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Analysis of the relationship between Green Packaging, Consumer Attitude and Consumer Buying Behaviour

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ABSTRACT

Consumer attitude to purchasing green packaged products usually varies from one country to the other, despite the importance of green packaging. In order to further situate the role of green packaging in consumer buying behaviour in this era of sustainable development, this study investigates the linkage between green packaging, consumer attitude and consumer buying behaviour in developing countries, using Nigeria as a case in point. Survey research design was adopted with the aid of a structured questionnaire to collect data, out of which 360 valid responses were analysed using Jamovi Advanced Mediation Models (JAMM). Results revealed that the estimate of the independent variables i.e., environmental concern, ecolabelling and packaging material are -0.442, 0.789, and 0.275 respectively. The prediction model shows that ecolabelling, environmental concern and packaging material influence consumer buying behaviour, having their p values to be <0.001 and their t values greater than 1.96. While ecolabelling and packaging material have positive significant relationship, environmental concern has a negative significant relationship. This implies that environmental concern has no significant effect on consumer buying behaviour, although consumers take note of the packaging material and labels on the products in making their buying decisions. This study concludes that, although consumers currently lack environmental awareness, manufacturing firms should consider the impact of their activities on the environment, and prevent deliberate harm to the ecosystem. Firms can further improve on their packaging materials by making using of biodegradable packaging materials with ecolabels as it causes less harm to the environment and mitigates the consequences of environmental degradation.

Keywords: Consumer Buying Behaviour, Ecolabelling, Environmental concern, Green Packaging, and Packaging material

1. Introduction

Environmental concerns have gained significant attention from businesses in recent times. In light of increasing costs of waste management, environmental degradation, public health issues, climate change and depletion of the ozone layer has attracted global attention of businesses over the years (Mahajan, 2023; Wahab, Imran, Ahmed, Rahim, & Hassan, 2024). Green packaging, described as describes the process of making use of ecological materials for packaging purposes, offers an avenue to reduce the impact of waste and pollution, and to promote sustainable development (Lau & Wong, 2024; Wandosell Paira-Merono, Akayde, & Bamos, 2021).

Firms in developed countries such as the United Kingdom and Canada are encouraged to adopt green packaging while increasing the importance consumers place on the environment, through the enactment of laws, regulations and taxation to make packaging sustainable and environmentally friendly (Nguyen, et al., 2020). Typically, organisations that are embarking on green packaging seeks to know about consumer's level of awareness and acceptance of green products for green packaging to be useful as a strategy; however, this can only be known when the behaviour of consumers are studied (Asim, et al., 2022). Observably, organisations across various industries make use of the best marketing communication tactics such as promotion of their sustainability credentials, storytelling and sense of urgency to sensitise, and persuade consumers to buy environmentally friendly products and adopt green consumption buying behaviour (Shrivastava & Dawle, 2020). Effectively, green packaging and green buying behaviour is reducing the environmental degradation in developed countries, leading to improved ecosystem health and increased resilience to natural disasters (Taufiqe & Vaithianathan, 2018) and reducing sales revenue in regions where the concepts are neglected (Wang & Uslay, 2018).

In recent times, changes in the climatic conditions have made citizens of different countries develop concerns for economic sustainability leading to legal regulations for the protection of human lives and the environment. This has caused disruptions in the supply chain of most manufacturing organisations (Ani, et al., 2022; Gonzalez, 2015). Essentially, green packaging is crucial for not only for environmental sustainability, but for sustainable business performance. This has made many companies such as Nestle, Ikea, Tesla and Nike consider developing environmentally friendly products (Mishra, et al. 2017) since consumers now give preference to eco-friendly products due to their environmental preservation tendencies, feeling of being responsible and the benefits offered by recycling (Orzan, et al. 2018). Consumer buying behaviour therefore attempts to explain the decision-making process of the buyers, both individually and in groups, with the customer playing the three distinct roles of buyer, decider and user. It combines aspects of economics, sociology, psychology, and social anthropology.

Therefore, within interdisciplinary product-packaging development teams, packaging development and marketing strategies must be coordinated in order to carry out strategic and operational measures centred on green packaging (De Koeijer, et al., 2017).

Within the contexts of developed countries, Jimenez-Guerero, Gazquez-Abad & Ceballos-Santamaria (2015) confirmed the role of green packaging solutions for the production of greater levels of consumer preference. Similarly, Maziriri, (2020), Orzan, et al. (2018) and Zeng (2022)

are of the view that green packaging enhances a company's overall business performance and competitive edge. Further, green packaging has been found effective through the use of marketing strategies supported by information and communication technologies (Juwaheer, et al., 2012; Maziriri, 2020) and also in providing consumers request (Magnier & Crie, 2015). Ketelesen, et al., (2020) noted that consumers typically consider the packaging material, ecolabels and packaging design elements while taking cognizance of the price and product quality.

Consumers, especially in Nigeria are generally not aware of the dangerous outcomes of manufacturing processes of many industries on the environment. Out of ignorance consumers patronise brands, buy their products and services while not considering the economic hazards and the environmental issues that they cause (Gonzalez, 2015). Fast moving consumer goods firms especially contribute more harm to the environment because they produce products that are used on a daily basis which lead to the accumulation of non-biodegradable packaging waste. Although companies in developed countries are ensuring that they contribute less harm by making use of biodegradable packaging materials, however in developing countries, reverse is the case (Jain & Hudnurkur, 2022).

In Nigeria, consumer buying behavior has been significantly influenced by factors like socio-economic status, cultural preferences, and increasing environmental awareness. Traditionally, Nigerian consumers have prioritized cost, availability, and quality. However, in recent years, there has been a growing shift toward environmentally-conscious purchasing decisions, particularly among urban consumers (Abubakar & Bala, 2020; Ogbonna & Ebong, 2021). For instance, Ecolabelling schemes are becoming more recognized through regulatory efforts of the National Environmental Standards and Regulations Enforcement Agency (NESREA) in order to promote eco-friendly certifications (Adebayo & Asaju, 2019; Ogunyemi, 2020).

