# NeuroQuantology

An Interdisciplinary Journal of Neuroscience and Quantum Physics

ISSN 1303 5150




## NeuroQuantology

Welcome to the future of Science




Publisher: AnKa Publisher



NeuroQuantology

Q3 Atomic and Molecular Physics, and Optics

best quartile

SJR 2021

0.29

powered by scimagojr.com

0.9 2020 CiteScore

13th percentile

Powered by Scopus

PubMed

twitter

https://www.neuroquantology.com/issue.php?volume=28&issue=133&page=64


# NeuroQuantology

An Interdisciplinary Journal of Neuroscience and Quantum Physics

ISSN 1303 5150




Volume 20, No 11 (2022)

## Table of Contents

# RESEARCH ON PURCHASING BEHAVIOR OF GREEN INDUSTRIAL PRODUCTS IN VIETNAM

**Tran Huu Ai,**
**Van Hien University, Vietnam**

**Abstract**

The problem of environmental pollution, resource depletion, and climate change are becoming more and more serious. To solve this problem, programs on sustainable development, green growth, and response to climate change have been implemented on a global scale. From these programs, green products are developed, and consumer markets for green products are formed, including the consumer market for green industrial products. Useful data were collected from interviews with 315 survey subjects. Research results show that six factors affect green product consumption behavior: (1) Perceived behavioral control (PBC); (2) Subjective norm (SN); (3) Perceived effectiveness (PC). (4) Concern for the environment (CE); (5) Environmental Action (EA) and (6) Attitude action (AA).

**Keywords:** Consumer behavior, Attitude, Purchasing behavior, green products
**DOI Number: 10.14704/nq.2022.20.11.NQ66642** **NeuroQuantology 2022; 20(11):6428-6441**



## 1. Introduction

Studies of consumer behavior can always show how a product is popularized in the market (Hoyer & Macinnis, 2010). Therefore, the consumption behavior of green products in general and green industrial products, in particular, should be further studied to contribute to the development of the green product market to meet the practical requirements set forth for green growth and development sustainable development. Green product consumption behavior is a topic that has attracted much attention from researchers. However, understanding of green product consumption behavior is still limited (Peattie, 2010). Consumer behavior includes shopping behavior, user behavior, and product disposal behavior (Hoyer & Macinnis, 2010; Philip Kotler, 2013). Meanwhile, studies on green consumption behavior focus a lot on green product purchasing behavior, a very few studies on green product use behavior and green product disposal behavior (Bianchi et al. & Birtwistle, 2012) are done. Green product disposal behavior has been neglected by researchers (Peattie, 2010).

On the other hand, in terms of environmental protection, for green products in general, and for green industrial products in particular, the disposal behavior is more critical than the purchasing behavior. Therefore, besides studying green product purchasing behavior, green product disposal behavior also needs to be reviewed to understand more about green product consumption behavior and meet the requirements of environmental protection. environmental protection.

Factors affecting shopping behavior, user behavior, and disposal behavior include psychological factors (motivation, ability, opportunity, exposure, attention, perception, knowledge, knowledge, attitudes, memory) and cultural factors (social influence, values, personality, lifestyle, influence of family and social class) (Hoyer & Macinnis, 2010; Kotler et al., 1999). Meanwhile, these factors have different directions and degrees of influence in different cultures and research contexts. The research results on green product purchasing behavior in the cultural context of Western countries cannot be applied directly to Eastern countries, research results in developed countries cannot be directly applied. into developing countries. Therefore, the factors affecting purchasing behavior, user behavior, and disposal behavior of green

products need to be studied in Vietnam, which is a developing country with an oriental culture to contribute to the growth of green products. understanding of green product consumption behavior.

Green products have been started to develop in Vietnam through the implementation of programs on climate change response, sustainable development, economical and efficient use of energy, and Vietnam green labele, sustainable production and consumption, and green growth. These programs have been put into practice with ambitious targets for green products, especially green industrial products. According to the Asian Development Bank (ADB), sustainable development (sustainable development) is comprehensive development, integrating the production process with the requirements of resource conservation and improvement of living environment quality. Sustainable development needs to meet the needs of the present generation, without compromising the ability of future generations to meet their own needs.

According to the United Nations Environment Program (UNEP), a green economy/green growth is an economy with low emissions, efficient and economical use of natural resources, ensuring fairness in terms of society and reducing environmental risks and ecological scarcity, and preventing the loss of biodiversity and ecosystem services. Green products have been circulating in the market, according to product groups such as green industrial products, green agricultural products, green construction products, green transportation products, and green tourism products. Current studies focus on two groups of objects, green products in general or a separate green product. Very few studies have been conducted on a group of products, especially in Vietnam green industrial products are the product group that accounts for a high proportion of the total green products in general. Therefore, it is necessary to study the consumption behavior of green industrial products in Vietnam in order to promote the development of production and trading of green industrial products.

**2. Theoretical basis**

Currently, there are many ways to understand the concept of green products. Some widely recognized concepts are Shadasani et al (1993); Wang (2012); Nimse et al (2007); Philip Kotler (2013). Shadasani et al (1993) argue that green products are products that do not pollute, do not degrade natural resources, can be regenerated, and conserve nature. A green product is a product that is environmentally friendly in nature or whose packaging has little impact on the environment (Elkington & Mackower, 1988). Nimse et al. (2007) argue that green products are products that use recycled materials, emit less waste, consume less water, save energy, pack less, and do not emit toxic substances. (Nimse et al., 2007).

According to Kotler (1999), consumer behavior is the specific behavior of an individual when making decisions to purchase, use and dispose of a product or service. Kotler (1999) believes that external factors when influenced by psychological factors will cause the "response" of consumers. Those “responses” can be goods and services selection, brand selection, dealer selection, and purchase volume selection. Consumer behavior is defined by Hoyer & Macinnis (2010) with broader implications.



