

Antecedents of attitudes towards the use of environmentally friendly household appliance products in Zimbabwe: an extension of the theory of planned behaviour

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Abstract

Purpose – This study aims to determine the antecedents that influence attitudes towards the use of environmentally friendly household appliance products and consumers' green purchase intention among consumers in Harare, Zimbabwe.

Design/methodology/approach – Data were collected from 329 consumers in Harare, Zimbabwe's commercial capital who were served from five using a structured questionnaire via an online web-based cross-sectional survey. Hypothesised relationships were tested through structural equation modelling with the aid of Smart PLS software.

Findings – Green product awareness, social influence, perceived benefit and attitude towards green appliances were found to have a significant positive effect on green purchase intention.

Research limitations/implications – The study's findings may not be generalised to other contexts as sample data was only collected in Zimbabwe. Complementary cross-sectional research studies can be done in other parts of the world to enable cross-cultural comparisons and methodological validations.

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Practical implications – The green appliance and energy saving practices are vastly growing, with many multinational appliance companies introducing green products within their product lines and adopting the concept of sustainability through modifications in production, design and consumption of household appliance products that encompass fewer harmful consequences on the environment in response to their concerns about the scarcity of natural resources, environmental well-being and the potential detriment of future generations.

Originality/value – Notwithstanding the limitations of the current study, the results have the potential to contribute to an improved understanding of influence attitudes towards the use of environmentally friendly household appliance products.

Keywords Attitude, Behaviour, Environmentally friendly, Green household appliance products

Paper type Research paper

Introduction

The need to encourage sustainable usage of environmentally friendly household appliance products has been urged by the increase in the general acceptance of global climate change (Nguyen *et al.*, 2017). This is so because air pollution and global climate change are the main causes of many deaths per annum (WHO, 2022). Energy consumption has proved to cause serious environmental problems, with an expected upward trend by 2040 as alternative cleaner-environmentally friendly energy sources are depleting (IEA, 2016). Prior research has proved that construction is responsible for almost 50% usage of this energy around the world (Yan *et al.*, 2019; Shabha *et al.*, 2023). Households and organisations, therefore, need to embrace sustainable technologies, with proper energy management and optimised energy use skills as a matter of urgency to counter this social responsibility issue (Zhou and Bukenya, 2016). In line with this, several studies have depicted that consumers' reduced consumption of energy-efficient high-tech, environmentally friendly appliances has contributed sustainability (Waris *et al.*, 2021; Yan *et al.*, 2019; De Luca *et al.*, 2018).

Despite the ability to provide important insights into the importance of environmentally friendly household appliance products, it is essential to note that there is still a shortage of empirical evidence of relationships between green product awareness, social influence, perceived benefit, attitudes towards green appliances and green purchase intention. Consequently, further scholarly introspections are considered necessary. Much of what is written on the subject is based on samples from Asian countries such as Pakistan, Malaysia, Korea, Vietnam, China and Bangladesh (among others). For instance, Bhutto *et al.* (2020) empirically investigate consumers' intentions in Pakistan to purchase energy-efficient appliances (EEAs). Harun *et al.* (2022) examined consumer purchases of energy-efficient appliances in Malaysia. In addition, Ha and Janda (2012) predicted consumer intentions to purchase energy-efficient products in Korea. Furthermore, Nguyen *et al.* (2016) determined the influence of consumers' values and knowledge on their attitudes and purchase behaviour of energy efficient household appliances in Vietnam. Additionally, Hua and Wang (2019), examined the antecedents of consumers' intention to purchase energy-efficient appliances in China. Moreover, Rahman and Haq (2016) investigated the factors influencing the buying intention of energy-efficient home appliances in Bangladesh.

Even in Zimbabwe, there is scant evidence in studies that have determined the antecedents that influence attitudes towards the use of environmentally friendly household appliance products and consumers' green purchase intention. Therefore, little is known of the same from developing parts of the world, such as African countries – Zimbabwe in particular. Hence, this lacuna deserves empirical inspection in the case of a neglected context. Local scholars in Zimbabwe have determined the environmentally-friendly practices in hotels in Zimbabwe (Mbasera *et al.*, 2016). In addition, Chikosha and Potwana (2021) examined consumer perceptions of green products, purchasing behaviour and loyalty in Zimbabwe. Furthermore, Ndofirepi (2019) explored on the gender-based dichotomies in various psychographic attributes for environmentally friendly products in Zimbabwe. Moreover,

[Ndofirepi and Matema \(2020\)](#) investigated on the relationship between personality and the intention on repeat purchases for environmentally friendly products among college students in Zimbabwe.

While these international and local studies are informative, they did not examine the association between green product awareness, social influence, perceived benefit, attitudes towards green appliances and green purchase intention in Zimbabwe. Therefore, this article helps tackle the gap by using a sample of consumers from a developing country context. It is also important to note that very few (if any) researchers have used Structural Equation Modelling (SEM) to test the relationships between green product awareness, social influence, perceived benefit, attitudes towards green appliances and green purchase intention. The exhaustive review of relevant literature opens a gap in research that needs to be addressed. Regarding the conceptual model proposed in this study, it can be noted that it is unique –as there are deficiencies in studies that have tested the variables in the proposed model in relation to the Zimbabwean context (to the best knowledge of the researchers). Moreover, the moderating role of attitudes has also been determined by authors such as [Camacho et al. \(2020\)](#), [Irshad and Ahmad \(2019\)](#), [Abrar et al. \(2019\)](#) as well as [Wulandari et al. \(2015\)](#). However, there is scant evidence, on studies that have explored the role of attitudes as a mediator between green product awareness and green purchase intention; social influence and green purchase intention; as well as perceived benefit and green purchase intention. Hence this study will be a significant contribution in addressing this gap.

This article is structured as follows: first, a theoretical basis for the analysis is presented, then a theoretical model is presented and then, the hypothesis is established. After that, the study design and methodology are discussed, followed by the findings and discussion. The implications, limitations and future research directions are discussed in the article's final sections.