Further, environmental concern in Nigeria has largely driven by issues such as waste management, pollution, deforestation, and the impact of oil extraction on the environment. However, government at various levels, non-governmental organisations and local communities are increasingly focusing on sustainability efforts, especially in urban centres like Lagos, where inadequate waste disposal infrastructure leads to severe environmental degradation (Abubakar & Bala, 2020; Akinmoladun et al., 2021).

Similarly, the packaging materials mostly used in Nigeria ranges from plastics and metals to paper and glass. Although, some of these materials are recyclable, others are not, contributing to the waste problem. In response to environmental concerns, government is promoting the use of biodegradable plastics, single-use plastic bags, paper-based materials, and plant-based packaging. However, the higher cost of these alternatives is a major barrier to widespread adoption, in addition to enforcement issues and public resistance (Ogunyemi, 2020).

Therefore, while the push for sustainable practices such as green packaging, Eco labeling, and environmental concern is gaining traction in Nigeria, challenges such as low consumer awareness, high costs, poor waste management infrastructure, and enforcement gaps continue to hinder progress. Although multinational firms operating in Nigeria, such as KFC and Nestle, are increasingly adopting greener practices, local businesses and consumers still face significant barriers (Ogunjimi & Odewale, 2020).

Having observed the divergence of thought in the state of the art in green packaging and consumer buying behaviour between developed countries such as the United Kingdom and Canada, and developing countries such as Nigeria and India; and the attendant implications of the widening gap on environmental sustainability and failure to meet sustainability goals, especially goal 12, the primary objective of this study is to investigate the mediating role of consumer attitude in the relationship between green packaging and consumer buying behaviour in developing countries; using Nigeria as a case in point. This study integrates pre-established constructs, based on Jozwik-Pruska, et al., (2022), Ketelesen (2020) and Prakash and Pathak (2017), such as eco-labelling, packaging material and environmental concern in measuring green packaging. Although, Hyder and Amir (2023) used ecolabelling and environmental concern amongst its independent variables in testing the impact of green packaging on consumer buying behaviour, they did not consider packaging material which is critical in mitigating environmental impacts.

2. Literature Review and Hypotheses Development

2.1 Consumer Buying Behaviour

Consumer buying behaviour is a series of actions or perceptions that culminate in a purchase. Campher (2013) noted that consumer demand for greener products is demonstrated by market research. According to Ottoman and Mallen (2014), people are looking for green products because they think they are better, organic, healthier, and environmentally friendly. In support of this, Manget, et al. (2009) discovered that consumers place a high value on the advantages of green products, including their superior freshness and taste, the assurance of safety and health, and the ability to save money on energy.

Therefore, the natural inclination of consumers to buy environmentally friendly products is significantly influenced by their concerns. Environmental issues are therefore not the sole reason why buyers choose to buy ecologically friendly goods. The purchases are the result of various circumstances including seeking products that will satisfy their basic needs and desires (Kolter & Armstrong, 2012).

2.1.1 Willingness to Pay Premium

Due to social implications, different customers have different preferences for green packaged products, however, buying decisions of customers regarding green packaged items are mostly impacted by worries and norms related to their willingness to pay (Hao, et al., 2019; Prakash & Pathak, 2017; Ut-tha, et al., 2021). Previous research has however reported conflicting results in this regard. While Yadav and Pathak (2016), and Prakash and Pathak (2017) demonstrated that consumers are price sensitive, Cronin, et al., (2011), Ferreira and Marques (2015) and Klaiman, et al., (2016), suggests that customers who cared about the environment may be willing to pay extra.

2.2 Green Packaging

Green packaging is popular today because of its social and economic benefits (Baas, et al., 2020; Fonseca, et al., 2020). Studies on green packaging that focus on consumers include the development of eco-design, packaging innovation, brand innovation benefits, supply chain innovation (Zimon, et al., 2019), marketing (Vila-Lopez, et al., 2021), and consumer behaviour (Singh & Ordonez, 2016). Further, in examining studies on customer decisions to purchase

green packaged goods, we found that these decisions were strongly influenced by factors such as the type of material used (Boesen, et al., 2019; Jerzyk, 2016); place of origin, price, and kind of packaging (Orzan, et al., 2018; Sodhi & Singh, 2017; Stileto, et al., 2020); format of packaging (Seo, et al 2016); consumers level of environmental concern and gender (Martinho, et al., 2015; Prakash, et al., 2019; Prakash & Pathak, 2017); environment, quality of green packaging and price (Hao, et al., 2019); and biodegradability, recyclability or reusability of packaging (Herbes, et al., 2018).

In terms of demography, it was discovered that young consumers are typically motivated to buy green packaged products (Prakash & Pathak, 2017). However, green packaging is not just about the container used, the labelling material of the container is also important. A firm cannot claim to be involved in green packaging, if they adopt an acceptable package and an unacceptable labelling material. When it comes to green packaging, both the container and the labelling has to tick the green packaging material boxes of contributing to environmental sustainability (Zhang & Zhao, 2012). Businesses are attempting to reduce the usage of paper labels by spray-painting product information on the exterior of containers or packaging, however, it is clear that in developing sustainable initiatives, cost is a challenge (Moustafa, et al., 2019; Nadeem, et al., 2020; Zhang & Zhao, 2012). The following primary hypothesis is therefore derived;
H_1: *Green packaging has a positive influence on consumer buying behaviour.*

2.2.1 Environmental Concern

Accurate understanding of the environment and the interaction between the environment and the ecosystem aids in the development of strategies by individuals and businesses to address environmental issues (Mishra, et al, 2017). Due to governmental and community constraints, it is critical for businesses to strike a balance between environmental concerns and business growth. Non-biodegradable packaging, i.e., materials' inability to dissolve or decompose naturally, is one of the main causes of environmental contamination. Therefore, a growing concern on the need to prevent environmental damage has forced producers to consider developing eco-friendly products (Mishra, et al, 2017). Therefore, based on the foregoing, the following hypothesis is derived:
H_2: *Environmental concern has a positive effect on consumer buying behaviour.*

2.2.2 Ecolabelling

Ecolabels serve as indicators or signals to persuade consumers to choose green products over those of numerous rivals in order ensure decrease of the harmful effect of artificial products on the environment while setting products apart from those of competitors (Hyder & Amir, 2023). These labels reassure producers that consumers care about the environment just as much as they do, encourage them to constantly develop innovative package concepts and styles that lessen their environmental impact (Jozwik-Pruska et al., 2022; Hyder & Amir, 2023). Consumer preferences are shifting, and they now purchase goods with environmentally friendly labelling on the packaging (Ketelesen, et al., 2020). Ecolabels will not be helpful until people understand the threats to the environment (Hyder & Amir, 2023; Jozwik-Pruska et al., 2022; Ketelesen, et al., 2020). From this foregoing perspective, the following hypothesis is derived:
H_3: *Ecolabelling has a positive effect on consumer buying behaviour*.