Green purchasing behavior (GPB) has been mentioned by many studies and understood under many different concepts such as environmentally sustainable product purchasing behavior (Arttachariya, 2017). Tan et al., (2011) also thinks that the concepts equivalent to the concept of green buying behavior include environmentally friendly buying behavior and environmentally responsible buying behavior.

Green Using Behavior (GUB) has not been studied (Ken David, 2015). In fact, research on green product use behavior needs to have a method throughout the time of product used in combination with other specialized methods. The research will consume much more time, complexity, and cost than the study of green product purchasing behavior (Ken Peattie, 2010). Lee et al. (2012) said that environmentally friendly consumption behavior includes green product purchase behavior, green product use behavior, and green product disposal behavior. The behavior of using green products depends on the factors of environmental knowledge, environmental

concern, and environmental impact (Lee et al., 2012).

Hyun-Mee & Park- Poaps (2013) and Bianchi & Birtwistle (2012) both said that the behavior of product disposal in general and green products, in particular, includes: throwing away as waste, giving to charity, using reuse, and reselling with two main motives: economic motives and environmental protection motives. Thus, green product disposal behavior can be understood as a stage in green product consumption behavior that brings benefits to the environment through waste reduction due to the use of fewer raw materials, fuel, and materials packaging, which can be recycled and reused.

The concept of green industry products is the product of the green industry based on the definition of the green industry. According to Jung & Min (2018), green industries are industrial activities that increase the efficiency of energy and resource use, reduce environmental pollution, protect the environment and improve the environment (Jung & Min, 2018). According to UNIDO (2018), green industries are activities of sustainable economic development through public investment and implementation of public policies to encourage environmentally responsible investment from the private sector (UNIDO, 2018). Thus, green industrial products have the characteristics of increasing efficiency in the use of energy and resources, reducing environmental pollution, protecting the environment, and improving the environment. The concept of green industrial products in this direction is similar to the concept of green products.

According to Jung & Min, 2018 green products are classified into 15 product groups such as green transportation products, green architectural products, green household products, and much other energy- and resource-saving product groups. & Min, 2018). Thus, green industrial products are a part of green products. In Vietnam, Vietnam's economic sub-sectors include 21 sectors divided into the following groups: Fisheries, forestry, and agriculture (group A); mining and industry (groups B, C, D); Construction (group E) and service industries such as transport and tourism (Prime Minister, 2010).

From the above analysis, it can be seen that green products when consumed go through all three stages of purchase, use, and disposal, mostly industrial products. Moreover, for different groups of green products such as green products in the industry, green products in agriculture, and green products in the transportation sector will have different characteristics, so the buying and waste behavior are different. The removal of these product groups is also different. In other words, green industrial products in Vietnam are understood as products of the industry and have the following characteristics: renewable, reduced packaging, less use of raw materials, fuels, and materials, and less impact on the environment.

**3. Review of research on purchasing behavior and green product disposal behavior**

There are many theories developed and applied to study consumer behavior in general and shopping behavior, green product disposal behavior in particular. Theories include:

According to Hoyer & Macinnis (2010), consumer behavior is a process consisting of many behaviors and influencing factors. Behaviors include purchase behavior, user behavior, and disposal behavior;

-The theory of consumer behavior of Kotler (1999), has generalized the factors affecting the behavior of shoppers into a separate model;

- The theory of Reasoned Action (TRA - Ajzen, 1991), is a widely used theory in social psychology research in general and consumer behavior in particular.

- The theory of Planned Behavior (TPB- Ajzen, 1991) is recognized by many researchers and used to study consumer behavior in general and green product consumption behavior in particular. When studying green product purchasing behavior, the perceived effectiveness of the behavior is added to the TPB model. This factor has been confirmed by many studies such as Bamberg (2003) and Tan & Lau (2011);

- The theory of Value, Attitude, and Behavior (VAB) was developed by Homer & Kahle (1988). The VAB theory suggests that personal values influence behavior through consumer attitudes (Tan, 2011).





eISSN1303-5150

- The theory of Self Perception (TSP) was developed by Daryl (1967), an individual who performs a behavior is affected by the attitude towards that behavior due to self-perception, it also has an impact on other behaviors with other attitudes. similarity;

- The theory of Attitude, behavior, and Context (ABC) is widely used in research on green product purchasing behavior and suggests that behavior is the result of both internal psychological factors and external influences (Hoyer & Macinnis, 2010);

- The theory of Motivation, Opportunity Ability (MOA) also holds that consumer behavior will ultimately be determined by their abilities and possible opportunities for them to engage in those behaviors;

- The theory of Norm Activation (NAT) argues that consumer behavior depends on their perceptions, feelings, and responsibility for the consequences they cause when consuming a product (Hoyer & Macinnis, 2010);

- The theory of Value Belief Norms (VBN) argues that consumer behavior depends on feelings and responsibility (Black & C. Stern, 1985, C. Stern, 2005).

**4. Research model and hypothesis**

**4.1. Research hypothesis**

The Factors that directly affect green product purchasing behavior. The overview study of green product purchasing behavior, the theoretical framework for researching green product purchasing behavior, and the practice of developing green industrial products in Vietnam, show four important factors that directly affect green product purchasing behavior. The buying behavior of green industrial products needs to be studied, including:

1) Attitude towards green industrial product purchasing behavior;

2) Subjective standards for purchasing behavior of green industrial products;

3) Perceived behavioral control for green industrial product purchasing behavior

4) Perceiving the effectiveness of green industrial product purchasing behavior.

5) Environmental concern for green industrial product purchasing behavior

6) Action for the environment towards purchasing behavior of green industrial products.

The following factors are studied, considering the content, nature, characteristics, and proposed research hypotheses.

