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Buying Behaviour towards Eco-Labelled Food Products: Mediation Moderation Analysis

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Abstract: This study aims to identify the determinants of eco-labelled food product buying behaviour in the Malaysian context. This research develops a comprehensive model proposing that ethical self-efficacy is the moderator, and TPB constructs are the mediators to test empirically. Data were gathered through a questionnaire survey method, and then structural equation modelling was used to analyse the data by AMOS software version 21. The study results confirmed that, besides TPB constructs (attitude, subjective norms, and perceived behavioural control), eco-labelling, perceived value, and self-efficacy affect buying intention. It was found that ethical self-efficacy moderates the relationship between perceived value and eco-labelled food product buying intention. The results also reveal that attitude, perceived behavioural control, and subjective norms mediate the association between environmental concern and eco-labelled food product buying intention. The research stresses the importance of environmental education from both the government and corporate initiatives regarding the path of environmentally conscious buying behaviour.

Keywords: buying behaviour; eco-labelled food products; ethical self-efficacy; theory of planned behaviour

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Citation: Alam, S.S.; Wang, C.-K.; Masukujjaman, M.; Ahmad, I.; Lin, C.-Y.; Ho, Y.-H. Buying Behaviour towards Eco-Labelled Food Products: Mediation Moderation Analysis. *Sustainability* **2023**, *15*, 2474. https://doi.org/10.3390/su15032474

Academic Editor: Flavio Boccia

Received: 14 October 2022
Revised: 17 December 2022
Accepted: 9 January 2023
Published: 30 January 2023

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1. Introduction

Eco-label systems have been established to make it easier to choose products that claim to be less environmentally hazardous. Eco-labels indicate that a product is superior to one that is not labelled in terms of environmental impact. Interventions aimed at permanently changing ecologically damaging behaviour have historically had minimal success among the general public [1]. As a result, research that uncovers characteristics that influence the frequency with which eco-labelled products are purchased is of interest.

Eco-labelling projects are gaining popularity and are proving to be an effective and high-profile environmentally friendly strategy [2]. This is a concerted effort that employs a distinctive emblem to tell shoppers about the environmental implications of purchasing a product [3]. This endeavour is a response to demonstrate the quality of production while also assisting in the transition of customer behaviour. In comparison to other commodities from competitors, the labelled goods are environmentally friendly, reminding consumers of the environmental effects of their use and enabling farmers to practise sustainable farming. Scholars urge that this eco-labelling scheme be implemented as part of the standard marketing strategy to help buyers and sellers communicate more effectively [4]. More than 3000 items and services had been registered in Malaysia's MyHIJAU Directory by the end of 2019 [5], exceeding the yearly target. Manufacturing and service, agriculture, energy, and water are among the industries where the eco-labelling initiative is being expanded.

There are a few research gaps to be addressed in this paper. Although there are various empirical studies on pro-environmental behaviour [6–8], green consumption, research on the buying intention of eco-labelled products is sparse [9,10]. Only one study, conducted in Sweden, focused on eco-labelled food products context [11]. In addition, there have been cross-cultural studies covering Western and Eastern cultures [12], Eastern cultures, emerging or evolving [13], and recently, limited cross-cultural research covering Western and Eastern cultures [14]. Only a few researchers have looked into this issue in developing countries [15,16]. In developing countries, particularly Malaysia, there is a scarcity of research on eco-labelled food product purchase behaviour. Despite increased consumer interest in eco-labelled food items, few researchers have examined the factors that influence purchasing eco-labelled food products in developing nations.

The extended TPB model has been used by the majority of researchers in the green product buying context [17–23], but there are still some limitations that need to be addressed [19]. Several researchers have extended TPB by including internal, psychological, environmental, and personal factors in the context of green product purchasing [24], but they have not looked into the possibility that other cognitive factors influence green purchasing behaviour [24], There is a scarcity of studied in the area of purchasing eco-labelled food products. Furthermore, the fundamental dependent variable in TPB is consumer intention, which reflects a person's willingness to behave in a particular way [25]. Other factors, such as environmental factors and other external factors, can mediate these associations, and behavioural intentions may not always translate into actual conduct [26]. Several prior studies on green purchasing behaviour concluded that buying intention could predict actual behaviour [27]. There is a disconnect between purpose and conduct, and these studies are only able to draw broad conclusions. Similarly, Laroche et al. [28] found that increased environmental concerns influence purchasers' consumption of eco-friendly products. Theoretically, buyers who care more about the environment would buy more green things than those who care less. Mostafa [29] disagreed with this approach, finding only a tenuous link between them.

This paper has made a unique addition to academia by filling the above-mentioned gap with an extended TPB model that incorporates cognitive constructs and external factors for improved explanatory power. The established scale and construct may be useful in the future study of poor countries, based on the results of the empirical test. As a result, the study's goal is to determine the factors of eco-labelled product purchasing behaviour in Malaysia. It will also look into the role of TPB constructs, including attitude, subjective norms, and perceived behavioural control in mediating the link between environmental concern and behavioural intention. It will investigate the function of ethical self-efficacy in moderating the relationships between perceived value and behavioural intention, attitude and behavioural intention, and subjective norms and behavioural intention.

2. Underpinning Theories

2.1. Theory of Planned Behaviour (TPB)

TPB is based on the well-known "Theory of Reasoned Action," which was created to represent the motivations behind acts [30]. TPB postulates that intention (one driver) is a superior guide for human action and that people routinely apply any present understanding [31]. TPB relates to a significant amount of related studies on beliefs, attitudes, behavioural intention, and behaviour in general. TPB investigates how diverse situational cognition influences a person's original purpose to act [25]. In general, a combination of attitude, subjective expectations, and perceived behaviour management drive a person's decision-making training. This social-psychological paradigm has been used by other researchers on a regular basis. Favourable and unfavourable attitudes have an impact on the purpose and conduct of such acts, which can help boost consumer engagement [22]. TPB believes that subjective standards, perceived behavioural control, and attitudes [25] are all based on behavioural purpose predicted by socio-cognitive factors.

2.2. Need for Extension TPB

Despite the fact that TPB is widely used and supported in social psychology for its frugal understanding of rational behaviour, scientists have suggested that the model might be enhanced by including a variety of actual causes [21]. Although TPB is a robust and competent model, according to Ajzen [25], it might be developed to improve explanatory power and add other predictor variables. The study by Paul et al. [10] focused on green product purchasing intentions, and it suggested that including relevant components in the TPB model could improve understanding and explanatory power. In actuality, TPB is a flexible model that can accommodate a variety of additional variables [22]. The TPB model can incorporate additional variables because of the extensive study history and context [6].