2.2.3 Packaging Material

The quality of packaging material has a great influence on consumer's purchasing decision in the sense that good packaging materials draw in more customers than inferior packaging materials. One crucial component that guards against loss or damage to the product is the type packing material. The quality of packaging material entails the degree of durability, hygiene, safety, environmental friendliness, and re-usability of a product's package (Imiru, 2017). Hammed & Abdulaziz, (2017) view quality packaging material as an important factor that drives the consumer perception towards the product and satisfies their needs and wants. Therefore, a good packaging material attract customers more than a low-quality material (Alagala, et al., 2018). Accordingly, the next hypothesis is as follows:

H_4: *Packaging has a positive effect on consumer buying behaviour*.

2.3 Mediating role of Consumer Attitude

Numerous studies have examined consumers' attitudes and green purchasing behaviour from various theoretical angles; although a number of characteristics were identified as contributing to green purchasing and environmental behaviour, consumer attitudes seem to be most relevant in developed countries. Due to the surge in green demand, especially in the global north, producers have created sustainable policies and resorted to using green packaging (Wandosell, et al., 2021). However, regulating the behaviour of a consumer is a difficult task and requires some initial data and knowledge of determinants of behaviour. Heide and Olsen (2017) assert that customer attitudes towards specific green packaging issues may alter how well-regarded a product is seen. Consumer attitudes towards green packaging are therefore shaped by their understanding of ecology and the environment (Engel, et al., 1993). Considering the various observations in literature, the following hypothesis is therefore developed:

H_5: *Consumer attitude has a positive mediating effect in the relationship between green packaging and consumer buying behaviour*.

2.4 Conceptual Framework

Based on the literature reviewed, conceptual model is proposed in Figure 1. Green packaging is proxied by environmental concern, ecolabelling, and packaging material, while consumer buying behaviour was proxied using consumer's willingness to pay a premium price for it.

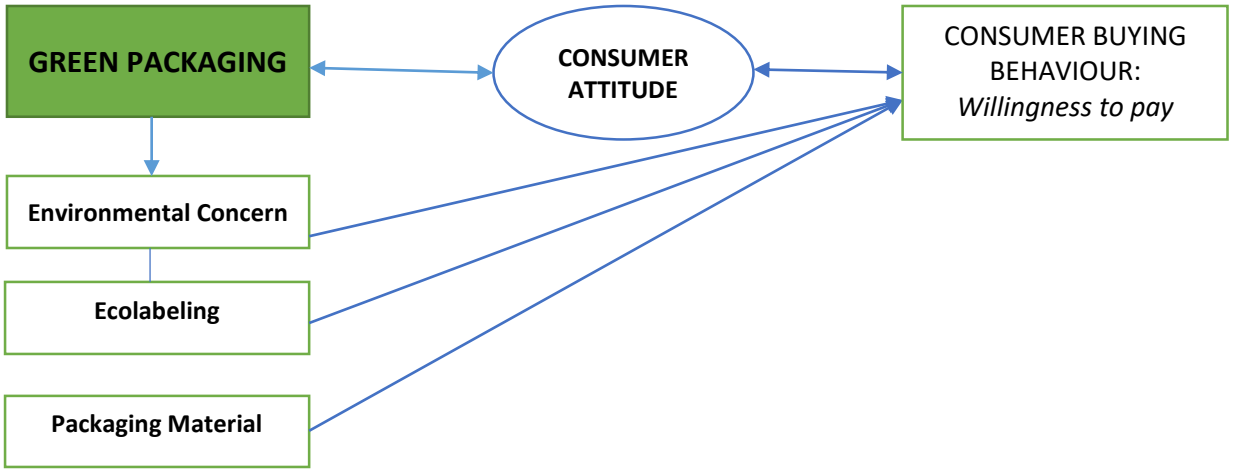

Figure 1: Conceptual Framework
Source: Authors conceptualisation.

3. Methodology

3.1 Data collection and Sample

The current study is limited to all available consumers of fast moving consumer goods (FMCGs) in the Nigerian manufacturing industry. This is primarily due to the widespread use of consumer goods across all strata of the society and the susceptibility of FMCGs to green packaging issues. An online closed-ended questionnaire based on Google Forms was used to collect the primary data, through social media platforms, from two selected sample frames (Student platforms and Consuming Public). The online questionnaire approach is deemed less expensive and it helped obtain large responses in a short period of time (Alkharusi, 2022; Mariel et al., 2021; Veal, 2011). At the end of a three-week survey period, 360 participants validly completed the questionnaire out of 423 responses that were received. The data cleaning process excluded respondents who are less than 18 years of age, respondents with inconsistent or invalid answers and respondents with potential biases such as brand ambassadors or promoters. The sample characteristics are shown in Table 1.

