



An Integrated Model of Green Purchase Behaviour: Environmental Antecedents and Mediating Role of Perceived Behavioural Control

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Abstract

The present study examines the determinants of Green Purchase Behaviour (GPB) by integrating Environmental Knowledge (EK), Environmental Concern (EC), Subjective Norms (SN), and Perceived Behavioral Control (PBC) into a structured research model. The study specifically investigates the influence of EK, EC and SN on GPB, examines the effect of PBC on GPB, and assesses the influence of EK, EC and SN on PBC. It further investigates the mediating role of PBC in the relationships between environmental and social antecedents and green purchase behaviour. Primary data were collected from 462 respondents through a structured questionnaire. The proposed relationships were examined using Structural Equation Modelling. The measurement model demonstrated satisfactory reliability and validity, with acceptable factor loadings, Cronbach's alpha, Composite Reliability and Average Variance Extracted values. Discriminant validity was also established using the HTMT ratio and Fornell–Larcker criterion. The structural model results indicate that Environmental Concern significantly and positively influences GPB ($\beta = 0.334$, $p < 0.001$), followed by Environmental Knowledge ($\beta = 0.125$, $p = 0.013$) and Subjective Norms ($\beta = 0.109$, $p = 0.036$). Perceived Behavioral Control also has a significant positive effect on GPB ($\beta = 0.165$, $p = 0.001$). Furthermore, EC, EK and SN significantly influence PBC. The mediation results reveal significant indirect effects of EC, EK and SN on GPB through PBC. The model explains 23.3% of the variance in GPB and 15.3% in PBC. The study concludes that environmental, social and perceived control factors jointly contribute to understanding consumers' green purchase behaviour.

Keywords: Green Purchase Behaviour, Environmental Knowledge, Environmental Concern, Subjective Norms, Perceived Behavioral Control, Green Consumption, Structural Equation Modelling.

1. Introduction

Growing environmental degradation, climate change, resource depletion, pollution and increasing waste generation have encouraged consumers, businesses and policymakers to reconsider conventional consumption practices. In this context, green purchasing has emerged as an important component of sustainable consumption. Green purchase behaviour refers to consumers' tendency to select products that are perceived to have lower negative impacts on the natural environment. The increasing relevance of sustainable consumption has made it necessary to understand not only whether consumers possess environmental awareness, but also how such awareness is translated into actual purchasing behaviour. The transition from environmental awareness to actual green purchasing is complex because consumer behaviour is influenced by cognitive, psychological and social factors. Environmental knowledge represents an individual's understanding of environmental problems, sustainable practices and environmentally friendly products. Environmental concern reflects the extent to which individuals are worried about environmental deterioration and its consequences. Previous research indicates that environmental knowledge and environmental concern can influence consumers' attitudes, intentions and environmentally responsible behaviour, although the strength of these relationships varies across contexts (Pagiaslis & Krontalis, 2014; Lin & Niu, 2018). A systematic review by Joshi and Rahman (2015) similarly identified environmental knowledge, social norms, perceived



behavioural control and other psychological factors among the important determinants of green purchasing. The Theory of Planned Behaviour (TPB) provides an appropriate theoretical foundation for explaining these relationships. Ajzen (1991) proposed that behavioural intentions are primarily determined by attitude, subjective norms and perceived behavioural control. Perceived behavioural control additionally reflects the individual's perception of having the ability, resources and opportunities necessary to perform a behaviour. In the context of green consumption, consumers may possess positive environmental attitudes but may not necessarily purchase green products if they perceive such products to be expensive, unavailable or difficult to access. Therefore, perceived behavioural control can play an important role in converting environmental motivation into purchasing behaviour. Subjective norms represent perceived social expectations from important reference groups such as family, friends, colleagues and society. Green consumption may be influenced by social expectations because consumers increasingly encounter environmental messages through social networks and interpersonal communication. Research has reported that social norms can influence green purchase intention and behaviour, although the magnitude of their effect differs across cultural and consumer contexts. Evidence from India is particularly relevant because the country represents a rapidly developing consumer market where sustainable consumption is gaining academic and managerial attention. Paul et al. (2016), using Indian consumers, found that an extended TPB framework provided greater explanatory utility for green product consumption than conventional TPB and TRA models. Similarly, Kumar et al. (2018) examined Indian consumers and found that environmental concern and perceived consumer effectiveness were important determinants of green purchase intention, while green purchase intention was an important predictor of actual green purchasing behaviour.

2. Review of Literature

2.1 Environmental Knowledge and Green Purchase Behaviour

This study analyzes the factors that influence Green Purchase Behaviour (GPB), based on the integration of Environmental Knowledge (EK), Environmental Concern (EC), Subjective Norms (SN) and Perceived Behavioral Control (PBC) in a structured research model. The study specifically examines the influence of EK, EC and SN on GPB, the effect of PBC on GPB and the influence of EK, EC and SN on PBC. It also examines how PBC mediated the relationships between the environmental and social antecedents and green purchase behaviour. A structured questionnaire was used to gather primary data from 462 respondents. Structural Equation Modelling was used to analyse the proposed relationships. The measurement model achieved a satisfactory reliability and validity with acceptable factor loadings, Cronbach's alpha, Composite Reliability and Average Variance Extracted. In addition, discriminant validity was also assessed by HTMT ratio and Fornell–Larcker criterion. The results of the structural model show that Environmental Concern is significant and positive, with a value of $\beta = 0.334$ ($p < 0.001$), Environmental Knowledge is significant and positive, with a value of $\beta = 0.125$ ($p = 0.013$), and Subjective Norms are significant and positive, with a value of $\beta = 0.109$ ($p = 0.036$). In addition, the perceived behavioral control is another significant positive predictor of GPB ($\beta = 0.165$, $p = 0.001$). Secondly, EC, EK and SN are important factors that significantly affect PBC. The results of mediation indicate that the variables of EC, EK and SN have significant indirect effects on GPB through PBC. The model accounts for 23.3% of the variance in GPB and 15.3% in PBC. The study finds that the combination of environmental, social and perceived control factors is useful for understanding consumers' green purchase behaviour.

