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Consumer Perceptions and Consumer Behavior Toward Bio-Based Products: An Empirical Study in Vietnam

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Abstract

Green economy, also known as sustainable economy, is a current development trend in which consumers prefer products that are wholly or partly derived from materials of biological origin since they have become more concerned about their health and the environment in which they live. This study aims to examine consumer behavior toward bio-based products with three key goals in mind. First, it helps to understand the perception of consumers toward bio-based products. Second, it properly helps consumers be aware of products derived from materials of biological origin so that the consumer can make purchasing decisions to protect their health and contribute to the protection of the environment. Third, the study on consumer behavior towards bio-based products will provide a more accurate view and assessment to companies looking to develop Bio-based products. Based on that, the research is carried out through surveying, collecting data from consumers, and then using the deductive approach, descriptive statistics, and quantitative method analysis. The results demonstrated that a positive relationship and a direct impact are established between the variables of Attitude and Social Norms and the Purchase Intention toward Bio-based products. Furthermore, the findings reveal that customers have positive feelings towards bio-based products in terms of trust, knowledge, and the environment.

Keywords: Bio-Based Products, Purchase Intention, Consumer Knowledge, Consumer Attitude

JEL Classification Code: D11, P46, C91, Q50, F64

1. Introduction

The global environment continues to deteriorate due to the current rapid growth of the economy and behavior worldwide (Chen & Chai, 2010). Products created from nonrenewable resources, in particular, have an environmental impact since they take a long time to decompose. In 2014, the world's oceans contained more than 5 trillion plastic bits (Eriksen et al., 2014). Plastic garbage created in Vietnam in 2019 was estimated to be between 2.6 and 2.8 million tonnes. Plastic packaging and bags have become a burden on

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the ecosystem, posing major threats to land, water, air, and ocean environments, and even resulting in a white pollution calamity. Human health is under the heaviest threat. We can change this with the economy, using biological products to decrease pollution. They used biomass as fibers, bamboo, and products that are easy to decompose (Tezer & Bodur, 2021). They did not affect the environment and were safe for consumers (Erickson, 2015).

Bio-based products are commercial or industrial products created entirely or primarily from biological products, forestry materials, or renewable agriculture materials such as plant, animal, or marine life (Singh et al., 2003). Green products include bio-based products. Although experts recognize the numerous advantages of utilizing bio-based products, consumers may not embrace or even reject them (White et al., 2019; Fevolden & Klitkou, 2017). Bio-based goods, on the other hand, are not yet widely used, and buyers are unaware of the benefits of utilizing them.

As a result, this research contributes to the understanding of customers' general perceptions and expectations of bio-based products. Besides, this study allows us to improve our understanding of consumer awareness and acceptance of Bio-based products in Vietnam. Furthermore, the authors seek to provide information so that consumers have a proper understanding of bio-based products. Finally, this research serves as a database for businesses and governors interested in developing bio-based products.

2. Literature Review

The main marketing theory is consumer behavior theory. Customers' buying decisions are influenced by three aspects: psychological factors, individual traits, and societal factors (Ajzen, 1991). Purchase Intention is a type of subjective consumer behavior in which users are more likely to buy or choose a product or service based on their prior experience, use, and desire in a given situation (Keller & Kotler, 2016). The purchase decision of a customer is a complicated process involving user behavior, perception, and mode.

The theory of planned behavior (TPB) is one of the most important theories of behavior decisions (Ajzen, 2020). One of the most fundamental theories of behavior decisions is the theory of planned behavior (TPB) (Ajzen, 1991). Individual variables, social circumstances, and non-volitional determinants all influenced Purchase Intention, according to the TPB (Han & Kim, 2010). The ABC theory (Attitude, Behavior, and Context) offers a useful framework for investigating Consumer Behaviors (Goh & Balaji, 2016). Other research aimed to directly incorporate variables including product information, prices, external driving factors, and product quality to investigate their direct impact on green purchasing behavior (Cheung & To, 2019; Jacobs et al., 2018; Shin et al., 2017; Lee et al., 2015).