Table 1: Sample Characteristics

Variable	**Category**	**Frequency** 360	**Proportion (%)**
Gender	Female	199	55.3
	Male	161	44.7
Age	18-28	130	36.1
	29-39	126	35.0
	40-50	58	16.1
	50+	46	12.8
Profession	Employed	239	66.4
	Student	81	22.5
	Public	40	11.1
Qualification	Bachelors' degree	209	58.1
	Diploma	53	14.7
	Postgraduate	44	12.2
	School leaving certificate	54	15.0
Marital Status	Married	193	53.6
	Single	167	46.4
Monthly Income	10,000-50,000	60	16.7
	51,000-100,000	104	28.9
	101,000-150,000	82	22.8
	150,000+	114	31.7
What aspects of green packaging influence your buying behaviour?	Environmental Impact	166	46.1
	Health and Safety Concerns	99	27.5
	Product Freshness and	54	15.0
	Preservation	21	5.8
	Aesthetic Appeal	20	5.6

3.2 Variable Measurements

Measures of the constructs hypothesised and tested in this study were derived from the literature and modified to suit the nature of this study. To ensure that these measures are valid for these constructs, two of our colleagues and two industry professionals reviewed the 5-point Likert scale questionnaire wording (with the scale ranging from 1 being 'strongly disagreeable' to 5 being 'strongly agreeable'). A pilot survey using 40 trade intermediaries (20 wholesalers and 20 retailers) was carried out. Based on the feedback, some of the questions were revised and adapted as follows:

Green packaging*:* This study draws on the measurement methods Jozwik-Pruska, et al., (2022), Ketelesen (2020), and Prakash and Pathak (2017), and divides green packaging into three dimensions: ecolabelling, packaging material and environmental concern. Ecolabelling and environmental concern have five items respectively while packaging materials has seven items.
***Consumer buying behaviour*:** This study draws on the measurement methods of Ut-tha, et al., (2021) who worked on Thai consumers' willingness to pay for sustainable coffee using environmental belief, attitude and willingness to pay. The section includes five items.
Consumer attitude: This study draws on the submissions of Mishra, et al. (2017), Engel, et al. (1993) to adapt measures of consumer attitude. The scale contains five items.

3.3 Method of Data Analysis

A simple linear regression analysis was first used, using IMB statistical package for the social sciences software to analyse the data gathered to determine the effect of green packaging on consumer buying behaviour i.e., hypotheses 2 to 3. Thereafter, factor analysis was carried out, then the general linear model mediation was used to measure the mediating effect of consumer attitude in the relationship i.e., hypothesis 5. To understand the aggregate relationship between green packaging and consumer buying behaviour, ANOVA was applied in this regard to hypothesis 1. With these analytical tools, the researcher used the gathered quantitative approach to comprehend the sample population in order to interpret the specific opinions of the respondents (Queirós, et al., 2017).

4. Analyses of empirical results

4.1 Reliability and Validity Test

The aggregate value of the Cronbach alpha is 0.906 which implies that the scale is reliable since it is higher than 0.7 (see table 2). Also, a reliability test was carried out for each of the items, the Cronbach alpha for all values is higher than 0.7, ranging from 0.896 to 0.910. Therefore, the questionnaire used in this study has a good reliability and aggregate validity. Further, Table 3 shows that confirmatory factor analysis results show good discriminative validity among the variables.

Table 2: Reliability test

Scale Reliability Statistics Summary	
	Cronbach's α
Scale	0.906
Note. items 'profession', 'qualification', 'monthlyincome', 'gppbb', 'attitude5', 'ecolabelling3', 'ecolabelling4', 'ecolabelling5', 'consumerbuyingbehaviour4'	

See Appendix for the reliability scale for each variable

Table 3: Confirmatory Factor Analysis

Factor Loadings					
Factor	**Indicator**	**Estimate**	**SE**	**Z**	**P**
Consumer Att.	Consumer attitude1	0.98643	0.0614	16.062	< .001
	Consumer attitude2	0.93687	0.0628	14.926	< .001
	Consumer attitude3	0.96956	0.0658	14.731	< .001
	Consumer attitude4	0.84298	0.0398	21.192	< .001
	Consumer attitude5	-0.28163	0.1426	-1.976	0.048
Ecolabelling	Ecolabelling3	1.83350	0.2000	9.167	< .001
	Ecolabelling4	1.21938	0.1275	9.565	< .001
	Ecolabelling5	1.26119	0.1154	10.932	< .001
	Ecolabelling1	-0.85410	0.0634	-13.463	< .001
	Ecolabelling2	-0.88723	0.0653	-13.588	< .001
Env. concern	Environmentalconcern1	-0.00964	0.0586	-0.164	0.869
	Environmentalconcern2	1.20192	0.0547	21.983	< .001
	Environmentalconcern3	1.18867	0.0546	21.783	< .001
	Environmentalconcern4	1.20910	0.0541	22.342	< .001
	Environmentalconcern5	1.22696	0.0550	22.325	< .001
	Environmentalconcern1	1.08892	0.0680	16.019	< .001
Packaging mat.	Packagingmaterial1	1.16842	0.0534	21.894	< .001
	Packagingmaterial2	1.18459	0.0526	22.500	< .001
	Packagingmaterial3	1.15665	0.0530	21.834	< .001
	Packagingmaterial4	0.60731	0.0686	8.859	< .001
	Packagingmaterial5	0.91856	0.0666	13.795	< .001
	Packagingmaterial6	0.91856	0.0666	13.795	< .001
	Packagingmaterial7	0.60845	0.0720	8.448	< .001
Con.buying beh.	Consumerbuyingbehaviour5	1.31267	0.1147	11.444	< .001
	Consumerbuyingbehaviour4	1.32324	0.1323	9.999	< .001
	Consumerbuyingbehaviour3	-0.86125	0.0599	-14.380	< .001
	Consumerbuyingbehaviour2	-0.84391	0.0617	-13.688	< .001
	Consumerbuyingbehaviour1	-0.72191	0.0547	-13.193	< .001

Above is the factor loadings for each item used to measure the independent and dependent variables. For attitude, only the first 4 items measure attitude having their p values less than 0.01, the fifth measure is an unacceptable measure of attitude. It has a negative insignificant relationship with attitude. The first two measures of eco-labelling have a negative significant relationship, while others are positive. For consumer buying behaviour and packaging material, while most of the factors have positive significant measures, some are measures, this implies that most of the items measure the variables, they intend to measure.

4.2 Regression analyses

4.2.1 Aggregate Regression Analysis for hypothesis 1:

Total effects

ANOVA Table				
R-squared	**F**	**df1**	**df2**	**P**
0.400	21.6	3.00	97.0	< .001

From the analysis of variance table above table, there is a significant variation between eco-labelling, environmental concern, packaging material and consumer buying behaviour. The r squared shows that 40% of variation in consumer buying behaviour is explained by eco-labelling, environmental concern and packaging material.