- Attitudes towards green industrial product purchasing behavior

Ajzen (1991) states that the attitude towards behavior is an individual's positive or negative feelings towards the performance of a particular behavior. According to the theory of Planned Behaviorattitudes towards green product purchasing behavior have been studied, and studies have confirmed the relationship between green product shopping behavior and attitude towards green product shopping. Ricky & Chan (2001) studied the influence of attitude towards buying green products through the behavioral intention to buy green products and concluded that attitude towards the green product purchasing behavior positively affects the green product purchase behavior (Ricky & Chan, 2001). Pham Thi Lan Huong (2014) said that attitude toward green product purchasing behavior has an average and positive influence on green product purchasing behavior. The influence of attitude toward green product purchasing behavior on green product purchasing behavior has the same intensity as that perceived effectiveness of green product purchasing behavior (Pham Thi Lan Huong, 2014). Some studies on green product purchasing behavior, use concepts such as attitude towards green products, and attitude towards the environment (Cherian & Jacob, 2012) (Chen & Chai, 2010). These are experimental studies, and the approach in these works is different from the theory of intended behavior TPB. Bamberg (2003) believes that these variables only have an indirect impact on green product purchasing behavior and that when these variables are considered as direct variables in the model, they will very limited explain the change in green product purchasing behavior as well as green product purchasing behavior (Bamberg, 2003).

From the above analysis, it shows that attitude toward green industrial product purchasing behavior has a strong, positive, and a direct impact on purchasing behavior of green industrial products.

Hypothesis H1 is stated as follows: *Attitude towards green industrial product*

*purchasing behavior has a positive impact on green industrial product purchasing behavior*.

- Perceived behavioral control for green industrial product purchasing behavior

Ajzen (1991) suggested that perceived behavioral control reflects how easy or difficult it is to perform a particular behavior. Perceived behavioral control has a direct impact on behavioral intentions and as such will have a direct impact on actual behavior (Ajzen, 1991). The perception of controlling green product purchasing behavior has been studied by many authors. Typical among these authors are Kumar (2012), Saleem & Gopinath (2013). These works show that perceived behavioral control of green product purchasing behavior has a weak, direct and positive impact on behavioral intention to purchase green products (Kumar, 2012; Saleem & Gopinath, 2013).

From the above analysis, it is shown that perceived behavioral control for purchasing behavior of green industrial products has a weak, positive, and direct impact on the intention to purchase green industrial products.

Hypothesis H2 is stated as follows: *Perceived behavioral control for green industrial product purchasing behavior has a positive impact on green industrial product purchasing behavior.*

- Subjective standards for purchasing behavior of green industrial products

Ajzen (1991) states that the subjective norm for behavior is the social influence of stakeholders (friends, family, co-workers) of an individual in the performance of a particular behavior.TPB theorystates that the subjective norm for action has a strong and positive influence on intention to act (Ajzen, 1991). Subjective standards for green product purchasing behavior are interested in research, in which two prominent works are Ha & Janda (2012) and Saleem & Gopinath (2013). Research results of Ha & Janda (2012) show that subjective norm has a positive and moderate impact on green product purchasing behavior (Ha & Janda, 2012). Saleem & Gopinath (2013) studied the impact of subjective norms on behavioral intention to buy green products. The results show that subjective norm has a positive impact on behavioral intention to purchase green products (Saleem & Gopinath, 2013). Thus, most of the studies suggest that subjective norm has a positive impact on the behavioral intention to purchase green products. However, in a very elaborate study, Kumar (2012) argues that subjective norm does not affect behavioral intention to buy green products (Kumar, 2012). This is contrary to the TPB theory, but the author does not give specific reasons.

From the above analysis, it is shown that the subjective norm for green industrial product purchasing behavior (SNP) has a positive impact on green industrial product purchasing behavior.

Hypothesis H3 is stated as follows: *Subjective norm for green industrial product purchasing behavior positively affects green industrial product purchasing behavior.*

- Perceiving the effectiveness of green industrial product purchasing behavior

Perception of the effectiveness of green product purchasing behavior and environmental protection behavior has been studied since the 1970s. Notable work is (Kinnear et al., 1974). According to this author, the perception of the effectiveness of environmental protection behavior is the consumer's belief that their behavior can contribute to environmental protection (Tan & lau, 2011) quoted (Taylor & Todd, 1995) Other studies on the perceived effectiveness of green product purchasing behavior show that they have a positive and direct impact on green product purchasing behavior (Tan & Lau, 2011); (Pham Thi Lan Huong, 2014) Perceiving the effectiveness of green product buying behavior is consumers' belief that their purchasing actions can contribute to environmental protection consumer believe that their green product purchasing actions contribute to environmental protection. TPB, this research concept is specific to the study of product consumption behavior of green products.

From the above analysis, it is shown that the perceived effectiveness of green industrial product purchasing behavior has a positive and direct impact on green industrial product purchasing behavior.

Hypothesis H4 is stated as follows: *Perceived effectiveness of green industrial*





eISSN1303-5150

*product purchasing behavior positively affects green industrial product purchasing behavior*.

Care about the environment

Concern for the environment is a form of behavior that shows concern, passion, and concern about the consequences on the environment. Attention to the environment does not directly affect the intention to purchase green products, but indirectly through the attitude toward green product purchasing behavior (Pham Thi Lan Huong, 2014). Arslan et al. (2012) argue that environmental concerns affect green product purchasing through green product awareness and green product purchasing attitudes, the effects are all positive. Another direction of impact is to be concerned with the environment, which affects attitudes towards the environment, then acts on actions towards the environment, before affecting the purchasing behavior of green products (Arslan et al., 2012). Meanwhile, Pagiaslis & Kronalis (2014) showed that concern for the environment has a strong effect on trust and a weak effect on knowledge of green products, then positively affects the willingness to buy and use green products (Anastasios & Krontallis, 2014).

The above analysis shows that paying attention to the environment has a positive impact on purchasing behavior of green industrial products. Through purchasing behavior of green industrial products, concern about the environment indirectly affects the purchase behavior of green industrial products.

Hypothesis H5 is stated as follows*: Environmental concern has a positive impact on purchasing behavior of green industrial products*.