Contextualisation of the study

Harare, Zimbabwe as a research setting

This section details the study's demarcation area, Harare, Zimbabwe. According to [Mwonzora \(2021\)](#) Harare is the capital city of Zimbabwe with a population of 2,123,132 million. [Chikosha and Potwana \(2021\)](#) recommended that future research be done in more extensive, wealthier areas like Harare to see how the results turn out. Their study examined the impact of product quality on purchase intention for green products. Therefore, the study by Chikosha and Potwana served as a starting point for the researchers to consider the factors that influence attitudes toward adopting environmentally friendly household appliance products in Harare, Zimbabwe. Electricity has a huge impact on mainly growing economies like Zimbabwe and is considered a significant input of production ([Rafindadi and Ozturk, 2016](#)), hence a study centred on the antecedents that influence attitudes towards the use of environmentally friendly household appliance products in Zimbabwe is of paramount importance. Research in this area is of even greater significance to Zimbabwe since the country heavily depends on conventional energy production means ([Samu et al., 2019](#)). These sources of energy production are not only depleting but they are unclean, not environmentally friendly and unsustainable, thus the policymakers should now incorporate renewable energy resources in the energy portfolio to ensure sustainability ([Samu et al., 2019](#)). In Zimbabwe, noticeable green products are energy saving bulbs, computers, refillable/reusable consumer product packages, solar energy systems, ethanol blended fuel and washing machines, amongst others ([Chikosha and Potwana, 2021](#)). To hasten the growth of a green economy, the Zimbabwean government has weighed in by crafting an environmental policy aimed at integrating environmental aspects into national development plans, embarking on specific actions that encourage the consumption of green products ([Chikosha and Potwana, 2021](#)).

Therefore, deducing from the aforementioned elucidations, the choice of Harare, Zimbabwe as the location for the study on attitudes towards the use of environmentally friendly household appliance products and consumers' green purchase intention is relevant for several reasons. Firstly, Harare is the capital city of Zimbabwe, representing a significant urban centre and a hub of economic activity. This makes it a suitable location to understand consumer behaviours and attitudes towards green products, as urban areas often have higher levels of consumption and access to a wider range of products compared to rural areas. Secondly, Zimbabwe is facing various environmental challenges, including deforestation, water scarcity and waste management issues. As a result, the study conducted in Harare can shed light on the specific context of a developing country facing environmental issues, providing valuable insights into the unique challenges and opportunities that exist in such a setting. Finally, by focussing on Harare, the study can help inform local policymakers, businesses and organisations about the factors influencing consumer attitudes and intentions towards environmentally friendly products, facilitating the development of targeted interventions and strategies to promote sustainable consumption patterns in the city.

Theoretical premise

Diverse models and theories exist for seeking to predict and explain human behaviour. To comprehend the antecedents that influence attitudes towards the use of environmentally friendly household appliance products and green purchase Intention. This study is grounded into the theory of planned behaviour. The theory is discussed in the ensuing section.

The theory of planned behaviour (TPB)

Ajzen (2002) proposed the Planned Behaviour Theory. The TPB improves the purchase intention model's predictability (Jebarajakirthy and Lobo, 2014) for green products. The TPB model has been one of the most widely used models for studying environmental behaviours (Fielding *et al.*, 2008). Many researchers believe that the TPB model can explain consumers' sustainable consumption behavioural intentions and predict their future behaviours well (Mannetti *et al.*, 2004). The TPB model demonstrates that three predictors guide human intention: attitude towards behaviour, subjective norm and perceived behavioural control. However, although the TPB model has been widely used to examine the motivation of sustainable consumption intentions, researchers have noticed that domain-specific factors have not been included in the model (Armitage and Conner, 2001; Donald *et al.*, 2014). An increasing number of studies have extended the TPB model by including new constructs (Jang *et al.*, 2015; Maichum *et al.*, 2016; Read *et al.*, 2013). This study extended the TPB by including three variables such as green product awareness, social influence, perceived benefit, as well as traditional TPB constructs (i.e., attitude towards behaviour and behavioural intention) to measure consumers' green purchase intention of environmentally friendly household appliance products.

Inferring from the Theory of Reasoned Action (TRA), green purchase intention can be rationalised by referring to Qureshi *et al.* (2023), who explored how to determine the factors that led to the intention to purchase green products? Other scholars, namely, Mohd Suki (2016) and Salam *et al.* (2022) have even gone further to adopt the TPB which is an extension of the TRA through the addition of perceived behavioural control to discuss attitudes and intention to purchase green product. Mohd Suki (2016) suggested that, done properly, green brand positioning has the potential to increase green brand knowledge, attitude toward green products and green brand purchase intention. Furthermore, Salam *et al.* (2022) justified the use of the TPB when it comes to green purchase behaviour because it helps explain the

factors that influence attitude toward green brands and additionally, whether these attitudes lead to purchase intention? The application of this model to this study is that, the model provides further explanations into the connection between green product awareness, social influence, perceived benefit, attitudes and green purchase intention. Since the literature on consumer purchase of environmentally friendly household appliance products is still in its infancy, it is commendable to scrutinise and examine the relation of the TPB with other critical determinants of consumer intention and purchase of environmentally friendly household appliance products. The outcome would provide helpful insight to policymakers and authorities to implement better mitigation plans to increase the purchase of environmentally friendly household appliance products.

Conceptual research model and hypotheses formulation

Figure 1 illustrates the conceptual model reflecting the distinct paths and connections between the investigated constructs. The subsequent sections will then provide the formulation of the hypotheses for the present research.

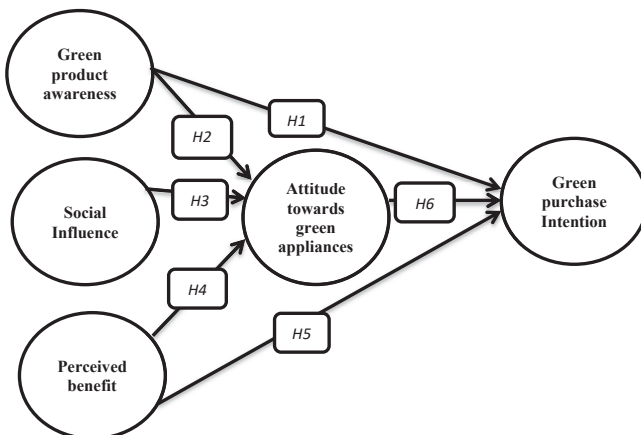
Green product awareness and green purchase intention

Braimah (2015) revealed that green brand awareness positively and significantly influences customer purchase intention. Similarly, a study conducted by Mahmood *et al.* (2014) found that green awareness is one of the most vital predictors of green purchase intention and that, ultimately, green awareness has a significant and positive relationship with green purchase intention. Moreover, Suki (2016) conducted a study on consumers’ green purchase intention whereby the findings postulate that green product awareness has a positive and significant impact on green purchase intention. Drawing from the above discussion, it can be hypothesised that:

- H1. Green product awareness has a significant and positive impact on green purchase intention.