Total effects predicting: consumer buying behaviour									
Names	**Effect**	**Estimate**	**SE**	**Lower**	**Upper**	**B**	**df**	**T**	**P**
Ecolabelling	ecolabelling	0.789	0.1535	0.484	1.093	0.800	97	5.14	< .001
Environmentalconcern	environmentalconcern	-0.442	0.0988	-0.639	-0.246	-0.770	97	-4.48	< .001
Packagingmaterial	Packagingmaterial	0.275	0.0478	0.180	0.370	0.451	97	5.76	< .001

The prediction model shows that eco-labelling, environmental concern and packaging material influence consumer buying behaviour, having their p values to be <0.001 and their t values greater than 1.96. However, while Eco-labelling and packaging material have positive significant relationship, environmental concern has a negative significant relationship.

4.2.2 Regression analysis for hypothesis 2:

Environmental concerns have significant effect on consumer buying behaviour

Descriptive Statistics			
	Mean	Std. Deviation	N
Cbuybehaviour	3.31	1.164	360
Econcern	3.19	1.218	360

Econcern means environmental concern

Cbuy behaviour means consumer buying behaviour

Consumer buying behaviour has a mean of 3.31 and a standard deviation of 1.164 while Environmental concern has a mean of 3.19 and a standard deviation of 1.218. This implies that consumers are moderately concerned with environmental concerns in their purchasing behaviour although it is not a priority. The standard deviations indicate that there is significant variation in consumer attitudes, suggesting that consumer preferences are diverse. Businesses should recognise these trends and segment their markets accordingly by ensuring that they offer

both green packaging options and competitive pricing while also educating consumers on the environmental benefits of their choices.

Correlations			
		Cbuybehaviour	Econcern
Pearson Correlation	Cbuybehaviour	1.000	.610
	Econcern	.610	1.000
Sig. (1-tailed)	Cbuybehaviour	.	.000
	Econcern	.000	.
N	Cbuybehaviour	360	360
	Econcern	360	360

The value of the correlation between environmental concern (econcern) and consumer buying behaviour (cbuybehaviour) is 0.610 at 0.000 level of significance which implies that there is positive significant effect between environmental concern and consumer buying behaviour.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.610[a]	.372	.370	.924	.372	211.900	1	358	.000	1.705

a. Predictors: (Constant), econcern
b. Dependent Variable: cbuybehaviour

The r square value from the model summary above is 0.372, this implies that 37.2% of variation in consumer buying behaviour is explained by environmental concern. The durbin Watson value being 1.705 is not so close to 2 which implies the presence of whitenoise and likelihood of autocorrelation.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	180.993	1	180.993	211.900	.000[b]
	Residual	305.782	358	.854		
	Total	486.775	359			

a. Dependent Variable: cbuybehaviour
b. Predictors: (Constant), econcern

The analysis of variance shows that there is significant difference between regression model and residual model. The p-value for the regression model is 0.000 which implies that the regression model is significant. F is 211.900, there is also a significant difference between their mean square and sum of squares.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	1.446	.137		10.560	.000	1.177	1.715		
	Econcern	.583	.040	.610	14.557	.000	.504	.662	1.000	1.000

a. *Dependent Variable: cbuybehaviour*

From the coefficient table above, the value of the standardized beta coefficient is 0.610 at 0.000 level of significance. This implies that eco-labelling has a positive significant relationship with consumer buying behaviour. Its t-value (14.557) is greater than 1.96 which shows that it is significant. The VIF value (1) is less than 5 which shows that there is absence of multicollinearity.

4.2.3 Regression analysis for hypothesis 3:

Eco-labelling has significant effect on consumer buying behaviour

Descriptive Statistics

	Mean	Std. Deviation	N
Cbuybehaviour	3.31	1.164	360
Elabel	3.28	1.228	360

Elabel means ecolabelling

Cbuy behaviour means consumer buying behaviour

Consumer buying behaviour has a mean of 3.31 and a standard deviation of 1.164 while Eco-labelling has a mean of 3.28 and a standard deviation of 1.228.

Correlations

		Cbuybehaviour	elabel
Pearson Correlation	Cbuybehaviour	1.000	.587
	Elabel	.587	1.000
Sig. (1-tailed)	Cbuybehaviour	.	.000
	Elabel	.000	.
N	Cbuybehaviour	360	360
	Elabel	360	360

The value of the correlation between eco labelling (elabel) and consumer buying behaviour (cbuybehaviour) is 0.587 at 0.000 level of significance which implies that there is positive significant effect between eco-labelling and consumer buying behaviour.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.587[a]	.345	.343	.944	.345	188.258	1	358	.000	1.669

a. Predictors: (Constant), elabel

b. Dependent Variable: cbuybehaviour

From the model summary table above, the r square value from the model summary above is 0.345, this implies that 34.5% of variation in consumer buying behaviour is explained by eco-labelling. The durbin Watson value being 1.669 is not so close to 2 which implies the presence of whitenoise and likelihood of autocorrelation.

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	167.758	1	167.758	188.258	.000[b]
	Residual	319.017	358	.891		
	Total	486.775	359			

a. Dependent Variable: cbuybehaviour

b. Predictors: (Constant), elabel

The analysis of variance shows that there is significant difference between regression model and residual model, F is 188.258, the mean square of the regression is 167.758 which is statistically different from that of the residual model.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	1.486	.142		10.477	.000	1.207	1.765		
	Elabel	.556	.041	.587	13.721	.000	.477	.636	1.000	1.000

a. *Dependent Variable: cbuybehaviour*

From the coefficient table above, the value of the standardized beta coefficient is 0.587 at 0.000 level of significance. This implies that eco-labelling has a positive significant relationship with consumer buying behaviour. Its t-value (13.721) is greater than 1.96 which shows that it is

significant. The VIF value (1) is less than 5 which shows that there is absence of multicollinearity.

4.2.4 Regression analysis for hypothesis 4:

Packaging material has significant effect on consumer buying behaviour.

Descriptive Statistics

	Mean	Std. Deviation	N
Cbuybehaviour	3.31	1.164	360
Pmaterial	3.39	.944	360

Pmaterial means packaging material

Cbuy behaviour means consumer buying behaviour

Consumer buying behaviour has a mean of 3.31 and a standard deviation of 1.164 while Packaging material has a mean of 3.39 and a standard deviation of 0.944.