This study provides a theoretical framework to influence consumers' Bio-based products Purchase Intention. The first category is psychological factors including Customers' Knowledge, Perceived Quality, Perceived Prices, and Perceived Risk. The second category is individual characteristics including Customer's Attitudes, Customer's Trust, and Environment Responsibility. The third category is social factors including Subjective Norms and Social Capital.

2.1. Psychological Factors

2.1.1. Customer's Knowledge (CK)

Vermeir showed that a customer's knowledge is directly proportional to their trust in green products (Vermeir & Verbeke, 2008). Product knowledge refers to consumers' perceived knowledge about specific items (Beatty & Smith, 1987), and it has a direct impact on their cognition of product attributions and evaluation criteria, as well as their ability to collect and process information (Barrutia & Gilsanz, 2013). Consumers will be more confident in evaluating green products and their effects directly on green customers' Purchase Intention (HPI) if they have a lot of green product information and knowledge about the origin, functions, qualities, and utility of green products.

H1.1: Customer's Knowledge is the positive association to Customer's Attitudes.

H1.2: Customer's Knowledge is the positive association to Customer's Trust.

2.1.2. Perception Quality (PQ)

The customer's perception of Bio-based products is called perceived quality. One of the most significant parts of the product development process that defines successful design is perceived quality (Stylidis et al., 2020). As the global green trend gains traction, customers are increasingly turning to bio-based goods to preserve their health and the environment (Chen et al., 2015). The perceived quality of the highly acclaimed Bio-based product will be positively influenced by its quality (Aertsens et al., 2011; Mondelaers et al., 2009).

H1.3: Perceived Quality is the positive association to customer's Purchase Intention.

H1.4: Perceived Quality is the positive association to a Customer's Attitude.

H1.5: Perceived Quality is the positive association to Customer's Trust.

H1.6: Perceived Quality is the positive association to Bio-based products prices.

2.1.3. Perceived Prices (CP)

One of the most important factors influencing consumer decision-making is the product price. According to several studies, market demand for some products is high due to their low cost (Chiu & Leng, 2015). Aside from that, the cost can impact the decision to utilize a particular product or brand (Faith & Edwin, 2014). In consumers' perception of consumption, the high price of a green product indicates that the product is high quality and reliable in terms of its function and effect on the environment. The study of Laroche et al. (2001) showed 67% of Americans expressed willingness to pay a 5–10% premium for green products, 1989; in 1991, a survey report found that environmentally conscious consumers were willing to pay a premium of 15–20% to buy green products; the research results express that most consumers are willing to pay a certain premium to buy green products (Lin & Huang, 2012).

H1.7: *Perceived Prices are a positive association with customers' Purchase Intention.*

H1.8: *Perceived Prices are a positive association with Customer's Attitudes.*

H1.9: *Perceived Prices are a positive association with Customer Trust.*

H1.10: *Perceived Prices are a positive association with Perceived Quality.*

2.1.4. Perceived Risk (PR)

Perceived risks refer to the spirit cost associated with customers' purchasing behavior, which represents a kind of uncertainty about the future. Perceived risk is the risk that consumers actively perceive because they do not understand product information. When the perceived risk of buying green products is lower, the consumer's desire to buy green products is more likely to increase (Tarabieh, 2020). Furthermore, when consumers see that the risk they encounter is greater than the benefits they receive, they are more likely to want to lower Perceived Risk rather than increase utility (Aji & Sutikno, 2015). Perceived risk is inversely associated with trust, according to research. When people's perceptions of risk are higher, they are less likely to believe products or brands that claim to be environmentally friendly (Chen & Chang, 2012; Aji & Sutikno, 2015; Harridge-March, 2006).

H1.11: *Perceived Risk is the negative association to Customer's Attitudes.*

H1.12: *Perceived Risk is the negative association to Customer's Trust.*

2.2. Customer Individual Characteristics

2.2.1. Customer's Attitude (ATT)

A person's positive or negative judgment of his or her performance in a given action is referred to as an attitude. Customer loyalty will be affected by consumer attitudes toward bio-based products. According to studies, dedicated buyers actively seek out things that they are interested in (Mosavi & Kenarehfar, 2013). Furthermore, consumer attitudes regarding bio-based products influence purchase decisions. Consumers give preference to products that they like based on their preferences and compassion for the product. Previous research has shown a correlation between Consumer Attitudes and Purchase Intention towards products (Jung et al., 2020), thereby showing that Consumer Attitudes are one of the determining factors to Consumer Behavior.