Green product awareness and attitudes

Anvar and Venter (2014) findings show that environmental awareness significantly and positively influences individuals’ attitudes towards green products. Boztepe (2012) also found



Source(s): Authors’ own work (2022)

Figure 1. The conceptual model

a positive and significant relationship between environmental awareness and consumers' attitudes towards purchasing a green product. Moreover, green product knowledge fundamentally encourages stronger beliefs towards the benefits attained through the use of green products and more positively balanced opinions regarding the various impacts of product use (Ha and Janda, 2012). Therefore, based on the above discussion along with Ajzen's Theory of Planned Behaviour (1991) stating that the beliefs consumers may have also form attitudes, the following hypothesis can be drawn:

H2. Green product awareness has a significant and positive impact on attitudes.

Social influence and attitudes

Muhammad and Ghani (2016) investigates the relationship between attitude and social influence on purchase behaviour. The results suggest a positive and significant relationship between social influence and attitude. Muhammad and Ghani (2016) state that social influences manipulate consumers to perform activities to gain approval in certain social situations. Those personal thoughts and social influences are predictors of behaviour towards intention. Ajzen's Theory of Planned Behaviour looks into subjective norms as being directly linked to social pressures and thus having a direct influence on whether or not to perform a specific behaviour (Ajzen, 1991). Therefore, the following hypothesis can be formed:

H3. Social influence has a significant and positive impact on attitudes.

Perceived benefit and attitudes

Ruiz-Molina and Gil-Saura (2008) found that perceived value has a significant and positive attitude on customer attitude. Zhang and Wang (2005) also discovered a positive and a significant relationship between perceived value and attitudes toward a given behaviour (Zhang and Wang, 2005). According to Mostafa (2006), perceived consumer benefit is a highly influential factor when analysing the attitude-consumer behaviour relationship. Furthermore, it was determined that concepts relating to people's beliefs about their impact on future outcomes and the desire to provide benefits for others provide benefits for others may positively influence pro-environmental attitudes and behaviours (Mostafa, 2006). Thus, it is hypothesised that:

H4. Perceived benefit has a significant and positive impact on attitude.

Perceived benefit and green purchase intention

Mahmood *et al.* (2014) revealed a positive and a significant relationship between green perceived value and green purchase intention. Furthermore, Salehzadeh and Pool (2017) found that perceived value positively and significantly influences purchase intention. Green purchase intention is described in terms of the willingness and probability of a consumer to choose products containing eco-friendly features over traditional products in their evoked set (Mei *et al.*, 2012). Chen and Chang (2012), argue that the perceived benefit and value of products act as a signal to consumers as judgement is often built from incomplete information, and therefore the benefit perceived will positively influence purchase intention. A consumer may find that an eco-friendly product provides high perceived benefit through the multiple advantage of environmental protection and personal gain which would positively influence their intention to purchase that product. Therefore, based on the above, the following hypothesis is proposed:

H5. Perceived benefit has a significant and positive impact on green purchase intention.

Attitudes and green purchase intention

Nam *et al.* (2017) found out that attitude has a significant and positive influence on green purchase intention whereby it was concluded that attitude plays a key role as a mediator between purchase intention and other relevant predictor variables (Nam *et al.*, 2017). Furthermore, Suki (2016) postulate that consumers' attitude toward green brands significantly and positively influences green product purchase intention. Purchase intention is built on consumers' attitudes, evaluation and external factors, essentially making it a vital factor to predict consumer behaviour (Brammah, 2015). Based on the above findings, it is hypothesised that:

H6. Attitude has a significant and positive impact on green purchase intention.

The mediating role of attitudes

Apart from the posited relationships depicted in conceptual model (Figure 1). Alternative hypothesis statements incorporating attitudes towards environmentally friendly household appliance products as a mediating variable have also been included. It is imperative to provide empirical evidence that regards attitudes towards using environmentally friendly household appliance products as a mediating variable between green product awareness, social influence, perceived benefit and green purchase intention. However, there are deficiencies in empirical studies that are centred on the use of environmentally friendly household appliance products as a mediating variable. Hence the need to close this mediation gap. A few closely related studies such as the one conducted by Chu (2018) discovered that consumer attitudes toward organic foods mediate the effects of health consciousness on the intention of purchasing organic foods. Camacho *et al.* (2020) revealed that product attitudes will mediate the relationship between xenocentrism and purchase intentions.

Furthermore, Irshad and Ahmad (2019) discovered that consumer attitudes mediate the relationship between hedonic value and purchase intentions, while Abrar *et al.* (2019) found out that consumer attitudes mediate behavioural intentions. The attitude variable has been proven to mediate consumer knowledge influence the purchase intention of green products (Wulandari *et al.*, 2015). Based on this premise, the mediating impact of attitudes still needs further clarification as there is still limited empirical research. It is expected that attitudes towards environmentally friendly household appliance product use can be a mechanism through which green product awareness, social influence and perceived benefit would influence green purchase intention. This is one of the essential empirical contributions of this study because it offers a more nuanced explanation of the essence of attitudes towards using environmentally friendly household appliance products as a mediator variable. Consequently, drawing from the above discussion and past empirical evidence, it can be hypothesised that:

H7. Attitudes towards the use of environmentally friendly household appliance products positively and significantly mediates the relationship between green product awareness and green purchase intention.

H8. Attitudes towards the use of environmentally friendly household appliance products positively and significantly mediates the relationship between social influence and green purchase intention.

Methodological aspects

The research philosophy for this study was positivism. This study was conducted using a quantitative research method. The design was suitable for gathering information on green product awareness, social influence, perceived benefit, attitudes towards green appliances

and green purchase intention. Furthermore, the technique enables for the investigation of causal links between the research constructs.