Correlations

		cbuybehaviour	pmaterial
Pearson Correlation	Cbuybehaviour	1.000	.673
	Pmaterial	.673	1.000
Sig. (1-tailed)	Cbuybehaviour	.	.000
	Pmaterial	.000	.
N	Cbuybehaviour	360	360
	Pmaterial	360	360

The value of the correlation between packaging material (pmaterial) and consumer buying behaviour (cbuybehaviour) is 0.673 at 0.000 level of significance which implies that there is positive significant effect between packaging material and consumer buying behaviour.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.673[a]	.453	.451	.862	.453	296.404	1	358	.000	1.638

a. Predictors: (Constant), pmaterial

b. Dependent Variable: cbuybehaviour

The r square value from the model summary above is 0.453, this implies that 45.3% of variation in consumer buying behaviour is explained by packaging material. The durbin watson value being 1.638 is not so close to 2 which implies the presence of whitenoise and likelihood of autocorrelation.

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	220.479	1	220.479	296.404	.000[b]
	Residual	266.296	358	.744		
	Total	486.775	359			

a. Dependent Variable: cbuybehaviour

b. Predictors: (Constant), pmaterial

The analysis of variance shows that there is significant relationship between regression model and residual model. The F is 296.404, the mean square of the regression being 220.479 is statistically different from the residual model. The p value is 0.000 which shows the statistical difference.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	.492	.170		2.898	.004	.158	.826		
	Pmaterial	.830	.048	.673	17.216	.000	.735	.925	1.000	1.000

a. *Dependent Variable: cbuybehaviour*

Source: SPSS output.

From the coefficient table above, the value of the standardized beta coefficient is 0.673 at 0.000 level of significance. This implies that packaging material has a positive significant relationship with consumer buying behaviour. Its t-value (17.216) is greater than 1.96 which shows that it is significant. The VIF value (1) is less than 5 which shows that there is absence of multicollinearity.

4.3 Mediation Analysis for hypothesis 5

To examine the mediating effect of consumer attitude in the relationship between green packaging (ecolabelling, environmental concern, packaging material) and consumer buying behaviour. A generalized linear mediation model (GLMM) was used. An exploratory factor analysis and confirmatory factor analysis was done before the model

4.3.1 Path Model

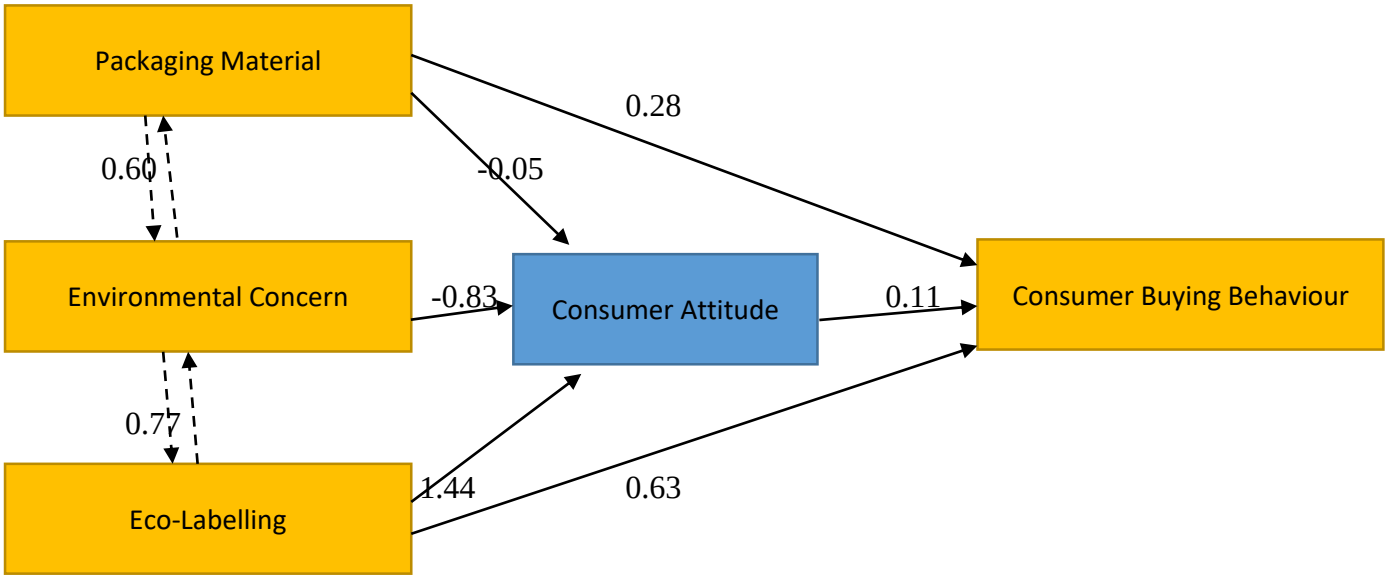

Figure 2: Path Model
Source: Jamovi output.

Figure 2 shows that the coefficients of the variables displayed i.e., consumer attitude, ecolabelling, packaging material and consumer buying behaviour with the direct and indirect effects.

