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# Influences of Green Eating Behaviors Underlying the Extended Theory of Planned Behavior: A Study of Market Segmentation and Purchase Intention

**Sasichakorn Wongsaichia [1,2], Phaninee Naruetharadhol [1,2], Johannes Schrank [1,2], Premchai Phoomsom [1,2], Kanjakhon Sirisoonthonkul [1,2], Vorrapol Paiyasen [1,2], Sedthawut Srichaingwang [1,2] and Chavis Ketkaew [1,2,*]**

[1] International College, Khon Kaen University, Khon Kaen 40002, Thailand; sasichakorn.w@kkumail.com (S.W.); phaninee@kku.ac.th (P.N.); johasc@kku.ac.th (J.S.); premchai.ph@kkumail.com (P.P.); kanjakhon@kkumail.com (K.S.); vorrapol_paiyasen@kkumail.com (V.P.); sedthawutsr@kkumail.com (S.S.)
[2] Center for Sustainable Innovation and Society, Khon Kaen University, Khon Kaen 40002, Thailand
* Correspondence: chaket@kku.ac.th

**Abstract:** Green food has been introduced into the market for several years. Nevertheless, most Thai consumers do not commonly purchase green food in their daily routine. This research article aims to identify the market segments and significant factors affecting green food purchase intention in Thailand based on the theory of planned behavior. It employed a sample of 458 green food consumers in five regions of Thailand. Based on the Food-Related Lifestyle model, we used cluster analysis to classify the market segments. Additionally, we employed a multi-group structural equation modeling technique to explore and compare customers' behaviors in different segments. The results demonstrated two primary market segments for green food products, including (1) non-green consumers and (2) green consumers. The findings indicate that green consumers' self-realization related to environmental issues positively affects their attitude and purchase intention, while non-green consumers reveal none of these relationships. Surprisingly, social norms related to green food consumption influence non-green consumers' attitudes toward green food more than it does toward green consumers. This research paper enlarges the understanding of Thailand's green food market regarding the market segments (non-green and green consumers). Furthermore, it points out implications on how marketing practitioners may penetrate those segments.

**Keywords:** green food; green labeling; green consumer; food-related lifestyle; food industry



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## 1. Introduction

Green products have played a significant role in the global environment showing that consumers are more aware of the negative impacts on the environment caused by global warming [1]. Green products as eco-friendly goods and the green production process uses eco-friendly technologies that are not disadvantageous to nature. Furthermore, characteristics-wise, a perfect green product should be organically grown, reusable, recyclable, biodegradable, non-toxic, non-animal testing, and use eco-friendly packaging [2]. A green product covers different aspects such as product functionalities, product design, product package, and product value [3]. In the food industry, green food products are produced in an eco-friendly way that does not harm the environment. The definition of green food involves a cleaner process starting from collecting resources, consuming, and decomposing the product [4]. Accordingly, the process of producing green food helps to prevent environmental pollution and enhances ecological advantages. Green food is harmless and includes nutritious food for consumer health. Green food should also be organic and nutritious for humans [5].

Environmental issues are the primary concerns of governments and citizens. Rahman and Reynolds [6] recommended that consumption of green products is strongly influenced

by consumer buying behavior. Research shows that consumers with environmental conservation awareness are rapidly increasing, and many consumers expect green products and services from producers globally [7]. Consumers' decisions to purchase the green product depend on a specific group's perception, values, behavior, and the individual's attitude [8]. Since 2017, the green consumer markets worldwide have generated approximately USD 290 billion annually. In addition, 14% of the gross world product (GWP) of a green product represents the eco-tourism market, increasing global environmental awareness [1]. This information shows that the number of green consumers has increased significantly, and the food industry should not ignore the green food market.

In Thailand, since January of 2020, there have been policies to reduce the use of plastic bags in convenience stores, supermarkets, and shopping malls. Jafarzadeh et al. [9] stated that 2020 would be the year of green, including green food, green packaging, and green organizing according to the environmentally friendly trend that has become the popular trend worldwide. Yanakittkul and Aungvaravong [10] also reported that 37% of Thais use only natural and organic products or green products daily. Nevertheless, the green market is new to Thailand, especially green foods. Therefore, a market segmentation study is a prerequisite for marketers to implement marketing strategies successfully. Segmenting customers allows marketers to understand the customers' behaviors deeply. This approach also allows marketers to tailor marketing strategies and deliver products and services in response to the segment's needs. However, few studies on green food and green consumers in Thailand are related to market segmentation and purchase intention. Thus, we considered exploring the consumers' buying behavior and categorizing consumers into segments to fulfill the knowledge gap.

In 2020, Thailand produced 25.37 million tons of waste [11]. Food packaging is one of the main contributors. Tangwanichagapong et al. [12] reported that the amount of all packaging materials has increased, and in particular plastic packaging, which has increased at a rapid rate in Thailand. Packaging waste comprised 22.5% of total municipal solid waste, and plastic was the major type of packaging found in the waste stream (15.8%), followed by glass (3.5%) and paper (3.2%). According to Sawasdee et al. [13], one of the biggest sources of solid waste from the food industry in Thailand is due to discarded non-degradable packaging; hence, green marketing focuses on creating more eco-friendly packaging. Yashasvini and Sundar [14] stated that eco-friendly packaging could reduce waste production and can minimize costs. Many resources are lost in the collection and degradation of plastic. However, eco-friendly packaging is naturally degradable, serves as a recyclable fuel, or is absent altogether. Therefore, it saves resources and investments. Thai authorities have been increasing their efforts to tackle the environmental problem, especially plastic waste and plastic packaging. They aim to reduce packaging and use bio-materials and green packaging instead. The Thailand Single-Use Plastic Reduction Roadmap aims to reduce 50% of packaging waste by 2025 and 55% by 2030. Plastic packaging reduction, increase in product recyclability, and the use of recycled material are the main environmental focuses. Green products are products that are produced in an environmentally friendly production process, while green packages are packages that are harmless to the environment [15]. In Thailand, most firms have expressed their social and environmental responsibility by offering green packaging. Hence, consumer products are becoming more available in recyclable and biodegradable packages. Fangmongkol and Gheewala [16] stated that biodegradable food containers from bagasse have a good environmental performance in Thailand.

Firms in Thailand acknowledged the need for recycling, waste reduction, and sustainable packaging. As an example, PTT Public Company Limited, the largest energy company in Thailand, strengthened its commitment to environmental friendliness by using compostable cups in coffee shops. CP ALL Public Company Limited, the largest operator of retail and wholesale businesses for consumer goods in Thailand, states that all plastic packaging of products under the company's control must be reusable, recyclable, or compostable by 2025. The company supports the use of materials from sustainably managed

renewable resources, such as paper material that is certified by the Forest Stewardship Council (FSC) or by the Program for the Endorsement of Forest Certification Scheme (PEFC). It aims to increase the amount of compostable packaging material, such as the usage of polybutylene succinate coated paper and the replacement of plastic with biodegradable material. It aims for recycled material and increases reusable packaging. ThaiBev Public Company Limited, Thailand's largest beverage company, aims to increase the amount of bio-based and bio-degradable materials used in plastic bottles and plastic bags.