In different inclusion of constructs, Wang et al. [21] found the highest explanatory power (R^2) of 68%, adding perceived consumer effectiveness and environmental concern. On the other hand, Choi et al. [32] found the lowest explanatory power of 26.5%, including personal norms (Table 1). The studies mentioned in Table 1, did not use self-efficacy, perceived values, and eco-labelling. To measure the purchase behaviour of eco-labelled products, the TPB model was utilised as the conceptual model of this study. In parallel to the existing TPB construct (attitude, perceived behaviour control, and subjective norms), we included cognitive (perceived value, self-efficacy) and green contextual factors (environmental concern and eco-labelling) in the expectation that the explanatory power will be greatly enhanced.

Table 1. Empirical works on green buying behaviour.

Sources	Survey Method	Sample Size/Country	Analysis Tools	Additional Constructs beyond TPB	Dependent Variable/ R^2
[17]	Face-to-face interviews of people more than 23 of age.	400/ Turkey	SEM, AMOS	Environmentally friendly activities, overall image, willingness to pay, satisfaction, and loyalty	Green customer behaviour 0.411 Intention to use-0.457
[20]	Questionnaires from residents	552/ China	PLS SEM	Environmental concern	Intention- 0.567
[18]	Highly-educated consumers	372/ Iran	SEM-AMOS	Corporate Social Responsibility, Trust	Intention- 0.638
[19]	Online website survey	223/China	PLS-SEM	Cognitive factor: environmental concern	Intention 0.319
[21]	Questionnaire survey	324/ China	SEM AMOS	Perceived consumer effectiveness and environmental concern	Intention 0.68
[22]	Questionnaire survey	620/ India	SEM AMOS	Perceived value and willingness to pay the premium (WPP)	Actual buying behaviour
[23]	Web-based survey through Amazon's Mechanical Turk	400/ U.S.A.	SEM AMOS	Consumer's willingness to sacrifice for the environment	Intention —
[33]	Web-based survey among teenage respondents Via Qualtrics.com.	382/ U.S.A.	SEM LISREL	Environmentally focused attributes	Behavioural Intention —
[32]	Web-based survey consumers (faculty members)	428/among the U.S.A.	SEM AMOS	Personal norms of consumer	Green customer behaviour 0.265
[34]	Hotel guests	458/Taiwan	SEM-SPSS	Consumer's environmental protection consciousness	Green customer behaviour –
[6]	Web-based survey among consumers via My3q.com.	559/Taiwan	SEM-AMOS	Perceived moral obligation	Consumer intention –

Even though different examinations affirmed the association between buying intention and TPB constructs, very few of them utilized TPB variables (perceived behavioural control,

subjective norms, and attitude) as a mediator [35]. Ajzen [36] suggested that perceived behavioural control, subjective norms, and attitude could be utilized as reasonable mediators. Courneya et al. [35]. found partial mediation, while Altawallbeh et al. [37] revealed that TPB constructs mediate the association between additional external constructs and intention. Hence, these inconsistent results require us to prove TPB constructs as mediation. Furthermore, Droms and Craciun [38] used perceived behavioural control and the term self-efficacy (PBC) interchangeably, while researchers such as Parkinson et al. [39] used them separately. Both constructs reflect on external and internal factors, but it is questionable whether they reflect similarly or separately [39]. In this research, they are used as separate constructs, where PBC includes external and internal variables, whereas self-efficacy is internal, following Parkinson's [39] proposition.

3. Conceptual Model and Hypotheses Development

Using TPB as a base model, this study developed a conceptual model (Figure 1) where the constructs include perceived value, environmental concern, subjective norms, perceived behavioural control, attitude, ethical self-efficacy, behavioural intention, eco-labelling, and actual behaviour.

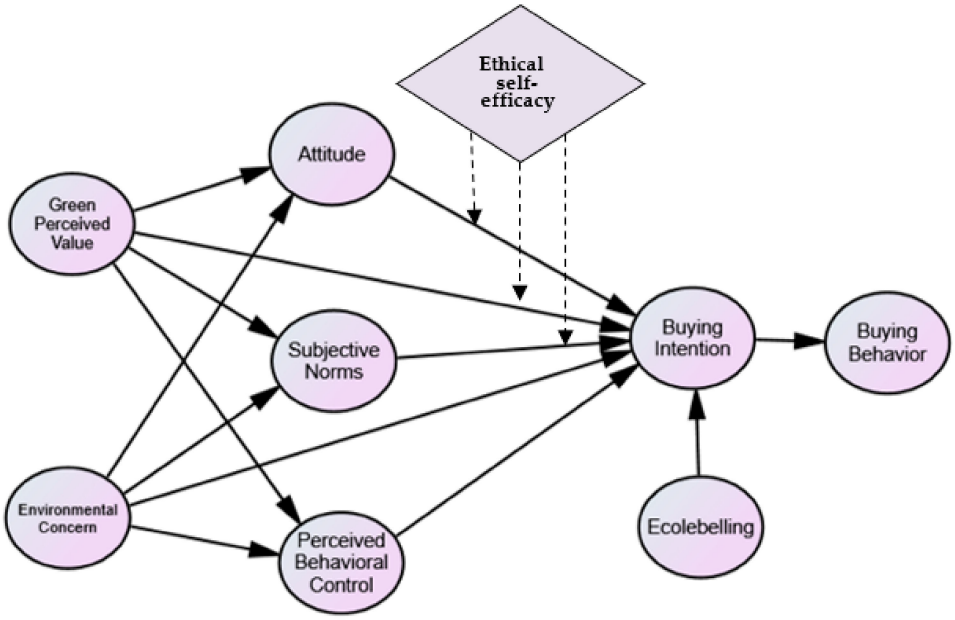


Figure 1. Conceptual Model of eco-labelled food products with the extension of TPB.

3.1. Green Perceived Value

Perceived value is the overall evaluation of purchasing goods and services [40]. Spreng and Patterson [41] defined green perceived value as "a consumer's overall appraisal of the net benefit of a product or service between what is received and what is given based on the consumer's environmental desires, sustainable expectations, and green needs." Another study confirmed that green perceived value has a significant effect on the green product's buying intention [42]. PV may come before attitude and the subjective norms that are exhibited by individuals who are affiliated with green products or services [43]. In addition, people's perceptions of their own behavioural control, which reflects both internal and external restrictions, are linked to the value they consider to have in their lives [43]. Liu et al. [44] proposed a relationship between ecological value with the attitude towards visiting green hotels and perceived behavioural control, which leads to the intention to visit green hotels. Meanwhile, Salehzadeh and Pool [45], Ahmed and Zhang [46], and Wei et al. [47] revealed that green perceived value is significantly linked with green online purchase intention. In the value–attitude–behaviour model, it was argued by the authors that perceived value affects buying intention through attitude [48]. Therefore, we proposed the following hypotheses:

Hypothesis (H1). *Green perceived value positively affects attitude.*

Hypothesis (H2). *Green perceived value positively affects buying intention.*

Hypothesis (H3). *Green perceived value positively affects subjective norms.*

Hypothesis (H4). *Green perceived value positively affects perceived behavioural control.*

3.2. Environmental Concern

Environmental concern is the individual consciousness regarding ecological deterioration. Suki [49] expressed that when an individual is furnished with knowledge and concern about the environment, it will urge them to show positive attitudes towards environmental products. The study of Yadav and Pathak [22] revealed that environmental concern positively and significantly affects attitude and intention to buy green products. Jaiswal and Kant [50] confirmed a significant association between environmental concern and buying intention and attitude toward India's green products. Another study extended the TPB model by including environmental concern as an additional construct, which positively and significantly affects buying intention, attitude, subjective norms, and perceived behavioural control [6]. Similar results were also found from the Study of Paul et al. [10], which confirmed there was a significant relationship between buying intention and all TPB constructs. Thus, the following hypotheses are proposed:

Hypothesis (H5). *Environmental concern affects attitude.*

Hypothesis (H6). *Environmental concern affects subjective norms.*

Hypothesis (H7). *Environmental concern affects perceived behavioural control.*

Hypothesis (H8). *Environmental concern affects buying intention.*

3.3. Effect of TPB Constructs on Buying Intention and Actual Behaviour

The research identified that attitude positively affects green buying intention. Different research [6,51] confirmed a positive association between attitude and behavioural intention. Various other researchers have recognized subjective norms as the significant construct in buying intention of halal food [52], intention to buy green products [53], and organic food purchase intention [54]. A considerable amount of research has confirmed a positive and significant association between perceived behavioural control and behavioural intention in different research contexts, such as organic foods [55], consumption of green products [10], and green hotels [51]. We assumed that the same situation would appear in this research. Thus, this research proposed the following hypotheses:

Hypothesis (H9). *Attitude affects buying intention.*

Hypothesis (H10). *Subjective norms affect buying intention.*

Hypothesis (H11). *Perceived behavioural control affects buying intention.*

3.4. Eco-Labelling

Eco-labels are considered essential tools in green marketing. Prieto-Sandoval et al. [56] stated that eco-labels are a multidimensional approach. Marketers can convey environmental benefits in many ways, and eco-labelling is one of them. Atkinson and Rosenthal [57] mentioned that eco-labels are information tools that provide information about the usage, disposal, consumption, and production of the products. In addition, numerous studies have shown that there is a favourable connection between eco-labels and the intention to make environmentally conscious purchases [58]. Travellers rely heavily on eco-labels

to guide their purchases of green goods [59]. Ecotourism destination market research conducted by Chi [59] found a positive correlation between ecolabeling and consumer propensity to make a purchase. Majeed et al. [60] found the same relationships. However, Mei et al. [61] and Sharaf et al. [62] did not find any relationship between eco-labelling and purchase intention in Malaysia. Thus, we intended to test the relationship again to obtain the validity of the result. Nowadays, consumers are very much concerned about their environment. Therefore, the chances of accepting eco-labelled food products are very high in this present situation. It is also relevant to this study, and therefore we proposed the following hypothesis:

Hypothesis (H12). *Eco-labelling positively affects buying intention.*

3.5. Behavioural Intention

Wang et al. [20] examined the association between attitude and intention, whereas Homburg et al. [63] examined self-reported behaviour. Due to a lack of behavioural data, a limited number of researchers examined the influence of intention on actual behaviour [64]. According to Ajzen [65], intentions are the direct construct of actual behaviour. Moreover, Zeithaml [66] opined that the mediation of intentions is widely researched, but the relationship with actual behaviour lacks confirmation. Wee et al.'s [67] study results reveal that buying intention significantly affects actual behaviour. Therefore, we proposed the hypothesis:

Hypothesis (H13). *Buying intention positively affects buying behaviour.*

3.6. Mediating Effect of TPB

A search of the literature revealed that very few studies had identified TPB constructs to mediate purchase intention. Recently, Altawallbeh et al. [37], Paul et al. [10], and Chen and Tung [68] examined the TPB constructs' subjective norms, perceived behavioural control, and attitude as mediating variables. The consequences of these investigations demonstrated that TPB constructs mediate the connection between purchase intention and environmental concern. Altawallbeh et al. [37] revealed that TPB constructs mediate the connection between behavioural intention and external variables. Thus, the present examination considered TPB constructs to have a mediating role in the connection between behavioural intention and environmental concern. The present study considered Saleem and Gopinath's [69] investigation, which proposed that environmental concern influences behaviour and intention through subjective norms, perceived behavioural control, and attitude. The following hypotheses are proposed:

Hypothesis (H14). *There is a mediating effect of attitude on the association between environmental concern and buying intention.*

Hypothesis (H15). *There is a mediating effect of subjective norms on the association between environmental concern and buying intention.*

Hypothesis (H16). *There is a mediating effect of perceived behavioural control on the association between environmental concern and buying intention.*

3.7. Moderating Role of Ethical Self-Efficacy

Ethics denotes an individual's moral principles that govern their behaviour. Self-efficacy, as part of social cognitive theory, refers to "people's beliefs about their capabilities to exercise control over their own level of functioning and over events that affect their lives" [70]. Purchasing an eco-labelled product is a kind of ethically attached purchase decision as people have responsibilities to safeguard their environment. When a consumer with a high level of ethical self-efficacy is confronted with an ethical consumption scenario, he or she will demonstrate disciplined behaviour in order to adhere to moral

standards, despite the moral intensity of the circumstance. Researchers such as Jaradat and Imlawi [71] proposed that self-efficacy moderates the association between subjective norms and behavioural intention to use nursing mobile decision support systems. Meanwhile, Doanh [72] projected that entrepreneurial self-efficacy moderates the relationship between entrepreneurial attitude and entrepreneurial intention. Similarly, the researcher Zainal et al. [73] assumed that there is a moderating role of self-efficacy between attitude and behaviour in cybersecurity awareness. Wang et al. [74] found a moderating effect of ethical self-efficacy between perceived value and purchase intention of illegal music files and online content services, respectively. Having only attitude may not translate into intention where ethical self-efficacy consolidates the propensity to act. Likewise, external influence may completely form intention when his/her self-efficacy strengthens the bonding in between. Thus, the following hypotheses are proposed:

Hypothesis (H17). *Ethical self-efficacy moderates the association between perceived value and buying intention.*

Hypothesis (H18). *Ethical self-efficacy moderates the association between attitude and buying intention.*

Hypothesis (H19). *Ethical self-efficacy moderates the association between subjective norms and buying intention.*

4. Research Design

4.1. Sample and Method

The present study employed the cross-sectional survey method to gather data by distributing questionnaires among young working people at three major shopping malls in Malaysia. Those shopping malls were located in Klang Valley. Youth in Malaysia's cohort make up 43 percent of the total population, and they are the main target market for the green movement and are still under research, specifically regarding attitudes toward environmental issues [75]. On the other hand, young people have a strong desire for green products that meet their needs. Therefore, it is likely that they will become regular buyers in the retail industry. The justification for selecting the Klang valley was that it is a densely populated area and is viewed as urbanized. Furthermore, the Klang valley is well equipped with a higher buying capacity than other states in Malaysia. The data were collected through a questionnaire survey, which was distributed physically in shopping malls, and participants were asked to fill out the questionnaires and drop them in the box at their convenience. We approached respondents through a week-long campaign in each mall during February 2022. Along with the questionnaire, we enclosed a consent form where we spelt out the purpose of this study and mentioned that the survey was only for academic purposes (Supplementary Materials). No personal information would be disclosed. In consideration, we offered 20 participants a gift voucher (RM 30) with a lottery system.