H2.1: *Customer's Attitudes are the positive association to customer's Purchase Intention.*

H2.2: *Customer's Attitudes are the positive association to Customer Trust.*

H2.3: *Customer's Attitudes are the positive association to Product's Prices.*

H2.4: *Customer's Attitudes are the positive association to Product Quality.*

2.2.2. Customer' Trust (CT)

Green trust is described as the willingness to rely on an object based on beliefs or expectations derived from that object's trustworthiness, compassion, and environmental performance. Customers' green purchasing intentions might be influenced by green beliefs, according to previous research in the field of green consumption (Chen, 2010). One aspect that reduces risk perception by raising expectations for bio-based products is trust. Thereby is leading to consumer purchasing behavior (Chen & Chang, 2013). Consumers will trust Bio-based products more and are likely to make Purchase Intention selections if they have confidence in them.

H2.5: *Customer's Trust is the positive association to customer's Purchase Intention.*

H2.6: *Customer's Trust is the positive association to Customer's Attitudes.*

H2.7: *Customer's Trust is the positive association to Perceived Prices.*

H2.8: *Customer's Trust is the positive association to Perceived Quality.*

2.2.3. Environmental Responsibility (ER)

Environmental responsibility is defined as taking action to help solve environmental problems, acting not for personal gain, but as a customer of societal-environmental well-being (Stone et al., 1995). Environmental Responsibility is a social psychology norm activation paradigm that applies to a variety of fields, including consumer behavior, environmental education, and environmental sociology (Schwartz, 1997; Slavoljub et al., 2015). Environmental responsibility is directly linked to environmental education, according to this research, and it affects a wide range of countries and cultures (Slavoljub et al., 2015; Kaiser & Scheuchl, 2003).

H2.9: *Environmental Responsibility is a positive association with Customer's Attitudes.*

H2.10: *Environmental Responsibility is a positive association with Perceived Quality.*

H2.11: *Environmental Responsibility is a positive association with Perceived Prices.*

2.3. Social Factors

2.3.1. Subjective Norms (SN)

Subjective norms refer to the belief that an important person or group of people will approve and support a particular behavior (Ajzen, 2020). Consumers are influenced by external influences such as family members, relatives, friends' attitudes, and colleagues while making purchasing decisions (Kai & Haokai, 2016). When a large number of people use Bio-based products and they receive positive feedback, consumers are more likely to utilize them (Kim & Chung, 2011). Consumer behavior and purchase decisions are influenced by the value of collectivism (Laroche et al., 2001). According to research, collectivism favors ecologically friendly items (Kim, 2011). As a result, Subjective Norms can be used to forecast Consumer Behavior to some extent based on collectivism.

H3.1: *Subjective Norms are the positive association to customer's Purchase Intention.*

H3.2: *Subjective Norms are the positive association to Environmental Responsibility.*

2.3.2. Social Capital (SC)

Social Capital is the norm for collective purposive action for the common good (Woolcock, 1998), rooted in framework-based individual relationships (Lin, 2001). Social capital is the networks together with shared norms, values, and understandings that facilitate co-operation within or among groups. The foundation for consumer guidance is

public action on social networking platforms. Consumers desire to build a positive reputation while buying things. They will choose green products and food that are good for the environment (Chen et al., 2018; Vitale et al., 2020). Bonding capital and bridging capital were the two types of social capital identified. The bonding capital is small and closely related to groups such as family and friends. Nonetheless, it had a significant impact on consumers' daily lives. However, when bridging capital (groups with common interests but not intimate ties) is employed strategically in the context of network development, it has a significant impact on people's daily lives.