The rise of environmental degradation, climate change, less availability of resources, pollution and more waste, has forced consumers, businesses and policy makers to rethink traditional consumption patterns. The green purchasing has become one of the main aspects of sustainable



consumption in this context. Green purchase behaviour is defined as consumers' tendency to purchase products in which their negative impact on the environment is perceived as less. This growing importance of sustainable consumption has made it essential to first understand consumers' environmental awareness and then, how it is expressed through their purchasing action. Changing from environmental awareness to buying green is a complicated process as consumers are affected by cognitive, psychological and social factors. Environmental knowledge is the individual's knowledge of environmental issues, sustainable consumption and environmentally friendly products. Environmental concern is an indicator of one's worry about environmental degradation and its impacts. The results of previous studies suggest that the relationship between environmental knowledge and environmental concern with consumers' attitude, intentions and environmentally responsible behaviour is different, depending on the context (Pagiaslis & Krontalis, 2014; Lin & Niu, 2018). The environmental knowledge, social norms, perceived behavioural control, and other psychological factors were also found as significant factors influencing GPs by Joshi and Rahman (2015) through their systematic review. The Theory of Planned Behaviour (TPB) offers a suitable theory for the understanding of these relationships. Ajzen (1991) suggested that attitude, subjective norms and perceived behavioural control are the three main factors that influence behavioural intentions. Perceived behavioural control was also proposed to indicate the perceived capability, resource and opportunity to engage in a behaviour. From a green consumption perspective, consumers might have positive green attitudes but still not buy green products when they believe it is expensive, inaccessible or unavailable. Thus, the concept of perceived behavioural control might be a crucial link between the environmental motivation and the consumer behaviour. Subjective norms are the perceived social norms from significant reference groups like family, friends, colleagues and society. Social expectations can also affect green consumption, as social communication and social networks now provide more frequent environmental messages to consumers. Social norms have been shown to impact the green purchase intention and behavior but in different extents depending on different cultural and consumer context. The relevance of evidence from India is especially significant as it is a fast-growing consumer market that has recently become a focus of academic and managerial interest for sustainable consumption. This study by Paul et al. (2016) with Indian consumers demonstrated that the extended TPB model explained more variance of green product consumption than the traditional TPB and TRA models. Likewise, Kumar et al. (2018) studied Indian consumers and determined environmental concern and perceived consumer effectiveness were important factors affecting green purchase intention, while green purchase intention was an important predictor of green purchase behaviour.

Environmental knowledge is the knowledge that consumers have about environmental issues, their causes, effects and potential solutions, as well as knowledge about environmentally friendly products and sustainable consumption. Information about a green alternative can be given to consumers so that they can identify and evaluate the green alternative. Joshi and Rahman (2015) conducted a systematic review of green purchase behaviour and found that among the factors studied, the factor of knowledge was the one that was studied most and that there was a significant number of studies reporting a positive relationship between knowledge and green purchasing. In the framework of environmentally responsible consumption Pagiaslis and Krontalis (2014) also investigated environmental concern and environmental knowledge and related beliefs. But there is no general agreement. For instance, Kumar et al (2018) did not find any significant impact of perceived environmental knowledge on all the components of green purchasing among Indian consumers. Overall, these mixed results imply that knowledge does not necessarily lead to behavior. More recent evidence continues to examine the knowledge–purchase relationship. Liu et al. (2026) researched environmental knowledge and green purchasing intention and built a higher-



order model to demonstrate the importance of environmental knowledge to green purchasing intention. Environmental knowledge is therefore an important explanatory variable, but may act through other psychological and behavioural processes.

2.2 Environmental Concern and Green Purchase Behaviour

Environmental concern is the awareness and concern about environmental issues. There may be a connection between consumers' concern for pollution, ecological degradation, resource depletion and climate change, and their willingness to accept environmentally responsible consumption. Paul et al. (2016) added the concept of environmental concern to an extended TPB model for Indian consumers and found that environmental concern greatly explained the green product purchase intention. Environmental concern was also among the key cognitive variables that impacted green purchase intention identified by Kumar et al., (2018) in India. These study results reinforce the theory that consumers can think about greening their purchase when they are motivated to do so by the concern of the environmental consequences.

2.3 Subjective Norms and Green Purchase Behaviour

Subjective norms are beliefs about the approval or approval expectation of important persons in the social world in which the individual lives, as they relate to a specific behaviour. Subjective norms is one of the three key factors in behavioural intention in TPB (Ajzen, 1991). In the context of green consumption, family members, friends, colleagues, and larger social circles can have an effect on consumers' choices by setting expectations for consumption that is "green. Lin and Niu (2018) explored the relevance of social and environmental factors in green consumption through the lenses of environmental knowledge, environmental consciousness, social norms and purchasing behaviour. Another review by Joshi and Rahman (2015) also revealed significant results for relationships between subjective/social norms and green purchase intention or behaviour. But, the results showed that subjective norm was not a significant predictor of green product purchase intention in Paul et al.'s Indian study (2016). This gap shows that there may be variations in the influence of social factors based on cultural, demographic, and product contexts.

2.4 Perceived Behavioural Control as a Mediator

Perceived behavioural control is especially relevant to green purchasing as the products might be available at a higher price, not be available, be inaccessible etc., or information about the product might be uncertain or the opportunity to purchase is limited. Perceived behavioural control indicates how easy or difficult it is to engage in a behaviour and may directly influence behaviour, as well as indirectly, via behavioural intention (Ajzen, 1991; TPB). Evidence from research on green consumption has been found to support the relevance of perceived behavioural control. Within the extended TPB model for Indian consumers, perceived behavioural control was found as one of the key predictors by Paul et al. (2016). Recently, the study of perceived behavioural control and self-efficacy has also been used to understand green purchasing.

3. Research Methodology

3.1 Research Design

The study uses the quantitative research design that considers the relationships between environmental knowledge, environmental concern, subjective norms, perceived behavioural control and green purchase behaviour. The research uses primary data collected through a structured questionnaire from the consumers. The theoretical framework used is the Theory of Planned Behaviour with the addition of environmental knowledge and environmental concern as antecedent variables.

3.2 Population and Sampling

Consumers with experience or awareness of environmentally friendly/green products are the target population. Depending on the accessibility of the subjects and the nature of the research, a structured questionnaire is administered, in that the subjects are sampled from the convenience

sample. The study has 462 respondents, who were valid, having the following demographic data: gender, age, employment status, educational level, and monthly income.

3.3 Research Instrument

The structured questionnaire consists of two broad sections with the primary data collected through this. The first part of the questionnaire collects demographic data from respondents. The second section is based on measuring study constructs, namely environmental concern, environmental knowledge, subjective norms, perceived behavioural control and green purchase behaviour. The items were rated on a five point rating scale in which "strong disagreement" was given the lowest score and "strong agreement" the highest score. To ensure content validity the constructs were operationalized with previously used scales from established literature on green consumer behaviour and the TPB.