Sample and data collection

Using an online questionnaire platform, a survey was conducted online. A pilot study using 40 samples was conducted prior to the full-fledged data gathering. The pilot study’s findings imply that the construct validity was satisfactory. The researchers divided the population potential respondents into more relevant and significant strata based on subsets where a random sample was drawn from each of the strata (Hair *et al.*, 2014) such as the customers’ profiles (low, middle- and high-income earning capacities) as well as the geographical locations (local, regional and international) to which they belong to. Stratified random sampling technique was applied due to its accuracy and easy-to-use advantages (Cude *et al.*, 2016). Krejcie and Morgan (1970) formula was applied to determine the sample size, which was necessary to construct a confidence interval (generally +5%). The participants were invited through the author’s networking and contacts. Survey invitations were sent to approximately 500 potential respondents, with their anonymity and confidentiality were guaranteed. Of the 500 questionnaires distributed, 329 questionnaires returned were useable, resulting in a response rate of 65.8%.

Measurement instrument

All questionnaires were distributed through the web-based survey method to customers. Participation was voluntary and the objectives of the study were explained to the participants in the research study before completing the questionnaire. Four constructs of the proposed research model were adopted from existing literature and refined based on the specific topic of this study. The respondents’ beliefs were captured using a five-point Likert-type scale anchored on strongly agree (5) to strongly disagree (1). The items used to measure each construct are provided in Appendix. Both descriptive and inferential statistics were used in analysing quantitative data from the questionnaire. Ethical considerations related to participating customers’ privacy, informed consent, freedom of response, professionalism, integrity, accuracy and values of research have been adhered to by the researchers.

Results analysis

Analysis of background variables

The subjects of this research are a total of 329 respondents. As shown in Table 1, there are 145 (44.48%) males and 184 (55.52%) females.

Sample adequacy and test of normality

The results showed that the KMO’s measure of sampling adequacy value was 0.863, which is by greater than the threshold value of 0.5 that indicated adequate sample size. Likewise, the Bartlett’s test of Sphericity tested ($\chi^2 (320) = 24165.271, p < 0.05$) and the correlation matrix

Items	Background variables	Number of people	Percentage (%)
Gender	Male	145	44.48
	Female	184	55.52
		329	100

Table 1.
Frequency distribution
of sample data

Source(s): Primary data (2022)

was adequacy. The proportion of item's variance explained by the extracted factors (communalities) were all above 3.00, further confirming that each item shared common variance with other items. The results indicated that the matrix was not an identity matrix and this allowed the factor analysis to be conducted as relationships between variables existed. Multivariate normality was examined by means of SPSS (Version 25).

According to the results in Table 2, ($KMO = 0.863, p > 0.05$), there is need to increase the sample size (collect more information) or to select certain variables to include in the analysis. The correlation matrix is not an identity matrix according to the Bartlett's test of Sphericity ($\chi^2(320) = 24165.271, p < 0.001$). The results indicate that the matrix is not an identity matrix, and this allows the factor analysis to be conducted as relationships between variables exist.

Reliability analysis

Results from Table 3 indicates that the Cronbach's alpha value ranges between 0.703 and 0.889, demonstrating that all the observed items are reliable and consistent. For green product awareness, social influence, perceived benefit, attitude towards green appliances and green purchase intention, the Cronbach's alpha value were 0.812, 0.773, 0.703, 0.806 and 0.832 respectively.

Measurement model assessment

SmartPLS 3.2.9 was used to evaluate the measurement model and test the main effects. Construct validity of the measurement model was assessed by investigating the construct

Kaiser-Meyer-Olkin measure of sampling adequacy		0.863
Bartlett's test of sphericity	Approx. chi-square	24165.271
	df	320
	Sig	0.000

Table 2.
KMO and Bartlett's test

Source(s): Primary data (2022)

Dimension	Question items	Skewness	Kurtosis	Factor loadings	Cronbach's alpha	CR	AVE
Green product awareness (GPA)	GPA1	1.173	-0.369	0.824	0.812	0.889	0.728
	GPA2			0.801			
	GPA3			0.785			
Social influence (SI)	SI1	1.151	-0.510	0.712	0.773	0.868	0.690
	SI2			0.814			
	SI3			0.763			
Perceived benefit (PB)	PB1	1.262	-0.353	0.696	0.703	0.834	0.626
	PB2			0.786			
	PB3			0.807			
Attitude towards green appliances (AT)	AT1	1.567	-0.300	0.841	0.806	0.873	0.632
	AT2			0.725			
	AT3			0.716			
	AT4			0.769			
Green purchase intention (GPI)	GPI1	1.125	-0.318	0.854	0.832	0.888	0.665
	GPI2			0.728			
	GPI3			0.742			
	GPI4			0.810			

Table 3.
Measurement model parameter estimation

Source(s): Primary data (2022)

measures' convergent and discriminant validity (Hair *et al.*, 2019). The standard criteria for convergent validity were applied, which include: (1) all standardised loadings (in PLS, outer loadings) which statically surpassed the recommended value 0.5 for each relevant research construct (Aldalaign and Buttle, 2002), the average variance extracted (AVE) of each construct is 0.5 or higher and the composite reliability (CR) value is 0.7 or higher. It is imperative to note that GPA1, GPA5, PB4, AT5, AT6 and GPI5 items were removed because the item loadings were less than 0.500; thus, less than 50% of variance was explained and the thresholds of equivalent or higher than 0.500 did not reach.

Correlation analysis

Lovakov and Agadullina (2021) gave the rule of thumb for the correlation coefficient to be as follows: $r < 0.2$ (very-weak), $0.2 \leq r < 0.4$ (weak), $0.4 \leq r < 0.6$ (moderate), $r \geq 0.8$ (very strong). Table 4, gives the inter-item correlation estimates: green product awareness and attitude towards green appliances ($r = 0.718$), green purchase intention and attitude towards green appliances ($r = 0.762$), perceived benefit and attitude towards green appliances ($r = 0.860$), social influence and attitude towards green appliances ($r = 0.831$), green purchase intention and green product awareness ($r = 0.979$), perceived benefit and green product awareness ($r = 0.719$), social influence and green product awareness ($r = 0.694$), perceived benefit and green purchase intention ($r = 0.753$), social influence and green purchase intention ($r = 0.716$) and social influence and perceived benefit ($r = 0.896$). From the results, the relationship among the variables very strong.

