

The Impact of Green Product Attributes on Green Purchase Decisions in the Sector of Cement Industry: A Study on Clients of Lafarge Algeria

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Abstract:

This study aims to investigate the impact of green marketing through green product attributes (Green Packaging X1 and Green Content Composition X2) on consumers' green purchasing decisions Y (a study on clients of Lafarge Algeria in the cement industry sector). The sample size was determined to be 114 participants, following Zikmund and Babin's formula methodology. Data was obtained through an electronic questionnaire based on a 5-point Likert scale. Analysis was conducted via multiple regression analysis using Jamovi software version 2.3. The study found that green content composition and green packaging have significant positive influences on the green purchase decision of Lafarge clients in Algeria. Therefore, the research articulated recommendations directed at policymakers and Algerian entities engaged in the cement industry, with the objective of promoting an inclination towards enhancing the attributes of green products.

Keywords: Green Marketing; Green Product; Green Purchase Decisions.

JEL Classification Codes: M31; Q56.

ملخص:

تهدف هذه الدراسة إلى تأثير التسويق الأخضر على قرارات الشراء الخضراء للمسهلكين من خلال خصائص المنتج الأخضر (التغليف الأخضر x_1 و المكونات الخضراء للمنتج x_2). دراسة على زبائن شركة لافاج الجزائر في قطاع صناعة الإسمنت. تم الاعتماد على معادلة زيكماند و باين لتحديد حجم العينة و التي قدرت بـ 114 زبائن. جمع البيانات كان من خلال استبيان الكتروني قائم على سلم ليكرت الخماسي. تحليل هذه البيانات تم من خلال تحليل الانحدار المتعدد عن طريق البرنامج الإحصائي Jamovi نسخة 2.3. أثبتت الدراسة وجود أثر إيجابي دال إحصائيا للمكونات الخضراء و التغليف الأخضر على قرارات الشراء الخضراء لزبائن شركة لافاج في الجزائر. ولذلك، قدمت الدراسة مجموعة من الاقتراحات لفائدة أصحاب القرار والمؤسسات الجزائرية التي تنشط في قطاع صناعة الإسمنت بهدف تشجيع التوجه نحو تطوير خصائص المنتجات الخضراء.

كلمات مفتاحية: تسويق أخضر; منتج أخضر; لافاج الجزائر.

تصنيفات JEL: Q56; M31

1. Introduction

Competition within the cement industry is intense, compelling firms to develop products that align with consumer needs and preferences. Currently, consumers are increasingly acknowledging the importance of using products that are environmentally sustainable. These evolving market trends and ecological considerations necessitate modifications in products, manufacturing processes, packaging, and marketing strategies.

Consequently, green marketing strategies in businesses are primarily driven by shifts in consumer product preferences. The rise in consumer awareness regarding environmental conservation has led numerous manufacturers to employ materials with minimal negative environmental impact.

Additionally, various factors contribute to the adoption of green marketing, including regulatory mandates from authorities and the imperative for firms to cultivate a green corporate image. Furthermore, the growing adoption of green marketing strategies has made the transformation in consumer behavior a central focus for marketers, urging firms to be more diligent in analyzing consumer behavior, particularly concerning purchasing decisions for green products.

However, further research is necessary to substantiate the factors influencing environmentally conscious consumers' choices of eco-friendly products in the cement industry. This need arises because previous research has yielded mixed results regarding the determinants of green purchasing decisions, especially among Algerian consumers.

Therefore, this study aims to investigate how the green product characteristics of Lafarge Algeria affect the eco-conscious purchasing decisions of Algerian consumers. To address this research gap, the following question can assist in identifying the study's problem:

Do the attributes of green products positively affect the green purchase decisions made by Lafarge Algeria clients?

Based on those mentioned above, the sub-questions were:

1- Does the green packaging have a positive impact on the green purchasing decisions made by Lafarge Algeria clients?

2- Does the green content composition have a positive impact on the green purchase decisions made by Lafarge Algeria clients?