- Action for the environment

Action for the environment includes a number of similar concepts: ecological action, environmental conservation action, and eco-friendly action. Environmental action is the ability to perceive and explain the level of environmental pollution and take appropriate actions to conserve ecosystems, restore the environment and improve the problem of environmental pollution. Some authors argue that ecological action has a direct impact on green product purchasing behavior, other authors argue that environmental action is an intermediate variable between attitude and behavior. These studies suggest that environmental action affects behavioral intention to purchase green products and dispose of green products through attitudes toward green product purchasing and green product disposal (Arslan et al., 2012; Bertrand & William, 2011).

The above analysis shows that environmental action has a positive impact on purchasing behavior of green industrial products. Through the purchase behavior of green industry products, environmental action indirectly affects the behavioral intention to purchase green industrial products.

Hypothesis H6 is stated as follows: *Action for the environment has a positive impact on purchasing behavior of green industrial products.*



### 4.2. Research Model

From the results of the research overview and the selection of the theoretical basis for the study Arslan et al., 2012, Saleem & Gopinath, 2013, Dagher & Omar (2014, Kumar, 2012; Wu & Chen, 2014; Florenthal & Arling, 2011; Arslan et al., 2012; Bertrand & William,the author synthesizes the factors affecting the purchasing behavior of green industrial products including independent variables:(1) Perceived behavioral control (PBC); (2) Subjective norm (SN); (3) Perceived effectiveness (PC). (4) Concern for the environment (CE); (5) Environmental Action (EA); and (6) Attitude action (AA). The dependent variable is the buying behavior of green industrial products.

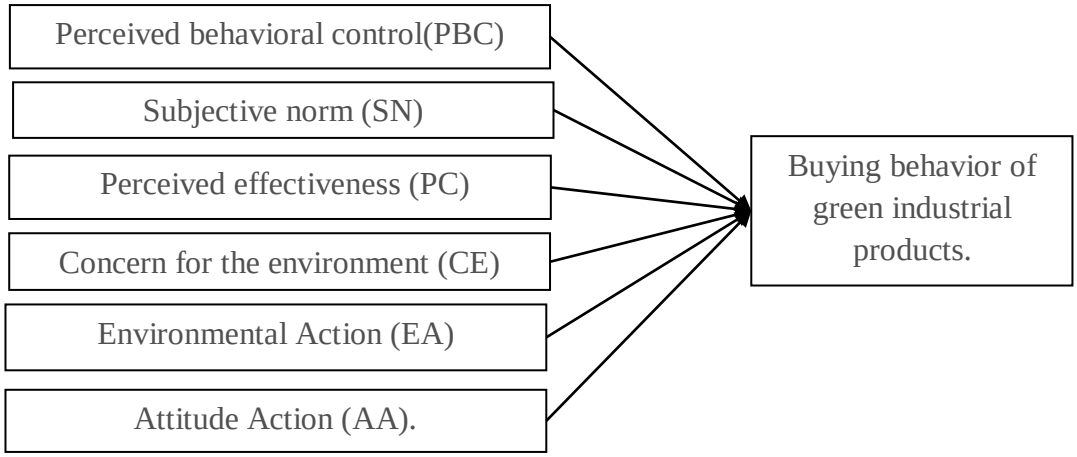



Figure 1: Research Model

**5. Research Methods**

The study combines documentary research and quantitative research methods. Research domestic and international documents according to the following contents: An overview study on purchasing behavior of green products, green industrial products; Current status of product development, procurement, and policy related to green industrial product development in Vietnam. From the results of the document analysis, a theoretical framework, research hypotheses, research models and research scales will be formed.

Quantitative research using questionnaires to investigate and collect data on purchasing behavior of green industrial products and some factors affecting consumers' buying behavior of green industrial products individuals in Vietnam. The data is used to test models and research hypotheses, thereby proposing orientations for state management agencies and businesses to promote the development of the green industrial product market in Vietnam. Vietnam. The data analysis methods used include Cronbach alpha analysis, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and structural model analysis. Structural Equation Model (SEM). The survey data were processed using the statistical analysis software SPSS 23.

• *Research sample*

The sampling method is a convenient method, data is collected from two groups of subjects. the first group is lecturers and some students from Van Hien University of Ho Chi Minh City and the second group is the delegates attending seminars on sustainable development, green growth, sustainable production, and consumption. sustainable, cleaner production, climate change, and energy saving.

Workshops hosted by the Ministry of Industry and Trade in Ho Chi Minh City, the questionnaire was broadcast live to the respondents from April 2022 to June 2022. For the participants. At the workshop, the questionnaire was distributed after the opening of the workshop and collected at the end of the meeting. Before distributing the questionnaire, concepts such as green industrial products, environmentally friendly products, energy-saving products, and data collection purposes are explained. The results obtained two sets of data. Preliminary analysis data: Number of questionnaires collected after cleaning 50 questionnaires. This data is used for Cronbach alpha analysis and EFA analysis. The number of questionnaires collected was 350 questionnaires, after cleaning, 315 questionnaires were collected. This data is used for CFA and SEM analysis.

The demographic characteristics of the sample are presented in Table 1. The demographic characteristics of the sample with 5 characteristics include age, education level, marital status, income, and occupation. To determine the representativeness of the sample compared to the Vietnamese market, the age distribution of the sample is considered. The sample statistical results show that: The population aged from 18 to 34 years old accounted for 60%; from 35 to 44 years old accounted for 24%; from 45 to 60 years old accounted for 17%. According to statistics of UNFPA (2016), the population distribution of Vietnam is as follows: The




eISSN1303-5150

population aged from 18 to 34 years old accounts for 45%; from 35 to 44 years old accounts for 19%; from 45 to 60 years old account for 18% (calculated according to (UNFPA, 2016). Thus, the characteristics of the sample do not completely coincide with the population, but there are certain similarities. It is possible that due to convenience sampling, the demographic results of the sample cannot match the population, which is one of the limitations of the study.

