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Environmental Knowledge, Awareness, and Business School Students' Intentions to Purchase Green Vehicles in Emerging Countries

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Abstract: Environmental awareness and changing attitudes toward "green consumption" are becoming evident in emerging countries' markets. Using an extended theory of planned behavior, this paper aims to examine emerging countries' business students' intentions to purchase green vehicles. Stratified random sampling was used to select study participants, and data were collected through face-to-face interviews. Results revealed that environmental knowledge and awareness have a significant influence on business students' favorable attitudes toward green vehicles. Further, a significant association between attitudes toward green vehicles, perceived behavioral controls, and intentions to purchase green vehicles was observed. Findings serve to inform managers and policy makers who are formulating strategies for maximizing value creation in an era of increasingly environmentally aware consumers in emerging markets. Ultimately, this policy will help to promote green technology initiatives, and encourage higher rates of adoption of eco-friendly vehicles in emerging countries.

Keywords: intention; behavior; green vehicles; business students; emerging country

1. Introduction

Environmental degradation is in large part due to motorized vehicles that emit large volumes of unhealthy emissions such as CO_2. Evidence of global warming, the greenhouse effect, climate change, pollution, and acid rain have raised people's consciousness on environmental awareness and green consumption. Uncertainties regarding future access to fossil fuels, and the significant volume of carbon emissions being produced have been widely recognized as the current millennium's largest challenges [1]. These environmental concerns have emerged as burning issues; for governments, societies, and business organizations [2]. In an era of globalization and connectivity, environmental degradation is being accelerated by the ever-increasing transportation sector, and will be further exacerbated as millions of people in the growing middle class in emerging countries begin to drive their own first car. We define emerging countries are those that have rapid economic growth (more than 5% on average annually) for last 15 to 20 years, a stable economy and a rising living standard [3].

A possible solution to the environmental problem is to use green vehicles that produce zero direct emissions and reduce oil dependency [2]. Green vehicles include electric cars, hybrid cars, and all those cars that run on alternative fuels. However, the differences in pace of economic development, public policies, educational level, culture, values and awareness of environmental issues create different contexts and develop different approaches of green product consumption in respective developed and emerging countries. Despite the popularity of green products, the market share of these products continues to be confined to one to three percentage of the entire market [4]. There are also gaps between consumers' favorable attitudes toward green products and their actual purchases [5].

Today's students or younger generation will be ultimately in charge of ensuring the planet's survival. Providing environmental education and awareness, the future generation can ensure conserving, preserving, and sustaining the environment [6]. With few exceptions, most emerging countries have large numbers of young people, and they are likely to have large work forces and high consumption in the future. Emerging countries are also rapidly industrializing and entering into consumer societies. Thus, it is vital to understand these growing population segments in terms of numbers and purchasing behavior of eco-friendly products like green vehicle. Many young students are actively involved in addressing environmental issues, demonstrating high levels of interest in learning about environmental problems and even hoping for careers in environment friendly organizations [7]. Business students are regarded as future managers likely to lead society toward eco-friendly production, distribution, and consumption. Their attitudes toward green or eco-friendly products are vital to ensuring the world's survival, and, for this reason, this study examines emerging country business students' intentions with regard to the adoption of green vehicles. Business studies incorporate theoretical, practical, social, and environmental education, and graduates are well prepared for socioeconomic prosperity and sustainability. Young business students are likely to be willing to accept change [8], and they will influence the future [9].

Several authors including Harun et al. [10], Hassan et al. [11], and Osman et al. [12], have explored young consumers' attitudes toward eco-friendly products, though none of these studies focused specifically on green vehicles, and many were inconclusive. Some studies have revealed that students in emerging countries generally show a moderate level of awareness in terms of environmental issues, despite having higher levels of environmental knowledge, regardless of their educational standards, thereby revealing the need for more focused research on this topic. Lim found that students have high levels of general knowledge about the environment, however, their perceptions of environmental problems and their identification with environmental issues is superficial; ultimately leading to relatively low levels of awareness and sensitivity toward environmental concerns [13]. Said et al. also found that students are aware of some local environment-related problems, but lack an understanding of sustainable consumption practices [14]. No studies, in our knowledge, have examined emerging countries' students' intentions toward green vehicles, and this study is designed to fill this gap. The demand for green vehicles is expected to grow, and very little is known about consumers'—and especially young consumers'—likely behaviors, toward green vehicles. Marketing strategies should be formulated after considering consumers' beliefs, attitudes, and responses to green vehicles, as well as their readiness to pay premium prices for these products. An in-depth understanding of the mechanisms by which business students develop their purchasing behaviors toward green vehicles is the key. Marketing managers and policy makers need to know what factors will entice business students to purchase green vehicles, and what factors will deter them from doing so. This study examines the effects of environmental knowledge and awareness on emerging country business students' attitudes toward the environment, and the effects that their attitudes, subjective norms, and perceived behavioral controls have on their intentions and behaviors toward green vehicles. To this end, we have collected data from students attending university business schools in Malaysia.

2. Literature Review

2.1. Study Background

The transport sector's energy demands have escalated over the last two decades, and continue to be a major contributor to CO_2 emissions in most countries [15]. Many emerging countries such as Malaysia are committed to decreasing their carbon emissions by 40% by 2020, so it is timely to improve our understanding of the mechanisms that will influence consumers to adopt cleaner and greener vehicles, and begin to effect the most sustainable solution for significantly minimizing fossil fuel dependence and reducing carbon emissions [16].

The Environmental Education program and the Education for Sustainable Development program have been promoting environmental awareness for younger citizens in many emerging countries. Many government policies and non-profit organizations emphasize the development of eco-friendly communities with environmental skills, knowledge, and values [17]. Although students have high levels of general environmental knowledge, their perceptions of and their identification with environmental problems remains superficial in nature, leading to lower levels of awareness and sensitivity toward environmental concerns [13]. Students with knowledge of local environmental problems may not be environmentally conscious, particularly, in terms of sustainable consumption [14]. Some students have been found to be moderately concerned about environmental issues [12], and even portray high levels of awareness and knowledge of the environment that are not reflected in their behaviors [11].