Research Hypotheses

H1: Green product attributes have a significant positive impact on green purchase decisions made by Lafarge Algeria clients.

Sub-hypotheses:

H1a: Green packaging has a significant positive impact on green purchase decisions made by Lafarge Algeria clients.

H1b: Green content composition has a significant positive impact on green purchase decisions made by Lafarge Algeria clients.

Research Objectives

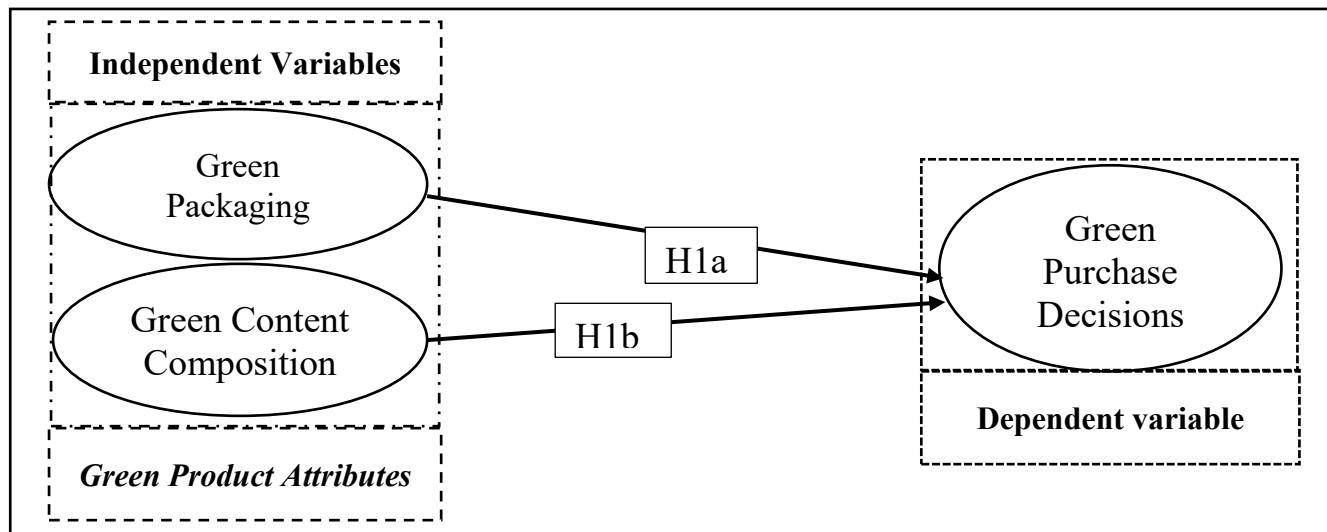
We seek, through the **theoretical side** of this study, to determine the following:

- 1- Clarify the concept of green marketing and green product attributes.
- 2- Define green consumers and green purchase decisions.

We seek, through the **application side** of this study, to determine the following:

- 1- Measuring the Impact of Green Product attributes (green cement attributes) on purchase decisions made by the clients of Lafarge Algeria.

Research Model



Source: Prepared by the researchers based on literature review

2. Literature Review

2.1 Definition of Green Marketing

As is frequently the case with topics that have a broad scope and an interdisciplinary approach, we can conclude that there is no universally agreed-upon definition of green marketing. A number of authors and institutions support the attempt to define the concept and its components' ideas and meaning. Because of this, some focus on how this differs from traditional marketing, while others apply the fundamental ideas of sustainable development.

According to Polonsky, green marketing is a collection of actions meant to create and enable any exchange intended to satiate human needs or desires with the least amount of adverse environmental effects (Polonsky, 2008).

As articulated by Liskova et al., this concept is characterized as a strategic approach aimed at promoting sustainable products and practices, with the dual objectives of mitigating adverse environmental impacts and appealing to environmentally conscious consumers. This marketing strategy includes various activities, including product modifications, sustainable production processes, and

environmentally friendly packaging, all of which are aimed at enhancing the attractiveness of green products on the market(Líšková, Cudlínová, Pártlová, & Petr, 2016).