Table 1: Demographic characteristics

| No | Properties | Classification | Quantity | Quantity Percentage |
|---|---|---|---|---|
| 1 | Age | From 18 to 34 years old | 185 | 0.59 |
| | | From 35 to 44 years old | 75 | 0.43 |
| | | From 45 to 60 years old | 45 | 0.32 |
| | | Over 60 years old | 10 | 0.03 |
| | | Total | 315 | |
| 2 | Marital status | Single | 176 | 0.56 |
| | | Married | 139 | 0.44 |
| | | Total | 315 | |
| 3 | Academic level | Common | 114 | 0.36 |
| | | Intermediate | 50 | 0.16 |
| | | University | 109 | 0.35 |
| | | Graduate | 42 | 0.13 |
| | | Total | 315 | |
| 4 | Total income | From 5 to 10 million VND | 163 | 75,28 |
| | | From 11 to 15 million VND | 78 | 12,68 |
| | | From 16 to 20 million VND | 31 | 5,04 |
| | | From 20 million or more | 43 | 6,99 |
| | | Total | 315 | |
| 5 | Job | Leading officials at all levels | 23 | 0.073 |
| | | Expert | 31 | 0.098 |
| | | Technical staff | 49 | 0.156 |
| | | Office staff | 47 | 0.149 |
| | | Worker | 121 | 0.384 |
| | | Other | 44 | 0.140 |
| | | Total | 315 | |

Exploratory factor analysis (EFA) to determine the number of appropriate factors, the indicators are often interested in testing such as KMO coefficient (Kaiser-Meyer-Olkin) > 0.5 is a sufficient condition. For the appropriate factor analysis (Hoang Trong et al., 2010), the factor loading, if the factor loading is less than 0.4 in EFA, will be rejected (Anderson & Gerbing, 1998) and the Eigenvalue has stopped when the extracted factors have eigenvalue coefficients ≥ 1 and total variance extracted (AVE ≥ 50%) (Hoang Trong et al., 2010). The results of the linearregression analysis show the relationship between the factors affecting the buying behavior of green technology products, from the results of the regression analysis will determine the significant relationships (the level of 95% test significance). At the same time, it also tests the research hypotheses to see if the relationship of factors is positive or negative and significant at the 95% test value and builds a regression equation. The model fit test is done through the tests: F value, adjusted R2 coefficient, correlation coefficient, residuals (normal distribution and linear relationship), and square magnification factor. false (VIF) < 2.

Table 2: Summary of EFA results

| Scale | Number of | Cronbach's | Variance | Value |
|---|---|---|---|---|

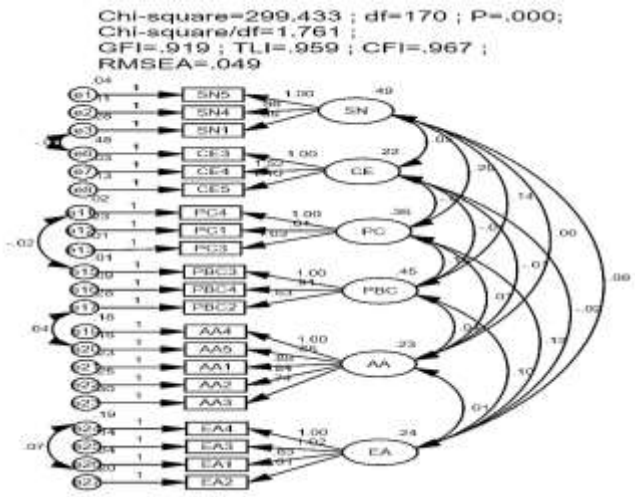
| | variables | Alpha | | |
|---|---|---|---|---|
| Perceived behavioral control (PBC) | 4 | 0,845 | | |
| Subjective norm (SN) | 5 | 0,938 | | |
| Perceived effectiveness (PC) | 4 | 0,895 | 69,954 | |
| Concern for the environment (CE) | 5 | 0,866 | | Qualified |
| Environmental Action (EA) | 4 | 0,817 | | |
| Attitude action (AA) | 5 | 0.789 | | |
| Buying behavior of green industrial products (BGIP) | 4 | 0,784 | 61,353 | |
| Total | 31 | | | |

Source: Author's calculations

Cronbach's alpha reliability coefficient and exploratory factor analysis method, present indicators to check the appropriateness of the research model such as F-value, R2, correlation coefficient, variance inflation factor (VIF), and hypothesis testing. Then, we tested the fit of the model, built multiple regression equations, and tested the hypotheses. Finally, we tested the reliability of the scale using Cronbach's Alpha, EFA, CFA, and SEM.

• Confirmatory factor analysis (CFA)

Regarding the overall goodness of fit, factor analysis confirmed that this model has a chi-squared statistical value of 299,433 with 170 degrees of freedom (p = 0.00). The relative chi-squared for degrees of freedom CMIN/def is 1,761 (<2). Other indicators are: GLI = 0.919 (> 0.9), TLI = 0.959 (> 0.9), CFI = 0.967 (> 0.9) and RMSEA = 0.049 (< 0.08). Therefore, this model is suitable for market data. This also allows us to say that there is a disorientation of the observed variables. Convergence values and standard weights of all scales are > 0.5 and statistically significant at p < 0.5. Therefore, the scales achieve convergent values.