3.4 Data Analysis

Data analysis performed in this study includes descriptive data analysis and partial least squares structural equation modelling (PLS-SEM). PLS-SEM can be used whenever the goal is to investigate the complex relationships among the latent constructs and to evaluate the measurement and structural models. The evaluation of the measurement model is conducted by factor loading, Cronbach's alpha coefficient, composite reliability (CR), average variance extracted (AVE) and discriminant validity. The average factor loadings were found to be well above the recommended level, Cronbach's alpha values were found to be between the range of 0.789 to 0.922, CR values were 0.807 to 0.923, and AVE values were 0.563 to 0.787. The Fornell–Larcker criterion and HTMT ratio are used to determine the discriminant validity. The analysis yielded HTMT values below 0.85 which showed discriminant validity. Next, the structural model is evaluated based on the path coefficient, t-statistic, p value and coefficient of determination (R^2). The direct relationships between environmental knowledge, environmental concern, subjective norm, perceived behavioural control and green purchase behaviour are tested. Perceived behavioural control is analyzed using mediation approach with bootstrapping method to see if it plays a significant role in the mediation between environmental/social antecedents and green purchase behavior.

The model shows that there is a positive significant relationship between environmental concern and GPB, environmental knowledge and GPB, PBC and GPB, and subjective norms and GPB. It also identifies the important relationships between the variables environmental concern, environmental knowledge and environmental subjective norms with PBC. The mediation effect analysis also shows that subjective norms and environmental concern and environmental knowledge have significant indirect effects on environmental behavior via PBC.

Objectives of the Study

1. To examine the influence of environmental knowledge, environmental concern and subjective norm on green purchase behaviour among consumers.
2. To analyse the impact of perceived behavioural control on green purchase behaviour
3. To access the effect of environmental knowledge (EK), environmental concern (EC), and subjective norms (SN) on perceived control (PC) in context of green purchasing decisions.
4. To investigate the mediating role of perceive behavioural control in the relationship between EK, EC, SN and GPB

4. Analysis and Findings

This section will provide detailed information on the reliability, validity and model fit of the proposed model with assessment of convergent and divergent validity, and overall model fit. To test the convergent validity, the Average Variance Extracted (AVE) and Composite Reliability (CR) are calculated and high values are expected to reflect the fact that the constructs successfully measure their respective variance. Comparisons made between the square root of AVE and inter-construct correlations are used to evaluate the discriminant validity and prove that the constructs



are discriminant. The importance of construct-construct relationships is explored through direct and indirect effects and it is concluded that significant and strong effects are found.

Demographic Profile of the respondents

Table 1: Demographic profile of the consumers

Variables	Categories	Frequency	Percentage
Marital Status	Female	212	45.9
	Male	250	54.1
Employment Status	Student	108	23.4
	Private Employee	149	32.3
	Government Employee	37	8.0
Age	18-25	63	13.6
	26-35	139	30.1
	36-45	175	37.9
	above 45	85	18.4
Education Qualification	UG	180	39.0
	PG	118	25.5
	Ph. D	68	14.7
	Others	96	20.8
Monthly Income (in Rs.)	20000	46	10.0
	20,001-40,000	131	28.4
	40,000	285	61.7
Total		462	100

Source: Primary Data

The gender ratios show it is a bit higher for males (54.1%) than for females (45.9%). Respondent's employment status, most are private employees (32.3%), next are students (23.4%) and government employees (a relatively small proportion 8.0%). This means that it is more representative of the population that is in the private sector and a part of the academic community. The age category shows that the majority of the respondents age is 36-45 (37.9%) followed by 26-35 (30.1%). Among the younger group age 18-25%, it is 13.6% and over 45 years it is 18.4%. This implies that the sample is predominantly made up of middle aged individuals and this can influence perceptions and decision-making processes. As far as the education is concerned, most of the respondents are undergraduates (39.0%) followed by postgraduates (25.5%). Most of them also hold Ph.D. degrees (14.7%) and 20.8% have other kinds of education. In terms of monthly income, a majority of respondents (61.7%) fall in the higher income category (above ₹40,000), followed by 28.4% in the ₹20,001–₹40,000 range, and only 10.0% earning up to ₹20,000. This is



because the sample consists of most of the higher income people and they may affect consumption behaviour and attitudes.

Measurement Model

The most important measures in SEM measurement models are reliability and validity. Hair et al. (2022) provides a guideline that the composite reliability (CR) and Cronbach alpha should be above 0.70 as a good indicator of reliability. In the convergent validity, the Average Variance Extracted (AVE) has to be higher than 0.50, or means the latent variable can explain not less than 50% of the variance of the indicators of the latent variables (Fornell and Larcker, 1981). That constructs are different is referred to as discriminant validity, and modern approaches like the Heterotrait-Monotrait (HTMT) ratio are frequently used to test discriminant validity, with values of HTMT < 0.85 indicating good discriminant validity (Henseler, Ringle, and Sarstedt, 2015).