Convergent validity

From the results displayed in Table 4, the AVE values for green product awareness (0.728), social influence (0.690), perceived benefit (0.626), attitude towards green appliances (0.632) and green purchase intention (0.665) (>0.50), showing that the indicators were assumed to measure the same construct sufficiently (Collier, 2020).

Discriminant validity

In line with the results presented in Table 5, all the cross-loadings are exceeding 0.6 implying that convergent validity on the measurement constructs exist (Fornell and Larcker, 1981). Moreover, discriminant validity of the constructs was also examined through Heterotrait–Monotrait Ratio of correlations.

Henseler *et al.* (2015) proposed a more rigorous valuation of the variables discriminant validity by observing the heterotrait-monotrait criterion. Henseler's HTMT criterion recommends that all the variables are uniquely different at HTMT 0.90 cut-off point. As

Construct	1	2	3	4	5
1	1				
2	0.718	1			
3	0.762	0.979	1		
4	0.860	0.719	0.753	1	
5	0.831	0.694	0.716	0.896	1

Note(s): **Correlation is significant at the 0.01 level (2-tailed)

Key: 1 – Attitude towards green appliances, 2 – Green Product awareness, 3 – Green purchase intention, 4 – Perceived benefit, 5 – Social Influence

Source(s): Primary data (2022)

Table 4.
Correlation between
constructs

Construct	Attitude towards green appliances	Green product awareness	Green purchase intention	Perceived benefit	Social influence
AT1	0.795	0.789	0.721	0.712	0.574
AT2	0.782	0.694	0.669	0.593	0.685
AT3	0.811	0.645	0.654	0.694	0.701
AT4	0.793	0.703	0.734	0.564	0.594
GPA1	0.646	0.863	0.685	0.669	0.648
GPA2	0.535	0.877	0.648	0.714	0.619
GPA3	0.519	0.818	0.583	0.627	0.620
GPI1	0.593	0.756	0.739	0.568	0.591
GPI2	0.635	0.793	0.857	0.628	0.493
GPI3	0.685	0.747	0.851	0.553	0.517
GPI4	0.702	0.694	0.808	0.639	0.633
PB1	0.639	0.773	0.674	0.800	0.581
PB2	0.589	0.720	0.696	0.747	0.584
PB3	0.718	0.665	0.701	0.825	0.622
SI1	0.664	0.699	0.638	0.573	0.703
SI2	0.627	0.607	0.617	0.643	0.888
SI3	0.726	0.739	0.593	0.588	0.886

Source(s): Primary data (2022)

Table 5. Cross loadings

shown in Table 6, the HTMT values for all variables are in the range from 0.692 to 0.884 and these indicate that are variables are uniquely different at values below HTMT 0.90 which also confirms discriminant validity. Hair et al. (2016) suggested HTMT cut off point value of 0.85, in this case we the research may lack discriminant validity.

Structural equation model (SEM)

After we have established a consistent and valid model, the next step of the analysis involves examining the relationship between the exogenous (independent) and endogenous (dependent) latent variables.

Research hypothesis testing results

The bootstrap method was used to confirm the significance of the path coefficients by comparing β values among all the paths. The output for the analysis was presented in Figures 1 and 2. In Table 7, the following path were statistically significant: green product awareness \rightarrow green purchase intention ($\beta = 0.885, t = 9.372, p = 0.025$), green product awareness \rightarrow attitude towards green appliances ($\beta = 0.180, t = 2.894, p < 0.01$), social influence \rightarrow attitude towards green appliances ($\beta = 0.254, t = 4.271, p < 0.01$), perceived

Construct	1	2	3	4	5
1					
2	0.886				
3	0.763	0.797			
4	0.806	0.741	0.836		
5	0.692	0.884	0.728	0.720	

Source(s): Primary data (2022)

Table 6. Heterotrait–monotrait ratio of correlations (HTMT)

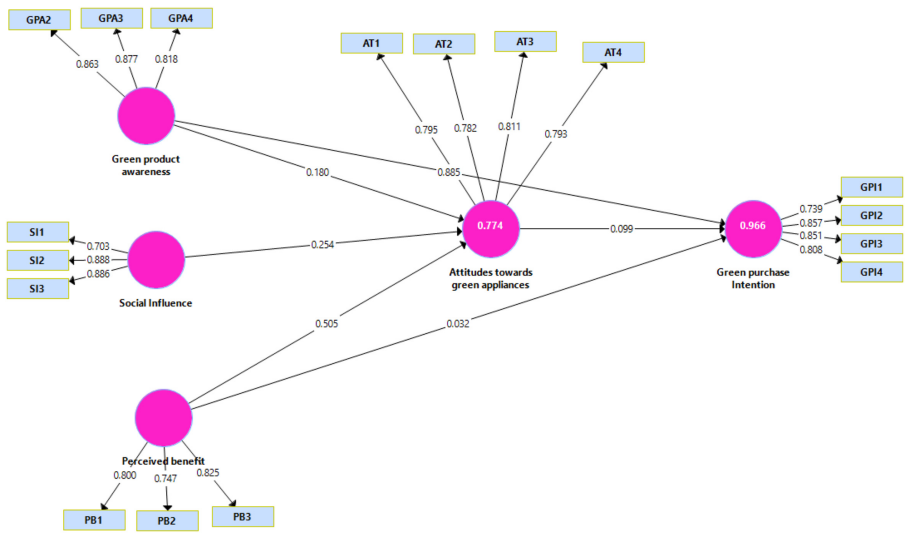


Figure 2.
SEM with coefficients

Source(s): Authors' own work (2022)

Path analysis	Path coefficient	t-value	p-value	Hypothesis
GPA → GPI	0.885	9.372	<0.01	H1 valid
GPA → AT	0.180	2.894	<0.01	H2 valid
SI → AT	0.254	4.271	<0.01	H3 valid
PB → AT	0.505	6.210	<0.01	H4 valid
PB → GPI	0.032	2.715	<0.01	H5 valid
AT → GPI	0.099	2.793	<0.01	H6 valid

Note(s): *Significant at $p < 0.01$
Source(s): Primary data (2022)

Table 7.
Path analysis

benefit → attitude towards green appliances ($\beta = 0.505, t = 6.210, p < 0.01$), perceived benefit → green purchase intention ($\beta = 0.032, t = 2.715, p < 0.01$), attitude towards green appliances → green purchase intention ($\beta = 0.099, t = 2.793, p < 0.01$).