The definition of this concept can be summarised as replacing traditional marketing activities with modern and innovative marketing activities based on an environmentally friendly foundation that reduces waste of resources (Amraoui, Djemaa, & Kaouache, 2018).

A. Rasmussen introduced the initial 4Ps concept (product, price, place, and promotion), which was eventually improved even more by Kotler and Lee (2008)However, with the introduction of the 4Ps concept in the 1960s, it evolved into a field of study. It established a theoretical foundation as this marketing mix is developed to ensure that a product is successfully marketed and fits the needs and desires of the customer(Mahmoud, 2019).

- ✓ **Green Product:** A material good or service that achieves consumer satisfaction. Substantial improvements have been made according to specific standards, allowing it to be brought into a form that can be easily recycled or disposed of without leaving harmful effects on the environment and consumers' health while maintaining the original performance and profitability of the product (Nacer & Ilham, 2018).

To produce these environmentally sustainable products, it is imperative for the organization's production and research and development departments to collaborate in determining the optimal production formula. This process encompasses the design and conversion phases through to the packaging phase. The use of innovative techniques, recycled or recyclable raw materials, and materials with environmentally friendly properties is essential in achieving this goal.(Bhalerao & Deshmukh, 2015).

2.2 Green Product Attributes

Green Product Attributes refer to environmentally friendly features integrated into products(Ghazali et al., 2023). They encompass physical, perceptual, and reflexive characteristics that influence consumer trust and purchasing decisions for environmentally friendly products(Khan, 2022). These environmentally friendly characteristics are integrated into various stages of production processes, affecting the firm's sustainability positively(Mendoza-Fong, García-Alcaraz, Ochoa-Domínguez, & Cortes-Robles, 2018). The previous study made by Asminah Rachmi explained that green product attributes include green packaging and green content composition(Rachmi, Wardani, & Sudjanarti, 2022). These two variables are the independent variables of this research paper.

2.2.1 Green Packaging (GP)

Green product packaging refers to sustainable packaging alternatives that aim to reduce waste, and minimize the negative impact on the ecosystem (Rajesh &

Subhashini, 2021). This process encompasses the use of green substances and energy-efficient production methodologies to fabricate packaging that is both resilient and environmentally conscientious (Yuan, 2022).

Green packaging is integral to safeguarding products and enhancing corporate social responsibility(Alam & Abunar, 2023). By adopting green packaging practices, businesses contribute to environmental conservation by reducing the use of resources, decreasing waste production, and lowering carbon footprints. Ultimately, green product packaging aims to protect the product to meet consumer needs while ensuring a cleaner environment for future generations(Rajesh & Subhashini, 2021)

Previous studies showed that green packaging serves as a formidable instrument for corporations striving to secure a competitive edge by significantly augmenting their brand image as well as catering to the preferences of environmentally conscious consumers (Ayoun & Schmitz, 2024).

2.2.2 Green Content Composition (GCC)

Green product content composition refers to the formulation of products with environmentally friendly attributes, aiming to reduce negative impacts on human health and the environment(Mohammad, 2014). In other words, Green product content composition refers to developing environmentally friendly products with materials and ingredients that have minimal impact on the environment to promote sustainability and eco-consciousness in the market(Haribabu, 2016).

2.3 Green Consumer

From an economic perspective, a consumer is regarded as the ultimate purchaser and user of goods and services, thereby generating demand within the market. This viewpoint accentuates the consumer's function in propelling market dynamics and shaping product availability(Kulkarni & Bhalerao, 2021).

According to Aynoun and S. Schmitz, the term “Green Consumers” refers to individuals who prioritize environmental sustainability in their purchasing decisions and behaviors. This concept encompasses a range of practices and attitudes aimed at reducing environmental impact through conscious consumption choices(Ayoun & Schmitz, 2024).