H3.3: *Social Capital is the positive association to customers' Purchase Intention.*

H3.4: *Social Capital is the positive association to Customer's Knowledge.*

The conceptual framework of this study is illustrated in Figure 1.

3. Methodology and Data

3.1. Research Methodology

Deductive Approach, Descriptive Statistics, and Quantitative Method are the three main research approaches used in this study (Wilson, 2014; Rendón-Macías et al., 2016; Bryman & Bell, 2015). We used the Quantitative Research approach to design this study. Because Quantitative Research methods use Questionnaires with predefined responses to reach huge groups of people (Hair et al., 2012). This strategy aids in the clarification of the problem by assisting in the determination of the relationship between the data sets (Woodside & Wilson, 2003). Furthermore, statistical data analysis can be used to draw conclusions.

An Inferential Design can make tests of the Causal Hypothesis (Arciszewski & Michalski, 1994; Wright, 2006). This design can test to see if this relationship is achieved more generally, but it also provides some strategies for using logic and data analysis to solve problems or identify patterns.

3.1.1. Operationalization of Constructs

Questionnaire Design: Respondents' Private Information was collected as Qualitative Data (Sheard, 2018). Researchers use a Nominal Scale that requires respondents to respond with raw responses, with no numerical value. The next part of the Online Questionnaire is used to collect Primary Data about Vietnamese Consumer' Behavior toward Bio-based products (Wilson, 2014). This Questionnaire was mainly designed based on a 5-point Likert scale with the principle from lowest to highest (from 1: Fully disagree to

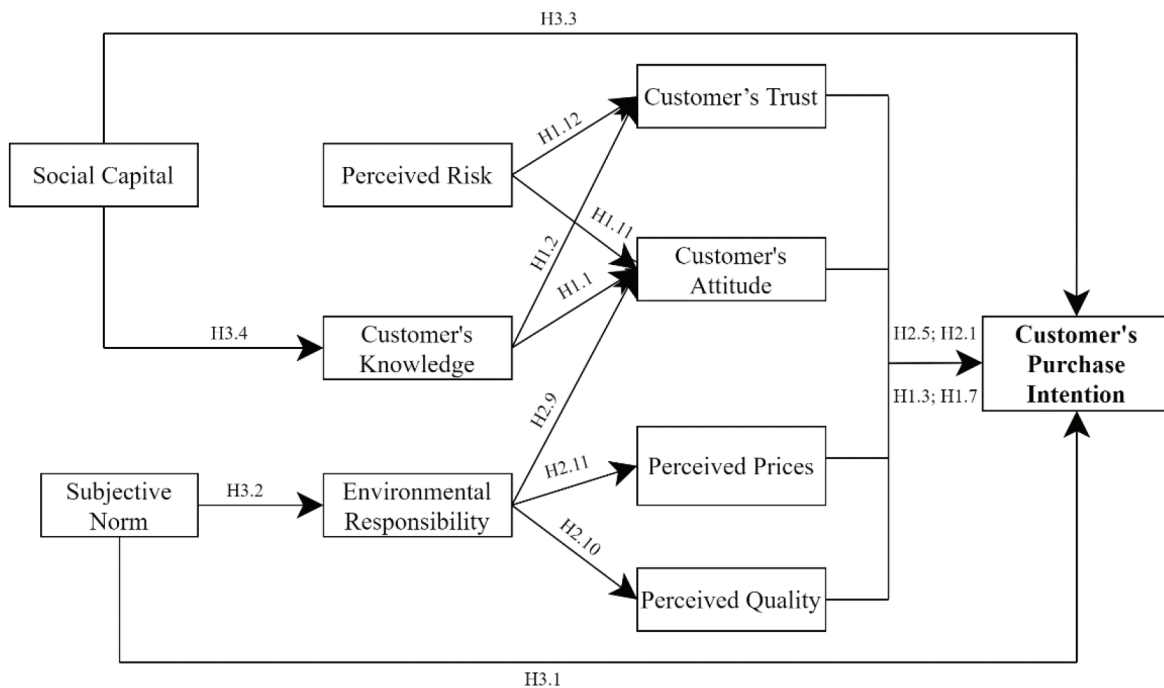


Figure 1: Research Framework

5: Fully agree) (Zainudin et al., 2016). Besides, researchers use Secondary Data collected from available reliable sources (Wilson, 2014). This data helps researchers to understand the business problems, research problems and to improve decisions.