Mediation effect analysis (Sobel's test)

It is defined when having a third variable (mediator) between the two variables (Cude *et al.*, 2016). Mediation analysis was done using Sobel's test in this study. The Sobel's test uses the product of coefficients. The results are presented in Table 8.

Taking for example the path GPA → AT → GPI. We find the product of 0.404 and 0.838 which are beta values for GPA → AT and AT → GPI respectively that is 0.180×0.099 we get 0.339. According to the results in Table 8, the relationship between green product awareness and green purchase intention is significantly mediated by attitude towards green appliances ($\beta = 0.118, p < 0.01$), the relationship between social influence and green purchase intention is significantly mediated by attitude towards green appliances ($\beta = 0.125, p < 0.01$) and the relationship between perceived benefit and green purchase intention is significantly

mediated by attitude towards green appliances ($\beta = 0.150, p < 0.01$). From the analysis showing direct and indirect relationship there was no change in terms of the significance of the constructs. The only notable change was the reduction in the beta value, and this indicates the existence of a partial mediation.

Evaluation of the structural model

Before concluding that the measurement model was valid and reliable, measuring the structural model outcomes was the next step. This included examining by at the Variance Inflation Factor (VIF), coefficient of determination (R^2), Effect size (f^2) and the predictive relevance of the model (Q^2) which in most cases not widely used. From our model results, the VIFs values of the most variables were below the rules of thumb of 5 and they were ranging from 2.124 to 5.212 which approves that there is no multicollinearity.

Coefficient of determination (R^2)

The exogenous variables in the model may have a significant effect in the dependent variable. The coefficient of determination (R^2) examines the amount of variation in the dependent variable which is caused by the exogenous variables as propounded by (Schumacher *et al.*, 2016). R^2 values of 0.75, 0.5 and 0.25 can be considered substantial, moderate and weak respectively (Hair *et al.*, 2011). Very high values of R^2 may result in model overfitting the data and may result in spurious relationship provided the R^2 value is greater than the Durbin Watson. In our case, as indicated in Table 10 attitude towards green applications has an R^2 value of 0.774 which is being explained by green product awareness, social influence and perceived benefit. The predictors have a direct effect towards emotional attachment. The green purchase intention R^2 value is 0.966 contributed by attitude towards green applications, green product awareness and perceived benefit directly. Social influence has an indirect relationship towards green purchase intention. The developed model has a substantial explaining power.

The effect size (f^2)

Effect size (f^2) is a measurement that tells the impact of change in the R^2 value when a specified exogenous construct is ignored in the model (Hair *et al.*, 2011). An effect size $f^2 \leq 0.30, 0.3 < f^2 \leq 0.50$ and $f^2 > 0.50$ is thought to represent a weak, moderate and strong effect respectively (Bliwise, 2006). From Table 9, above, f^2 values of the relationship between perceived benefit and green purchase intention is weak. The effect sizes of most of the relationships between the variables are moderate as depicted by (Bliwise, 2006).

Hypothesis	Path	Std beta	Std error	t-statistics	p-values	Decision	Bootstrapping confidence interval 95% CI	
							LL	UL
H7	GPA → AT → GPI	0.118	0.131	2.692	<0.01	Supported	0.006	0.101
H8	SI → AT → GPI	0.125	0.108	2.740	<0.01	Supported	0.010	0.163
H9	PB → AT → GPI	0.150	0.041	3.253	<0.01	Supported	0.021	0.138

Note(s): *Significant at $p < 0.01$

Source(s): Primary data (2022)

Table 8. Mediating effect analysis via Sobel test

PRR
8,3

Constructs	f square	VIF (inner values)
GPA → GPI	0.394	2.246
GPA → AT	0.367	2.124
SI → AT	0.455	5.212
PB → AT	0.432	4.590
AT → GPI	0.302	4.201
PB → GPI	0.277	4.205

762

Table 9.
Collinearity

Note(s): GPA – Green Product awareness, GPI – Green Purchase Intention, AT – Attitude towards green applications, SI – Social Influence, PB – Perceived benefit
Source(s): Primary data (2022)

Table 10.
The coefficient of determination

Endogenous variables	R square	t-value	p-value
Attitude towards green applications	0.774	2.682	<0.01
Green purchase intention	0.966	2.715	<0.01

Note(s): *Significant at $p < 0.01$
Source(s): Primary data (2022)

Goodness of fit of the model

The Standardised Root Mean Square Residual (SRMSR) is an index of the average of standardised residuals between the observed and the hypothesised covariance matrices (Chen, 2007). SRMR is a measure of the estimated model fit. When $SRMSR \leq 0.08$, then the study model has a good fit (Hu and Bentler, 1998), with a lower SRMSR being a better fit. According to Table 11 results, the SRMR value for the fitted model is 0.071 which is less than the threshold value of 0.08, suggesting that the model can be accepted. Furthermore, the NFI value for the model is 0.902 which is slightly above the recommended threshold value of 0.9. These results suggest that the fitted model is a good model, whereas the *Chi*-Square was equal to 7426.162.

Overall assessment

Goodness of Fit (GoF) defined as the geometric mean of both average variances extracted (AVE) and the average of R^2 of all endogenous variables (Akter et al., 2017). PLS results can be assessed globally for the overall mode and locally for the measurement and structural models (Henseler et al., 2015). The criteria of GoF to decide whether GoF values are not fit, small, medium, or large to be considered as global valid PLS model are given by (Akter et al., 2017) as GoF less than 0.1(not fit), GoF between 0.1 and 0.25 (small), GoF between 0.25 and 0.36

Table 11.
Goodness of fit results

	Estimated model
SRMSR	0.071
d_ ULS	11.527
d_ G	15.920
<i>Chi</i> -Square	7426.162
NFI	0.902

Source(s): Primary data (2022)

(medium) and GoF greater than 0.36 (large). The formula for calculating GoF was adopted from (Aker *et al.*, 2017) as follows:

$$\text{GoF} = \sqrt{\text{AVE} \times R^2}$$

Therefore, as clearly shown in Table 12, the GoF value for this study is 0.762 which is above 0.36 as indicated (Aker *et al.*, 2017). This proves that the developed model is large in explaining the issues of corporate brand perception.