2.2. Theoretical Foundation

Social psychologists have developed theories to explain and predict human behavior. The Theory of Planned Behavior (TPB) links beliefs and behavior. This theory is to predict one's intention to engage in a behavior at a specific time and place. It explains human behaviors [18] in terms of how one's attitude affects his or her actual behaviors [19]. The TPB considers individuals' intentions to perform a given action to assess how important an action is to them, and how much effort they are willing to exert to perform a particular behavior [20]. The TPB has been used extensively to predict intentions and consumption behaviors. Previous TPB-based research has explained speeding intentions [21], travel mode choices [22], drinking and driving behaviors [23], seat belt usage [24], and the adoption of electric vehicles [1]. This study's conceptual framework is premised on the TPB, and is directed at evaluating emerging country business students' intentions and behaviors toward green vehicles.

The TPB asserts that three types of reflections generally guide individuals' actions: behavioral beliefs, normative beliefs, and perceived control. Behavioral beliefs are the individuals' beliefs regarding the likely outcomes of a specific behavior. Normative beliefs are the individuals' expectations regarding how their significant others' will view their behavior, and perceived control stems from an individual's beliefs about factors that may favor or hamper the performance of a behavior [20]. Collectively, behavioral beliefs precipitate an individual's positive or negative attitudes toward a particular behavior; while normative beliefs foster subjective feelings in an individual; perceived control allows the individual to choose whether or not to engage in a certain behavior. Attitudes, subjective norms, and perceived behavioral controls combine to form behavioral intentions, and so lead to actual behaviors [20].

The TPB places more emphasis on the individual's personality and the influences of an individual's social groups than on the individual's intention to behave in a certain way, and the individual's actual behavior. Environmental knowledge and awareness of consequences form the attitude towards environment. This study examines the effects that attitudes, social norms, and perceived behavioral controls have on the purchasing intentions towards green vehicle by business students in emerging countries, and their perceived behaviors. By integrating the mediating effects of Intention between Attitude, Subjective norms, Perceived Behavioral Control, and Perceived Behavior, the model attempts to extend the scope of the TPB. Figure 1 shows the extended TPB.
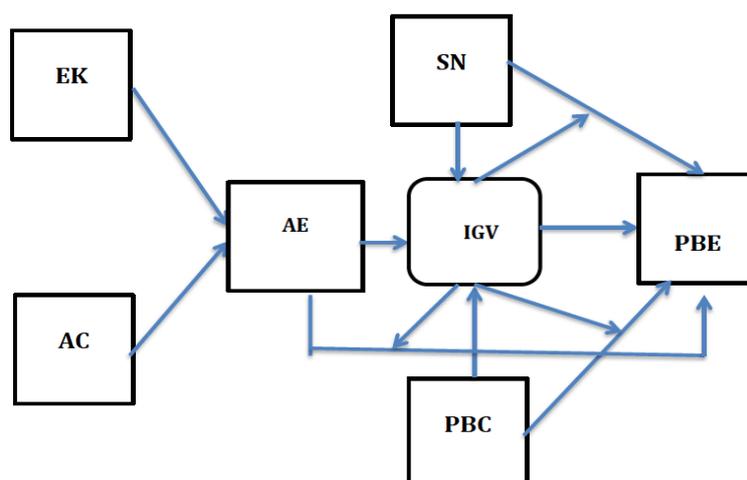
Figure 1. Conceptual Framework. Notes: Environmental Knowledge (EK), Awareness of Consequences (AC), Attitude towards Environment (AE), Subjective Norms (SN), Perceived Behavioral Control (PBC), Intention Towards Green Vehicles (IGV), Perceived Behavior (PBE). Mediating effects of Intention between Attitude, SN, PBC, and PBE.

2.3. Environmental Knowledge, Awareness of, and Attitudes toward the Environment

Research has confirmed that education is one of the most effective strategies for preparing young people to learn about environmental issues, and ultimately be able to mitigate or slow environmental degradation [7,25,26]. According to Incekara et al. and Hassan, Shaw, Shiu, Walsh and Parry, students' apathetic attitudes toward the environment are due to a lack of knowledge of and interest in environmental issues [27,28]. Other research has revealed that students are well informed about environmental issues and are interested in them [29]. Few studies, however, have found that students' conceptual understanding of environment issues have influenced them to conserve the environment [30,31]. Business school students in the emerging countries develop their knowledge and understanding of eco-friendly business processes as they target to internationalize their businesses to the developed country market where the prospective consumers have higher level of awareness of environment and attracted by eco-friendly products and services. These varied findings lead to uncertainty as to whether environmental knowledge and awareness influence their attitudes toward the environment, and suggest the need for further study. This study proposes that environmental knowledge and awareness are significant predictors of students' attitudes to the environment, and posits the following hypotheses for empirical testing:

Hypothesis 1 (H_1). *Environmental knowledge has a positive and significant effect on emerging country business students' attitudes toward the environment.*

Hypothesis 2 (H_2). *Awareness of consequences has both a positive and a significant effect on emerging country business students' attitudes toward the environment.*