4.3.2 Mediation

Table 4: Mediation analysis result

Indirect and Total Effects

					95% C.I. (a)				
Type	Effect	Estimate	SE	Lower	Upper	B	z	P
Indirect	Ecolabelling ⇒ attitude ⇒ consumer buying behaviour	0.16205	0.15571	-0.1431	0.46723	0.16439	1.041	0.298
	Environmental concern ⇒ attitude ⇒ consumerbuyingbehaviour	-0.09314	0.08961	-0.2688	0.08249	-0.14972	-1.039	0.299
	Packaging material ⇒ attitude ⇒ consumerbuyingbehaviour	-0.00541	0.00709	-0.0193	0.00848	-0.00964	-0.763	0.445
Component	Ecolabelling ⇒ attitude	1.43648	0.13807	1.1659	1.70708	1.41423	10.404	< .001
	Attitude ⇒ consumer buying behaviour	0.11281	0.10785	-0.0986	0.32420	0.11624	1.046	0.296
	Environmental concern ⇒ attitude	-0.82566	0.08886	-0.9998	-0.65149	-1.28804	-9.291	< .001
	Packaging material ⇒ attitude	-0.04794	0.04296	-0.1321	0.03626	-0.08291	-1.116	0.264
Direct	Ecolabelling ⇒ consumerbuyingbehaviour	0.62672	0.21540	0.2045	1.04890	0.63576	2.910	0.004
	Environmental concern ⇒ consumerbuyingbehaviour	-0.34930	0.13118	-0.6064	-0.09220	-0.56146	-2.663	0.008
	Packaging material ⇒ consumerbuyingbehaviour	0.28071	0.04685	0.1889	0.37253	0.50021	5.992	< .001
Total	Ecolabelling ⇒ consumerbuyingbehaviour	0.78877	0.15121	0.4924	1.08514	0.80015	5.216	< .001
	Environmental concern ⇒ consumerbuyingbehaviour	-0.44244	0.09732	-0.6332	-0.25169	-0.71118	-4.546	< .001
	Packaging material ⇒ consumerbuyingbehaviour	0.27530	0.04705	0.1831	0.36751	0.49057	5.851	< .001

Note: Confidence intervals computed with method: Standard (Delta method)

Note: Betas are completely standardized effect sizes

Source: Jamovi output

The mediation analysis result in the table above, shows the indirect, direct and total effects of variables. From the indirect effect, attitude does not mediate the relationship between green packaging (ecolabelling, environmental concern and packaging) and consumer buying behaviour. It is evident that the p values are all above 0.005, having their p values to be 0.298, 0.299 and 0.445 respectively. Although ecolabelling influence consumer attitude, consumer attitude does not influence consumer buying behaviour. However, there is a significant relationship between the measures of the independent variable and consumer buying behaviour considering the direct effect and total effect.

4.3.3 Mediator Model

Dependent variable: Consumer attitude

ANOVA									
R-squared		**F**		**df1**		**df2**		**P**	
0.524		35.6		3.00		97.0		< .001	

Source: Jamovi output.

Considering the mediation model, when the relationship between ecolabelling, environmental concern, packaging material and consumer buying behaviour is mediated by consumer attitude, 52.4% of variations in consumer buying behaviour is explained by consumer attitude and the independent variables. This implies that there is a significant difference between the mediating variable, independent and dependent variable.

5. Discussion of Findings and Implications

5.1 Revised Conceptual Framework

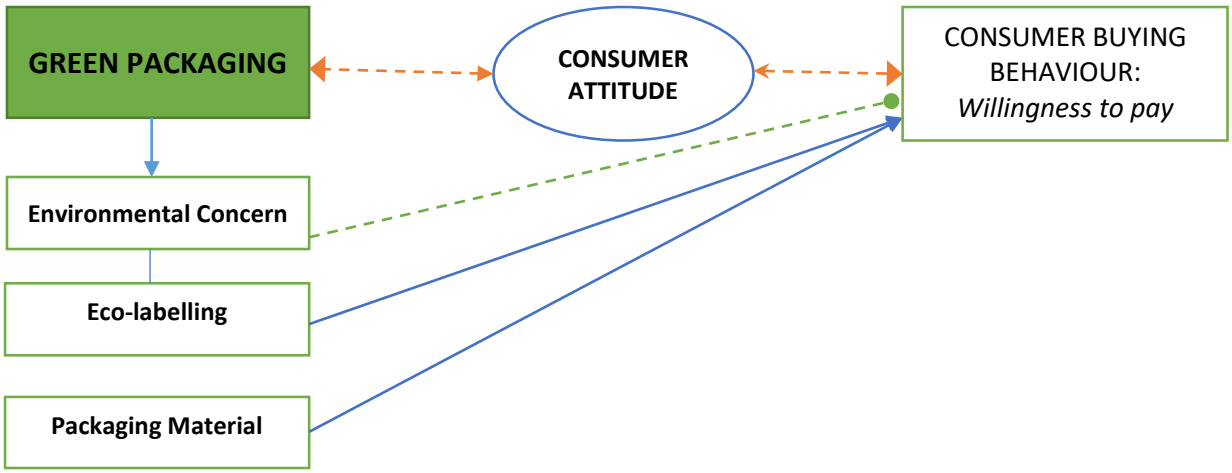

Figure 1: Revised Conceptual Framework
Source: Authors' data interpretation.

Environmental concern was found to be a significant factor that influence consumer buying behaviour in this study with the OLS regression analysis, environmental concern was found to be significant. This is in support of the findings of Ogiemwonyi, et al. (2023), Hyder and Amir, (2023), Iqbal, et al. (2023) and, Hammed and Warris, (2018). They opined that environmental concerns have a positive significant relationship with consumer buying behaviour. However, from the findings of the generalized linear mediation model, environmental concern has a negative significant relationship with consumer buying behaviour, this implies that consumers do not acknowledge the role of environmental concern in their decision making without concurrent availability of green packaging materials and ecolabelling.

In contrast, ecolabelling has a positive and significant relationship on consumer buying behaviour in this study in agreement with the submissions of Dangi, et al. (2020), Gujarati, (2021) and Potter, et al. (2021). Their findings suggests that ecolabels increase trust in organic food. They state that eco-label has a positive significant effect on consumer buying behaviour of organic food. Similarly, packaging material was found to have a positive significant relationship on consumer buying behaviour in this study in concurrence with the submissions of Joseph and Rao (2023). Packaging material and ecolabelling therefore influences consumer buying behaviour as the results of this study reveal. This implies that consumers take note of the packaging material and labels on the products in making their buying decisions.

Although from the findings in this study, consumer attitude has an insignificant mediating relationship between green packaging and consumer buying behaviour, ecolabelling influences consumer attitudes and the full model shows that green packaging influences consumer buying behaviour. Comparing the results of ordinary least square (OLS) regression with that of the generalized linear mediation model (GLM), all measures of the independent variable have a positive significant relationship with the dependent variable in OLS analyses, while for GLM, environmental concern has a negative significant relationship. However, according to developing nations require environmental strategies and policies that will incorporate green strategies. Especially with the reckless use of single-use plastics, inadequate recycling, and landfill deposits are the main contributors to this unusual incidence of occurrence (Ali, et al., 2022; Phelan, et al., 2022).