The current study adopted the G*power program priori test to ascertain the sample size adequacy. As set out in Cohen's proposal [76], the suggested samples were 178 for eleven independent constructions or predictors (F2 = 0.15 for effect size, $\alpha = 0.05$ for error type one, and $\beta = 0.20$ for error type two). Barclay et al. [77] suggest thumb rules for sampling as 10, multiplied by the highest number of formative indicators applied. Thus, this study needed 360 respondents for its 36 items. Yet, to mitigate potential complications from a small sample size, we approached 612 respondents, though only 505 questionnaires were found to have correct responses in all sections and the other 107 questionnaires were incomplete, or duplicated in a few cases. The non-probability convenience technique was used in this study. It was a feasible option because of the expenses and comfort in acquiring enough respondents.

Overall, a large part of the respondents was female (60.56%); as expected, 25–35 years-of-age respondents were dominant (52%), followed by the age group of 35–45 years (27%).

The Chinese were the primary response givers of the total respondents (51.65%), while the next group was Malays (44.35%). The majority of the respondents were married (65%), and the others were single (35%). The majority of the respondents worked in the private sector (61%), while 30% of them worked in the public sector. The majority of respondents were Muslim (58%) in terms of religion, and the next were Buddhist (17%) (Table 2). In addition, the highest portion of respondents had diploma degrees (28%), followed by undergraduate education (27%) and master's degrees (14%).

Table 2. Demographic Profile (N = 505).

Aspects	Classification	%	Aspects	Classification	%
Gender	Male	39.40	Marital status	Married	65.0
	Female	60.60		Single	35.0
	Total	100		Total	100
Age	25 to 35 years	52.0	Educational level	SPM/O-Level	8
	35–45 years	27.0		STPM/A-Level	20
	45–55 years	14.0		Diploma	28
	Above 55 years	8.0		Undergraduate	27
	Total	100		Masters	14
Occupation	Public sector	30.0		PhD	3
	Private sector	61.0		Total	100
	Self-employed	09.0	Religion	Muslim	58.0
	Total	100		Buddhist	17.0
Ethnicity	Chinese	51.65		Hindu	3.0
	Malays	44.35		Christian	21.0
	Indians	3.0		Others	1.0
	Others	1.0		Total	100
	Total	100			

4.2. Measures

All items were adopted or adapted from previously validated questionnaires to measure the instruments. Attitude, behavioural intention, and perceived behavioural control were adapted from the scales developed by Alam and Sayuti [52]. The measures of perceived value and eco-labelling were adopted from the Study of Nhu et al. [78], and ethical self-efficacy was adopted from Wang et al. [74]. Subjective norm was revised and modified from Vermier and Verbeke [79]. Moreover, environmental concern was modified and adapted from Yang [80]. Actual behaviour was adopted from the study by Sethi [81] and modified. In the survey, all the questions adopted a six-point Likert scale, which is represented by 1 "strongly disagree," 2 "disagree," 3 "somewhat disagree," 4 "somewhat agree," 5 "agree," and 6 "strongly agree." This study omitted the neutral value and used the six-point scale. The reason for this is that, with a six-point scale, people are more likely to think about the question and make a choice that leans either positively or negatively. The six-point scale assist us in dealing with the fact that our thoughts are rarely neutral [82].

4.3. Common Method Bias

Based on the suggested guidelines by Harman [83], in this research, common method bias was tested by utilizing exploratory factor analysis. The Kaiser–Meyer–Olkin (KMO) standard was adopted to evaluate the sampling adequacy for factor analysis. The analysis findings demonstrated that all values in the matrix's diagonal were above 0.5, while the KMO value was at 0.859. Moreover, the Kaiser–Guttman standard and the screen test were

applied to distinguish the number of existing variables. The evaluation demonstrated that eight factors had more principal eigenvalues than one, which accounted for 62.132% of the variance. In contrast, the primary factor represented 29.5% of the variance in the factors. As per the factor analysis, more than one single factor showed up, and most of the variance was not represented by one general factor. Along these lines, this affirmed that there was no presence of common method bias.

5. Data Analysis

5.1. Measurement Model (Reliability and Validity)

Assessment of the measurement model was performed to estimate the validity of the construct and internal consistency. Construct validity was examined by testing AVE (Average Variance Extracted) and Composite Reliability. All the constructs (Table 3) have an AVE value higher than 0.5, which implies convergent validity [77,84]. The analysis results in Table 3 indicate discriminant validity as the value of AVE's square root in the diagonal is higher than other constructs in the off-diagonal [84].

Table 3. Reliability and validity test (Cronbach Alpha, Composite Reliability, AVE).

Constructs	Item Loading	Alpha α	CR	AVE
Buying Behaviour		0.890	0.924	0.753
When product qualities are similar, I choose eco-label food products over non-green products.	0.821			
I buy eco-label food products, although it is expensive compared to non-green products.	0.903			
If any product is non-environmentally friendly, I do not want to buy it.	0.915			
I buy a product which clearly states the environmental effect on eco-label.	0.828			
Attitude		0.826	0.896	0.741
I like eco-label food products because they will balance nature.	0.840			
I have a favourable attitude toward buying eco-label food products.	0.901			
I like eco-label food products as humans are severely abusing the environment.	0.841			
I would use eco-label food products because humans need to adapt to the natural environment.	0.834			
Buying Intention		0.867	0.919	0.791
I would like to use eco-label food products.	0.926			
I will buy eco-label food products if I happen to see them in a store.	0.895			
I would actively seek out eco-label food products in a store to purchase them.	0.845			
Environmental Concern		0.833	0.923	0.857
I pay much attention to the environment.	0.934			
The environmental aspect is crucial in my product choice.	0.917			
I am emotionally involved in environmental protection issues.	0.902			
Eco-Labelling		0.874	0.941	0.888
I am familiar with the term eco-labelling.	0.946			
I can recognize the eco-label seal.	0.939			
Environmental protection-related information is provided on the eco-label package.	0.933			
Perceived Behavioural Control		0.870	0.920	0.794
Buying eco-label food products regularly is entirely up to me.	0.825			
Buying eco-label food products is entirely within my control.	0.912			
If I wanted to, it would be easy for me to buy eco-label food products.	0.933			