2.4. Environmental Attitudes and Intentions Toward Green Vehicles

Drawing on the TPB, this study posits that attitudes reflect an individual's unfavorable or favorable evaluation of a behavior in a given context [20]. According to the TPB, attitude, when coupled with other constructs of the model, is able to successfully predict both intention and actual behavior [20]. Previous studies have found that certain dimensions of attitude significantly predicted the adoption of innovative products [32]. Other studies found that attitudinal factors such as compatibility and relative advantage effectively predicted the adoption of Internet banking [33]. Particularly in cases of green

innovation, attitude is one factor that has been found to successfully predict an individual's willingness to adopt eco-friendly innovations [34]. More specifically, recent studies found that attitudinal factors positively affect consumers' intentions to acquire green vehicles [35–37]. Ramayah et al. also stressed that attitudinal variables play a significant role in the adoption of innovation and technology [38]. Business students in emerging countries are among the first who receive both education and awareness on the importance of eco-friendly businesses in the global market and they are the early adopter of eco-friendly attitudes. This study perceives their attitudes toward the environment as being a significant predictor of students' intentions with regard to green vehicles, and hypothesizes the following:

Hypothesis 3 (H_3). *Individuals' attitudes toward the environment have a positive and significant effect on emerging country business students' intentions toward green vehicles.*

2.5. Subjective Norms and Intentions toward Green Vehicles

Subjective norms refer to the social pressures and/or influences an individual perceives, as to whether or not he or she should perform a certain behavior [20,39]. This construct normally measures an individual's perceptions of what the people who are significant to him or her would think, with regard to whether he or she should or should not perform a behavior [40]. According to the TPB, subjective norms—coupled with other constructs of the model—are able to predict both intentions and actual behaviors [20]. Moreover, researchers have found that social externalities, such as social influence, peer pressure, and subjective norms, may influence purchasing decisions [41]. In a closely related study, Jeon et al. and Tarkiainen and Sundqvist found that consumers with higher levels of perceived subjective norms had higher levels of intentions to purchase hybrid electric vehicles [42,43]. Similarly, research conducted by Ozaki and Sevastyanova also found that social norms and consumers' willingness to comply with their reference groups' norms influenced purchasing decisions related to hybrid cars [36].

Ramayah et al. found that a country's social factors play a key role in influencing its citizens' choices [38], and since most emerging countries have collectivist cultures that highly value social norms, individuals' actions may be influenced by the group with which an individual identifies, and shares societal value. Business students in emerging countries can also be influenced by the people who are significant to him or her, or those who could judge his or her specific behavior. For example, Business students could be influenced to act eco-friendly by their "Teachers" who are the most educated in emerging countries, play the role model for their students and enjoy a respectable position in the collective societies. Few existing studies, however, have reported no significant correlation between subjective norms and willingness to adopt innovative technology [33,44]. The varied findings cast doubt on the assumption that there is a sound relationship between subjective norms and intentions toward the adoption of a new technology, and suggest the need for further research. This study therefore perceives subjective norms as significant predictors of individuals' purchasing intentions toward green vehicles, and hypothesizes the following for empirical testing:

Hypothesis 4 (H_4). *Subjective norms have a positive and significant effect on emerging country business students' purchasing intentions toward green vehicles.*

2.6. Perceived Behavioral Control and Intentions toward Green Vehicles

Perceived behavioral control (PBC) or locus of control focuses on a person's personality traits, such as self-confidence and self-efficacy, or on his or her beliefs [20]. This construct refers to factors that could either hinder or encourage the performance of a particular behavior [37]. Behavioral control is thought to have two components: the first is self-efficacy, and could be defined as an individual's

self-confidence in his or her ability to perform a certain behavior, and the second is the belief in facilitating conditions, and reflects the relative availability of the resources needed to engage in a particular behavior [44]. According to the TPB, perceived behavioral control (PBC), when coupled with other constructs of the model, can be used to predict both intention and actual behavior [20].

According to other research, a weaker relationship exists between the components of perceived behavioral controls, such as government incentives and the adoption of innovative technologies such as hybrid-electric vehicles [45]. Gallagher and Muehlegger similarly found that certain forms of behavioral control positively affected the adoption of green vehicles [46]. Furthermore, research has also found that although certain behavioral control dimensions significantly influence the adoption of greener vehicles, they are not sufficient to instigate an actual behavioral change [47]. The findings reported in the literature establish a rather causal relationship between perceived behavioral control and intention, and thereby, indicate the need for further research on this subject. Most emerging Asian countries emphasize on modernity with local characteristics. That is to say that they emphasize on tradition, conservation and peaceful co-existence with nature and ecology and develop self-restraints toward preservation of status quo. This study therefore considers PBC as a significant predictor of intention toward green vehicles, and hypothesizes the following for empirical testing:

Hypothesis 5 (H_5). *Perceived behavioral control has a positive and significant effect on emerging country business students' intentions toward green vehicles.*

2.7. Intention and Behavior toward Green Vehicles

It can be assumed that in general, no behavior occurs without intention. The TPB also asserts that intentions could be the best predictors of behavior [20]. Earlier researchers have established both causal links and discrepancies between intentions and behaviors [40]. It is generally thought that intention reflects acceptance, but this study argues that an individual's behavior is critical, and cannot be guaranteed through mere intention; however, the study acknowledges that intention is a significant determinant, and that it positively affects behavior. The diffusion of innovative technology is conceived as being a multistage process that begins with intention, and extends to behavior, before finally creating value [48]. Actual behavior occurs at the post-adoption stage [49], after the user has adopted the technology being considered. It seems highly unlikely that an innovative technology would be used without intention; hence, this study expects intention to be an important factor and antecedent for an individual's behavior toward green vehicles. Business students in emerging countries develop their understanding of the importance of eco-friendly business practices in the global market. They subsequently develop their intention to adopt eco-friendly practices into their own life styles. They translate their learning into practice. Related research also confirms that although relevant and important factors may encourage the adoption of greener and cleaner fuel-dependent vehicles, they are not necessarily sufficient to stimulate behavioral changes [47]. This study therefore acknowledges the possibility that there is an underlying significant relationship between intention and behavior toward green vehicles, and proposes the following hypothesis:

Hypothesis 6 (H_6). *Intentions toward green vehicles have a positive and significant effect on emerging country business students' perceived behavior toward green vehicles.*