Source: Author's calculations

Table 3: Results of estimating the cause-and-effect relationship between factors affecting purchasing behavior of green technology products

| Correlations | | | Estimate | S.E. | C.R. | P |
|---|---|---|---|---|---|---|
| SN | <--> | CE | .051 | .020 | 2.506 | .012 |
| SN | <--> | PC | .199 | .027 | 7.306 | *** |
| SN | <--> | PBC | .141 | .028 | 4.954 | *** |
| SN | <--> | AA | .004 | .022 | .164 | .039 |
| SN | <--> | EA | .082 | .023 | 3.556 | *** |
| CE | <--> | PC | .009 | .016 | .533 | .004 |
| CE | <--> | PBC | .005 | .018 | .304 | .041 |
| CE | <--> | AA | .005 | .014 | .365 | .015 |

| Correlations | | | Estimate | S.E. | C.R. | P |
|---|---|---|---|---|---|---|
| CE | <--> | EA | .021 | .015 | 1.388 | .005 |
| PC | <--> | PBC | .128 | .024 | 5.394 | *** |
| PC | <--> | AA | .006 | .018 | .318 | .050 |
| PC | <--> | EA | .130 | .021 | 6.172 | *** |
| PBC | <--> | AA | .040 | .020 | 1.985 | .047 |
| AA | <--> | EA | .008 | .016 | .514 | .007 |

Source: Author's calculations

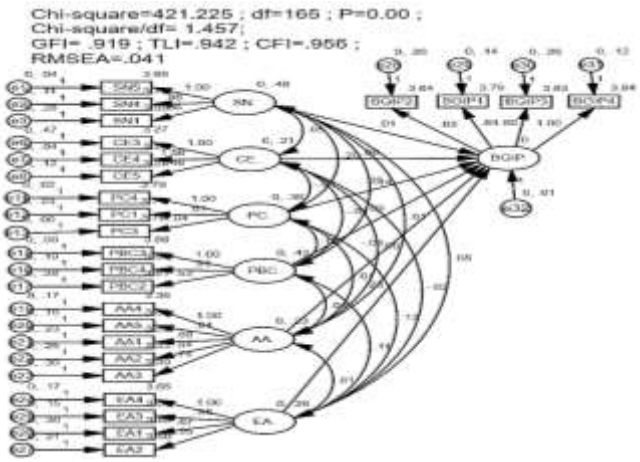



Figure 2: SEM analysis

Source: Author's calculations

- *Structural equation modeling results*

The research model includes 6 concepts, after checking CFA and SEM, there are 6 satisfactory concepts, of which 6 are independent: (1) Perceived behavioral control (PBC); (2) Subjective norm (SN); (3) Perceived effectiveness (PC); (4) Concern for the environment (CE); (5) Environmental Action (EA) and (6) Attitude action (AA). The dependent variable is the purchasing behavior of green industrial products.

The results show that this model has a chi-squared value of 421.225 with 165 degrees of freedom (p = 0.000). The relative squared value of CMIN/def degrees of freedom is 1.457 (<2). Other indicators include: GTI = 0.919 (> 0.9), TLI = 0.942 (> 0.9), CFI = 0.956 (> 0.9), and RMSEA = 0.041 (< 0.08). Therefore, this model achieves compatibility with the collected information. Factors include (1) Perceived behavioral control (PBC) (ES = 0.147, P = 0.020); (2) Subjective norm (SN) (ES = 0.494, P = 0.006); (3) Perceived effectiveness (PC) (ES = 0.356, P = 0.021); (4) Concern for the environment (CE) (ES = 0.206, P = 0.010); (5) Environmental Action (EA) (ES = 0.226, P = 0.015) and (6) Attitude action (AA) (ES = 0.264, P = 0.008).

Table 4: Results of estimating the causal relationship between the factors brand identity and brand image

| Relationship | | | Estimate | S.E. | C.R. | P | Label |
|---|---|---|---|---|---|---|---|
| BIM | <--- | BRP | 0.147 | 0.063 | 2.323 | 0.020 | Yes |
| BIM | <--- | BRL | 0.353 | 0.147 | 2.408 | 0.016 | Yes |
| BIM | <--- | BPF | 0.084 | 0.081 | 1.041 | 0.028 | Yes |
| BIM | <--- | BPS | 0.169 | 0.082 | 2.043 | 0.041 | Yes |
| BIM | <--- | BRT | 0.054 | 0.066 | 0.814 | 0.015 | Yes |
| BIM | <--- | TS | 0.243 | 0.156 | 1.558 | 0.019 | Yes |
| BIM | <--- | EF | 0.039 | 0.050 | 0.789 | 0.030 | Yes |

(Source: Authors' own calculations)

Table 5: Summary of the results of testing the hypotheses of the green industrial product purchasing behavior model

| No | Hypothesis | Test Result | Reference |
|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| 1 | H1 | Positive | Accept | Positive impact | Ajzen, 1991; Cherian & Jacob, 2012; Ricky & Chan, 2001. |
| 2 | H2 | Positive | Accept | Positive impact | Ajzen, 1991; Saleem & Gopinath, 2013. |
| 3 | H3 | Positive | Accept | Positive impact | Ajzen, 1991; Ha & Janda, 2012; Saleem & Gopinath, 2013) |
| 4 | H4 | Positive | Accept | Positive impact | Tan & Lau, 2011; Taylor & Todd, 1995. |
| 5 | H5 | Positive | Accept | Positive impact | Arslanet al., 2012;Bertrand&William,2011. |
| 6 | H6 | Positive | Accept | Positive impact | Arslan et al., 2012; Bertrand & William, 2011. |

The bootstrap method is usually used to test the model estimates, with the pattern repeatedly being N =1000. The estimation results for 1000 samples averaged together with the deviations are presented in Tab 5. CR has a very small absolute value, thus, it can be stated that the deviation is very low, while also being not statistically significant at the 95% confidence level. Thus, we can conclude that the model estimates can be trusted

Table 6: Results estimated by means of bootstrap, N = 1000

| Parameter | | | SE | SE-SE | Mean | Bias | SE-Bias | CR |
|---|---|---|---|---|---|---|---|---|
| BGIP | <--- | BRP | .111 | .002 | .169 | .004 | .003 | 0.75 |
| BGIP | <--- | BRL | .436 | .002 | .371 | -.003 | .003 | -1.00 |
| BGIP | <--- | BPF | .167 | .001 | .015 | .001 | .002 | 2.00 |
| BGIP | <--- | BPS | .141 | .002 | -.129 | -.005 | .003 | -0.6 |
| BGIP | <--- | BRT | .107 | .002 | .169 | .004 | .003 | 0.75 |
| BGIP | <--- | TS | .511 | .012 | .209 | -.007 | .015 | -2.14 |
| BGIP | <--- | EF | .065 | .005 | .061 | .003 | .006 | 2.00 |

(Source: Authors' own calculations)

## 6. CONCLUSION

- Discussion

There is no clear difference in the intention to purchase and dispose of green industrial products to consumers by education level and occupation. There are differences between different types of consumers, according to age, marital status, and income. Consumers who are older than 35 years of age tend to appreciate more and tend to purchase green industrial products; Married consumers have a higher sense of purchasing green industrial products; Consumers with incomes from 16-20 million VND/month tend to buy green industrial products than other subjects.