This paper aims to explore the significant relationships among factors such as self-efficacy, environmental concern, utilitarian eating value, perceived price, attitude, perceived behavioral control, subjective norm, and purchase intention associated with consumer buying behavior and marketing segmentation of green foods. The variables are mainly derived from the theory of planned behavior [17]. It helps to predict consumer behavior by exploring subjective norms, perceived behavioral control, attitude, and purchase intention. We added four additional variables, which are utilitarian eating value, environmental concern, perceived price level, and self-efficacy. These variables can help to predict consumers' purchase intention. The cluster analysis and structural equation modeling (SEM) methods were used to explore the market segments and examine the significant relationships of these variables. These approaches are suitable for this research because we are trying to create a multi-factor model to predict the purchase behavior of a cross-sectional sample divided into multiple groups [18,19].

This paper is organized as follows: Section 2 begins with a review of the literature on the existing theories; Section 3 outlines the research methodology involving pilot test and cluster analysis, sample and data gathering, development of measures as well as data analysis and statistical measures; Section 4 presents the analyses and findings; Section 5 discusses the research implications for theory and practice; Section 6 shows the research limitations; Section 7 summarizes this research article by discussing major conclusions drawn from this study.

## 2. Literature Review

Several research articles related to food marketing utilized employing the SEM approach. Most research results revealed relationships among consumer attitudes and marketing terms interpreted by consumer perceptions and behavioral intention [20–23]. Following those recent papers, we propose that the relationship of variables in this paper could be created using the SEM framework. The following sections provide details regarding theories and the related literature that helped create a structural model and hypotheses for this research.

### *2.1. Theory of Planned Behavior*

The theory of planned behavior (TPB) consists of attitude, subjective norm, and perceived behavior control [17]. The theory of planned behavior is universally used to predict consumer behavior [24]. Dowd and Burke [25] applied the theory of planned behavior in the previous study regarding food choice. Additionally, prior research adopted TPB to examine green food intention among Asian consumers [26]. Hence, TPB has become a successful theory for predicting and forecasting consumers' buying behavior globally. According to Qi and Ploeger [27], TPB is one widely used framework to explain consumers' food choices. Considerably, in the food industry, TPB could predict approximately 60% of consumer intentions and estimate 50% of fast-food predictions. Qi and Ploeger [28] found that the TPB is useful in predicting consumers' green food purchase intention. Wang and Wang [29] studied the theory of planned behavior to predict the green food and beverage behaviors in protecting the food environment and found that commitment, perceived behavioral control, and perceived knowledge are the most influential factors of green food and beverage.

Nevertheless, the present study enhanced its conceptual framework partly from the extended TPB. This theory suggests that a person's behavioral intention influences

one's behavior. The behavioral intention construct is an indicator of one's willingness to perform a given action. Instead, the behavior construct is an individual's observed response in a given situation concerning a given target [30]. This paper assumes that green consumers (behavioral intentions) are more likely to consume green food products (behavior). Additionally, it is hard to measure actual behavior. Hence, the real behavior construct is omitted in this study following Ketkaew et al. [19], Nosi et al. [21], and Watanabe et al. [22].

#### 2.1.1. Subjective Norm

A subjective norm refers to a particular behavior influenced by social forces such as their communities, associates, or close family members' friends. It can change an individual's behavior performance [17,23]. Hence, this study suggested that the subjective norm affects intention. Furthermore, various studies found that subjective norms are significantly related to attitude, perceived behavioral control, and purchase intention [31,32]. Perceived behavioral control has been indicated as a significant component of an individual's intentions to purchase green commodities [33]. We, therefore, developed H3, H5, and H8: the subjective norm has a positive influence on the perceived behavioral control, attitude, and purchase intention.

#### 2.1.2. Attitude

Ajzen [17,23] revealed that perceived behavior control affects intention. Previous studies recommend that customers' attitudes toward environmentally friendly commodities play a mediating role in the connection between consumption value and purchase intention [7,34]. Empirical studies suggested that attitude and purchase intention are positively correlated [35,36]. Additionally, a prior study on eco-friendly products and green purchase behavior indicated that consumers' attitude positively affects green purchase intention [24]. Furthermore, a recent study revealed that there is a positive and significant relationship between a green attitude and purchasing behavior [37]. Hence, we set up H7, i.e., attitude has a positive influence on purchase intention.

#### 2.1.3. Perceived Behavioral Control

Ajzen [17,23] claimed that perceived behavioral control affects intention. Several studies indicated that perceived behavioral control is an essential component of intention [38,39]. Therefore, the consumer's perceived behavioral control variable directly affects purchase intention. Higher perceived behavioral control leads to a higher possibility of purchasing green food products [32], and this relationship is mediated by attitude [40]. Additionally, the previous studies recommended that perceived behavioral control is associated with individual factors such as skill, time, money, and resources [41,42]. Thus, we developed H6 and H9: perceived behavioral control has a positive impact on attitude and purchase intention.

#### 2.1.4. Purchase Intention

Purchase intention refers to consumers' readiness to purchase sustainable products [43]. Prior research said that consumers prefer to perform a behavior to engage when they have a more accepting attitude towards purchase intention [17,23]. Purchase intention represents the possibility of engaging an individual's behavior, which can be affected by perceived behavioral control, subjective norms, and attitude. The positive attitude toward green foods, subjective norms, perceived behavioral control, and self-efficacy are used to predict the possibility of purchasing green foods [44]. Ahmed et al. [45] found that attitude, subjective norms, and perceived behavioral control have positive effects on the purchase intention of young consumers of organic food. Moreover, Liu et al. [46] discovered that attitude plays the most important role in predicting consumers' green purchase intentions.

### *2.2. Utilitarian Eating Value*

Hoffman and Novak [47] defined utilitarian eating value as overall values judgment of functional advantages. Consumers with utilitarian motivation concentrate primarily on instrumental value. Therefore, people with the utilitarian component are generally considered goal-oriented people. Additionally, a previous study suggested that utilitarian value positively influenced subjective norms [48], whereas Ajzen [49] found that attitude and subjective norms affect the intention to execute a specific behavior. Hence, utilitarian value is related to an individual's decision-making process of consuming green food before the actual purchase [50,51]. This leads to H1: utilitarian eating value has a positive influence on the subjective norm.

### *2.3. Perceived Price*

Zagata [52] recommended that perceived price is associated with the construct of perceived behavioral control. In contrast, Al-Swidi et al. [53] suggested that perceived price relates to the construct of attitude. Consumers' perception that organic food is expensive has a positive effect on purchase intention [54]. The higher price of products represents a higher quality and functional benefit [55]. Thus, premium prices expand organic products' attractiveness and influence one's perceived behavioral control. We established H2: The perceived price level has a positive impact on the perceived behavioral control.

### *2.4. Environmental Concerns*

Environmental concern is a significant factor in encouraging the consumer to improve their consumption behavior to be environmentally friendly [28]. Green consumers are aware of using and consuming natural resources, which are limited resources. Hence, environmental concerns can cause green consumption behavior. Prior studies found that environmental concern positively influences the attitude towards green food consumption [56]. Environmental concern is a principal motivational element for purchasing any merchandise, including organic commodities [57]. Moon et al. [58] extended the theory of planned behavior by adding beliefs about the outcome of ecological actions and found that the perceived seriousness of environmental problems is one of the most influential determinants of green purchase intentions. Thus, H4 states that environmental concern has a positive effect on attitude.