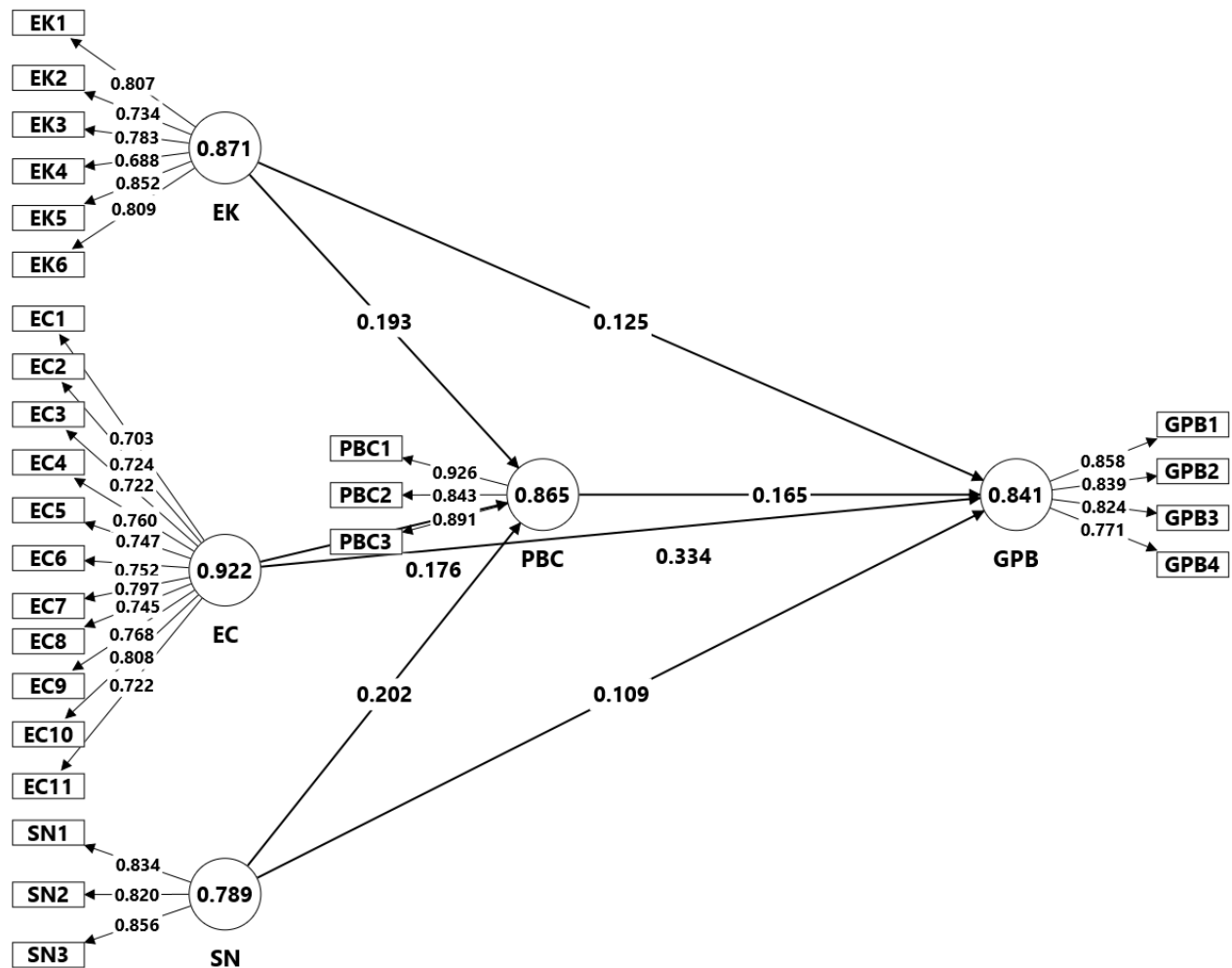


Figure 1: Measurement Model



Constructs	Items	Factor Loading	VIF	Cronbach's alpha	CR	AVE
Environmental Concern (EC)	EC1	0.703	1.670	0.922	0.923	0.563
	EC2	0.724	1.866			
	EC3	0.722	1.814			
	EC4	0.760	2.144			
	EC5	0.747	1.917			
	EC6	0.752	2.045			
	EC7	0.797	2.592			
	EC8	0.745	2.225			
	EC9	0.768	2.329			
	EC10	0.808	2.794			
	EC11	0.722	2.195			
Environmental Knowledge (EK)	EK1	0.807	1.924	0.871	0.881	0.610
	EK2	0.734	1.723			
	EK3	0.783	1.935			
	EK4	0.688	1.536			
	EK5	0.852	2.801			
	EK6	0.809	2.388			
Green Purchase Behavior (GPB)	GPB1	0.858	2.050	0.841	0.847	0.678
	GPB2	0.839	1.942			
	GPB3	0.824	1.903			
	GPB4	0.771	1.605			
Perceived Behavior Control (PBC)	PBC1	0.926	3.054	0.865	0.878	0.787
	PBC2	0.843	2.084			
	PBC3	0.891	2.250			
Subjective Norms (SN)	SN1	0.834	1.808	0.789	0.807	0.701
	SN2	0.820	1.660			
	SN3	0.856	1.567			

The results of evaluating measurement model are presented in Table 1 which is factor loading, multicollinearity (VIF), internal consistency reliability and convergent validity. The factor loading of all the items in all the constructs such as Environmental Concern (EC), Environmental Knowledge (EK), Green Purchase Behavior (GPB), Perceived Behavioral Control (PBC), and Subjective Norms (SN), are greater than the suggested threshold of 0.70 in most of the cases, with some slightly lower but acceptable (greater than 0.60). This means that the items have considerable face validity, or representativeness, of their constructs. Both VIF values of all the indicators fall within the range of 1.536 and 3.054, well below the critical value of 5. This proves that there are no multicollinearity problems among the indicators. Cronbach alpha values of all the constructs are between 0.789 and 0.922 which is above the lowest acceptable level of 0.70. Likewise, the values of Composite Reliability (CR) are within the range of between 0.807 and 0.923, which again proves the high level of internal consistency. Average Variance Extracted (AVE) is used to assess convergent validity and all the constructs have an AVE value greater than the desirable level of 0.50 (ranging from 0.563 to 0.787). This is to show that all the constructs explain over 50% variance in its indicators.



	EC	EK	GPB	PBC	SN
Environmental Concern (EC)					
Environmental Knowledge (EK)	0.080				
Green Purchase Behavior (GPB)	0.430	0.287			
Perceived Behavior Control (PBC)	0.219	0.332	0.352		
Subjective Norms (SN)	0.078	0.566	0.286	0.349	

As shown in Table 2, the Heterotrait-Monotrait (HTMT) ratio used to assess the discriminant validity between constructs ranged from 0.42 to 0.80, indicating that the ratio was consistent with the criterion of ≤ 0.70 . The range of values of all HTMT is between 0.078 and 0.566 with a significant range of values that lie below the conservative level of 0.85 (and even lower). This means that each construct becomes a new empirical specific one. For instance, the highest HTMT is observed between Environmental Knowledge (EK) and Subjective Norms (SN) (0.566) and is still within acceptable limits. Extremely low HTMT values such as between Environmental Concern (EC) and Subjective Norms (SN) (0.078) also mean high levels of discriminant validity.

Table 3: Discriminant validity-Fornell–Larcker criterion

	EC	EK	GPB	PBC	SN
Environmental Concern (EC)	0.751				
Environmental Knowledge (EK)	0.065	0.781			
Green Purchase Behavior (GPB)	0.380	0.247	0.823		
Perceived Behavior Control (PBC)	0.198	0.298	0.301	0.887	
Subjective Norms (SN)	0.051	0.462	0.234	0.301	0.837

Under this criterion, the square root values of AVE (diagonal values) of each construct should be greater than the correlations between the construct and other constructs. The EC (0.751), EK (0.781), GPB (0.823), PBC (0.887) and SN (0.837) diagonal values are all greater than the inter-construct correlations. The square root of AVE for Green Purchase Behavior (0.823) is greater than its correlations with EC (0.380), EK (0.247), PBC (0.301), and SN (0.234). The same is the case with all constructs.