Table 3. *Cont.*

Constructs	Item Loading	Alpha α	CR	AVE
Green Perceived Value		0.715	0.838	0.634
For me, the eco-label food product provides good value and meets expectations.	0.782			
I purchase eco-labelled food products because they focus more on environmental concerns than other products.	0.803			
I buy eco-labelled food products because they have higher environmental benefits than other products.	0.803			
Ethical Self-efficacy		0.723	0.867	0.765
During the necessity for consumption, I am confident to refuse non-eco-label food products.	0.846			
I am confident I will convince my friends/colleagues to refrain from using non-eco-label food products, even if they are necessary for them.	0.903			
Subjective Norms		0.833	0.923	0.857
People who influence my behaviour think that I should buy the eco-label food product.	0.923			
People who are important to me think I should buy the eco-label food product.	0.928			

A value of CR higher than 0.7 indicates a good model and is considered highly acceptable for the early stages of research [85]. The constructs of this study are considered statistically satisfactory as CR exceeds the cut-off values stated earlier. For robustness, this study also measured the HTMT value due to its supremacy over Fornell–Larcker in various situations [86]. The HTMT value is higher than 0.85/0.90, which suggests an absence of discriminant validity [86]. The present study satisfies the threshold values (Tables 4 and 5). Overall, these analyses suggest that reliability and validity are not an issue for further analysis.

Table 4. Discriminant validity test using Fornel–Larker Criterion.

	BB	ATT	BI	EC	Eco	PBC	PV	ESE	SN
Buying Behaviour	**0.868**								
Attitude	0.334	**0.861**							
Buying Intention	0.549	0.615	**0.889**						
Environmental Concern	0.422	0.316	0.523	**0.926**					
Eco-labelling	0.796	0.467	0.649	0.285	**0.942**				
Perceived Behavioural Control	0.480	0.410	0.514	0.176	0.349	**0.891**			
Green Perceived Value	0.483	0.389	0.569	0.249	0.385	0.488	**0.796**		
Ethical Self-efficacy	0.392	0.373	0.630	0.269	0.368	0.542	0.431	**0.875**	
Subjective Norms	0.456	0.416	0.658	0.258	0.356	0.737	0.495	0.351	**0.926**
Mean	3.399	3.878	3.277	3.798	3.208	3.251	3.638	3.059	3.379
Standard Deviation	0.789	0.639	0.814	0.701	0.913	0.725	0.744	0.766	0.821
Skewness	−0.274	−0.416	−0.220	−0.400	−0.257	0.147	−0.628	−0.028	−0.335
Kurtosis	0.388	0.363	−0.354	1.039	−0.110	−0.475	1.195	−0.687	−0.302

Note: BB = Buying behaviour, ATT = Attitude, BI = Buying intention, EC = Environmental concern, Eco = Eco-labelling, PBC = Perceived behavioural control, PV = Green perceived value, ESE = Ethical self-efficacy, SN = Subjective norms. (In the Table, bold elements, the square root of AVE).

Table 5. Discriminant validity test using Heterotrait–Monotrait Ratio (HTMT).

	BB	ATT	BI	EC	Eco	PBC	PV	ESE	SN
Buying Behaviour	–								
Attitude	0.377	–							
Buying Intention	0.623	0.722	–						
Environmental Concern	0.488	0.374	0.615	–					
Eco-labelling	0.898	0.539	0.743	0.593	–				
Perceived Behavioural Control	0.543	0.472	0.585	0.400	0.586	–			
Green Perceived Value	0.598	0.483	0.709	0.484	0.665	0.402	–		
Ethical Self-efficacy	0.494	0.485	0.803	0.472	0.547	0.553	0.581	–	
Subjective Norms	0.529	0.498	0.775	0.426	0.580	0.404	0.573	0.854	–

Note: BB = Buying behaviour, ATT = Attitude, BI = Buying intention, EC = Environmental concern, Eco = Eco-labelling, PBC = Perceived behavioural control, PV = Green perceived value, ESE = Ethical self-efficacy, SN = Subjective norms.

5.2. Testing Normality and Multicollinearity

In terms of normality, the results were good, as the variance from normality was not an issue. The skewness and kurtosis values were less than ±3 and ±10 [87], respectively (Table 3). As suggested by Kleinbaum et al. [88], one effective technique, including the evaluation of the Variance Inflation Factor (VIF), was used to decide the presence of multicollinearity among independent variables in this research. The outcome in Table 6 shows that the VIF ranges from 1.00 to 2.893, which indicated well below 10. This concludes that multicollinearity in this study is not the issue.

Table 6. Multicollinearity test using Variance Inflation Factor (VIF) Value.

	BB	ATT	BI	PBC	SN	R^2
Buying Behaviour						0.50
Attitude			1.569			0.17
Buying Intention	1.875					0.89
Environmental Concern		1.280	1.446	1.000	1.000	
Eco-labelling			2.115			
Perceived Behavioural Control	1.401		1.638			0.12
Green Perceived Value		1.385	1.826			
Ethical Self-efficacy	1.709		1.973			
Subjective Norms			2.784			0.25

Note: BB = Buying behaviour, ATT = Attitude, BI = Buying intention, PBC = Perceived behavioural control, SN = Subjective norms.

5.3. Coefficient of Determination

Santosa et al. [89] proposed a need to measure the models' explanatory powers by ascertaining the endogenous variable's coefficient of determination (R^2). Falk and Miller [90] suggested that the R^2 of the endogenous variable ought to be 0.10. Cohen [91] recommended, based on different researchers, that the value of R^2 of endogenous constructs is significant when the value is 0.26, and a value of 0.13 is considered moderate; lastly, if the value is 0.02, it is considered weak. In Table 5, the R^2 estimations of every endogenous value found in this research are over the prerequisites, as recommended by Falk and Miller [90], demonstrating the model falls into an acceptable level.

5.4. Confirmatory Factor Analysis

In the measurement model, we assessed the confirmation of factors using Confirmatory Factor Analysis (CFA). The resulting CFA model (Table 7) produced good fit indices: χ^2/df = 2.501, Goodness of Fit Index (GFI) = 0.913, Tucker–Lewis Index (TLI) = 0.934, IFI = 0.942, Comparative Fit Index (CFI) = 0.933, NFI = 0.921, root mean square error of approximation (RMSEA) = 0.067. The t-values corresponding to all the items were significant at less than 5%.