### *2.5. Self-Efficacy*

Self-efficacy refers to people's judgments of their competence to arrange and conduct courses of action needed to accomplish designated categories of performances [59]. In commercial terms, self-efficacy implies an individual's evaluation of products [60]. Self-efficacy is based on past behavior or experience [61]. It can identify factors of behavioral intention and can be influenced by demographics, personality traits, and attitudes toward surrounding aspects [17,23]. Theoretically, self-efficacy is a powerful factor that predicts and encourages decision-making of purchase intention [62]. Hence, self-efficacy directly influences purchase intention. Therefore, we created H10: self-efficacy has a positive impact on purchase intention.

Based on the literature review, this research established ten hypotheses and proposed the following conceptual framework. We also proposed that the market segments of green food play a moderation effect in this structural model. The model examined the relationships among factors such as utilitarian eating value, environmental concern, perceived price, subjective norm, perceived behavioral control, self-efficacy, attitude, and purchase intention linked with consumer buying behavior and marketing segmentation of green foods based on the theory of planned behavior. A solid blue line shows the effect of one factor on another factor. A dashed orange line shows the effect of market segments on a factor.

## 3. Research Methodology

### *3.1. Pilot Test and Cluster Analysis*

The first purpose of the study concerns the market segmentation for green food products. Thus, we performed the pilot study by collecting data from consumers in five regions in Thailand. It was suggested to have a minimum sample size of 20–30 for the pilot study [63]. We decided to collect data from 60 respondents. More specifically, by employing the food-related lifestyle (FRL) instrument, this study shows consumer groups' existence sharing typical food lifestyles, preferences, and purchases of green food production. The FRL dimensions were established from the 69 statements containing 23 scales with three items each [64]. All items are related on a 7-point Likert-type scale. Ward's hierarchical clustering approach was performed to segment consumers into two groups. Moreover, a *t*-test was executed to identify whether any differences existed between the means of variables that belong to each cluster to determine the number of clusters. Each cluster was named based on the characteristics of the descriptive statistics for each cluster.

### *3.2. Sampling, Data Collection, and Development of Measures*

Data collection in this research was based on quota sampling. The data were gathered from 500 respondents. The data were collected in front of supermarkets in five regions (north, northeast, central, east, and south), which can be used as a representation of Thailand. There were 100 respondents per region. The cities in the five regions are Chiang Mai in the north, Khon Kaen in the northeast, Bangkok in the center, Pattaya in the east, and Phuket City in the south. The selected supermarkets sell both green and non-green food. The data collection was conducted during the COVID-19 pandemic, but all required health standards were met, including distancing, mask-wearing, hand washing, body temperature screening, etc. It was suggested to have a minimum sample size of 200 for any SEM analysis [65]. In this study, data from 500 respondents were collected. After removing irrelevant data, outliers, and errors, 458 responses were usable. Hence, the rate of invalid samples was 8.4%. The data remained confidential. The data were gathered based on a structured questionnaire. Questionnaires had introductory questions, demographic questions, and questions regarding customer attitudes towards green eating behavior (see more details in Appendix A).

The demographic profiles reveal that most of the participants were female (78.2%); 48.5% of the respondents were aged below 21 years. People aged between 22 and 38 years old were 48% of the total, 2% were aged between 39 and 53 years of age, and the smallest group was those over 54, which accounts for 1.5%. With respect to income, 81.4% have an income less than THB 15,000, 13.8% make THB 15,001–20,000, 1.5% make THB 20,001–25,000, 1.1% earn THB 25,001–30,000, and 2.2% have an income more than THB 30,000. For taste experience, 85.2% have consumed green food, and 14.8% have never purchased green food before; 94.1% will consume green food products in the future, and 5.9% will not buy green food production.

In order to assess customer attitudes toward green eating behavior, the research methods used were data collection via a survey using questionnaires and data analysis using quantitative methods. Leung [66] stated that quantitative research is accomplished according to primary numerical data and statistical interpretations under a reductionist, logical, and rigidly objective paradigm. Hence, this study used a questionnaire to identify the main factors that affect green food purchase intention. Bell and Bryman [67] argued that quantitative research involves the collection of numerical data and presentation of the relationship between theory and research as deductive. In this paper, a survey was used to perform data collection of customers in Thailand.

The collected data were information from Thai customers based on a questionnaire survey that was conducted in front of supermarkets in five regions of Thailand. The survey questionnaire followed eight identified factors that affect green food purchasing, i.e., self-efficacy, environmental concern, utilitarian eating value, perceived price, attitude, perceived behavioral control, subjective norm, and purchase intention. These eight in-

dicators were assessed by a total of 34 questions. The questionnaire was divided into three sections. The first section comprised introductory questions that identify regular and potential buyers of green food. The second section consisted of demographic profile questions in the form of multiple-choice questions, including gender, age, income, and family size. The demographic profiles were also used as a nominal variable to classify the scale. In the third section, the survey provided a linear scale of the eight indicators to allow individual participants to assess their views. The linear scale was composed of seven levels of agreement (1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = neutral, 5 = somewhat agree, 6 = agree, and 7 = strongly agree). The second factor (environmental concern) targets the consumers' behavior towards green packaging and the reduction in plastics. Consumers with a large environmental concern are likely to aim for green food and green packaging.

### *3.3. Data Analysis and Statistical Measures*

Before scrutinizing the data, we addressed common method variance (CMV) in this study. CMV occurs when variables in the same model are estimated employing the same technique or derived from the same source. The findings have systematic error variances among those variables and might have biased the assessed relationships [68]. This study gathered the data, including dependent and independent variables from the same respondents, thus exhibiting a CMV risk. We applied Harman's single factor test following Podsakoff et al. [68]. The results disclosed the cumulative variance of 49.835 percent (less than the 50% threshold), which further assured the absence of CMV.

The study's data analysis used the structural equation modeling (SEM) method. SEM encompasses such diverse statistical techniques as path analysis, confirmatory factor analysis (CFA), and causal modeling with latent variables. SEM was executed to estimate the model's estimation in two steps [69]. Step 1 validates the CFA model to measure each indicator's relationship and its variable, whether valid and reliable. This step requires appraising the goodness of fit (GOF), convergent validity, and discriminant validity. As for the GOF and convergent validity conditions, the designated thresholds included CMIN/df < 3.00, CFI > 0.90, RMSEA < 0.10, AVE > 0.50, and CR > 0.70 [17]. As for the discriminant validity condition, this paper studied issues of multicollinearity and the identity matrix of the indicator variables. The study used Pearson's moment correlations with the threshold <0.80 to check multicollinearity [70]. The Kaiser–Mayer–Olkin (KMO) and Bartlett's sphericity tests were employed to check an identity matrix [71]. These criteria were all satisfied. Step 2 evaluates the structural model to measure whether the entire structure is reliable, including the estimation of GOF. The designated fit indices thresholds were CMIN/df < 3.00, CFI > 0.90, and RMSEA < 0.10. In step 3, to examine the segment's moderating effect on the structural relationship, we conducted a multi-group moderation analysis [72]. This step performs a measurement invariance (MI) analysis utilizing the segment as a moderator dividing the sample into two groups (non-green consumer and green consumer) and then performing a z-test for the difference between the two groups' factor loadings. A z-test was used for the multi-group analysis in SEM [20,73,74]. The results of the statistical analysis are discussed in the next section.