Structural Model

Path coefficients are illustrated through the structural model. Path coefficients show the strength of the relationships among constructs, as well as which constructs are directly linked to which. Loadings show the strength of the association of individual indicators with their latent constructs.

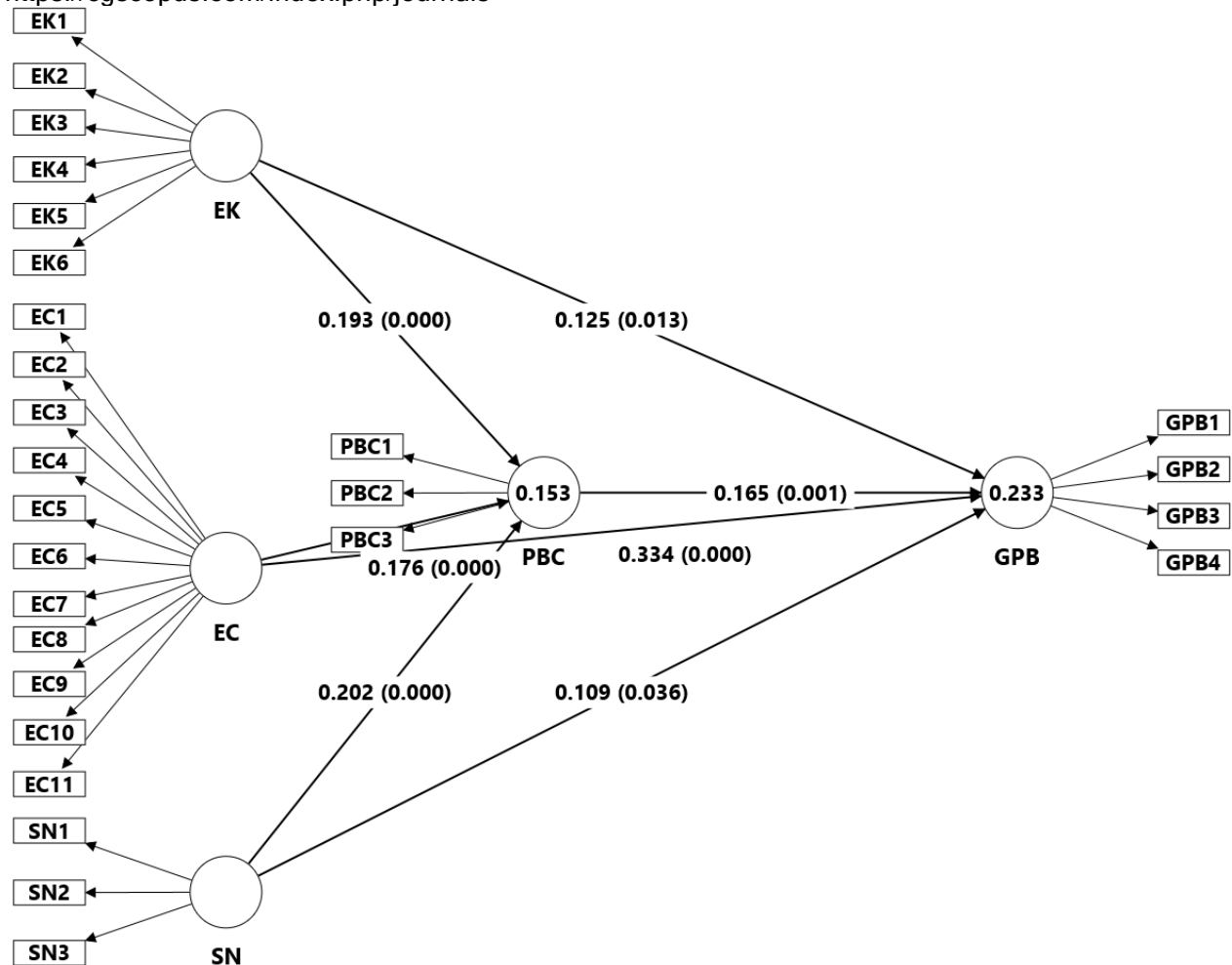


Figure 2: Structural Model

Table 4: Path coefficients (β)

Path	(β) coefficient	SD	T statistics	P values
Environmental Concern (EC) $\rightarrow$ Green Purchase Behavior (GPB)	0.334	0.041	8.170	0.000
Environmental Concern (EC) $\rightarrow$ Perceived Behavior Control (PBC)	0.176	0.048	3.682	0.000
Environmental Knowledge (EK) $\rightarrow$ Green Purchase Behavior (GPB)	0.125	0.050	2.498	0.013
Environmental Knowledge (EK) $\rightarrow$ Perceived Behavior Control (PBC)	0.193	0.048	4.060	0.000
Perceived Behavior Control (PBC) $\rightarrow$ Green Purchase Behavior (GPB)	0.165	0.047	3.481	0.001
Subjective Norms (SN) $\rightarrow$ Green Purchase Behavior (GPB)	0.109	0.052	2.102	0.036
Subjective Norms (SN) $\rightarrow$ Perceived Behavior Control (PBC)	0.202	0.052	3.854	0.000

**a) Environmental Concern (EC) → Green Purchase Behavior (GPB)**

H01: Environmental Concern (EC) has no significant impact on Green Purchase Behavior (GPB).

H1: Environmental Concern (EC) has a significant positive impact on Green Purchase Behavior (GPB).