There is a clear difference between assessing the behavior to purchase green industrial products and the behavior to dispose of green industrial products. Consumers tend to evaluate positively the behavior to purchase green industrial products (5,96) and tend to evaluate negatively the behavior to dispose of green industrial products (3, 05). The evaluations of consumers may be due to the propaganda and dissemination of green industrial products in Vietnam, which are focusing on promoting the procurement of green industrial products, but not paying attention to promoting emissions that abandon green industrial products. The results also reflect the reality of Vietnam's waste product collection system that has not been fully and effectively built and operated.

- Shorten and briefly

The results show that the subjective norm for green industrial product purchasing behavior has positive, direct, and weak effects on green industrial product purchasing behavior. Ajzen (1991) states that the subjective norm for behavior is the social influence of stakeholders (friends, family, co-workers) of an individual in the performance of a particular behavior. Thus, the purchase of green industrial products is influenced to a

certain extent by friends, family, and colleagues. This result is consistent with TBP theory and previous studies such as Ha & Janda (2012) and Saleem & Gopinath (2013). Therefore, businesses need to focus on an overall strategy for stakeholders in society to influence and create social effects on target customers.

The results show that the perceived effectiveness of purchasing green industrial products has a positive impact on buying behavior of green industrial products. This result is consistent with previous studies such as Tan & Lau (2011). Research results show that Vietnamese consumers have a certain confidence in their buying behavior of green industrial products that can contribute to environmental protection. Therefore, on the business side, it is necessary to increase customer awareness about the environmental protection characteristics of green industrial products.

The results indicate that environmental concerns have a positive impact on purchasing behavior of green industrial products. This result is consistent with previous studies such as Arslan et al., (2012) and Anastasois & Krontalis (2014). Concern for the environment is an attitude that expresses concern, passion, and concern about the consequences for the environment.

The results show that attitude towards green industrial products has a positive effect on purchasing behavior of green industrial products. This result is consistent with the conclusions of Cheah & Phau (2011) but not consistent with the study results of Florenthal & Arling (2011). Thus, the positive attitude toward green industrial products also affect to a certain extent the intention to purchase green industrial products.

The results show that perceived behavioral control for green industrial product purchasing behavior positively affects green industrial product purchasing behavior. However, the decision to buy green industrial products for customers in Vietnam still depends on many external factors that are not entirely decided by the buyer such as availability, and a convenient distribution system. Therefore, businesses need to pay attention to building a distribution system that is more convenient to meet the needs of consumers.

The results show that environmental action affects attitude towards green industrial product purchasing behavior. This result is different from previous studies such as Arslan et al (2012). Disposal of green industrial products plays an increasingly important role in protecting the environment and promoting economic development, while the proportion of green products in general and green industrial products in particular in society increasing.

- Limitations and directions for future research.

Like any other study, this study also has certain limitations. The study only stopped at Van Hien University in Ho Chi Minh City. Ho Chi Minh City, there may be differences in the measurement scale in other universities.

The study was conducted on the subject of green industrial products in general, not specifically analyzing each individual industrial product. Further research should be conducted on the following groups of subjects: energy-saving products, green-label products, and biofuels. Research should then be continued on specific populations of the aforementioned product groups.



However, the results may be better if the research is extended to other schools and cities and addresses the impact of media on brand image building. This problem suggests new research directions for future scientists.

**References**

1. Ajzen Icek (1991) The Theory of Planned Behavior. *Organizational BehaviorandHumanDecisionProcesses,*50,179-211.

2. Ajzen Icek (2017). Constructing a Theory of Planned Behavior Questionnaire. Accessed: July 17, 2020. Address: http://people.umass.edu/aizen/pdf/tpb. measurement.pdf

3. Anastasios Pagiaslis, Athanasios Krystallis Krontalis.(2014).GreenConsumptionBehaviour Antecedents:EnvironmentalConcern,Knowled ge,andBeliefs.*Psychology&Marketing,*31(5),33 5-348.

4. ArslanT.,YilmazV.&AksyH.K.(2012).Structu ralEquationModelforEnvironmentallyConsciou sPurchasingBehaviour.*InternationalJournalEnv ironmentalResearch,*6(1),323-334.

5. ArttachariyaPatricia(2017).*EnvironmentalismandGreenPurchasingBehaviour: A Study on Graduate Students in Bangkok, Thailand*. Accessed: July 18, 2020. Address: http://www.bu.ac.th/knowledgecente/epaper/julydec2012/pdf/ac01 .pdf

6. BambergSebastian(2003).HowdoesEnvironmentalConcernInfluence SpecificEnvironmentallyRelatedBehavior*J.EnvironPsycho.,*32,21-32.

7. BertrandUrien&WilliamKilbourne(2011). GenerativityandSelf-EnhancementValuesinEco-friendlyBehavioralIntentionsandEnvironmentallyResponsibleConsumptionBehaviour.*PsychologyandMarketing,*28(1),69-90.

8. Bianchi, Constanza & Birtwistle, Grete (2012). Consumer Clothing Disposal Behaviour: aComparativeStudy.*InternationalJournalofConsumerStudies,*36(3),335-341.

9. Black J.Stanley & C.Stern Paul (1985). Personal and Contextual Influences onHouseholdEnergyAdaptations.*JournalofAppliedPsychology,*70(1),3-21.