## 4. Result of the Study

### *4.1. Pilot Study and Market Segmentation*

The *t*-test result showed questions that were significant at <0.05. The target was classified into segments by analyzing segments of FRL questions and assessing the segments through *t*-tests. The findings revealed that there are two segments, including (1) non-green consumers and (2) green consumers. These names follow the characteristics of each cluster inferred from the descriptive characteristics. The test results demonstrated significant differences between the means of the FRL scores of the segment 1 and 2 consumers, with all the *p*-values below 0.01. The overall means of segment 1 ranged from 2.65 to 3.65, and segment 2 ranged from 4.14 to 5.75. Segment 1 comprised those who do not care about

reading food labels. Their decision to purchase food depends on their preferences; they are pleased with inexpensive food without regard to its nutritional value or environmental friendliness. People in segment 2 are typically concerned with food label information and base their food consumption decisions on criteria such as price, food nutrition, and environmentally friendly or "green" food products.

According to Table 1, there was a sample size of 100 in segment 1. The sample consists of 41 males and 105 females. Most of the participants were age below 21 years old and were college students, and had earned less than THB 15,000 per month. In segment 2, there was a sample size of 358. The composition of sample size consists of 59 males and 253 females. Most of the participants were aged between 22 and 38 years old and were college students, earning less than THB 15,000 per month.

**Table 1.** Descriptive statistics for demographic profile.

| Demographic Variable | Categories | Segment 1 (Non-Green Consumers) | | Segment 2 (Green Consumers) | | Total | | Significance Chi-Square Test |
|---|---|---|---|---|---|---|---|---|
| | | *n* | % | *n* | % | *n* | % | |
| Segment size | | 146 | 31.9 | 312 | 68.1 | 458 | 100.0 | |
| Gender | Male | 41 | 9.0 | 59 | 12.9 | 100 | 21.8 | 0.027 |
| | Female | 105 | 22.9 | 253 | 55.2 | 358 | 78.2 | |
| Age | <21 | 75 | 16.4 | 147 | 32.1 | 222 | 48.5 | 0.364 |
| | 22–38 | 69 | 15.1 | 151 | 33.0 | 220 | 48.0 | |
| | 39–53 | 1 | 0.2 | 8 | 1.7 | 9 | 2.0 | |
| | >54 | 1 | 0.2 | 6 | 1.3 | 7 | 1.5 | |
| Income | <15,000 | 125 | 27.3 | 248 | 54.1 | 373 | 81.4 | 0.481 |
| | 15,001–20,000 | 16 | 3.5 | 47 | 10.3 | 63 | 13.8 | |
| | 20,001–25,000 | 1 | 0.2 | 6 | 1.3 | 7 | 1.5 | |
| | 25,001–30,000 | 2 | 0.4 | 3 | 0.7 | 5 | 1.1 | |
| | >30,000 | 2 | 0.4 | 8 | 1.7 | 10 | 2.2 | |
| Family size | 1 | 3 | 0.7 | 4 | 0.9 | 7 | 1.5 | 0.001 |
| | 2 | 52 | 11.4 | 61 | 13.3 | 113 | 24.7 | |
| | 3 | 68 | 14.8 | 200 | 43.7 | 268 | 58.5 | |
| | 4 | 23 | 5.0 | 47 | 10.3 | 70 | 15.3 | |
| Tasted experience | Ever | 115 | 25.1 | 275 | 60.0 | 390 | 85.2 | 0.009 |
| | Never | 31 | 6.8 | 37 | 8.1 | 68 | 14.8 | |
| Consume in the future | Will | 136 | 29.7 | 295 | 64.4 | 431 | 94.1 | 0.553 |
| | Will not | 10 | 2.2 | 17 | 3.7 | 27 | 5.9 | |

Source. Data adapted from authors (2022).

There are two primary steps to perform a statistical test on structural equation modeling (SEM): measurement and structural models [69].

### *4.2. Measurement Model*

The measurement model was examined using CFA. The model was determined for internal consistency, reliability, convergent validity, and discriminant validity in this context. All constructs were connected with covariances to perform CFA [17]. The indicator must involve each construct before testing. In order to enhance the goodness of fit (GOF) relationship, we allowed covariances among errors within the same construct.

#### 4.2.1. The Goodness of Fit (GOF)

Table 2 illustrates the GOF measures and their thresholds. The results were acceptable in that all the measures passed the required threshold. CMIN/df (2.649), Tucker–Lewis

index (TLI; 0.944), comparative fit index (CFI; 0.951), incremental fit index (IFI; 0.951), and root mean square error of approximation (RMSEA; 0.060) passed the designated threshold.

**Table 2.** The Goodness of Fit of Measurement Model.

| Fit Index | Value | Threshold | Assessment |
|---|---|---|---|
| *p*-value | 0.00 | | Acceptable |
| CMIN/df | 2.649 | <3.00 | Passed |
| TLI | 0.944 | >0.90 | Passed |
| CFI | 0.951 | >0.90 | Passed |
| IFI | 0.951 | >0.90 | Passed |
| RMSEA | 0.060 | <0.10 | Passed |

Source. Data adapted from authors (2022). Note. TLI = Tucker–Lewis index; CFI = comparative fit index; IFI = incremental fit index; RMSEA = root mean square error approximation.

#### 4.2.2. Convergent Validity

Convergent validity was estimated by comparing the model results with the fit index threshold. The average variance extracted (AVE) [75] and composite reliability (CR) [17] were determined. The thresholds for AVE and CR are 0.50 and 0.70, respectively. Table 3 shows the suggested thresholds of the convergent validity measures, and the calculated indicators are as follows.

**Table 3.** Convergent validity.

| Construct | Indicator | Loading | *p*-Value | AVE | CR |
|---|---|---|---|---|---|
| Self-efficacy (SE) | SE1 to 5 | 0.757 to 0.939 | *** | 0.761 | 0.941 |
| Environmental concern (EC) | EC1 to 5 | 0.791 to 0.937 | *** | 0.772 | 0.944 |
| Utilitarian eating value (UT) | UT1 to 5 | 0.728 to 0.873 | *** | 0.660 | 0.906 |
| Perceived price (PP) | PP1 to 4 | 0.783 to 0.906 | *** | 0.730 | 0.915 |
| Attitude (AT) | AT1 to 5 | 0.870 to 0.932 | *** | 0.810 | 0.955 |
| Perceived behavioral control (PC) | PC1 to 3 | 0.845 to 0.913 | *** | 0.772 | 0.910 |
| Subjective norm (SN) | SN1 to 5 | 0.741 to 0.884 | *** | 0.690 | 0.917 |
| Purchase intention (PI) | PI1 to 4 | 0.898 to 0.955 | *** | 0.861 | 0.961 |

Source. Data adapted from authors (2022). Note. AVE = average variance extracted; CR = composite validity. *** significant at <0.001.

Table 3 shows the SE (self-efficacy), EC (environmental concern), UT (utilitarian eating value), PP (perceived price), AT (attitude), PC (perceived behavioral control), SN (subjective norms), and PI (purchase intention) constructs nicely passed the convergent validity criteria when comparing the calculated measures with their thresholds.

#### 4.2.3. Discriminant Validity

Discriminant validity is the level to which two or more theoretically similar constructs are different. This is assessed by comparing the square root AVEs (on diagonal) with the correlations of the related matrices [74]. According to Table 4, each AVE's square root was higher than the off-diagonal correlation coefficients, recommending that all constructs could theoretically measure the different constructs, and this result was acceptable.