Discussion

Justification for the study of Harare, capital city of Zimbabwe is that the country heavily depends on conventional energy production means. Further to this, there is barely sufficient evidence in prior research enquiries that have determined the antecedents which influence attitudes towards the use of environmentally friendly household appliance products and consumers' green purchase intention. Therefore, there is paucity of the same information from developing parts of the world, such as African countries, Zimbabwe in particular. Hence, this lacuna deserves empirical inspection in the case of a neglected context. The sources of energy production are not only depleting but they are unclean, not environmentally friendly and unsustainable, thus the policymakers should now incorporate renewable energy resources in the energy portfolio to ensure sustainability.

With the above background justifying the need for carrying out research in the study area of Harare, the result after bootstrapping, showed a positive relationship between Green product awareness → green purchase intention ($\beta = 0.885$, $t = 9.372$, $p = 0.025$). This implies that environmental knowledge is associated with pro-environmental behaviour and that exposure (through eco-labelling, eco-branding, environmental advertising, word of mouth and so forth) is essentially the most important factor to environmentalism. Consumers that have a concern for the environment often make purchasing decisions that are directly influenced by brand image awareness and therefore it is the marketers' responsibility to ensure that information regarding green products, eco-labelling and green messages are provided in order to familiarise customers with the green brand (Alshura and Zabadi, 2016). As part of a study conducted by Aman *et al.* (2012), it was determined that as a result of past literature and previous studies, actual purchase behaviour has a high level of dependency on an individual's green purchase intention and, therefore strongly correlates with Ajzen and Fishbein (1980, 1991) Theory of Planned Behaviour. However, there has not been a significant amount of studies directed at green purchase behaviour, and more importantly, green purchase behaviour within developing countries as opposed to westernised, developed countries (Mei *et al.*, 2012).

Construct	AVE	R^2
AT	0.632	0.774
GPA	0.728	
PB	0.626	
GPI	0.665	0.966
S1	0.690	
AVE	0.668	
$\text{AVE} \times R^2$	0.581	
GoF	0.762	

Source(s): Primary data (2022)

Table 12.
Goodness of fit index calculation

Green product awareness → attitude towards green appliances ($\beta = 0.180, t = 2.894, p < 0.01$). [Kim and Chung \(2011\)](#), elucidate that environmental consciousness directs people towards making purchase decisions that are more environmentally friendly, along with the verdict that consumers' environmental awareness is essentially a pre-requisite for green consumption. Moreover, studies show that green product knowledge fundamentally encourages stronger beliefs towards the benefits attained using green products as well as more positively balanced opinions with regards to the various impacts of product use ([Ha and Janda, 2012](#)).

Social influence → attitude towards green appliances ($\beta = 0.254, t = 4.271, p < 0.01$). A powerful example illustrating the existence of social influence is the way in which romantic relationship partners jointly make consumer decisions and by doing so they ultimately influence each other's attitudes, beliefs and judgement ([Wood and Hayes, 2012](#)). [Muhammad and Ghani \(2016\)](#) state that social influences manipulate consumers to perform particular activities to gain approval in certain social situations. Those personal thoughts and social influences are predictors of behaviour towards intention. Therefore, highlighting that marketing and promotional efforts should be directed at the cognitive and emotional components of consumers' attitudes to ensure a better understanding and support for green products, especially in developing countries ([Hamid, 2014](#); [Nyagadza, 2021](#)).

Perceived benefit → attitude towards green appliances ($\beta = 0.505, t = 6.210, p < 0.01$). Studies concur that consumer's look towards green products based on the environmental benefit they may provide. In many cases consumers adopt green products for the direct personal benefit in the form of energy saving through the use of an eco-friendly air conditioner, perceived health benefits as a result of organic foods as well as perceived financial gain by minimising personal electricity usage or reducing water consumption using eco-friendly washing machines ([Kong et al., 2014](#)). According to [Mostafa \(2006\)](#), perceived consumer benefit is a highly influential factor when analysing the attitude-consumer behaviour relationship.

Perceived benefit → green purchase intention ($\beta = 0.032, t = 2.715, p < 0.01$). A consumer may find that an eco-friendly product provides high perceived benefit through the multiple advantage of environmental protection and personal gain which would positively influence their intention to purchase that product. [Alshura and Zabadi \(2016\)](#) indicates that perceived benefits not only assist in maintaining long-term customer relationships but also have a significant impact in influencing purchase intention. In addition, it is pointed out that consumers are increasingly viewing the use of environmentally friendly products as more beneficial and rewarding as opposed to conventional products and therefore encourages consumer green purchase intention on the basis that perceived benefit is a strong influencer of consumer trust ([Alshura and Zabadi, 2016](#)).

Attitude towards green appliances → green purchase intention ($\beta = 0.099, t = 2.793, p < 0.01$). Prior research findings postulate that consumers' attitude toward green brands significantly and positively influences green product purchase intention ([Suki, 2016](#)). These results are in line with literature. Purchase intention is built on consumers' attitudes, evaluation and external factors, essentially making it a vital factor to predict consumer behaviour ([Braumah, 2015](#)). Additionally, a previous study led by [Balderjahn \(1988\)](#) concluded that having a positive attitude towards environmentally conscious living will ultimately result in purchasing and using these environmentally responsible products ([Mostafa, 2006](#)).

As reflected in [Table 8](#), "attitude towards green appliances" was discovered to mediate the relationship between green product awareness and green purchase intention ($\beta = 0.118, t = 2.692, p < 0.01$), social influence and green purchase intention ($\beta = 0.125, t = 2.740, p < 0.01$) as well as perceived benefit and green purchase intention ($\beta = 0.150, t = 3.253, p < 0.01$). These results mirror with the works of [Camacho et al. \(2020\)](#) who revealed that product attitudes will mediate the relationship between xenocentrism and purchase

intentions. [Irshad and Ahmad \(2019\)](#) also discovered that consumer attitudes mediate the relationship between hedonic value and purchase intentions. Moreover, [Abrar *et al.* \(2019\)](#) found out that consumer attitudes mediate behavioural intentions.

