herbes et al. (2018) also emphasized the environmentally friendly properties of packaging. They also argued that cultural differences with some misconceptions about sustainable packaging affect consumers' purchasing intent. Scott and Vigar Ellis (2014) in line with the results of this study pointed to the direct and indirect impact of environmental awareness on consumers' intention to buy sustainable products. In their view, gender and age had no effect on the definition and understanding of "environmentally friendly packaging", which confirms the contradiction in the literature regarding the existence (or non-existence) of the relationship between age and environmental behavior and also a relationship between gender and environmental behavior.

Monnot, Parguel, and Reniou (2015) found in their study that consumers perceive product quality, high cost, environmental friendliness, and comfort differently depending on the packaging provided to them. Magnier, Schoormans, and Mugge (2016) also emphasized the classification of ecological signs into structural, informational, and graphic signs, noting that duplication of claims that may mislead consumers must be avoided in order to communicate effectively with the environment.

In another study, Nguyen and Johnson (2020) claimed that the classification of environmentally friendly packaging is done in three dimensions: packaging materials, market attractiveness, and manufacturing technology. Contrary to the results of this study, they believe that consumers generally do not consider the aspect of production technology.

## 5.2 The second research question

What is the comprehensive model of factors affecting consumer behavior in choosing sustainable packaging and what is its validity?

To answer this question through smart-PLS software, first, the exploratory factors of the research model were identified. The model was then fitted and after the model fitting was confirmed, the contribution of each component in explaining the model was tested. The results finally showed the significant role of each component in determining consumer behavior in sustainable packaging. Therefore, the final research model is drawn in Figure 5.

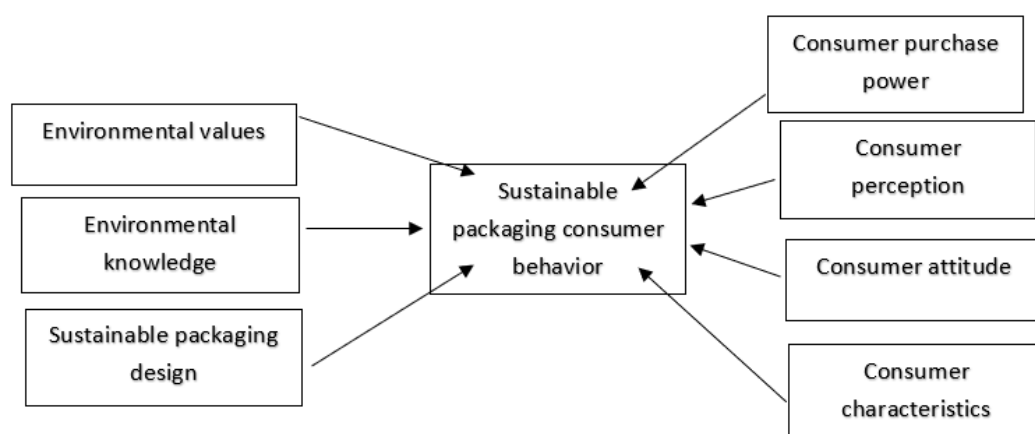


Fig. 5 The final model of sustainable packaging consumer behavior

Finally, after drawing the final model, consumer behavior in Turkey and Iran was compared and it was observed that from the point of view of Turkish and Iranian participants in the variables of transport efficiency, time spent to find the product, green trust, advertising style. And marketing, the severity of environmental issues, knowledge of a sustainable logo or brand, relationship with consumer health, graphic signs, ease of transportation, perceived quality, level of economic development, cultural differences, income level, level of education, and age, no significant difference was observed.

The results show that differences of opinion exist regarding easy opening and re-sealing, easy storage at home, information on labels, color and shape of the packaging, environmental claims, production technology, ability to read labels, knowledge of climate change and heating Global, environmental concerns and regulations, product prices, distance traveled for the product, willingness to pay more, efficiency optimization, waste reduction, use of recycled items and renewables. In terms of environmental values, Turkey ranked higher than Iran.

Turkish consumers also tended to pay more for durable packaging and scored higher than Iranians in the distance they found to find the product. For Iranian consumers, price has a significant effect on their purchasing power. In terms of environmental knowledge, Turkish consumers were more knowledgeable about environmental issues than Iranians, but the sense of responsibility of Iranian participants was higher than Turkey.

Packaging design is also more important for Turkish consumers than for Iranians. In terms of consumer perception, Iranians scored higher in re-sealing packaging and environmental compatibility than Turkish consumers. These differences can be attributed to the further development of the Turkish packaging

industry compared to Iran. The growth of Turkey's packaging sector has been enhanced by the enactment of laws that directly protect the public and consumer health. In Iran, on the other hand, the value of the packaging industry is not very favorable compared to other countries, and economic pressures are one of the reasons that highlight the importance of price in the purchase of durable packaging by Iranians. Also, in Iran, the necessary culture in the field of sustainable development has been done at a low level, which has a significant impact on consumer behavior.

### 5.3 Research limitations

- The present study was conducted using a questionnaire there may be bias in the opinions of participants, so you should be careful in generalizing the results.
- Research has been limited to two countries, Iranian and Turkish, and caution should be exercised in extending the results to other countries.
- The corona pandemic was also one of the most important restrictions that limited the possibility of conducting interviews and direct access to the sample.

### 5.4 Research suggestions

#### 5.4.1 Practical suggestions

In order to improve consumer behavior in sustainable packaging, the following suggestions were made:

- It is suggested to the authorities to increase the level of media advertisements about sustainable packaging in order to increase the level of knowledge and

awareness of consumers and to prepare more programs as a result of using these packages on social media and television.

- In the field of sustainable packaging design, the necessary support should be provided to companies active in this field so to develop sustainable and environmentally friendly designs.
- Prepare the structure for holding internal conferences on the introduction and consequences of using sustainable packaging industries in order to increase the level of public awareness about this industry.
- In the sustainable packaging industry, efforts should be made to use up-to-date technologies for packaging design, which is effective in attracting attention and increasing the quality of these packages.
- Taxes on durable packaging should be reduced so that people are more inclined to buy this type of packaging.

#### 5.4.2 Research suggestions

- It is suggested that in future research, other tools besides questionnaires be used to collect information, such as observation and interviews.
- In future research, surveys should be conducted at the level of consumers in other countries and the results should be compared.
- In future research, the effect of each of these variables on consumer behavior should be quantitatively examined and the relationship between them should be clearly explained.

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