**Table 4.** Discriminant validity.

| Construct | PI | SN | PC | AT | PP | UT | EC | SE |
|---|---|---|---|---|---|---|---|---|
| PI | 0.928 | | | | | | | |
| SN | 0.798 | 0.830 | | | | | | |
| PC | 0.636 | 0.707 | 0.790 | | | | | |
| AT | 0.824 | 0.844 | 0.776 | 0.900 | | | | |
| PP | 0.573 | 0.612 | 0.775 | 0.679 | 0.854 | | | |
| UT | 0.639 | 0.650 | 0.708 | 0.717 | 0.730 | 0.812 | | |
| EC | 0.579 | 0.532 | 0.610 | 0.642 | 0.666 | 0.661 | 0.879 | |
| SE | 0.586 | 0.577 | 0.633 | 0.640 | 0.643 | 0.703 | 0.684 | 0.720 |

Source. Data adapted from authors (2022).

### *4.3. Primary Structural Model*

After examining the measurement model, we connected all the constructs to develop the structural model according to the purpose model in Figure 1. Furthermore, we studied the variables via the main objective structural model. The results of most of the goodness of fit (GOF) criteria show how constructs support each other. All GOF indices were satisfied with the thresholds of [76] (see Table 5).

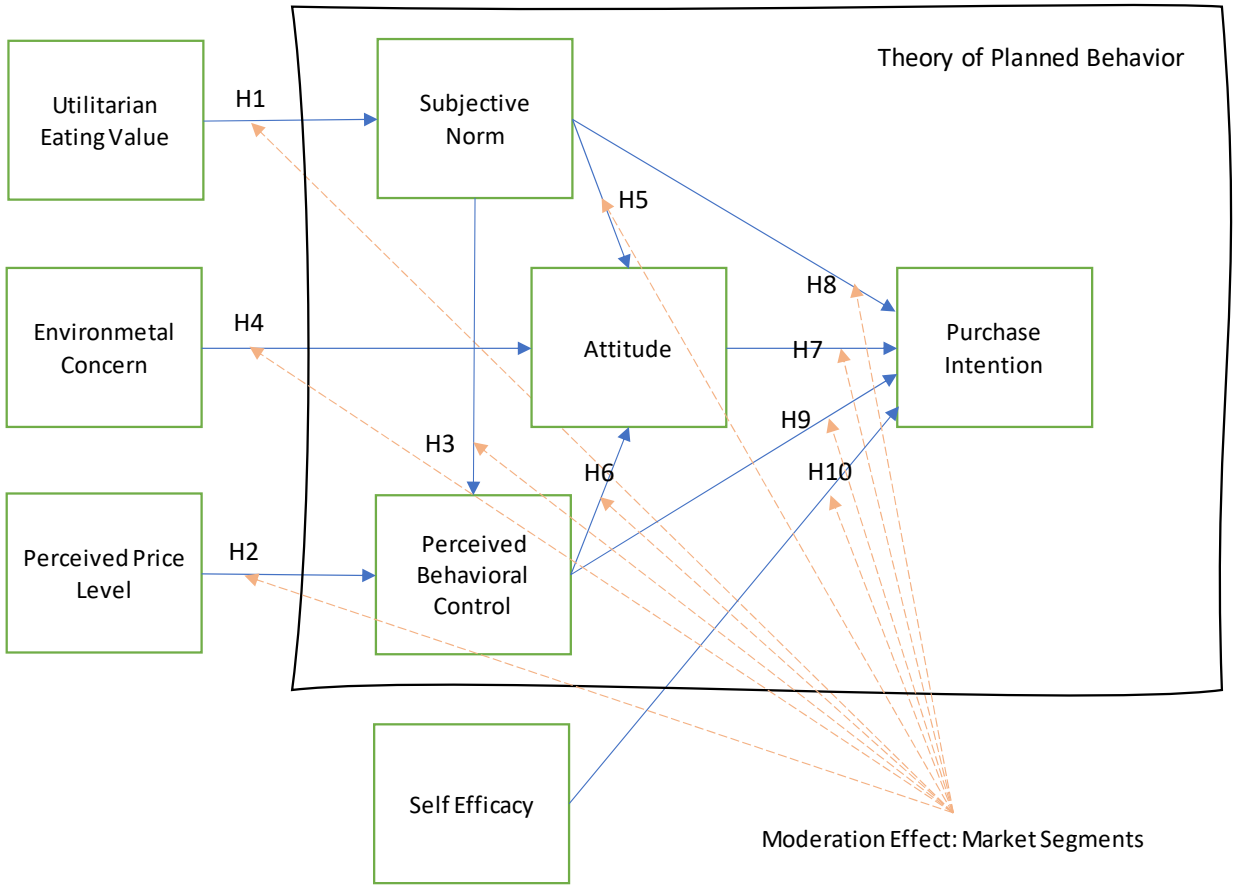


**Figure 1.** Proposed Model. Source: Figure created by authors (2022).

**Table 5.** The GOF of the Structural Model (SEM).

| Fit Index | Value | Threshold | Assessment |
|---|---|---|---|
| *p*-value | 0.00 | | Acceptable |
| CMIN/*df* | 2.679 | <3.00 | Passed |
| TLI | 0.943 | >0.90 | Passed |
| CFI | 0.949 | >0.90 | Passed |
| IFI | 0.949 | >0.90 | Passed |
| RMSEA | 0.061 | <0.10 | Passed |

Source. Data adapted from authors (2022).

According to Table 6 and Figure 2, the structural model's test results supported H1 to H8 and H10 at the significant level of 0.001 or less, whereas H9 was not supported. The relationships among the constructs were highly significant in statistics. The researchers established the analysis by considering the following constructs: utilitarian eating value, perceived price, subjective norm, environmental concern, perceived behavioral control, attitude, self-efficacy, and purchase intention adapted to the theory of planned behavior [17,23]. H1 was supported first, indicating that the utilitarian eating value had positive influences on subjective norms with a standardized factor loading of 0.695.