Table 7. Fitness indices (CFA and Structural model) with standards.

Fit Indices	Measurement Values for CFA	Meas. Values for Structural Model	Standards with Sources	
χ^2/df	2.501	2.742	<3	[92]
IFI	0.942	0.922	>0.900	[93]
NFI	0.921	0.912	>0.900	[93]
CFI	0.933	0.911	>0.900	[94]
GFI	0.913	0.903	>0.900	[93]
AGFI	0.921	0.916	>0.900	[95]
TLI	0.934	0.927	≥0.90	[96]
SRMR	0.045	0.066	<0.080	[93]
RMSEA	0.067	0.071	<0.080	[96,97]

5.5. Structural Modelling

The structural model of this analysis is illustrated in Figure 2. As the calculation was successfully carried out in the CFA test of the measurement model, the validation of the structural model checked the goodness of the fit indices of the proposed model. The SEM outcome demonstrates that the conceptual framework showed an excellent data fit (χ^2/df = 2.742). The realized value of Root Mean Square Error Approximation (RMSEA) was 0.071, which justifies the cut-off value of less than 0.08 [98]. The other fit indices, such as CFI, GFI, IFI, and TLI, met the standard of 0.9 and higher [97].

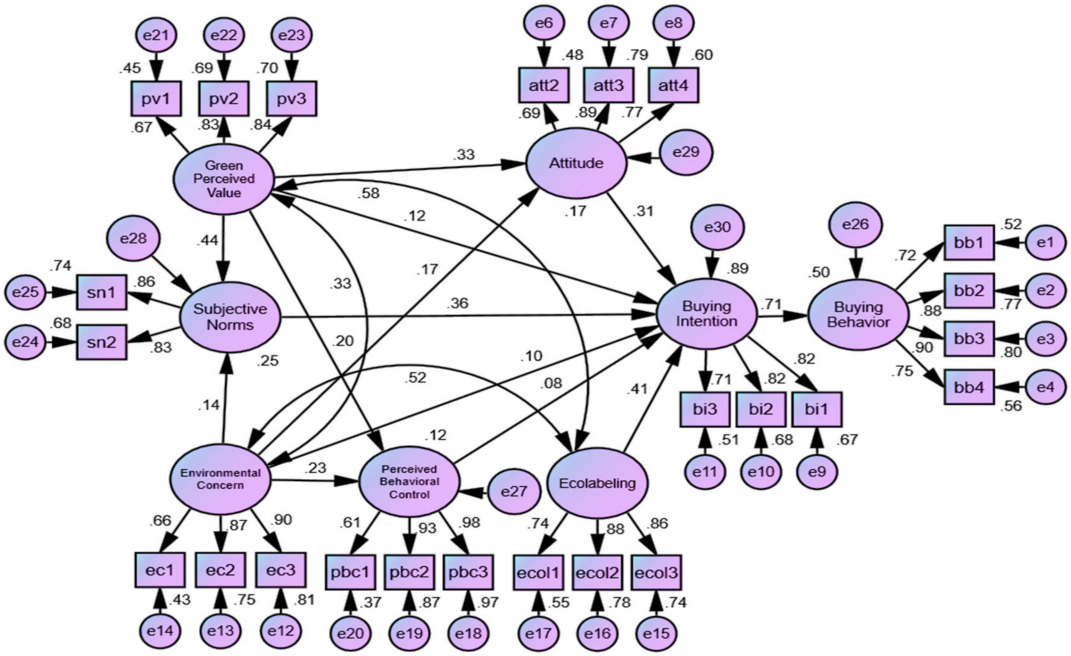


Figure 2. Structural model of eco-label food product using AMOS 21 output (with factor loading, beta, and R^2 values).

The results in Table 7 show the value of perceived value and environmental concern on attitude ((β = 0.325; t = 5.698), (β = 0.165; t = 3.182)), perceived behavioural control ((β = 0.198; t = 3.908), (β = 0.226; t = 4.601)), and subjective norms ((β = 0.440; t = 7.555), (β = 0.141; t = 2.772)). Likewise, the outcome of AMOS output (Table 8) shows that the relationship among perceived value (β = 0.117; t = 2.660) environmental concern (β = 0.096; t = 2.729), subjective norms (β = 0.358; t = 9.492), perceived behavioural control (β = 0.084; t = 3.004), eco-labelling (β = 0.414; t = 9.526), attitude (β = 0.313; t = 8.810), and buying intention are significant. Similarly, behavioural intention (β = 0.706; t = 13.34) significantly affects actual behaviour. Therefore, we accept Hypotheses 1–13, which were found significant at a 1% level of significance.

Table 8. Structural Model and Hypothesis Testing Result.

Hypotheses	STD Beta	STD Error	*t*-Values	*p*-Values	Significance ($p < 0.05$)
H1: PV → ATT	0.325	0.040	5.698 ***	0.000	Supported
H2: PV → BI	0.117	0.042	2.660 ***	0.008	Supported
H3: PV → SN	0.440	0.060	7.555 ***	0.000	Supported
H4: PV → PBC	0.198	0.057	3.908 ***	0.000	Supported
H5: EC → ATT	0.165	0.032	3.182 ***	0.001	Supported
H6: EC → SN	0.141	0.046	2.772 ***	0.006	Supported
H7: EC → PBC	0.226	0.048	4.601 ***	0.000	Supported
H8: EC → BI	0.096	0.029	2.729 ***	0.006	Supported
H9: ATT → BI	0.313	0.048	8.810 ***	0.000	Supported
H10: SN → BI	0.358	0.035	9.492 ***	0.000	Supported
H11: PBC → BI	0.084	0.024	3.004 ***	0.003	Supported
H12: Eco → BI	0.414	0.033	9.526 ***	0.000	Supported
H13: BI → BB	0.706	0.053	13.34 ***	0.000	Supported
H14: EC → ATT → BI	0.109	0.014	2.998 ***	0.002	Supported
H15: EC → SN → BI	0.138	0.016	2.668 ***	0.007	Supported
H16: EC → PBC → BI	0.043	0.006	2.520 **	0.011	Supported
H17: ESE×PV → BI	0.108	0.047	2.300 **	0.021	Supported
H18: ESE×ATT → BI	−0.056	0.034	−1.676	0.094	Not Supported
H19: ESE×SN → BI	−0.040	0.042	−0.154	0.878	Not Supported

Note: ** Significant at 5% level, *** Significant at 1% level, BB=Buying behaviour, ATT = Attitude, BI = Buying intention, EC = Environmental concern, Eco = Eco-labelling, PBC = Perceived behavioural control, PV = Green perceived value, ESE = Ethical self-efficacy, SN = Subjective norms.