However, researchers such as Koenig-Lewis, et al. (2014), Joshi and Rahman, (2015), Yadav and Pathak, (2016) regard environmental concern as a major antecedent on green attitude and purchase behaviour. Similarly, Singh and Pandey, (2018) links green packaging to the 4R1D principle - reduce, reuse, reclaim, recycle, and degradable. They characterised packaging as the fifth P in the marketing mix, protecting and conserving the real product. These submissions on consumer attitudes' mediating role between green packaging and consumer buying behaviour are however not obtainable in developing countries at present.

6. Conclusion and recommendations

The hypothesis test conducted indicates the relevance of the variables used. There is a significant relationship between environmental concern and consumer buying behaviour. P value=0.000. Also, there is a positive significant relationship between eco-labelling and

consumer buying behaviour. P value=0.000. Furthermore, there is a positive significant relationship between packaging material and consumer buying behaviour. P value=0.000. Finally, attitude has a negative mediating effect between green packaging and consumer buying behaviour. This study therefore concluded that green packaging has effect on consumer buying behaviour as consumers take notice of ecolabels on product before making purchase because they believe that eco-labels guarantee a product is completely environmentally friendly. Consumers also consider products that contributes less to waste, air pollution and less harm to climate change when choosing packaging product. Furthermore, consumers prefer brands that use biodegradable and recyclable material in packaging their product with precise information in their labelling material.

Curiously, consumer attitude does not significantly mediate the relationship between green packaging and consumer buying behaviour. However, this is in tandem with the assumptions of the theory of planned behaviour as propounded by Ajzen, (1991; 2011). The theory posits that the intention of a person to perform a specific behaviour, like purchasing a green-packaged product, is influenced by attitude which refers to the positive or negative evaluation of the behaviour of a person. This is a subjective norm which reflects the perceived social pressure to perform the behaviour and perceived behavioural control which assess how easy or difficult someone believes it will be to behave in a particular manner. Also, this outcome is a validation of the fact that environmental concern has a negative significant relationship with consumer buying behaviour in the generalized linear mediation model of this study. Essentially, consumer's refusal to acknowledge the role of environmental concern in their decision making without concurrent availability of green packaging materials and ecolabelling implies their attitude may vary.

Therefore, given that ecolabeling has a stronger direct impact on buying decisions compared to packaging material, it is recommended that promotion of consumer knowledge about eco-labels and packaging sustainability, along with ensuring wider availability of truly eco-friendly options is key to manufacturing organisations. This study therefore recommend that firms should ensure that they use ecolabels in packaging their product, and ensure that they make use of environmentally friendly material in packaging their product.

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APPENDICES

Appendix I: Questionnaire

QUESTIONNAIRE ON GREEN PACKAGING AND CONSUMER BUYING BEHAVIOUR

Instruction: Please tick (√) to indicate by ranking the degree of agreement based on your opinion on the importance of the following statements relating to GPP using a five point where Strongly Agree (SD= 5), Agree (A= 4), Undecided (U= 3), Disagree (D= 2), Strongly Disagree (SD= 1)

PART IA: ECO-LABELLING

S/N	STATEMENTS	SA 5	A 4	U 3	D 2	SD 1
1	I take notice of eco-labels on product					
2	Eco-labels guarantee a product is completely environmentally friendly					
3	I prefer nylon labels					
4	I prefer paper labels					
5	I prefer labels that use synthetic material					

PART IB: ENVIRONMENTAL CONCERN

S/N	STATEMENTS	SA 5	A 4	U 3	D 2	SD 1
6	Reduction of contribution to waste is of great concern when choosing my packaging product					
7	I consider products that contributes less to the loss of biodiversity					
8	I consider products that contributes less to deforestation					
9	I consider products that contributes less harm to climate change					
10	I consider product that contributes less to air pollution					

PART IC: PACKAGING MATERIAL

S/N	STATEMENTS	SA 5	A 4	U 3	D 2	SD 1
11	I prefer packaging material that protects the product					
12	I prefer brands that use recyclable material in packaging their product					
13	I prefer brands that proffer precise information in their labelling material					
14	I prefer glass packaging material					
15	I prefer paper packaging material					
16	I prefer plastic packaging material					
17	I prefer biodegradable materials					

PART II: CONSUMER BUYING BEHAVIOUR

S/N	STATEMENTS	SA 5	A 4	U 3	D 2	SD 1
18	I will buy products that are clearly labelled green or sustainable product					

19	I will buy products with recycling symbol with additional information					
20	I will buy products with information on the material used					
21	I will buy a product because a green packaged material is used in its packaging					
22	I am willing to choose a green packaged product					

PART III: CONSUMER ATTITUDE

S/N	STATEMENTS	SA 5	A 4	U 3	D 2	SD 1
1	I feel brands that use eco label on their products are safe					
2	I feel green packaged products are quality and healthy					
3	I feel green packaging contributes to reducing environmental hazard					
4	I am likely to be enticed by the packaging of a product					
5	I feel I will like to buy a green packaged product					

Appendix II: Variable Reliability Statistics

Variable Reliability Statistics

	If item dropped Cronbach's α
Age	0.909
Profession	0.909
Qualification	0.909
Monthlyincome	0.912
Gppbb	0.909
attitude1	0.901
attitude2	0.899
attitude3	0.898
ecolabel1	0.898
ecolabel2	0.897
environmentalconcern1	0.897
environmentalconcern2	0.896
environmentalconcern3	0.898
environmentalconcern4	0.897
environmentalconcern5	0.897
packagingmaterial1	0.897
packagingmaterial2	0.897
packagingmaterial3	0.896
packagingmaterial4	0.904
packagingmaterial5	0.906
packagingmaterial6	0.906

Variable Reliability Statistics

	If item dropped
	Cronbach's α
packagingmaterial7	0.904
consumerbuyingbehaviour1	0.903
consumerbuyingbehaviour2	0.903
consumerbuyingbehaviour3	0.904
attitude4	0.900
attitude5	0.910
ecolabelling3	0.909
ecolabelling4	0.908
ecolabelling5	0.908
consumerbuyingbehaviour4	0.908
consumerbuyingbehaviour5	0.908
Gender	0.907
Maritalstatus	0.908