2.4 Green Purchase Decision (GPD)

According to Marbun, a purchasing decision is defined as the cognitive process by which consumers assess alternatives and ultimately choose to acquire a product or service that meets their needs and desires. This decision-making process encompasses various stages, including the assessment of product quality, price, and brand image, in addition to promotional influences, which significantly impact consumer behavior at the point of purchase(Marbun & Khoiri, 2023).

Green purchase decisions refer to consumers' choices to buy environmentally friendly products. In other words, they refer to consumers choosing environmentally

friendly products to combat environmental issues caused by traditional products (Joshi & Rahman, 2015). Factors influencing this decision include environmental concern, perceived benefits, price awareness, willingness to purchase, and green marketing mix(Nekmahmud & Fekete-Farkas, 2020).

3. Study Case

One of the top providers of building supplies worldwide, LafargeHolcim is a multinational corporation that makes concrete, aggregates, and cement. Lafarge Algeria refers in particular to LafargeHolcim's presence and activities in the Algerian market(Lafarage, 2023).

3.1 Lafarge Algeria Green Product

✓ **CEMENT CHAMIL™ ECOPlanet:** This new cement, which goes by the "Shamel" brand, lowers carbon dioxide emissions by forty percent when compared to traditional cement in Algeria. Its production is based on a technology created by the Construction Development Laboratory in Rouiba City, Algeria. The development of this new cement took two years and involved high-tech experiments(Algeria-Press-service, 2023).

3.2 Lafarge Algeria Green Content Composition

Lafarge Algeria offers green cement that integrates alternative raw materials known as supplementary cementitious materials (SCMs) like fly ash, slag, silica fume, calcined clay. These components have the potential to act as partial replacements for conventional clinker in the cement manufacturing process, thereby diminishing the environmental impact linked with clinker production(Holcim, 2024).

3.3 Lafarge Algeria Green Packaging

Green packaging within the cement industry pertains to the use of environmentally sustainable materials and techniques in packaging cement-based products. In this regard, the Algerian paper firm “Général Emballage” partnered with Lafarge Algeria to create environmentally sustainable packaging for cement products.(Algeria-Press-service, 2023).

4. Methods

This study adopts a quantitative methodology to evaluate theoretical constructs by examining the interrelationships among variables. A survey method was employed to efficiently gather primary data from Lafarge customers through electronic questionnaires distributed via Google Forms to the company's client service department in Mascara. The questionnaire was organized into four sections: the initial section collected basic demographic information, including gender, age, and income; the subsequent three sections evaluated the key constructs of the study. Specifically, the items related to green product packaging and green content composition were adapted from the framework developed by Nataliya and Nuvriasari (2023), while the

items concerning green purchasing decisions were influenced by the conceptual model established by (Lee, 2008). Each of the three thematic sections comprised five items, rendering the instrument both concise and comprehensive. The responses were exclusively collected from clients who had purchased green cement products from Lafarge, ensuring relevance and alignment with the research objectives.

The research population is LAFARGE HOLCIM consumers whose numbers cannot be estimated. Consequently, the sampling methodology involves using the formula (N) established by Zikmund and Babin (2013).

$$N = \frac{Z^2 c. 1. pq}{E^2}$$

With a confidence level estimated at 95% ($Z_c = 1.96$), in cases where the permissible sampling error (E) does not exceed 4%, the estimated proportion of success (p) is 95%, and q is equal to 1-p, the calculation yields a cumulative sample size of 114.

Data analysis comprises conducting validity and reliability assessments to test the instruments, along with traditional assumption tests like normality, Multicollinearity and Heteroscedasticity. These tests are essential to guarantee the suitability for carrying out multiple linear regression analysis. The use of multiple linear regression analysis aims to construct a model that elucidates the impact of predictor variables on the dependent variable (Manning & Munro, 2007). Furthermore, multiple regression analysis is employed to examine the validity of the hypotheses.