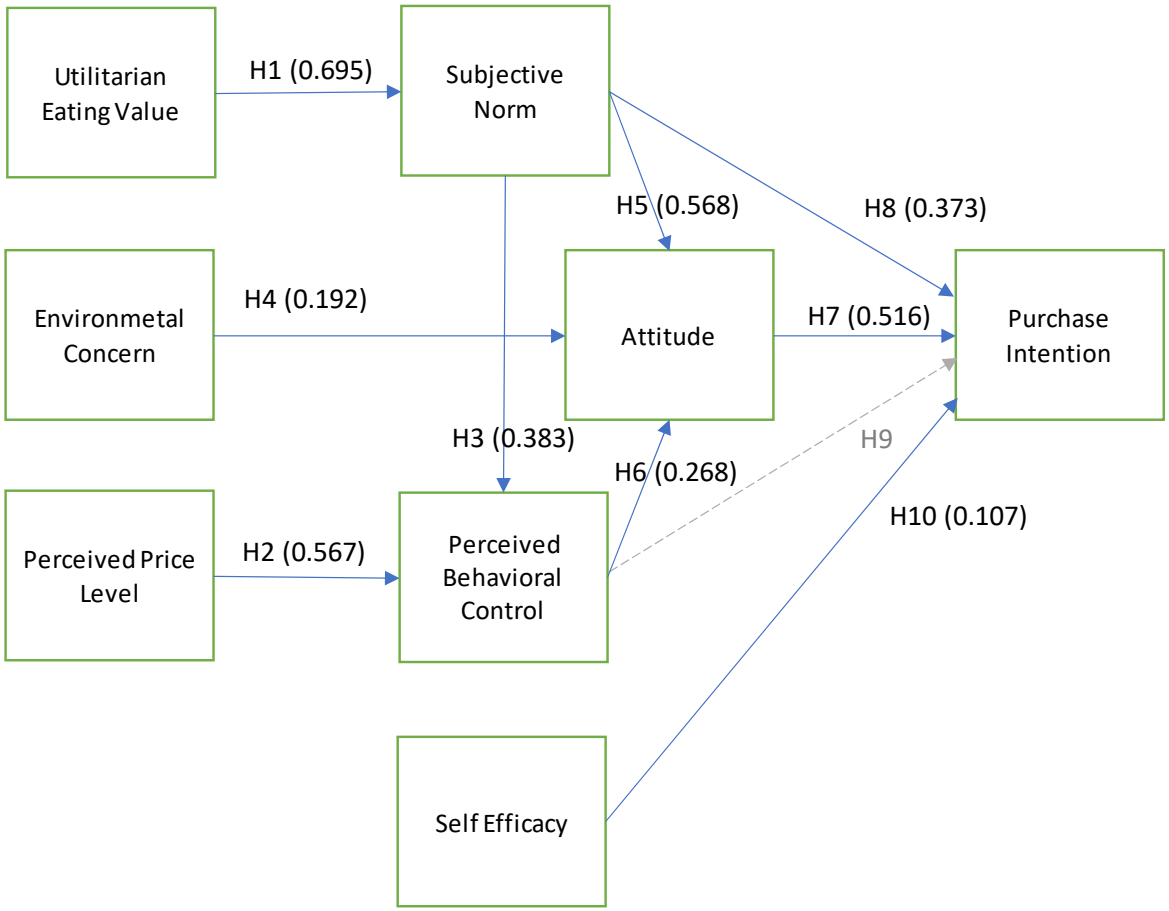


**Figure 2.** The structural model. Source. Figure created by authors (2022).

**Table 6.** Test results from the structural model.

| Path | Relationships | Standardized Estimate | Result |
|---|---|---|---|
| H1 | UT → SN | 0.695 *** | Supported |
| H2 | P → PC | 0.567 *** | Supported |
| H3 | SN → PC | 0.383 *** | Supported |
| H4 | EC → AT | 0.192 *** | Supported |
| H5 | SN → AT | 0.568 *** | Supported |
| H6 | PC → AT | 0.268 *** | Supported |
| H7 | AT → PI | 0.516 *** | Supported |
| H8 | SN → PI | 0.373 *** | Supported |
| H9 | PC → PI | −0.094 | Rejected |
| H10 | SE → PI | 0.107 ** | Supported |

Source. Data from this study (2022). Note: *** Significant at <0.001, ** Significant at <0.01.

H2 was supported, which predicts that perceived prices had a significant effect on perceived behavioral control with a standardized factor loading of 0.567.

H3 was also supported, recommending that subjective norms directly affected perceived behavioral control with a standardized factor loading of 0.383. H4 predicted that environmental concern significantly influences consumers' attitudes toward green food products; it was also supported (standardized estimate = 0.192). This study's findings recommended that Thai consumers are aware of environmental defense issues and obtain their responsibilities towards environmental defense. Therefore, customers with pro-environmental behavior have a positive attitude towards green food production.

H5 was also supported, implying that the subjective norm directly affects consumers' attitudes toward green food consumption with a standardized factor loading of 0.568. Further, H6 was supported, which suggested that perceived behavioral control positively impacts consumers' attitudes toward green food products with a standardized factor loading of 0.268. H7, regarding the positive impact of consumers' attitudes on their purchase intention for green food consumption, was supported (standardized estimate = 0.516). H8 was also supported and confirmed that subjective norms significantly influenced green food purchase intention with a standardized factor loading of 0.373.

H9 was rejected, which stated that perceived behavioral control is not influenced by purchase intention in consumer buying behavior in the green food industry. Finally, H10 was supported, claiming that self-efficacy positively affects purchase intention for green food production with a standardized factor loading of 0.107.

### *4.4. Multigroup Moderation Analysis (MGA)*

#### 4.4.1. Measurement Invariance

Measurement variance (MI) is a method to demonstrate the difference between two groups of the measurement model, whether different or not [72]. Multigroup analysis helps us understand the constructs of questionnaires in the same way by assessing the responses between two groups (non-green consumers and green consumers). According to the measurement model (CFA), the multi-group analysis reveals the following: (1) configural invariance (unconstrained model), (2) metric invariance (equal factor loading), and (3) scalar invariance (equal intercept). If only configural invariance and metric invariance are satisfied, then partial MI is supported, allowing one to compare factor loadings between two groups. Nevertheless, if partial MI detains and scalar invariance is accepted, then full MI is formed, which lets us compare factor loadings between them. Table 7 exhibits the assessment of MI successively performed after the CFA model.

**Table 7.** Measurement Invariance.

| Fit Index | Configural Invariance | Metric Invariance | Scalar Invariance | Threshold |
|---|---|---|---|---|
| *p* value | 0.00 | 0.00 | 0.00 | |
| CMIN/*df* | 1.967 | 1.931 | 1.929 | <3.00 |
| TLI | 0.934 | 0.936 | 0.936 | >0.90 |
| CFI | 0.942 | 0.943 | 0.941 | >0.90 |
| IFI | 0.943 | 0.944 | 0.942 | >0.90 |
| RMSEA | 0.046 | 0.045 | 0.045 | <0.10 |
| Assessment | Acceptable | Acceptable | Acceptable | |

Source. Data from this study (2022).

According to Table 7, the CMIN/*df* values of configural invariance, metric invariance, and scalar invariance passe the threshold of <3.00. Other fit indices such as TLI, CFI, IFI, and RMSEA of configural invariance, metric invariance, and scalar invariance are considered also pass the thresholds of >0.90, >0.90, >0.90, and <0.10, respectively. Therefore, full MI was established, allowing us to conduct further analysis in the next section.

#### 4.4.2. Z-Test for Loading Differences

We next used critical ratio difference to gather z-test results by comparing factors loading between two segments (1. non-green consumers and 2. green consumers) from structural models [19]. In the multi-group analysis, we used the pairwise parameter comparison to estimate each parameter's critical ratios' difference to test differences in statistically significant. The factor loadings are significantly different between two segments (1. non-green consumers and 2. green consumers) when the value of the critical ratio is more than the threshold of 1.96. The paths of H1, H2, H3, H5, H6, H7, and H8 were statistically significant for non-green consumers. The paths of H1, H2, H3, H4, H5, H6, H7, and H8 were statistically significant for green consumers.

Table 8 and Figure 3 demonstrate that the paths of H1, H2, H3, H4, H5, H6, H7, and H8 for both segments are statistically significant (see the stars), which is in line with the results shown in Table 6. The paths of H9 and H10 for both segments were not statistically significant; they are also consistent with the findings in Table 6. However, only two path differences exist in H4 and H5 (see the stars under the critical ratio difference column).