5.6. Mediation and Moderation Effect of TPB Constructs

As proposed by [99], the current study used the Sobel test to examine the mediation effect of attitude, subjective norms, and behavioural control on the association between environmental concern and buying intention. Due to the normally distributed nature of the data, we used the Sobel test rather than the bootstrapping technique. The joint significance of the indirect effects method is the proper analysis, which can provide the needful endorsement. It is clear that attitude mediates the association between environmental concern and behavioural intention ($\beta = 0.109$, $t = 2.998$, $p < 0.05$) while subjective norms mediate environmental concern and intention to buy ($\beta = 0.138$, $t = 2.668$, $p < 0.05$). Finally, perceived behavioural control mediates the association between environmental concern and intention to buy ($\beta = 0.043$, $t = 2.520$, $p < 0.05$). Therefore, Hypotheses 14–16 are accepted.

The moderation effect is tested based on the interaction effects of the variables. The study results (Figure 3 and Table 7) show that ethical self-efficacy moderates the association between perceived value and intention to buy ($\beta = 0.108$, $t = 2.300$, $p < 0.05$). In contrast, ethical self-efficacy does not moderate the association between attitude ($\beta = -0.056$, $t = -1.676$, $p > 0.05$) and buying intention, as well as subjective norms ($\beta = -0.040$, $t = -0.154$, $p > 0.05$) and intention to buy. Therefore, Hypothesis 17 is accepted and Hypotheses 18 and 19 are rejected.

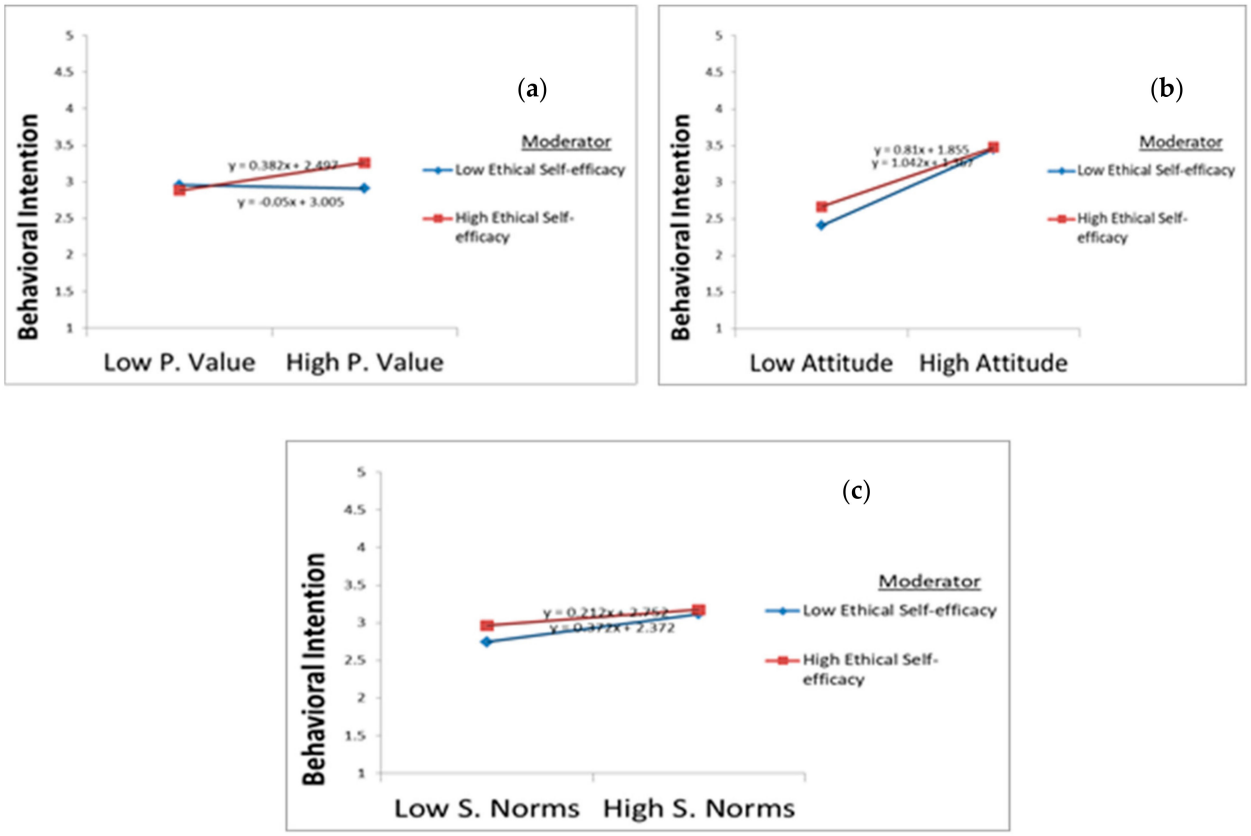


Figure 3. Interaction of ethical self-efficacy (**a**) strengthens PV, BI (**b**) dampens ATT, and BI (**c**) dampens SN and BI relationships.

6. Discussion

The study attempted to integrate cognitive constructs such as environmental concern, environmental knowledge, perceived values, and self-efficacy along with related eco-labelling variables. In the extended model, the R^2 values of purchase intention and actual behaviour were 0.89 and 0.50, respectively, which are greater than the values of 0.319 and 0.271 observed in the original TPB model [100]. Even this explanatory power is much greater than the studies that previously extended TPB in the context of green purchase behaviour for the dependent variable of intention [17–20] and purchase behaviour [32]. These results showed that, because extended TPBs can perceive green purchasing behaviour, the proposed model is generally comprehensive, adequate, accurate, and functional for understanding eco-labelling product purchases.

There were significant positive relationships between original TPB constructs such as attitude, subjective norms, perceived behavioural control, and behavioural intention. This result is consistent with previous studies [10,101]. The study proposed three cognitive predictors of attitude: environmental concern and perceived value. All the factors are considered significant enough to estimate attitude, which is in line with the Study of Satyawan et al. [102]. However, environmental concern as the assumed predictor of subjective norms is significant, supporting the study of Chen and Tung, [6].

In the study, the influence of perceived behavioural control on intentions was found to be significant. This finding is consistent with the original TPB and preliminary studies [10,101]. However, Kim et al. [103] did not accept that finding in their study [25]. It should be noted that PBC's behavioural intention effects were the lowest of the nine crucial projectiles. We also found that environmental buying intentions have a significant effect on purchasing behaviour. This analysis's findings are consistent with the previous study [67], where the purchasing intention was identified as substantially influencing actual behaviour. The outcome is the same as that of TPB; behavioural intentions are direct behavioural predictor

variables [25]. Likewise, green perceived value relates to the purchase intention of the eco-labelled food product. This research's findings are also consistent with the previous study conducted by Doszhanov and Ahmad [42]. This result signifies that if consumers feel a premium value in the eco-label product, their buying intention increases. The external factor of eco-labelling on the intention to purchase was tested, and it was found that eco-labelling affected intention. This finding was in line with the study of Chi [59], who also found a significant relationship between eco-labels and green consumption intention in the case of ecotourism destinations. The excellent design of eco-labels would make consumers act more environmentally friendly.