5. Results and Discussion

5.1 Validity Assessment

Table (1) presents the validity assessment outcomes using the Pearson correlation method. Items corresponding to each research variable yield a computed R-value exceeding 0.5 and significant (0.000), thereby rendering all indicators valid.

Table 1. Validity Assessment

Variables	Items Text	Pearson Correlation (r)	Sig.	Conclusion
Green packaging (X1)	“Cement Green packaging is important for me because it is protecting environment”	0.861	0.000	Valid
	“Cement Green packaging is important for me because it can be recycled”	0.817	0.000	Valid
	“I prefer Green packaging materials because they are not dangerous”	0.851	0.000	Valid
Green Content Composition (X2)	“Green cement content composition is important for me because it is protecting environment”	0.891	0.000	Valid
	“I prefer cement with recycled raw materials as long as it have the same quality with traditional cement”	0.841	0.000	Valid
	“Cement green content composition is important for me because it have a minimal damage to the environment”	0.849	0.000	Valid
Green purchasing decision (Y)	“When I want to buy cement , I look at the ingredients label to see if it contains things that are environmentally damaging”	0.906	0.000	Valid
	“When I want to buy cement , I consider if it is green packaged”	0.879	0.000	Valid
	“I choose to buy cement that is environmentally friendly”	0.853	0.000	Valid
	“I buy green cement even if it is more expensive than the non-green one”	0.828	0.000	Valid

Source: Prepared by the researchers based on Jamovi 2.3 outputs

5.2 Exploratory Factor Analysis

Exploratory Factor Analysis (EFA) is a statistical method used in multivariate analysis to uncover hidden relationships among variables by identifying underlying factors that explain observed patterns in data. It is widely applied across various fields, including social sciences and economics, to simplify complex datasets into interpretable structures. The process involves determining the number of factors, estimating factor loadings, and interpreting these factors, often facilitated by rotation methods for clarity. (Taherdoost, HAMED , & Sahibuddin, 2014).

Table 2. Exploratory Factor Analysis

Factor	Value: 1		Uniqueness
Variables			
(X1) GP	Q1	0.969	0.0610
	Q2	0.938	0.1195
	Q3	0.956	0.0868
(X2) GCC	Q4	0.919	0.1551
	Q5	0.945	0.1077
	Q6	0.872	0.2399
(Y) GPD	Q7	0.923	0.1485
	Q8	0.973	0.0534
	Q9	0.932	0.1307
	Q10	0.882	0.2212

Source: Prepared by the researchers based on Jamovi 2.3 Output using direct Oblimin rotation method

A pilot investigation was carried out using a questionnaire comprising 10 items, with a sample containing 30 participants. To enhance the research tool, exploratory factor analysis (EFA) was used. Only factors exhibiting eigenvalues exceeding 1.0 were preserved, as illustrated in Table (2), and scale items that demonstrated factor loadings of 0.50 or greater were maintained, leading to the exclusion of 00 items. As a result, the conclusive research instrument employed for data collection consisted of a 10-item scale.

5.3 Reliability Assessment

Table 3. Reliability of variables

Variables	N of Items	Cronbach's	Criteria	Conclusion
Green packaging (X1)	3	0.976	0.7	Reliable
Content composition (X2)	3	0.964	0.7	Reliable
Green purchasing decision (Y)	4	0.970	0.7	Reliable

Source: Prepared by the researchers based on Jamovi 2.3 outputs

Reliability assessments indicate that all investigated variables yielded Cronbach alpha coefficients exceeding 0.7, signifying that the study variables (GP, GCC, and GPD) demonstrate a high degree of reliability.

5.4 Multiple Linear Regression Assessment

The outcomes presented in Table (4) reveal that the Adjusted R Square value for this model is 0.930. This indicates that the independent variables (X1 and X2) explain 93% of the variance observed in the dependent variable (Y). Conversely, the remaining 7% of the variability in GPD (Y) could be ascribed to additional factors that are not included in this investigation.