2.8. The Mediating Role of Intention toward Green Vehicles

In response to the different causal relationships reported, and to further examine the intensity of those relationships, this study conceptualizes attitudes toward the environment, subjective norms, and perceived behavioral controls as significant predictors of business students' intentions toward green vehicles. The study simultaneously articulates a relationship between intentions toward green

vehicles and perceived behaviors. However, there is gap between the intention and the actual action of an individual. According to Bagozzi and Yi, intention needs to be well formulated in order to be consistent with behavior. Poorly formulated intention is less consistent with the actual behavior than the well-formulated behavior [50]. Consumers in Action oriented (high self-regulated) culture of most developed countries have the capacity to regulate their emotion and thoughts to fulfill their intentions. However, consumers or business students in most emerging countries have the "state orientation" culture indicating inability to regulate their emotions and thoughts. The effectiveness of predictable variables depends on the degree of intention formulation. Hence, this study expects that emerging country business students' intentions toward green vehicles will significantly mediate the association between their attitudes toward the environment, subjective norms, and perceived behavioral controls with perceived behavior. For this reason, this study required the inclusion of a mediator in its model, consistent with Baron and Kenny [51], and proposes the following hypothesis:

Hypothesis 7 (H$_7$).　*Intentions toward green vehicles mediate the effects of attitude, subjective norms, and perceived behavioral controls on emerging country business students' perceived behaviors toward green vehicles.*

3. Research Methodology

This study, conducted in Malaysia, adopts a quantitative approach and a cross-sectional design following Grunert and Juhl [52], to measure the effect of environmental knowledge and awareness on students' attitudes toward the environment. The study simultaneously examines the effects Kelantan university business students' attitudes, subjective norms, and perceived behavioral controls have on their intentions toward green vehicles and perceived behavior.

3.1. Research Instrument

The questionnaire for this study was designed using simple unbiased language, so that the respondents could easily understand the questions. A total of 35 questions were used to measure environmental knowledge, awareness of consequences, attitudes toward the environment, subjective norms, perceived behavioral controls, intentions toward green vehicles, and perceived behavior. The questions used to measure environmental knowledge were adapted from Dunlap, Van Liere, Mertig, and Jones [53], with minor modifications. Questions used to measure awareness of consequences were adapted from Steg, Drijerink, and Abrahamse, with minor modifications [54]. Similarly, the questions used to measure attitudes toward the environment, subjective norms, perceived behavioral controls, intentions toward green vehicles, and perceived behaviors, were adapted from Wong et al. [55], Moons and De Pelsmacker [56], and Kumar [57], with minor modifications. A five-point Likert scale (strongly disagree, disagree, neutral, agree, and strongly agree) was used for all the variables.

3.2. Sample Selection and Data Collection

Study participants included students currently enrolled in Business Schools at the University Malaysia Kelantan (UMK), MARA University of Technology (UiTM), and Darulnaim College of Technology (KTD), in Kelantan; Malaysia; aged between 18 and 30 years; and older. There were 2294 students registered in business studies in these institutes. This population was chosen on the assumption that university students within the given age range would have intentions toward eco-friendly vehicles. Random sampling was used to select the participants. Once the researchers had the list of possible participants from the respective institutes; the students received emails asking if they would be willing to participate in the study; and 200 students from the three universities were then selected as participants. According to Wolf; Harrington; Clark; and Miller; the sample size could be between 30 and 450 for a structural equation modeling [58].

3.3. Data Analysis Methods

This study used the Partial Least Square (PLS) technique to analyze data, by utilizing SmartPLS 2.0 software to validate measurements and test the hypotheses. The Partial Least Squares (PLS) approach was applied to estimate the causal models, following Hulland's procedure, which suggested evaluating each model in two stages [59]. This method provides the basics of estimating, and the parsimonious model on the higher-level analysis with the presence of the Lower Order Constructs (LOCs) [60]. Evaluation of the measurement model was based on an assessment of internal consistency (CR), indicator reliability (Cronbach's alpha), convergent validity (AVE), and discriminant validity. The values of composite reliability and AVE were used to test the reliability and validity of the constructs, and revealed that all the values were greater than 0.5 for all the constructs. Thus, construct reliability and convergent validity were achieved and explained. The discriminant validity for each measure was calculated. Finally, in the second stage, the paths between the constructs in the models were estimated.

4. Summary of Findings

4.1. Demographic Characteristics of Respondents

The following Table 1 provide demographic characteristics of respondents of this study.

Table 1. Profile of the Respondents.

	n	%		n	%
Gender			*Age*		
Male	93	46.5	18–21	45	22.5
Female	107	53.5	22–25	129	64.5
Total	200	100	26–30	23	11.5
			31 and above	3	1.5
Race			Total	200	100.0
Malay	125	62.5			
Chinese	54	27	*University*		
Indian	20	10	UMK	67	33.34
Others	1	0.5	UiTM	67	33.34
Total	200	100			
			KTD	66	33.33
Ownership of Cars			Total	200	100.0
Yes	82	41			
No	118	59	*Type of car*		
Total	200	100	Environment Friendly Car	34	41.5
			Not Environment Friendly Car	48	58.5
Number of Cars at Home			Total	82	100
1 Car	91	45.5			
2 Cars	73	36.5	*Type of car at Home if chose1*		
3 Cars	36	18	Environment Friendly Car	45	49.5
Total	200	100	Not Environment Friendly Car	46	50.5
			Total	91	100.0
Type of car at Home if chose 2			*Type of car at Home if chose 3*		
For Car 1: Environment Friendly Car	22	15.1	For Car 1: Environment Friendly Car	12	11.1
For Car 1: Not Environment Friendly Car	51	34.9	For Car 1: Not Environment Friendly Car	24	22.2
For Car 2: Environment Friendly Car	27	18.5	For Car 2: Environment Friendly Car	9	8.3
For Car 2: Not Environment Friendly Car	46	31.5	For Car 2: Not Environment Friendly Car	27	25.0
Total	146	100.0	For Car 3: Environment Friendly Car	7	6.5
			For Car 3: Not Environment Friendly Car	29	26.9
Decision to buy			Total	108	100.0
Environment Friendly Car	139	69.5			
Not Environment Friendly Car	61	30.5			
Total	200	100			