The results show that the positive influence of Environmental Concern on Green Purchase Behavior is significant and high ($\beta = 0.334$, $t = 8.170$, $p = 0.001$). It implies that people are more inclined to make environmentally responsible purchasing decisions when they have more concern about environmental issues, for example, pollution, climate change, and resource depletion. The high relative size of the beta value compared to other predictors also shows that environmental concern is one of the most important factors in the model of green purchasing. Therefore, the alternative hypothesis is supported and environmental awareness plays a vital role in the choice of sustainable consumption patterns.

b) Environmental Concern (EC) → Perceived Behavioral Control (PBC)

H02: Environmental Concern (EC) has no significant impact on Perceived Behavioral Control (PBC)

H2: Environmental Concern (EC) has a significant positive impact on Perceived Behavioral Control (PBC)

The results shows that the Environmental Concern has a significant and positive effect on Perceived Behavioral Control ($\beta = 0.176$, $t = 3.682$, $p = 0.001$). This implies that the more concern with the environment the person is, the more likely they will develop a perception of being more competent at engaging in green behaviors. Increased concern improves the confidence and perceived capability of individuals to make environmentally-friendly decisions. Despite the medium strength of the relationship, it is statistically significant, thus, the alternate hypothesis is accepted.

c) Environmental Knowledge (EK) → Green Purchase Behavior (GPB)

H03: Environmental Knowledge (EK) has no significant impact on Green Purchase Behavior (GPB)

H3: Environmental Knowledge (EK) has a significant positive impact on Green Purchase Behavior (GPB)

The results showed that the environmental knowledge was positively and statistically significant on green purchase behavior, and the value of the coefficient β was positive ($\beta = 0.125$, $t = 2.498$, $p = 0.013$). The more people know about the environmental issues, green products and green practices the more likely they are to be involved with green purchasing. But, the beta coefficient is not too high suggesting that knowledge is not a strong determinant unless it is combined with other determinants such as concern or social influence. But as it turns out, the hypothesis, and the educational process of the consumers must be primarily focused on to support sustainable consumption.

d) Environmental Knowledge (EK) → Perceived Behavioral Control (PBC)

H04: Environmental Knowledge (EK) has no significant impact on Perceived Behavioral Control (PBC)

H4: Environmental Knowledge (EK) has a significant positive impact on Perceived Behavioral Control (PBC)

The results indicate that there are significant positive relationships between the environmental knowledge and perceived behavioral control ($\beta = 0.193$, $t = 4.060$, $p < 0.001$). This means that those with a stronger understanding of the environment are more empowered and can make better choices for the environment. Knowledge increases awareness of the available options, eco-labels and buying alternatives, thus, perceived ease and control of the green behavior. This hypothesis is then accepted and it is known that knowledge plays a great role in improving the perceived behavioural control of individuals.



e) Perceived Behavioral Control (PBC) → Green Purchase Behavior (GPB)

H05: Perceived Behavioral Control (PBC) has no significant impact on Green Purchase Behavior (GPB)

H5: Perceived Behavioral Control (PBC) has a significant positive impact on Green Purchase Behavior (GPB)

The results indicate that Perceived Behavioral Control has a significant influence on Green Purchase Behavior ($\beta = 0.165$, $t = 3.481$, $p = 0.001$). It means that those people are more inclined to undertake green behaviors when they think that they possess resources, opportunities, and ability to do it. It is the practical component of behaviour in which individuals can be informed but behaviour is based on the perceived ease or possibility. The alternative hypothesis is that the control perceptions are relevant in the process of making the intention come to fruition.

f) Subjective Norms (SN) → Green Purchase Behavior (GPB)

H06: Subjective Norms (SN) have no significant impact on Green Purchase Behavior (GPB)

H6: Subjective Norms (SN) have a significant positive impact on Green Purchase Behavior (GPB)

The result shows that the positive influence of Subjective Norms on the Green Purchase Behavior is positive ($\beta = 0.109$, $t = 2.102$, $p = 0.036$). It suggests that the social aspects such as family and friends views and views of the society have an impact on people's green purchasing. Other predictors have a higher impact, but not as high. This implies that the choices people make in order to act in an environmentally responsible manner are made in reference to those whom they expect to act the same way. The alternate hypothesis is then accepted and the level of social influence to encourage green consumption is significant.

g) Subjective Norms (SN) → Perceived Behavioral Control (PBC)

H07: Subjective Norms (SN) have no significant impact on Perceived Behavioral Control (PBC)

H7: Subjective Norms (SN) have a significant positive impact on Perceived Behavioral Control (PBC)

The results indicated that the subjective norms has a positive and significant effect on Perceived Behavioral Control ($\beta = 0.202$, $t = 3.854$, $p < 0.001$). This implies that social influence not only directly affects behaviour, but also boosts the perceptions of people by increasing their capabilities to act green. Peer support and encouragement, family support and encouragement or society support and encouragement can enhance confidence and decrease perceived barriers. The higher the value of beta of the predictors of PBC, the more significant the subjective norms' contribution is in the formation of perceptions of control. Thus, the hypothesis is proved right.

Table 5: Mediating Effect

Path	Original sample (O)	SD	T statistics	P values
Subjective Norms (SN) → Perceived Behavior Control (PBC) → Green Purchase Behavior (GPB)	0.033	0.013	2.478	0.013
Environmental Concern (EC) → Perceived Behavior Control (PBC) → Green Purchase Behavior (GPB)	0.029	0.011	2.522	0.012
Environmental Knowledge (EK) → Perceived Behavior Control (PBC) → Green Purchase Behavior (GPB)	0.032	0.013	2.543	0.011

a) Subjective Norms (SN) → Perceived Behavior Control (PBC) → Green Purchase Behavior (GPB)

H08: Subjective Norms (SN) do not have a significant indirect effect on Green Purchase Behavior (GPB) through Perceived Behavioral Control (PBC).

H8: Subjective Norms (SN) have a significant indirect effect on Green Purchase Behavior (GPB) through Perceived Behavioral Control (PBC).



Based on the findings, it can be seen that the relationship between the SN and GPhB through PBC is significant and positive ($\beta = 0.033$, $t = 2.478$, $p = 0.013$). The value of p is less than 0.05, so that H08 is rejected and H8 is accepted. This suggests that the influence of subjective norms on green purchase behavior is mediated through the perception of others' powers to engage in green purchase behavior. That is, the confidence and capacity of the individuals to engage in green purchasing increased by the social pressure and their own, family, and social expectations, thereby improving their actual behavior. This ascertains the mediating nature of PBC in the association between subjective norms and green purchase behavior, partially.

b) Environmental Concern (EC) $\rightarrow$ Perceived Behavior Control (PBC) $\rightarrow$ Green Purchase Behavior (GPB)

H09: Environmental Concern (EC) does not have a significant indirect effect on Green Purchase Behavior (GPB) through Perceived Behavioral Control (PBC).

H9: Environmental Concern (EC) has a significant indirect effect on Green Purchase Behavior (GPB) through Perceived Behavioral Control (PBC).