Regarding the mediation effect, attitude, subjective norms, and PBC were tested to mediate the relationship between environmental concern and behavioural intention. The present study confirms all these mediations, thus confirming the prior studies [6,10,37]. These results indicate that environmental concern influences eco-labelled buying intention if persons hold positive attitudes towards green products, are referred by their peers or surrounding people, and feel the discretion to decide independently. Subjective norms compared to other mediators are found to be more substantial between environmental concern and buying intention of eco-labelled products. Hence, ethical self-efficacy is rejected as a moderator on the relationship between attitude and buying intention. This outcome disagrees with the findings of Doanh [72], who discovered a strong moderating relationship of entrepreneurial self-efficacy between the attitude towards entrepreneurship and entrepreneurial intention. Likewise, the present study found no moderating roles of ethical self-efficacy between subjective norms and behavioural intention, which is in line with past research [71,72]. However, ethical self-efficacy is found to moderate the relationship between perceived value and eco-labelled product buying intention, consistent with the prior studies [74,104].

7. Conclusions

The objective of this study was to find out the factors affecting eco-friendly buying behaviour in the Malaysian context. It also intended to identify the mediating effect of TPB constructs and ethical self-efficacy as a moderator on the association between TPB constructs and eco-labelled food product buying intention. The empirical findings that attitude, subjective norms, perceived behavioural control, eco-labelling, perceived value, and self-efficacy significantly affect buying intention. The study found that ethical self-efficacy moderates the relationship between perceived value and eco-labelled food product buying intention. The results also reveal that attitude, perceived behavioural control, and subjective norms mediate the association between environmental concern and eco-labelled food product buying intention.

8. Implications

8.1. Managerial Implication

There are several managerial implications suggested by this study. First, assisting specific manufacturers or companies with valuable information can improve revenue by utilizing these research results. Ecological labels have an impact on customers' buying behaviour to some extent. It is important for the ultimate consumer and equally important to their family members, colleagues, and mentors so that marketers acquire their support in creating a pressure group in favour of buying. Thus, this can improve the impression of the client towards eco-label food products in Malaysia. Second, perceived value is a vital predictor of buying intention. If consumers feel the eco-labelled product is valuable or premium in terms of status and passion, they will buy the product. Marketers should lucratively design their products and place the eco-label aesthetically to attract such consumers to give them a premium feel. They can highlight such individual prestige issues and value to society through various campaigns. Third, perceived behavioural control was positively and significantly associated with the intention of purchasing green goods, suggesting that if green products were easier to acquire, they would have a higher intention

of purchase. Offering cheaper products may enhance the accessibility of green products. Retailers may help customers find their green goods by setting simple slogans and offering more open shelving.

8.2. Policy Implications

Policymakers may draw on such policy action to encourage citizens' pro-environmental behaviour and encourage the protection of environmental affairs. Steps should be taken to boost the people's environmental interest by implementing appropriate ecological safety guidelines and legislation, increasing the media's coverage to cultivate awareness, or enhancing public knowledge about environmental legislation and practices as consumers feel the governments and businesses can address the ecological issues and do not feel it is their responsibility. Therefore, the government could regularly publicize and emphasize that every user has the capacity and responsibility to save the environment. Therefore, environmental friendliness has a massive impact on the resolution of pollution challenges [105]. Furthermore, environmental education programs should be enhanced to shift consumer views and attitudes towards environmentally friendly goods. Raising awareness will contribute to a buying pattern for eco-labelled goods if they are environmentally conscious and threatened by potential disruption.

8.3. Theoretical Contribution

This paper delivers some original contributions to the current literature, specifically on green buying behaviours and eco-labelling goods. First, the current research addresses the research gap by empirically examining the in-depth effects and the underlying mechanism of eco-label informed green purchase and its acceptance from Malaysian perspectives. Second, this study extends the TPB model with some cognitive constructs, such as self-efficacy, perceived value, and external factors, with the inclusion of eco-labels enhancing its comprehensiveness. Third, this research simultaneously establishes the proposed model by its empirical test and validates it by excluding and including constructs contributing to the original model's extended explanatory power. Fourth, the study also validates the measurement developed for this research; therefore, future researchers can replicate or expand this research as well. Fifth, this research offers some meditating and moderated relationships missing in the original model and for the eco-labelling products. Ethical self-efficacy moderates the association between perceived value and eco-labelled production buying intention. All TPB constructs were tested as mediators in the association between attitude, environmental concern, buying intention, and purchase behaviour. Finally, this study fills the limitations of many researchers by taking both the intention and actual behaviour to avoid further confusion.

9. Limitations and Future Research Directions

This study is not without limitations. The time and situational imperatives motivated the respondent from inside the Klang Valley zone covering Kuala Lumpur and the rural areas within the Selangor states in Malaysia. Respondents were chosen based on convenience sampling due to time and budget limitations. However, the present study may pose a limitation of sampling bias as it only considers the dwelling of Kuala Lumpur. It could also be extended to other regions. Therefore, generalizing the present results on the overall population must be performed cautiously. Future researchers need to examine the motive behind eco-labelled product buying behaviour and actual behaviour, such as social benefits, health benefits, personal benefits, and environmental benefits. Malaysia is a multi-racial country, so it would be intriguing if future researchers conduct research to examine culture as a construct. It is also suggested to conduct a cross-country study by using the constructs applied in this research. Furthermore, in this study, we did not incorporate a detailed knowledge construct to understand the understanding level of consumers, which could be pertinent for future studies. The current research did not emphasize a specific category of eco-labelled food products. Therefore, it is suggested that future researchers focus on a

specific category or categories of products. The present study also discovered the mediation between eco-label product buying intention and environmental concern regarding the TPB constructs.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/su15032474/s1, File S1: Questionnaire.

Author Contributions: Conceptualization, S.S.A., C.-K.W., M.M. and I.A.; methodology, S.S.A. and C.-Y.L.; software, M.M.; validation, S.S.A., C.-K.W., I.A. and Y.-H.H.; resources, I.A. and Y.-H.H.; writing—original draft preparation, S.S.A., C.-K.W., C.-Y.L., I.A. and Y.-H.H.; writing—review and editing, C.-Y.L. and Y.-H.H.; project administration, S.S.A. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Informed consent was obtained from all subjects interviewed involved in this study.

Data Availability Statement: The data that support the findings of this study are available from the corresponding authors upon reasonable request.

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

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