**Table 8.** Test result from loading differences. (N = 458, Non-green Consumers = 146, Green Consumers = 312).

| Path | Relationships | Standardized Loading | | Critical Ratio Difference |
|---|---|---|---|---|
| | | Non-Green Consumers | Green Consumers | |
| H1 | UT → SN | 0.682 *** | 0.669 *** | \|−0.453\| |
| H2 | P → PC | 0.640 *** | 0.536 *** | \|−0.715\| |
| H3 | SN → PC | 0.314 *** | 0.418 *** | \|1.333\| |
| H4 | EC → AT | 0.046 | 0.272 *** | \|2.431\| * |
| H5 | SN → AT | 0.764 *** | 0.404 *** | \|−3.643\| * |
| H6 | PC → AT | 0.194 * | 0.371 *** | \|1.399\| |
| H7 | AT → PI | 0.547 ** | 0.543 *** | \|−0.004\| |
| H8 | SN → PI | 0.325 * | 0.360 *** | \|0.132\| |
| H9 | PC → PI | 0.119 | 0.109 | \|−0.470\| |
| H10 | SE → PI | −0.065 | −0.127 | \|−0.172\| |

Source. Data adapted from authors (2022). Note: *** *p* value < 0.001, ** *p* value < 0.01, * *p* value < 0.05.

The critical ratio value of H4 is slightly greater than the threshold, suggesting that segment 1 and segment 2 have different perspectives on environmental concerns and green attitudes. This result is consistent with the existing literature [28,56]. Additionally, environmental concerns do not affect (loading = 0.046 and insignificant) attitudes toward green labeling products for the non-green consumer segment because they do not think that

environmental issues are caused by human consumption. Some of them are unnoticeable environmental issues. Thus, a non-green consumer who is unaware of an environmental problem will not have a good attitude toward green food. In contrast, segment two (green consumers) weigh environmental concerns as particularly important and are willing to improve their consumption actions. They attempt to find the resolution of environmental issues. Hence, a green consumer deeply concerned about the environment will have a positive attitude toward green labeling.

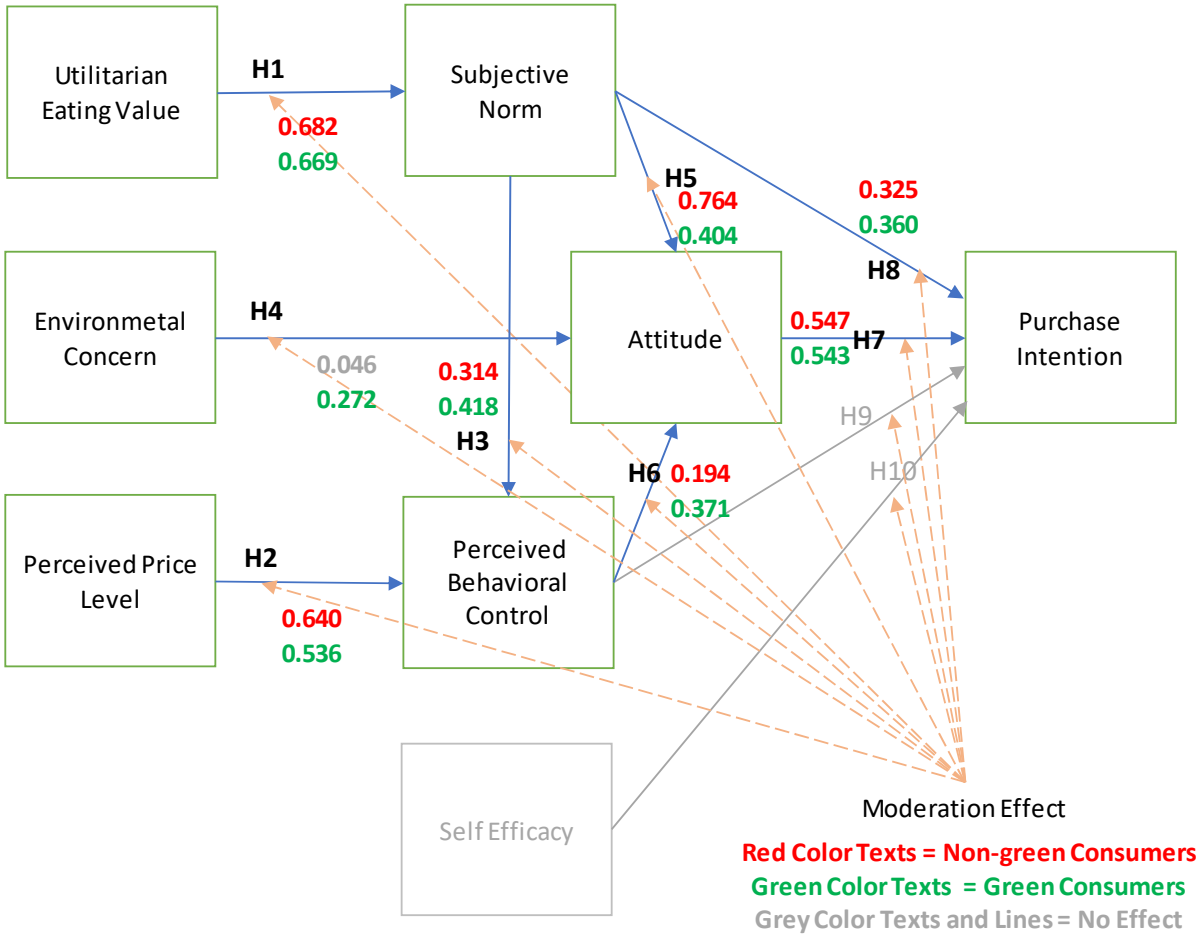


**Figure 3.** Moderation Effects and Structural Model. Source. Figure created by authors (2022).

H5 demonstrates a high level of critical ratio at $|-3.643|$, which means that the paths of segments 1 and 2 are significantly different. According to the standardized loadings, non-green consumers' subjective norms impact their attitudes more than green consumers. Non-green consumers are more likely to consume any food regardless of environmental attitude toward green food production because their consumption choice is influenced mainly by friends. However, green consumers constantly consume green labeling as usual. This is sometimes due to their environmental awareness—communities can impact dietary choices. This finding is in line with the existing literature [32].

## 5. Discussion

We found that the utilitarian eating value had positive influences on the subjective norm, consistent with previous studies regarding green food production [48]. The results imply consumers prefer functional attributes of green food products concerned with environmental friendliness and would like to receive social acceptance when making food decisions before purchasing. Customers feel more pressure from other peers to purchase green food products. They may become more engaged in purchasing green food prod-

ucts [51]. We found support that perceived prices had a significant effect on perceived behavioral control. This confirms previous research findings on the positive influence of price on perceived behavioral control [5,52]. The premium price increases the perceived behavioral control and purchase intention for green food. Consumers believe that the higher price of green products represents a higher quality and functional benefit [55]. We discovered that subjective norms directly affected perceived behavioral control. This result suggested that perceived social pressure from others can form a consumer to act an eco-friendly behavior. This behavior relates to an environmentally friendly lifestyle in their consumption pattern of green food products. We found that environmental concerns significantly influence consumers' attitudes toward green food products. The findings are consistent with previous studies by Zhu et al. [56]. We identified that the subjective norm directly affects consumers' attitudes toward green food consumption. This finding revealed that others' perceived social pressure could establish an individual's attitude toward eco-friendly food consumption. Furthermore, we found that perceived behavioral control positively impacts consumers' attitudes toward green food products. This finding implied that the perceived behavioral control in eco-friendly lifestyle increased and attitude toward green food products became more positive [40]. Additionally, we detected the positive impact of consumers' attitudes on their purchase intention for green food consumption. Thus, buyers with a positive attitude toward eco-friendly food packaging are more willing to purchase those products [24]. We found evidence that subjective norms significantly influenced green food purchase intention. The results indicated that subjective norm emerged as the strongest among the other significant factors of the purchase intention of eco-friendly packaged products. This reflects that Thai consumers received peer pressure from others about the environmental protection issue. Thus, consumers desire social acceptance and moral responsibility towards the environment, which influences their food purchasing choices. We discovered that perceived behavioral control is not influenced by purchase intention in consumer buying behavior in the green food industry. It contradicts the theory of planned behavior hypothesis proposed by Ajzen [17,23], which implied that purchase intention was not dependent on the consumer's perceived behavioral control. We identified that self-efficacy positively affects purchase intention for green food production. This result revealed that self-efficacy in green food consumption might encourage decision-making of purchase intention in green food production.