3.2. Survey and Sample

The questionnaire was distributed to participants via social networking sites: Facebook, Instagram, and Zalo. The survey was conducted from August 1, 2021, to August 31, 2021, received 501 valid responses from survey participants.

Among the respondents, the under 24 age group and the 41 to 65 years old group both together accounted for 35.5%, the highest in the survey. While those between the ages of 41 and 65 accounted for about 20.6%, ranked second in the total number of respondents. Regarding the qualifications of the respondents, the majority of those with university degrees accounted for 48.1%. In addition, the groups of post-graduate level, high school, and college with the proportions of 18.8%, 17.8%, and 15.4% respectively. For occupation, the majority of respondents are students, accounting for 31.3%, groups of officers, free jobs, teachers, engineers, and farmers accounted for 20.6%, 14.4%, 13%, 10.4%, and 8% respectively. In terms of income, those earning less than 15 million VND per

month accounted for 61.1 percent, those earning 15 million to 30 million VND accounted for 29.5 percent, and those earning more than 30 million VND per month accounted for 9.4 percent.

4. Results

4.1. Reliability Test

We use Cronbach's Alpha to measure and check the reliability and validity of textures. The results showed a total of nine satisfactory structures. After observation, Cronbach's Alpha values of all constructions ranged from 0.74 to 0.89. Table 1 lists the constructs that satisfy the minimum criteria (Cronbach's Alpha coefficient larger than or equal to 0.60; adjusted Total Correlation value greater than or equal to 0.3) (George & Mallery, 2003). Because all structures' Cronbach's coefficient alpha is listed in Table 1, the study's findings are considered reliable.

4.2. Exploratory Factor Analysis

After conducting EFA with all variables, the results showed that the scale measures six constructs with 21 items that satisfy the above conditions. The Factor loading is greater than 0.6, indicating that the variables have practical significance. The Composite Reliability (CR) of each face

in this model scale is greater than 0.7, which can strengthen the feasibility of the measurement. After testing the Average Variance Extracted (AVE) value of the variables to measure the convergence validity of the model, the values are all higher than the standard AVE ratio of 0.5 (range 0.51 to 0.65 - higher than the standard AVE ratio of 0.5) (Hair et al., 2010). Since six elements satisfy the above conditions, the discriminant validity can be said to be appropriate. The result of the measurement model test for exogenous and endogenous constructs can be seen through the loading factor coefficient value of each indicator which is presented in Table 2.

4.3. Structural Equation Modeling

In general, the models presented by SEM samples often provide a series of associations that involve hypothetical cause-and-effect relationships, which once evaluated and identified, confirm or disprove hypotheses based on statistical data (Figure 2 and Table 3).

To fit the model, it was done by evaluating the consistency between the internal structure and the actual data. The Chi-square (χ^2/df) value is 2.740, less than 5; the value of the

Goodness of Fit Index (GFI) is 0.925 and the Comparative Fit Index (CFI) value is 0.944, greater than 0.9, and the final value is the Root Mean Square Error of Approximation (RMSEA) is 0.059, less than 0.08. The model shows good fitness and all scales are acceptable (Hair et al., 2010).

Purchased Intention (PI) is affected by two variables including Subjective Norms (SN) and Consumers' Attitude (ATT). Consumers' Attitude (ATT) has a direct, positive, and significant impact on Purchased Intention (PI) of 0.81. This implies if Customer' Attitude (ATT) increases by 1 unit, there will be an increase in Purchased Intention of customers by 0.79 units. This is a very large impact and will have a great impact on the consumers' Purchase Intention toward Bio-based products.

Subjective Norms (SN) have a direct, positive, and statistically significant effect on (1) Purchase Intention (PI) of 0.22 and (2) Consumer Knowledge (CK) of 0.53. Based on the findings, it was discovered that when consumers' Subjective Norms are high, they have a beneficial impact on their Purchase Intention and Knowledge (i.e., SN-PI, SN-CK). That is, if a customer's Subjective Norms (SN) increases by one unit, the consumer's Purchase Intention (PI) for Bio-based products increases by 0.22 units.