Based on the results, the influence of Environmental Concern on the Green Purchase Behavior through Perceived Behavioral Control is positive and significant ($\beta = 0.029$, 2.522, 0.012). Hence, H09 is rejected and H9 accepted. This shows that persons who have greater environmental concern will tend to acquire a stronger sense of control on their level of ability to do environmentally responsible behaviors that will result in the greater green purchasing behaviors. Therefore, environmental concern has an indirect effect in terms of an increase in perceived behavioral control which indicates the mediating effect of PBC.

c) Environmental Knowledge (EK) $\rightarrow$ Perceived Behavior Control (PBC) $\rightarrow$ Green Purchase Behavior (GPB)

H010: Environmental Knowledge (EK) does not have a significant indirect effect on Green Purchase Behavior (GPB) through Perceived Behavioral Control (PBC).

H10: Environmental Knowledge (EK) has a significant indirect effect on Green Purchase Behavior (GPB) through Perceived Behavioral Control (PBC).

The results of this study show that there is a positive and significant indirect effect of Environmental Knowledge on Green Purchase Behavior via Perceived Behavioral Control ($\beta = 0.032$, 2.543, 0.011). So, H010 is rejected and H10 is accepted. This means the more people know about environmental issues and green products, the more competent and confident they will be in making environmentally friendly purchases and ultimately, changing their actual purchasing behavior. Therefore, the mediation of the effect of environmental knowledge on environmental purchase behaviour is partial, as perceived behavioral control is once again found to mediate the effect.

Table 6: R square

R square	Original sample (O)	SD	T statistics	P values
Green Purchase Behavior (GPB)	0.233	0.035	6.565	0.000
Perceived Behavior Control (PBC)	0.153	0.034	4.483	0.000

The values of R^2 used to assess the explanatory power of the structural model is the proportion of variance in the endogenous constructs covered by the predictor variables as shown in Table 6. The R^2 of Green Purchase Behavior (GPB) is 0.233 and this value indicates that the shares of the variance in green purchase behavior attributed to the Environmental Concern (EC), Environmental Knowledge (EK), Perceived Behavioral Control (PBC) and Subjective Norms (SN) are 23.3%. This explanatory power is significant as the t -value is 6.565 and the p -value is < 0.001 . This degree of R^2 , according to widely recognized levels, may be classified as moderate



implying that, though the model can be found to explain a significant amount of behavior, there are other elements outside the model which can also be used to make green purchasing decisions. The R² of Perceived Behavioral Control (PBC) is 0.153 which means that 15.3% of the variance in perceived behavioral control is explained by Environmental Concern (EC), Environmental Knowledge (EK), and Subjective Norms (SN). The correlation is statistically significant ($t = 4.483$, $p < 0.001$). This value can be understood as weak to medium, meaning although the predictors that are included are significant and contribute to explaining the PBC, there is still a large proportion of variance that is not explained which suggests that other external or psychological factors could be contributing to this.

Discussion of Findings

The present study investigated whether Environmental Knowledge (EK), Environmental Concern (EC), Subjective Norms (SN) and Perceived Behavioral Control (PBC) would impact Green Purchase Behaviour (GPB) and if PBC would mediate the relationship between the other variables. The results highlight the significant relationships between environmental, cognitive, social and behavioural-control factors in determining the consumers' green purchasing behaviour. The findings are in line with the general approach of the Theory of Planned Behaviour (Ajzen 1991) that looks at the subjective norms and perceived behavioural control as factors that influence behaviour decision making. In addition to influencing behavioural intentions, perceived behavioural control can also influence actual behaviour (Ajzen, 1991).

Environmental Concern and Green Purchase Behaviour

The results show that the Environmental Concern has significant and positive influence on Green Purchase Behaviour ($\beta = 0.334$, $t = 8.170$, $p < 0.001$). This means that the more concerned the respondents are in this regard, they are more likely to undertake environmentally responsible purchasing behaviour. Environmental concern is a measure of how much the individual is aware of and concerned with environmental degradation and its implications. The result aligns with Pagiaslis and Krontalis 2014 who investigated the relationships between environmental concern, environmental knowledge and environmental behavioural intention and found positive relationships among the environmental factors. Their study proved that environmental concern is pertinent to understanding environmental consumer responses. This result also aligns with Paul, Modi and Patel (2016) who applied the theory of planned behavior (TPB) to explain the consumer's buying intention for green products and found that environmental concerns was a factor in the development of the green product purchase intention. Therefore, the current study offers additional empirical evidence on the importance of the environmental concerns in explaining green purchasing behaviour.

Environmental Concern also has a positive and significant effect on Perceived Behavioral Control ($\beta = 0.176$, $t = 3.682$, $p < 0.001$). This indicated that more environmentally concerned respondents also felt they had more ability or control in making environmentally responsible purchases. The indirect role of PBC on the relation between Environmental Concern and Green Purchase Behaviour was also significant ($\beta = 0.029$; $t = 2.522$; $p = 0.012$), highlighting that PBC is another important pathway via which environmental concern relates to green purchasing behaviour.

Environmental Knowledge and Green Purchase Behaviour

Environmental Knowledge has positive and statistically significant relationship with Green Purchase Behaviour ($\beta = 0.125$, $t = 2.498$, $p = 0.013$). This means that consumers who have knowledge of environmental issues, sustainable consumption and environmentally-friendly products are more likely to exhibit green purchasing behavior. The relatively low coefficient, however, indicates that knowledge is not enough to account for the consumers' purchasing behaviour. The finding is consistent with that of Pagiaslis and Krontalis (2014) who found that environmental knowledge is among the constructs that explain environmentally oriented



behavioural responses. They concluded that there were significant relationships between the constructs of environment concern, environmental knowledge and behavioural intention. Likewise, Lin and Niu (2018) conducted a survey of 649 consumers in Taiwan, which investigated environmental knowledge, environmental consciousness, social norms and purchasing behaviour. They concluded that environmental knowledge and social norms were significant for the environmentally oriented attitudes and green purchasing behaviour. Given their results and the current study's results, the consistency further reinforces their claim that environmental knowledge can help to support environmentally responsible consumption. Environmental Knowledge also has a significant impact on Perceived Behavioral Control ($\beta = 0.193$, $t = 4.060$, $p < 0.001$). This suggests that higher levels of environmental knowledge among consumers could lead to higher ability to recognize and choose environmental-friendly products. In their study on Eco-Sustainable Product Purchasing, Rusyani et al. (2021) focused on the interrelationships between environmental knowledge, environmental concern and green attitude and perceived behavioural control. They found their results to be relevant for further analysis along the lines of knowledge and concern as well as perceived behavioural control to explain sustainable purchasing behaviour. The results from the mediation also reveal that there is a significant indirect effect between Environmental Knowledge and Green Purchase Behaviour via PBC ($\beta = 0.032$, $t = 2.543$, $p = 0.011$). The direct impact of Environmental Knowledge on GPB also proved to be substantial, so the results suggest that PBC is a second pathway by which Environmental Knowledge is linked to GPB.