To wrap up the discussion, in order to hasten the growth of a green economy, the Government of Zimbabwe has weighed in by crafting a “National Environmental Policy and Strategies” (June 2009), under the “Ministry of Environment and Natural Resources Management”, aimed at integrating environmental aspects into national development plans, embarking on specific actions that encourage the consumption of green products. Electricity has a huge impact on mainly growing economies like Zimbabwe and is considered a significant input of production, hence a study centred on the antecedents that influence attitudes towards the use of environmentally friendly household appliance products in Zimbabwe is of paramount importance. In Zimbabwe, noticeable green products are energy saving bulbs, computers, refillable/reusable consumer product packages, solar energy systems, ethanol blended fuel and washing machines, amongst others.

Conclusion and implications for theory and practice

To conclude the study, green appliance purchase intention can be explained as an indication towards a potential purchase behaviour specifically at the stage where consumers evaluate and rank considerable brands as part of the purchase intention process, bearing in mind the effect of unexpected situational factors, attitudes of others and the subjective expectancies attached to the purchase of green products. Moreover, consumer’s beliefs and values are empirical in the assessment of influences towards purchase behaviour as values directly affect people’s beliefs, ultimately influencing personal norms that induce pro-environmental behaviours. The ideal method for environmental preservation is through the internalisation of consumer and producer activities that potentially have an adverse effect on the environment. These methods take the form of environmental standards, including environmental taxes and penalties along with eco-labelling and eco-branding on products that can be used as an effective tool for the moderation of environmental problems.

Practically, environmental knowledge is associated with pro-environmental behaviour, and exposure (through eco-labelling, eco-branding, environmental advertising, word of mouth and so forth) is essentially the most important factor to environmentalism. The more consumers know about environmentally friendly behavioural actions, the more they will act positively. Green awareness is operationalised as the level of knowledge a consumer bears regarding environmental education and consumption effects on the environment, along with the capacity consumers must identify, recognise and pro-actively respond to environmental concerns and green product features. Social influence as a key predictor of young consumer purchase behaviour is highly impactful factor when assessing the purchase intention towards environmentally friendly products. In addition, it is pointed out that consumers are increasingly viewing the use of environmentally friendly products as more beneficial and rewarding as opposed to conventional products and therefore encourages consumer green purchase intention on the basis that perceived benefit is a strong influencer of consumer trust. Although consumers may have little environmental awareness, they would still express a strong emotional attachment towards the environment’s wellbeing.

Furthermore, several recommendations can be made to producing companies across various sectors. Firstly, companies should prioritise research and development to innovate and produce more environmentally friendly products that align with consumers’ sustainability values. This can involve adopting energy-efficient technologies, using recyclable materials and reducing carbon emissions throughout the product lifecycle. Secondly, companies should invest in robust marketing strategies to raise awareness and educate consumers about the benefits of green products, highlighting their positive impact on

the environment and personal well-being. This can be done through effective communication channels, such as social media, eco-friendly certifications and partnerships with environmental organisations. Thirdly, companies should consider pricing strategies that incentivise consumers to choose green products, such as offering competitive prices or discounts for eco-friendly alternatives. Lastly, fostering collaboration and partnerships among companies, government agencies and non-profit organisations can help establish industry-wide standards and regulations for sustainable production practices. By adopting these recommendations, companies can contribute to the reform of the environment on a global scale, while also meeting the growing demand for environmentally friendly products among consumers in Harare and beyond.

The implication to theory suggests that attitude toward the behaviour relates to the measure of the degree to which an individual has either a negative or positive outlook on his/her performance of the behaviour. Perceived behavioural control is directly linked to individual perceptions of whether they can perform that given behaviour or not, as well as how easy it potentially is to perform whereas subjective norm is connected to the views and opinions of others as to whether the individual should perform the behaviour. Thus, perceived benefit can be explained as the expected value of a consumer relative to their personal and environmental needs or wants whereby the more benefit a consumer receives, the more positive their attitude and purchase intention become towards green products.

Limitations of the study and future research avenues

This study has its fair share of limitations. The usage of a cross-sectional design has drawbacks. Future studies could adopt the longitudinal research design. This approach will aid in investigating the behaviour of environmentally friendly household appliances over time and not in a snapshot. In this way, time-specific solutions can be implemented over a series of times. It is imperative to note that the results cannot be generalised to customers of environmentally friendly household appliances in other countries. New studies should focus on including respondents from other countries and, preferably, encompass cross-national studies which compare attitudes of environmentally friendly household appliances between different country samples. Nonetheless, the identified limitations offer a starting point for future studies in the same area of interest as it provides general guidelines and suggestions for the proposed antecedents that influence attitudes towards the use of environmentally friendly household appliance products. Understanding the limitations mentioned above enables future studies to address or scrutinise the above issues to expand the knowledge and better understandability of this emerging yet exciting area of research.

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Appendix

Measurement scales

Green product awareness (Ansu-Mensah, 2021)

- GPA1-I have heard about green products.
- GPA2-I have detailed knowledge and understanding about green products.
- GPA3- I am aware of the difference between green products and conventional products.
- GPA4-I buy green products instead of common/conventional products.
- GPA5-I am aware that buying green products contributes to sustainable future.

Social influence (Varshneya et al., 2017)

- SI1- My friends, often, recommend environmentally friendly household appliance products to me.
- SI2- My friends often go shopping for environmentally friendly household appliance products with me.
- SI3- My friends often share their experiences and knowledge about environmentally friendly household appliance products with me.

Perceived benefit (Akroush et al., 2019)

- PB1-Environmentally friendly household appliance products give me extra value for example, economic value, environmental value, social
- PB2- Environmentally friendly household appliance products have high utility
- PB3- Environmentally friendly household appliance products can meet my requirements
- PB4- Environmentally friendly household appliance products give me more benefits than the costs

Attitude towards green appliances (Chen and Tung, 2014)

- AT1- I feel that green appliances' environmental conservation claims are generally trustworthy
- AT2- I feel that green appliances' environmental protection reputation is generally reliable
- AT3- Buying green appliances is/would be a good idea for me and the environment
- AT4- Buying green appliances is/would be a worthwhile purchase decision
- AT5- I have a favourable attitude towards purchasing a green version of products
- AT6- If I had to choose between green appliances and conventional ones, I would prefer the green version.

Green purchase intention (Ansu-Mensah, 2021)

- GPI1-I will likely purchase green products next month.
- GPI2- I intend to switch to a green variety of a product.
- GPI3- I am willing to purchase green products for personal use.

GPI4- I will make an effort to purchase green products for my own use.

GPI5-I plan to purchase green products for they do not pollute the environment.

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