10. Cheah Isaac & Phau Ian (2011). Attitudes towards Environmentally FriendlyProducts:TheInfluenceofEcoliteracy,InterpersonalInfluenceandValueOrientation.*MarketingIntelligence& Planning,*29(5),452-472.

11. Cherian Jacob & Jacob Jolly (2012). Green Marketing: A study of Consumers'Attitude towards Environment Friendly Products. *Asian Social Science,* 8(12), 117- 135.

12. Dagher Grace K. & Omar Itani (2014). Factors Influencing Green PurchasingBehaviour:EmpiricalEvidencefromtheLebaneseConsumers.*JournalofConsumerBehaviour,*13(3),188-195.

13. DarylJ.Bem(1967).Self-perception:AnAlternativeInterpretationofCognitiveDissonancePhenomena.*PsychologicalReview,*74(3),183-200.

14. Florenthal Bela & Arling Priscilla A. (2011). Do Green Lifestyle ConsumersAppreciateLowInvolvementGreenProducts*MarketingManagementJournal,*21(2),35-45.

15. Ha Hong-Youl& Janda Swinder(2012).PredictingConsumerIntentionstoPurchase Energy-Efficient Products.*Journal of Consumer Marketing,* 29(7), 461-469.

16. Hoang Trong & Chu Nguyen Mong Ngoc, (2008). Data Analysis with SPSS, Hong Duc Publishing House, Ho Chi Minh City.

17. Hoyer Wayne D. & Macinnis Deborah J., (2010). *Consumer Behavior*.NelsonEducation,Ltd.,South-Western,5191NatorpBoulevardMason,OH45040USA.

18. Hyun-MeeJ.&Park-PoapsH.(2013).FactorsMotivatingandInfluencingClothing Disposal Behaviours. *International Journal of Consumer Studies,* 37(1),105-111.

19. Jung Ho S. & Min Kyung S. (2018). *A Measurement on Green Economy inKorea: Green Industry Statistics*. Accessed: August 17, 2018.Address:https:www.statistics.gov.hk/wsc/ STS085-P4-S.pdf

20. Ken Peattie (2010). Green Consumption: Behavior and Norms *Annual Review of Environment and Resources*, Vol. 35:195-228. https://doi.org/10.1146/annurev-environ-032609-094328

21. Kenny David A. (2015). *Measuring Model Fit*. Accessed, March 7, 2016. Address: http://davidakenny.net/cm/fit.htmKumar Bipul (2012). Theory of Planned Behaviour Approach to Understand thePurchasing Behaviour for Environmentally Sustainable Products *Indian. Institute ofManagement*,Ahmedabad,India.

22. Lee Yong-Ki, Choi Jeang Gu, Kim Min Seong, Ahn Yoon Gih & Gerro TallyKatz(2012). ExplainingPro-EnvironmentalBehaviorswithEnvironmetallyRelevant Variables: A Survey in Korea. *African Journal of Business Management,*6(29),8677-8690.

23. Prachi Nimse,Abhilash Vijayan,Ashok Kumar,&Charanya Varadarajan(2007).AReviewofGreenProductsDatabase',*EnvironmentalProgress,*26(2).

24. Pham Thi Lan Huong (2014). Predicting young consumers' green purchasing intentions: Influence of cultural and psychological factor. Journal of Economics and Development, 200, 66-68.

25. PhilipKotler(2013).*GreenMarketing*.Accessed: May 17, 2020. Addresshttp://philipkotler2013.blogspot.com/2011/11/green-marketing.html.

26. Philip Kotler, Gary Armstrong & John Saunders,(1999).*PrinciplesofMarketing*

,PrenticeHallEuro,Milan,Italy.

27. RickyChan(2001).DeterminantsofChinese Consumers.GreenPurchase Behavior',*PsychologyMarketing,*18,389-413.

28. Saleem Farida & Gopinath C. (2013). Antecedents of Environmental ConsciousPurchaseBehaviors.*Middle-EastJournalofScientificResearch*14(7),979-986.

29. Prem Shamdasani, Gloria Ong Chon-Lin, Daleen D. Richmond (1993).ExploringGreenConsumerin an Oriental culture: Role of Personal and Marketing Mix. *Advance in CosumerResearch,*20,488-493.

30. TanBooi-Chen(2011).TheRoleofPerceivedConsumerEffectivenessonValue-Attitude-Behaviour Model in Green Buying Behaviour Context.*AustralianJournalofBasicandAppliedSciences,*5(12),1766-1771.

31. Tan Booi-Chen & Lau Teck-Chai (2011). Green Purchase Behavior: ExaminingtheEfluenceofGreenEnvironmentalAttitude,PerceiveConsumerEffectivenessand Specific Purchase Attitude. *Australian Journal of Basic and Applied Science*5(8),559-567.

32. Thomas C. Kinnear, James R. Taylor and Sadrudin A. Ahmed. (1974). Ecologically Concerned Consumers: Who Are They? The Journal of Marketing, 20-24. https://doi.org/10.2307/1250192

33. TaylorShirley.&Todd A. Peter (1995).UnderstandingHouseholdGarbageReductionBehavior.*J.PublicPolicyMark.,*14,192-204.

34. UNFPA (2016). Summary of some statistical indicators from the Vietnam Population and Housing Census. Accessed: August 22, 2017. Address: http://vietnam.unfpa.org

35. UNIDO (2018). *Green Industry Initiative*. Accessed: August 17, 2020. Address: unido.org/our-focus/cross-cutting-services/green-industry/green-industry-initiative.

36. WangWen-lan(2012).AStudyonConsumerBehaviorforGreenProductsfrom a Lifestyle Perspective. *The Journal of American Academy of Business,* 18(1),164-170.

37. Shwu-Ing Wu, Jia-yi Chen(2014). AModelofGreenConsumptionBehaviorConstructedbytheTheoryofPlannedBehavior.*InternationalJournalofMarketingStudies,*6(5),119-132.





*e*ISSN1303-5150