Perceived Behavioral Control and Green Purchase Behaviour

Perceived Behavioral Control is positively and statistically significant to Green Purchase Behaviour ($\beta = 0.165$, $t = 3.481$, $p = 0.001$). Therefore, the findings suggest that consumers who feel capable, have resources and opportunities to make environmentally responsible purchases are more likely to make those purchases in a green manner. This is theoretically in line with Ajzen's (1991) Theory of Planned Behavior. Perceived Behavioural Control is the ease or difficulty that a person sees in performing a specific behaviour and is a key part of the process of making a behavioural decisions, says Ajzen. The findings are also important for Paul et al. (2016) who used the Theory of Planned Behavior to explain green product consumption and found the constructs of TPB to be significant in explaining green product purchase intention. The current results take this view one step further, showing that there is a significant relationship between PBC and reported Green Purchase Behaviour.

Subjective Norms and Green Purchase Behaviour

Subjective Norms positively and significantly affect Green Purchase Behaviour ($\beta = 0.109$, $t = 2.102$, $p = 0.036$). This means that what consumers feel they're expected to do and how significant people act around them relate to their green buying habits. Expectations or encouragement from family members, friends, colleagues and other relevant social groups can impact consumers' environmentally responsible consumption. The result agreed with the findings by Ajzen (1991) that one of the major factors of the Theory of Planned Behavior is subjective norms. It is also in line with Lin and Niu (2018), who explicitly studied the social norms concerning the environmental consumption behavior and concluded that they are relevant to the environmental consumption behavior. Subjective Norms also have a significant positive effect on Perceived Behavioral Control ($\beta = 0.202$, $t = 3.854$, $p < 0.001$). This implies that social support and perceived expectations might be linked with consumers' prospective to perform green purchasing behaviour. The indirect effect of Subjective Norms on Green Purchase Behaviour via PBC is significant (0.033 , $t = 2.478$, $p = 0.013$). Hence, the PBC is an additional mechanism that relates Subjective Norms to green purchasing behaviour.

Mediating Role of Perceived Behavioral Control



Perceived Behavioral Control is one of the important findings of the study as it significantly mediates between the variables. The mediation analysis shows that the relationship between the variables of Environmental Concern and Environmental Knowledge with Green Purchase Behaviour is indirect via PBC and is significant. Specifically, the indirect effects of Environmental Concern, Environmental Knowledge and Subjective Norms are $\beta = 0.029$ ($p = 0.012$), $\beta = 0.032$ ($p = 0.011$), and $\beta = 0.033$ ($p = 0.013$), respectively. The results show that the perceived control over the behaviour is a link between the three antecedents and Green Purchase Behaviour. The results are theoretically consistent with Ajzen's (1991) model in which perceived behavioural control is regarded as a relevant factor in determining behaviour. The findings also have implications for Rusyani et al. (2021), who explored the factors of perceived behavioural control, alongside environmental knowledge and environmental concern, in the context of eco-sustainable product purchasing. The present study, therefore, makes a contribution to the existing research by investigating the role of PBC as a mediator between the environmental/social antecedents and green purchase behaviour.

Explanatory Power of the Model

The structural model explains 23.3% of the variance in Green Purchase Behaviour ($R^2 = 0.233$). Together, these factors (Environmental Concern, Environmental Knowledge, Subjective Norms and Perceived Behavioral Control) explain this amount of variance in GPB. The variances not accounted for in the current model indicate that other factors beyond those incorporated into the current model may also impact green purchasing behaviour. The R^2 value for Perceived Behavioral Control is 0.153, which means that 15.3% of this control is explained by the three variables of Environmental Concern, Environmental Knowledge and Subjective Norms. The results indicate that while environmental and social influences are important factors for perceived behavioural control, consumers' perceptions of control could also be influenced by other factors such as availability, price, accessibility, previous experience and situational factors. Overall, results indicate that an integrated view, in which environmental knowledge and environmental concern and social influences are related directly and indirectly via perceived behavioural control, is supported.

Conclusion

The results of the present study show that among the respondents, Environmental Knowledge, Environmental Concern, and Subjective Norms and Perceived Behavioral Control were important factors that influence Green Purchase Behaviour. The results reveal that consumers' environmental concern indeed has a significant positive relationship with green purchasing behaviour and that environmental knowledge and subjective norms also have a significant positive effect on GPB. Results also indicate that Environmental Concern and Environmental Knowledge, as well as Subjective Norms, significantly impact Perceived Behavioral Control. PBC, in turn, has a significant impact on Green Purchase Behaviour. The results are in line with the theoretical assumption of the Theory of Planned Behavior (Ajzen, 1991) that subjective norms and perceived behavioural control play an important role in the process of making behavioural decisions. The mediating analysis further supports the proposed model as a significant role of the PBC. The results reveal that Environmental Interest, Environmental Knowledge and Subjective Norms have significant indirect impacts on Green Purchase Behaviour via PBC. The results suggest that consumers' environmental knowledge and environmental concern and social influences are linked to green purchasing behaviour through their perceptions of control over environmentally responsible purchasing. The findings are also supported by previous empirical research. Pagiaslis and Krontalis (2014) found environmental concern and environmental knowledge to be relevant in environmentally oriented consumer behaviour, and Lin and Niu (2018) found the relevance of environmental knowledge, environmental consciousness and social norms in green consumption. Rusyani et al. (2021) also investigated the correlations between: (1) environmental knowledge and



(2) environmental concern and perceived behavioural control in relation to buying eco-friendly products. The above shows that the selected variables accounted for 23.3% of the variance in Green Purchase Behaviour and 15.3% of the variance in Perceived Behavioral Control. Thus, the results support the proposed integrated model and suggest that there may be other psychological, economic, social and situational factors that influence the green purchasing behaviour. Finally, it illustrates that green purchasing behaviour is a multi-dimensional concept, which represents the sum of three dimensions: environmental cognition, environmental concern and subjective norm and perceived control.

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