## 6. Research Implications

The following suggestions were presented to three main stakeholders: producers, consumers, and policymakers. Green labeling is an essential tool to disclose goods and services' environmental and social performance from a green-producer viewpoint. Thus, a producer can use green labeling as a benchmark for the enhancement and competitiveness of their products. Green food manufacturing companies and green packaging producers should create green labeling merchandise because it can influence the purchase decisions of consumers who are genuinely concerned about environmental issues. Marketers and research and development (R&D) teams would directly benefit from this research by receiving and understanding consumers' buying behavior and consumer types in the potential market for green food products and green packaging.

Moreover, this research can help consumers understand more about green food and green labeling because green labeling offers consumers information regarding the green components of the products. This information is a form of increased quality evaluation of goods and services. The green consumer can use green labeling as an essential factor in making a purchasing decision. With the help of green labeling, consumers can target to purchase green food and green packages.

Furthermore, this research can be a practical tool for estimating and improving Thailand's sustainable foods and packages production from a policymaker's perspective. Policymakers must be aware of the importance of green labeling and other green food/package production by using green labeling as a complementary tool to generate food producers'

motivations to produce eco-friendly food products and green packages. Moreover, Thai policymakers should create an environmental awareness campaign to inform Thai consumers of the benefits of consuming green labeling food. These policies can encourage them to produce and purchase more green foods and packages.

In addition to the described practical implications, there are theoretical implications. This research revealed relationships among consumer attitudes and marketing terms interpreted by consumer perceptions and behavioral intention. The utilitarian eating value has a positive effect on subjective norms. Perceived prices have a significant effect on perceived behavioral control. Subjective norms have a positive impact on perceived behavioral control. Environmental concerns, the subjective norm, and the perceived behavioral control significantly affect consumers' attitudes towards green food. Consumers' attitudes, the subjective norm, and self-efficacy have a positive impact on the purchase intention for green food consumption. These research findings provide evidence for the theory of planned behavior. The subjective norm and attitude of consumers can be used to predict consumer behavior towards the purchase intention of green food.

## 7. Limitations of the Study

Thus, this study's information is insufficient to support the generalized market because we only focused on green food products, which are particular in the market compared with general food. Future research may apply other antecedent variables to the current structural model, such as hedonic eating value, to understand consumers' experiences. Moreover, it may change the consumer segment's moderator to a more varied segment such as age.

## 8. Conclusions

Environmental awareness and consumer behavior have changed dramatically in recent years. Consumers have raised their environmental awareness and adjusted their consumption behavior to reduce overall environmental impacts by using more eco-friendly products and services. Thus, we analyzed market segmentation by collecting data based on the food-related lifestyle criteria and performing cluster analysis. Consequently, we found consumers were divided into (1) non-green consumers and (2) green consumers. Moreover, this article aimed to examine the significant relationships among factors such as self-efficacy, environmental concern, utilitarian eating value, perceived price, attitude, perceived behavioral control, subjective norm, and purchase intention associated with consumer buying behavior and marketing segmentation of green foods. The hypothesized relationship was analyzed using a structural equation modeling (SEM) technique. This study formed ten hypotheses, as previously explained. We performed quantitative research based on structured questionnaires with 458 valid respondents consuming green food in Thailand. Most of the hypothesis test results supported the previously formed hypotheses except for H9, which concluded that perceived behavioral control was not related to their purchase intention of green food. Additionally, the multi-group analysis suggested that green consumers make their purchase decision of green foods based on their perception of environmental issues, whereas non-green consumers demonstrate no effects.

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**Institutional Review Board Statement:** Khon Kaen University Ethics Committee for Human Research, Khon Kaen University, Khon Kaen, Thailand, has made an agreement that this study has met the criteria of the Exemption Determination Regulations on 11 November 2021 (HE643227).

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** Not available.

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**Conflicts of Interest:** The authors declare no conflict of interest.

## Appendix A. Questionnaire

*Appendix A.1. Introductory Questions*

(a) Are you a regular buyer of green food?
(b) Are you a potential buyer of green food?

*Appendix A.2. Demographic Data of Respondents*

1. Gender
   Male, Female
2. Age (years)
   <21, 22–38, 39–53, >54
3. Income (Thai Baht)
   <15,000, 15,001–20,000, 20,001–25,000, 25,001–30,000, >30,000
4. Family size
   1, 2, 3, 4
5. Tasted experience
   Ever, Never
6. Consume in the future
   Will, Will not

*Appendix A.3. Customer Attitudes*

7. Customer Attitudes towards Green Eating Behavior
   - 7.1. Self—Efficacy [59,62] Do you trust farmers to grow a green plant for green food? Do you trust the procession of a producer to produce green food? Do you trust the government to manage green food policies? Do you trust the green food certificate from the certificate authority? Do you strongly trust green food?
   - 7.2. Environmental concern [28] Do environmental issues impact your purchasing decision on green food? Does your knowledge of environmental issues impact your purchasing decision on green food? Does your realization of environmental issues impact your purchasing decision on green food? Does the threat of environmental issues impact your purchasing decision on green food? Do the government policies about environmental issues affect your responsibility to the environment?
   - 7.3. Utilitarian eating value [50,51] Is the price of green food reasonable? Do you rather consume only food that you had before and you know it is tasty? Does the food portion of green food can supply your hunger (per meal)? Do you like a variety of food recipes? Do you like a variety of green food recipes?
   - 7.4. Perceived price [52,53] Is the price of green food expensive? Is the price of green food reasonable? Is green food more expensive than normal food? Is the price of green food higher than you expected?
   - 7.5. Attitude [17,23] Does buying green food benefit your purchasing decision? Do you buy green food for your safeness? Do you demand to buy green food? Do you buy green food for a better quality of life? Are you interested to buy green food?
   - 7.6. Perceived behavioral control [17,23] Does it depend on your decision whether you buy green food or not? Do you believe that you could buy green food whenever you want? Do you have enough money, time, and a chance to buy green food?

7.7. Subjective norm [17,23] Do people around you support you to consume green food? Do people around you expect you to consume green food when you are at home? Do environmental groups influence your consuming decision about green food?

7.8. Purchase intention [17,23] Will you buy green food if it is available in the shop? Do you intend to buy green food? Do you want to buy green food? How possible is it that you will buy green food?

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