The classical assumption test was conducted, demonstrating that the data conformed to a normal distribution. The multicollinearity assessment revealed that all variables were devoid of multicollinearity issues, as indicated by VIF scores below 10. The heteroscedasticity test, performed using a scatter plot, exhibited no discernible pattern, suggesting the absence of heteroscedasticity problems, thereby permitting the continuation of regression analysis.

Table 4. Determination coefficient Assessment

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.965	0.932	0.930	0.287	2.05

Source: Prepared by the researchers based on Jamovi 2.3 outputs

Based on Table 5, the regression equation shows that GP (X1) (p-value=0.012)

and GCC (X2) (p-value=0.000) have a positive and significant influence on GPD (Y) at a significance level of 0.05. This illustrates that all hypotheses achieved statistical significance, indicated by a p-value < 0.05 and a t-score exceeding the critical t-value, thus leading to the rejection of H0 for each hypothesis and **the acceptance of the main hypothesis (H1)**.

Table 5. Multiple Linear Regression Assessment

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig
	Variables	B	Std.error	Beta		
	(Constant)	2.278	0.090	-	1.95	0.054
	Green packaging(x1)	0.316	0.123	0.325	2.56	0.012
	Green Content composition(x2)	0.638	0.125	0.645	5.09	0.000

Source: Prepared by the researchers based on Jamovi 2.3 outputs

Consequently, the equation representing the regression can be formulated as follows:

$$Y = 2.278 + 0.316X1 + 0.638X2$$

The positive magnitude of the constant and coefficient regressions indicates that Y (green purchasing decisions) has a value of 2.278 when the values of X1 (Green Packaging) and X2 (Green Content Composition) are zero. Furthermore, the regression model demonstrates that an increase in X1 and X2 results in a corresponding increase in Y. These findings from the multiple regression analysis suggest that green packaging significantly and positively influences the purchasing decisions of Lafarge clients. This implies that as product packaging becomes more environmentally friendly, consumers are more inclined to engage in green purchasing behaviors. This research further confirms that the green purchasing decisions of Lafarge Cement are positively influenced by the composition of the materials. Specifically, as the environmental friendliness of the cement's components increases, Lafarge customers exhibit a greater willingness to engage in green purchasing behaviors.

The results of this research indicate that Green Packaging and Green Content Composition, serving as dependent variables, have a substantial impact on the green purchasing decisions of Lafarge green cement consumers in Algeria. This demonstrates that within the cement industry, consumers are more inclined to make environmentally conscious purchases when the product's packaging and content composition exhibit stronger eco-friendly characteristics. In other terms, the study showed a positive correlation between the environmental attributes of cement products and consumers' willingness to engage in green buying behavior.

6. Conclusion

The investigation explored how green product attributes through packaging and content composition influence the green purchasing decision of Lafarge clients in Algeria. The findings derived from the statistical examination conducted in this investigation indicated that green product attributes have a positive impact on green purchasing decisions. In light of empirical findings, it is recommended that enterprises within the cement industry prioritize environmentally sustainable product characteristics, as these attributes significantly influence green purchasing decisions. This research offers an analytical framework to examine how the characteristics of green cement influence Algerian consumers' eco-friendly purchasing choices. In doing so, it aims to establish a foundation of knowledge regarding the environmentally friendly attributes of green cement and the purchasing decisions made by Lafarge customers in Algeria.

Finally, to support environmental conservation efforts in developing nations, the findings from this research will be valuable for upcoming studies that explore the key elements influencing consumers' choices regarding green products.

Recommendations

To attract green consumers, cement manufacturers in Algeria must dedicate increased resources to the research and development of sustainable packaging and material formulations.

- Firms in the green cement industry should prominently display eco-friendly features such as a reduced carbon footprint, fully recyclable packaging, and "sustainable composition" directly on the packaging. This enhances consumer green purchasing decisions.

-The government ought to collaborate with regulatory bodies to advance policies that favor sustainable products, including tax incentives and financial support for eco-friendly construction materials. This would encourage companies within the cement sector to embrace environmentally conscious marketing strategies.

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