4.2. Reliability and Validity

Cronbach's alpha values for environmental knowledge, awareness of consequences, attitude toward the environment, subjective norms, perceived behavioral control, intention toward green vehicles and perceived behavior were all found to be more than 0.7 (Table 2). Since Cronbach's alpha for each of the items was greater than 0.7, all items were considered reliable [61]. For composite

reliability, the indicators had different loadings for all items greater than 0.7, and if the indicators are greater than 0.7, they can be considered reliable [62]. Convergent validity signifies that a set of indicators represents one and the same underlying construct, which can be demonstrated through its unidimensionality, and the average variance extracted (AVE) value for all items is more than 0.5, which indicates sufficient convergent validity [63] (see Table 2).

Table 2. Reliability and Validity.

Variables	Items	Mean	SD	Cronbach's Alpha	Composite Reliability	AVE
Environmental Knowledge	5	3.5860	0.91586	0.900	0.926	0.715
Awareness of Consequences	5	4.0380	0.84053	0.912	0.934	0.741
Attitude towards Environment	5	3.8900	0.94826	0.924	0.943	0.767
Subjective Norms	5	3.7240	0.87616	0.868	0.905	0.655
Perceived Behavioral Control	5	3.4470	0.87557	0.868	0.904	0.654
Intention Towards Green Vehicles	5	3.6700	0.93007	0.890	0.919	0.693
Perceived Behavior	5	3.7710	0.86272	0.900	0.926	0.715

As shown in Table 3, the cross loading values are less than the outer loadings, which infers good discriminant validity. Cross loadings of the indicators should be examined to assess discriminant validity and the Fornell–Larcker criterion is used to quantify discriminant validity at the construct level [64]. The Fornell–Larcker criterion in Table 3 is largely unable to detect any lack of discriminant validity. Lastly, the Heterotrait–Monotrait Ratio (HTMT) is used to estimate correlation between constructs, which parallels the disattenuated construct score creation. Using a value of 0.9 as the threshold, this study concluded that there is no evidence of a lack of discriminant validity and all the constructs meet the criteria satisfactorily.

Table 3. Discriminant Validity.

	EK	AC	AE	SN	PBC	IGV	PBE
Environmental Knowledge (EK)							
I know more about recycling than the average person does	*0.844*	0.584	0.584	0.573	0.632	0.519	0.636
I understand the environmental phrases and symbols on product packaging.	*0.877*	0.627	0.626	0.632	0.668	0.572	0.686
I know how to select products and packages that reduce the amount of waste ending up in landfills	*0.854*	0.616	0.644	0.629	0.567	0.560	0.685
I am very knowledgeable about environmental issues	*0.833*	0.560	0.562	0.582	0.630	0.599	0.635
Using environmentally sustainable products is a primary means to reduce pollution.	*0.817*	0.675	0.682	0.668	0.634	0.645	0.693
Awareness of Consequences (AC)							
Global warming is a problem for society	0.653	*0.908*	0.640	0.667	0.556	0.596	0.663
Energy savings help reduces global warming.	0.620	*0.860*	0.587	0.647	0.534	0.549	0.634
The environmental quality will improve if we use less energy.	0.632	*0.865*	0.607	0.629	0.541	0.590	0.627
I am aware that transportation sector contributes highly towards CO_2 emission.	0.641	*0.873*	0.696	0.649	0.548	0.588	0.642
I am aware that EFVs can contribute to reduce CO_2.	0.582	*0.794*	0.633	0.607	0.559	0.625	0.662
Attitude towards Environment (AE)							
I like the idea of purchasing green.	0.686	0.685	*0.917*	0.663	0.527	0.654	0.714
I have a/an attitude toward purchasing a green version of a product.	0.636	0.565	*0.845*	0.582	0.549	0.631	0.644
I feel good about myself when I use environmentally sustainable products.	0.677	0.682	*0.922*	0.687	0.564	0.664	0.732
I believe that use of environmentally sustainable products by me will help in conserving natural resources.	0.613	0.642	*0.846*	0.665	0.532	0.553	0.662
I believe that use of environmentally sustainable products by me will help in reducing wasteful use of natural resources.	0.611	0.656	*0.846*	0.671	0.546	0.580	0.683
Subjective Norms (SN)							
My family thinks that I should purchase green products.	0.622	0.590	0.599	*0.825*	0.549	0.541	0.626
My friends think I should purchase green products.	0.556	0.470	0.503	*0.769*	0.543	0.521	0.546
Mass media reports have influenced me to try green products.	0.645	0.667	0.646	*0.849*	0.578	0.602	0.647
Conventional car can create air pollution.	0.588	0.645	0.639	*0.816*	0.576	0.575	0.645
Conventional car can create smog in large cities.	0.550	0.626	0.625	*0.786*	0.570	0.530	0.640