Table 1: Cronbach Alpha Test Results

Constructions	Code	Items	Cronbach's Alpha
Consumer's Knowledge	CK	6	0.736
Perceived Quality	PQ	5	0.736
Perceived Risk	PR	3	0.888
Consumer's Attitude	ATT	5	0.825
Customer's Trust	CT	4	0.865
Environmental Responsibility	ER	5	0.855
Purchase Intention	PI	4	0.732
Subjective Norms	SN	3	0.809
Social Capital	SC	4	0.763

Table 2: Exploratory Factor Analysis

Constructs	Items	Factor Loadings	CR	AVE
Customer's Knowledge (CK)	4	0.607–0.771	0.681	0.518
Consumer's Attitude (ATT)	3	0.758–0.824	0.761	0.516
Customer's Trust (CT)	4	0.798–0.833	0.867	0.621
Environmental Responsibility (ER)	5	0.739–0.786	0.855	0.541
Subjective Norms (SN)	2	0.824–0.86	0.784	0.645
Purchase Intention (PI)	3	0.816–0.857	0.753	0.505

Note: CR: Composite Reliability; AVE: Average Variance Extracted.

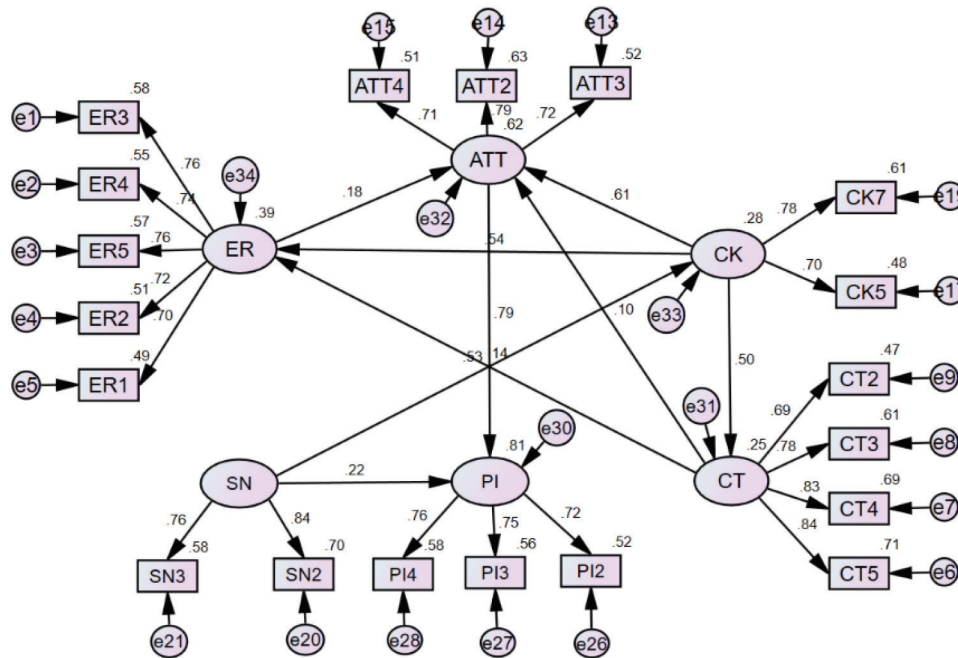


Figure 2: The Result of the Full Model

Table 3: Hypothesis Testing Result

Variables	Coefficient	SE	P
CK ← SN	0.533	0.046	***
CT ← CK	0.502	0.068	***
ER ← CT	0.544	0.073	***
ER ← CK	0.136	0.052	0.017**
ATT ← ER	0.181	0.053	0.003**
ATT ← CK	0.605	0.074	***
ATT ← CT	0.103	0.040	0.045**
PI ← SN	0.218	0.038	***
PI ← ATT	0.786	0.082	***

Note: *, p -value < 0.1; **, p -value < 0.05; ***, p -value < 0.001. Significant at the 0.05 level.