Table 3. *Cont.*

	EK	AC	AE	SN	PBC	IGV	PBE
Perceived Behavioral Control (PBC)							
My budget is sufficient to buy an electric car.	0.560	0.468	0.468	0.548	*0.777*	0.592	0.519
I will be allowed to charge my electric car with energy I have produced myself.	0.518	0.432	0.448	0.483	*0.770*	0.547	0.533
I am familiar with the availability of environmentally sustainable products in my locality.	0.672	0.607	0.555	0.601	*0.839*	0.637	0.668
I can easily get environmentally sustainable products whenever I need them.	0.579	0.482	0.481	0.584	*0.839*	0.646	0.602
I have complete control over the number of environmentally sustainable products that I need to buy for personal use.	0.652	0.572	0.547	0.586	*0.815*	0.687	0.677
Intention Towards Green Vehicles (IGV)							
I intend to purchase green products in the near future.	0.626	0.696	0.725	0.656	0.604	*0.831*	0.716
I would buy an environmentally friendly car if the quality is lower than a conventional car.	0.531	0.498	0.492	0.505	0.659	*0.831*	0.612
I would buy an environmentally friendly car even if it is less comfortable.	0.502	0.455	0.479	0.513	0.648	*0.836*	0.588
I would buy an environmentally friendly car even if it has a less-appealing design.	0.550	0.461	0.479	0.496	0.664	*0.833*	0.595
I would like to use environmentally sustainable product.	0.631	0.701	0.714	0.654	0.645	*0.833*	0.725
Perceived Behavior (PBE)							
I consider the social and environmental policies of a brand before buying a car.	0.638	0.691	0.700	0.657	0.574	0.640	*0.841*
If I understand the potential damage to the environment that some products can cause, I do not purchase those products.	0.617	0.667	0.627	0.671	0.599	0.617	*0.827*
I take into consideration eco-incentives before buying a car.	0.699	0.650	0.685	0.632	0.614	0.672	*0.859*
Often talk with others about a more environmentally friendly way of living.	0.690	0.588	0.666	0.641	0.678	0.680	*0.848*
I often buy environmentally friendly car to protect our natural environment.	0.696	0.587	0.643	0.648	0.683	0.698	*0.853*
Fornell-Larcker Criterion							
Environmental Knowledge	0.845						
Awareness of Consequences	0.728	0.861					
Attitude towards Environment	0.737	0.738	0.876				
Subjective Norms	0.733	0.744	0.746	0.810			
Perceived Behavioral Control	0.741	0.637	0.620	0.696	0.809		
Intention Towards Green Vehicles	0.687	0.686	0.705	0.685	0.772	0.833	
Perceived Behavior	0.791	0.751	0.785	0.768	0.746	0.783	0.846
Heterotrait-Monotrait Ratio (HTMT)							
Environmental Knowledge	-						
Awareness of Consequences	0.799	-					
Attitude towards Environment	0.803	0.801	-				
Subjective Norms	0.825	0.833	0.832	-			
Perceived Behavioral Control	0.834	0.712	0.691	0.799	-		
Intention Towards Green Vehicles	0.760	0.749	0.765	0.770	0.877	-	
Perceived Behavior	0.875	0.831	0.861	0.869	0.837	0.867	-

4.3. Path Analysis

A path coefficient indicates the direct effect of a variable assumed to be a cause on another variable assumed to be an effect [65]. Path coefficients are estimated as path relationships in the structural model between the constructs in a model [65]. As presented in Table 4 below, the path coefficients between environmental knowledge and awareness of consequences was found to have a positive and statistically significant effect on attitude toward the environment (at the 5% level of significance). Furthermore, attitude toward the environment and perceived behavioral control intention was also found to have a positive and statistically significant effect on intention toward purchasing green vehicles (at the 5% level of significance). However, the subjective norm was found to have no statistically significant effect on intention toward green vehicles, despite having a positive relationship. Lastly, intention toward green vehicles was also found to have a positive and statistically significant effect on perceived behavior (at the 5% level of significance).

According to the effect sizes (f^2) in Table 4, environmental knowledge and awareness of consequences were found to have small effects on attitude toward the environment. Attitude toward

the environment, subjective norms, and perceived behavioral control exhibited small effects on the intention toward green vehicles, and in turn, intention toward green vehicles also displayed small effects on perceived behavior. The coefficient of determination (r^2) of all endogenous latent variables, as shown in Table 4, are considered moderate, and therefore acceptable, since this study was not designed to identify the key factors affecting intention toward green vehicles; rather, the study only attempted to identify how different constructs related to the TPB model affected the intention toward green vehicles, and perceived behavior among university business students. Predictive relevance (Q2) is critical to assess the predictive validity of a complex model [66]. It refers to "a synthesis of cross validation and function fitting with the perspective that the prediction of observables is of much greater relevance than the estimation of what are often artificial construct–parameters" ([66], p. 679). Q^2 values are used to assess the relative predictive relevance of a predictor construct on an endogenous construct value, and a larger than zero value indicates that the path model's accuracy is acceptable [61]. Based on Table 4, Q^2 values are greater than zero, thereby indicating the predictive relevance of the factors (i.e., attitude toward the environment, subjective norms, and perceived behavior control) on the intention toward green vehicles, and university business students' perceived behavior.

Table 4. Path Analysis.

Hypothesis		Coefficient	*Sig.*	Decision	r^2	Q^2	f^2
H$_1$	EK → AE	0.425	0.000	*Supported*			0.229
H$_2$	AC → AE	0.429	0.000	*Supported*	0.629	0.480	0.233
H$_3$	AE → IGV	0.321	0.000	*Supported*			0.137
H$_4$	SN → IGV	0.091	0.112	*Not Supported*	0.683	0.464	0.404
H$_5$	PBC → IGV	0.510	0.000	*Supported*			0.009
H$_6$	IGV → PBE	0.783	0.000	*Supported*	0.613	0.435	-

Notes: Environmental Knowledge (EK), Awareness of Consequences (AC), Attitude towards Environment (AE), Subjective Norms (SN), Perceived Behavioral Control (PBC), Intention Towards Green Vehicles (IGV), Perceived Behavior (PBE).