Environmental Responsibility (ER) and Consumer Attitudes (ATT) were found to have a positive association (i.e., positive ERATT). The index has a positive and significant association (0.18). Environmental Responsibility has a positive impact on Consumer Attitudes while choosing Bio-based Products, as evidenced by the acceptable nature of the index between ER and ATT.

Customer’s Knowledge (CK) has a direct and positive influence on (1) Customer’s Attitude (ATT), (2) Customer’s Trust (CT), and (3) Environmental Responsibility (ER)

with a correlation of 0.61, 0.50, and 0.54. According to the findings, having a high level of customer knowledge has a good impact on attitudes, beliefs, and environmental responsibility. Through Customer Attitudes, Customer Knowledge indirectly influences Purchase Intention (PI) (ATT).

Customer’s Trust (CT) has a positive and significant impact on (1) Environmental Responsibility (ER) of 0.10 and (2) Customer’s Attitude (ATT) of 0.53. According to the results, the higher the Customer’s Trust, the more direct impact on Environmental Responsibility (ER) and Customer’s Attitude (ATT). Customer’s Trust (CT) has an indirect impact on Purchase Intention (PI) through Customer’s Attitude (ATT).

5. Discussion and Managerial Implications

5.1. Discussion

There was a complicated relationship between green product knowledge and green purchase intent. Green Purchase Intention was also influenced by green product knowledge via the mediating variable green trust and customers’ perceived efficacy, according to the study (Wang et al., 2019). The association between customers’ knowledge and Purchased Intention is investigated in this study using Consumers’ Attitude as an intermediary variable. Some of the main factors impacting buyers’ understanding include

functional performance information on labels or availability, as well as easy-to-find information regarding Bio-based products. Consumers can purchase Bio-based products even if they are unaware of their existence. However, when consumers gain more understanding about bio-based products, they will develop a positive attitude toward them based on their newfound knowledge, resulting in customers' purchase intentions.

According to the findings, a customer's attitude has a direct positive impact on purchase intent. It is true that green purchasing attitudes and health consciousness have an impact on green purchasing intentions (Nguyen et al., 2020; Aprianti et al., 2021). Moreover, research results provided that the majority of consumers have a positive attitude towards Bio-based products. This is demonstrated by consumers admitting to being sympathetic and willingly try Bio-based products.

Green trust, according to certain studies, serves as an intermediary between green product knowledge and green Purchase Intention, assisting in the transition of green product knowledge into green Purchase Intention (Wang et al., 2019). Green trust also has a positive impact on attitude and purchase intent (Nguyen et al., 2021). Customer trust, on the other hand, has an impact on customer attitudes and purchase intentions, according to the findings of the study. In the relationship between customer trust and purchase intent, customer attitudes serve as a mediator. Customer trust has a direct impact on customer attitudes, according to the findings of the study. Customer Attitudes have an impact on Purchase Intention (Bio-based products). Many respondents believe that bio-based products on the market are beneficial to their health. They are factors that have an impact on customer trust. These features, according to the study, have a considerable impact on customer trust.

According to Chen and Deng (2016) and Zhang et al (2019), subjective norms have a positive and significant effect on green purchase intention. This research demonstrated that Subjective Norms have a positive and direct impact on consumer Purchase Intention, supporting the findings of the previous study. Along with that, research shows that the Subjective Norms Indirectly affect Purchase Intention through Consumer's Knowledge and Attitude. Based on what was proved, it can be seen that the Subjective Norms play an important role both directly and indirectly in Purchase Intention toward Bio-based products. Subjective Norms will be determined by two factors in the context of the analyzed background: the consumer's family and colleagues. This demonstrates that the family and others are interested and value bio-based products. It will enhance Subjective Norms and have a positive impact. The process that directly or indirectly affects Purchase Intention toward Bio-based will be determined by the level of Subjective Norms.