4.4. Mediating Effects

Baron and Kenny's four-step mediation approach is used to assess the mediating effects university business students' intentions toward green vehicles have on their attitudes toward the environment and perceived behavioral control [51]. The steps taken, requirements for next steps, and current status, are presented in Table 5. In step one of the mediating effects of intention toward green vehicles between attitude toward environment and perceived behavior, the coefficient of attitude toward environment on perceived behavior was 0.787, with a *p*-value < 0.0001, which satisfies the requirements for step one. Step two tested the effect of attitude toward the environment on the intention toward green vehicles. As the coefficient value was 0.321, with a *p*-value < 0.0001, it therefore satisfied the requirements of Baron and Kenny's mediation approach for step two [50]. In step three the coefficient of intention toward green vehicles on perceived behavior was found to be 0.783, with a *p*-value < 0.0001, which satisfied the requirements for step three. Step four tested the effect of attitudes toward the environment and intention toward green vehicles on perceived behavior. The coefficient value for step four was 0.464, with a *p*-value < 0.0001. The statistically significant *p*-value < 0.05 displayed in the effects of attitude toward the environment on perceived behavior in steps one through four indicates partial mediation of intention toward green vehicles between attitude toward the environment and perceived behavior among university business students.

Similarly, the steps, requirements for next steps, and the status of the mediating effect of intention toward green vehicles between perceived behavioral control and perceived behavior among university business students was measured using Baron and Kenny's four-step mediation approach, and presented in Table 5 [51]. In step one of the mediating effects of intention toward green vehicles between perceived behavioral control and perceived behavior, the coefficient of perceived behavioral

control on perceived behavior was found to be 0.750, with a *p*-value < 0.0001, which satisfied the requirements and allowed the initiation of step two. Step two tested the effects of perceived behavioral control on the intention toward green vehicles. As the coefficient value for step two was found to be 0.510, with a *p*-value < 0.000, the requirements were satisfied. In step three the coefficient of intention toward green vehicles on perceived behavior was found to be 0.783, with a *p*-value < 0.0001, which satisfied the requirements for this step. Step four tested the effects of perceived behavioral control and intention toward green vehicles on perceived behavior. The coefficient value for step four was found to be 0.356, with a *p*-value < 0.0001. The statistically significant *p*-value < 0.05 displayed in the effects of perceived behavioral control on perceived behavior in Steps 1 through 4 indicates partial mediation of intention toward green vehicles between perceived behavioral control and perceived behavior among university students.

Table 5. Mediating Effects.

Mediation: AE → IGV → PBE	Coefficient	P	Requirements for Next Step	Decision
Step 1: AE → PBE	0.787	0.000	Statistically Significant	Satisfied
Step 2: AE → IGV	0.321	0.000	Statistically Significant	Satisfied
Step 3: IGV → PBE	0.783	0.000	Statistically Significant	Satisfied
Step 4: AE and IGV → PBE	(AE → PBE) 0.464	0.000	Step 1: *p*-value < 0.05 Step 4: *p*-value < 0.05	Partial Mediation
Mediation: PBC → IGV → PBE				
Step 1: PBC → PBE	0.750	0.000	Statistically Significant	Satisfied
Step 2: PBC → IGV	0.510	0.000	Statistically Significant	Satisfied
Step 3: IGV → PBE	0.783	0.000	Statistically Significant	Satisfied
Step 4: PBC and IGV → PBE	(PBC → PBE) 0.356	0.000	Step 1: *p*-value < 0.05 Step 4: *p*-value < 0.05	Partial Mediation

Notes: Attitude towards Environment (AE), Subjective Norms (SN), Perceived Behavioral Control (PBC), Intention Towards Green Vehicles (IGV), Perceived Behavior (PBE).

4.5. Importance Performance Matrix Analysis

To further examine the results, this study considered conducting a post-hoc importance-performance matrix analysis (IPMA) using environmental knowledge, awareness of consequences, attitude toward the environment, subjective norms, perceived behavioral controls, and intentions toward green vehicles as variables, and intentions toward green vehicles and perceived behaviors as the target construct. As shown in Table 6, attitude toward the environment was the most important factor in determining intentions toward green vehicles and perceived behavior as was reflected by its relatively high importance and performance values. Perceived behavioral control had a high importance value, but lower performance values. Subjective norm scores established that the construct was not significant in predicting intentions toward green vehicles and perceived behaviors, and lastly, intentions toward green vehicles were also significant in predicting perceived behaviors among university students by means of high importance and performance values.

Table 6. Performance and Total Effects.

Target Construct	Intention towards Green Vehicles		Perceived Behavior	
Variables	Total Effect	Performance	Total Effect	Performance
Environmental Knowledge	0.136	65.228	0.107	65.228
Awareness of Consequences	0.138	74.552	0.108	74.552
Attitude towards Environment	0.321	72.323	0.251	72.323
Subjective Norms	0.091	68.842	0.071	68.842
Perceived Behavioral Control	0.510	62.014	0.400	62.014
Intention Towards Green Vehicles	-	-	0.739	68.842

5. Discussion

This study's findings confirmed that both environmental knowledge and awareness of consequences have a positive and significant effect on university business students' attitudes toward the environment (H$_1$ and H$_2$). This finding corroborates with the findings of Chang and Chang [67]. The result indicates that the business students not only have environmental knowledge, but also have awareness of their actions that affect their surrounding environment. Attitude toward the environment was also shown to have a positive and significant effect on emerging country business students' intentions toward purchasing green vehicles (H$_3$), indicating that they emphasize on eco-friendly consumption while considering their impacts on the environment. Perceived behavioral control is also found to have a positive and significant effect on university business students' intentions toward green vehicles, indicating that hypothesis (H$_5$) is also supported, since the students display self-confidence and perceive the availability of the required resources for adopting green vehicles. Our results show that there are positive and significant relationships between attitude and behavior, and these findings differ from those of Wheale and Hinton, who reported a gap between attitude and actual behavior [68]. This could be interpreted as indicating a growing understanding of the importance of eco-friendly consumption in emerging countries, and influencing young peoples' consumption behaviors. Accelerated globalization and easy access to all sorts of international media channels' advocacy for environment might enable the rising educated young generation in emerging countries to be aware of environmental issues and importance for sustainable living.

Intentions toward green vehicles also exhibited a positive and significant effect on the perceived behavior of university business students (H$_6$), which means that university students "walk the talk." They not only intend to use eco-friendly vehicles, but also are already adopting and using them. However, the effects of subjective norms on the intentions toward green vehicles were not found to be statistically significant (H$_4$). This is an interesting finding in the emerging country context. Our findings differ from those of Dean et al. [69], Thogersen [70], and Al-Swidi et al. [71]. These authors studied organic food consumption behaviors in developed countries' markets. On the other hand, our findings corroborate the findings of Tarkiainen and Sundqvist [43], Yazdanpanah and Forouzani [72] and Bamberg and Moser [73]. These authors found that subjective norms have no direct association with intention. This may be due to the fact that many students are very aware of environmental degradation, and are determined to use eco-friendly products, whether or not their friends, family, or society endorses them. Inconsistent findings could be attributed to different products, markets, contexts, and time differences (year of the study). Absence of the significant relation between subjective norms and purchase intention of green vehicles can also be attributed to the fact that many people in emerging countries have not developed yet the awareness on environmental issues to the level of developed market consumers. Even if they have the knowledge on environmental issues, the emerging market consumers are still lacking the "values" that promote and preserve the environment for sustainability. A multi-product multi-country longitudinal study could explain more of this puzzle. Findings related to the mediating effects of intention toward green vehicles on the relationships between attitudes toward the environment and perceived behavioral controls (PBC) with perceived behavior (PBE) among university students was found to be statistically significant. This indicates that the intention toward green vehicles is partially responsible for the relationship between attitude toward the environment and perceived behavioral control (PBC) with perceived behavior (PBE) among university business students.

6. Conclusions

A recent study found that one of the key contributing factors responsible for the escalation of environmental issues is human negligence toward the environment. Therefore, it is logical to conclude that humans are primarily responsible for addressing environmental issues, and that the younger generation will have to ensure the Earth's survival. With this backdrop, the present study examined the effects environmental knowledge and awareness have on university business students' attitudes

toward the environment, and the effects that attitudes, subjective norms, and perceived behavioral controls have on their intentions and behaviors toward green vehicles, from the perspective offered by the TPB.

This study's novelty contributes to the existing literature in several respects. Firstly, it extends the TPB model by explaining the effects that attitude has on environment-friendly consumption, subjective norms, and perceived behavior controls on perceived behavior by means of university business students' intentions toward purchasing green vehicles. This study also makes a significant theoretical contribution to the TPB in particular, and to leadership and management theories in general, by exploring the adoption behaviors of green vehicles by business students under the extended scope of the theory by adding the mediating effects of 'Intention to purchase green vehicle' between attitude, subjective norms and perceived behavior control and the 'perceived behavior' of purchasing green vehicle.

Furthermore, this study contributes to theory by providing empirical evidence of the relationship between attitudes toward the environment, subjective norms, and perceived behavioral controls on intentions toward purchase of green vehicles and perceived behavior, to explain young educated consumer's behavior with regard to purchasing green vehicles. Lastly, the study addresses the scarcity of studies focusing on the adoption of eco-friendly durable products such as green vehicles that are different from consumer products such as the organic foods considered in several studies, and thereby enriches the existing literature, particularly in an emerging country context.

This study's findings can guide emerging countries' managers in formulating strategies for the development, sale, and adoption of eco-friendly products such as green vehicles. Specifically, automobile companies offering green vehicles could use the findings for decision-making, and to help the automobile industry in emerging countries understand consumers' intentions toward, and their use of, green vehicles. In terms of students, the study could encourage the adoption of green practices in students' daily routines, since it was found that university students have considerable knowledge of environmental concerns, but lack knowledge of environmentally friendly practices. Findings could be generalized to a wider market context, based on Synodinos, who revealed that responses from students were comparable to those obtained from general consumers [74].

As emerging countries progress toward becoming developed nations, future citizens as managers as well as consumers with high environmental awareness and knowledge are likely to make an impact on availability of eco-friendly products and consumption behaviors. As this study shows positive effects of environmental knowledge, awareness, attitude on green product purchase intentions and actual purchases, future generations with environmental knowledge, awareness, and perceived behavioral control will be more inclined to purchase green vehicle and contribute to conserving, preserving, and sustaining the environment. Environmental education can play an important role by influencing future generations to become responsible eco-friendly consumers and managers. The Association of American collegiate schools of business (AACSB), an accreditation body for Business Schools, is promoting business education with a focus on the environment and ethics. Integrating environmental concerns and promote environmental awareness in business school's curriculum can foster environmental literacy and encourage green technology initiatives that might lead to higher rates of adoption of eco-friendly products among business students.

Future researchers could use this study to understand the influences attitudes toward environment, subjective norms, and perceived behavioral controls on perceived behaviors have on university business students' intentions toward green vehicles. One of this study's limitations is that we did not include consumer affective elements known to influence consumer ethical behavior in our model [75,76]. Consumer behaviors are not only affected by attitude, but also by various other personal and situational factors. Future research could attempt to integrate more constructs into the study's model, or implement the same model in different cultural or geographical settings, to reveal a deeper and more generalized understanding of the adoption and use of eco-friendly products—particularly among future generations in emerging markets. Growing awareness of green

products and changing attitudes toward these products are aspects of the dynamic processes that will occur over a period of years. A longitudinal study could further explore consumers' purchasing decisions with regard to green products—including vehicles. Future research could also consider the tenets of theories other than TPB, such as Reciprocal deterministic theory (RDT) and/or developmental theory model (DTM), to better understand sustainable consumer behaviors [77,78]. The model used for this study suggests that personal factors such as attitudes, along with previous sustainable behaviors and sociocultural environments, affect future sustainable behaviors. Partial mediation effects indicate that more variables need to be included in the model, to strengthen explanatory power, the validity and further generalizability of the study's findings.

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