Consumers have a high belief in the usage of green products that have a positive influence on the environment, contributing to the protection and enhancement of the environment. Consumers' Purchase Intention was directly influenced by the environment. The study of Yue et al. (2020) showed that Environmental Responsibility was an intermediary factor between Customer Attitude and Green Purchase Intention. Based on the findings of their research on Consumer Behavior towards Bio-based products, Environmental responsibility acts as an indirect factor affecting Purchase Intention through Consumer Attitude. That factor is seen as a bridge between Environmental Responsibility and Purchase Intention. This study went against Wang's previous research but supports the results of Yue's study, which showed that Environmental Responsibility has a significant impact on consumer perception, i.e., consumers have a good attitude towards the environment. A higher degree of Environmental Responsibility is more likely to lead to the Purchase Intention of environmentally friendly products.

Based on the analysis and research process, five factors are affecting Environmental Responsibility that is highly appreciated by consumers. Bio-based products, specifically, are thought to reduce waste, by-products, and non-recyclable materials, as well as the greenhouse effect. Furthermore, it contributes to the achievement of Vietnam's global environmental goals relating to climate change and environmental preservation. Consumers care about environmental responsibility, as seen by their attitudes when making purchases.

5.2. Managerial Implications

According to the findings, improving customer attitudes is required to enhance purchase intent. Customers' knowledge, on the other hand, is one of the factors influencing customer attitudes. Therefore, the author has the following suggestions to improve the knowledge of customers toward Bio-based products. To begin, the planning of activities such as media events and public discussions provides information about bio-based products. Second, education disseminates information and knowledge regarding bio-based products to the general public, especially the youth. Set up online resources and portals where information on bio-based products and their applications, as well as information about manufacturers, may be exchanged. Finally, establish consulting services that impart knowledge to farmers to better their understanding of the potential of bio-based products and materials.

When a customer's trust is strengthened, it directly improves their attitude and indirectly increases their purchase intention. This study recommends that manufacturers should provide clear labels on their products; it helps in increasing

customers' trust and increase the positive attitudes of customers. Furthermore, manufacturers must provide more information about their products on their websites, social media, and other platforms.

The findings revealed that Subjective Norms are a social factor that influences Purchase Intention toward Bio-based products to some extent. As a result, family, friends, and the community can help to raise the standard of the Subjective Norms. People must be knowledgeable about bio-based products and have a positive attitude toward them. Collectivism will have an impact on Subjective Norms in particular. Subjective Norms for Bio-based Products will be high if collectivism has good knowledge, beliefs, and attitudes.

Finally, the research model suggested that to increase Purchase Intention toward Bio-based products, environmental responsibility must be increased, which indirectly leads to increasing the consumer Purchase Intention. Therefore, several proposals are made to enhance Environmental Responsibility. Manufacturers shall provide environmental information on product packagings, such as the amount of natural resources saved and the decrease of carbon emissions. This will encourage customers to consider how much they will contribute to environmental protection by purchasing this product. Furthermore, salespeople can inform customers about the product's environmental protection features and consequences, which will increase their confidence and faith in the product, resulting in a Purchase Intention. Furthermore, the government should use the media and social media to disseminate information about the environmental benefits of bio-based products. Thereby, increasing customer confidence in bio-based products will help to protect the environment.

6. Conclusion

The study with 501 observational samples, and based on the analysis results of the SEM model, demonstrated that the factors of Environmental Responsibility, Customer Knowledge, and Customer Trust all have an impact on Customer Attitudes of Bio-based products. At the same time, Consumer Attitudes directly and positively influence Purchase Intention. The Subjective Norm factors also affect the intention to buy Bio-based products. The research results help us better understand the perception of Vietnamese consumers about Bio-based products. This study found that when Subjective Norms and Customer's Attitude enhances, it will improve customer's Purchase Intention. Besides, when Environmental Responsibility, Customer Knowledge and Customer Trust are enhanced, it will indirectly improve Purchase Intention through Customer Attitudes and Subjective Norms intermediately. The study also helps consumers to be more aware of Bio-based products, thereby

making purchasing decisions that protect health and the environment. In addition, the study on consumer behavior towards bio-based products will provide a more accurate view and assessment to companies looking to develop Bio-based products.

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