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Examining factors inhibiting solar systems adoption mediated by consumer confusion on green consumption in Bulawayo

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Abstract

Green marketing is a philosophy better understood and practised in developed economies. In developing countries, the concept is not fully understood and faces significant challenges that hinder its strategic implementation and the adoption of innovations by organisations and consumers. The study was motivated by the urge to examine the impact of the repressing factors encountered by solar systems consumers in Zimbabwe as they try to adopt green innovation. Similarity consumer confusion, and ambiguity are examined as mediating variables. A quantitative sample of 306 was drawn using random sampling of household numbers. A further sample of 12 was used for the qualitative survey. The explanatory sequential mixed methods design was applied. The research hypotheses were tested using structural equation modeling - SmartPLS, while qualitative data were processed using the reflexive thematic approach in NVivo version 12. The study established that the exorbitant cost of solar systems in Zimbabwe was one of the significant repressing factors. Additionally, greenwashing and green myopia were found to have a profound negative impact on the green marketing philosophy as they are proven antecedents of consumer confusion militating against the adoption of solar systems. The study recommended the facilitation of local production of solar systems and the introduction of subsidies on high-quality solar systems to ease the burden on consumers.

Keywords: Green marketing; green consumption; green product adoption; ambiguity confusion; green myopia

1. Introduction

Climate change due to global warming has posed some pressure on governments and firms to react through research and development of environmentally friendly sources of energy. The situation resulted in the review of the production of electrical power which was mainly anchored on non-renewable fuel-based sources. The El Niño induced climate changes have reduced volumes of water in the used-to-be reliable water bodies, making the production of hydropower even more difficult than previously. Such negative developments triggered the greater need for and the production of solar energy which brought great hope ever as a clean and renewable alternative (International Energy Agency, 2023). Additionally, global supply chains for solar components create economic opportunities while addressing environmental challenges. The shift to solar energy is also important for attaining the United Nations Sustainable Development Goals (SDGs), especially those focused on smart energy and climate action (McKinsey & Company, 2024; Ember, 2024). Improved solar adoption can activate job creation in manufacturing, installation, and maintenance sectors, contributing to high economic resilience. Financial techniques like subsidies and microfinancing improve access to solar energy for different populations. This ensures that the benefits of solar technology are widely distributed. A collaborative worldwide approach is important to overcome the obstacles to solar energy adoption and maximise its benefits.

Africa is endowed with sufficient solar resources which makes it an important candidate for renewable energy solutions. Solar energy has the potential to reduce energy poverty, particularly in rural areas where access to the grid is limited (International Energy Agency, 2024; Ember, 2024). Nonetheless, Africa faces unique challenges, such as consumer confusion and a lack of education about solar technologies, which hampers extensive adoption. Localised solar solutions drive economic growth and empower communities through energy independence. That allows the communities to control their natural resources effectively. Governments across the continent are increasingly appreciating the importance of solar energy in their national development strategies, focusing on improving energy access and sustainability (McKinsey & Company, 2024; Ember, 2024). International partnerships play an important role in improving technology transfer and capacity building in the solar energy fraternity which facilitates the adoption of innovative solutions. Furthermore, solar energy adoption stimulates local manufacturing, creating jobs and supporting economic strength in African economies. Paying adequate attention to the reduction of consumer confusion is essential to increase solar system adoption rates among African populations. This is essential since informed consumers are more likely to invest in solar technologies. Community-based initiatives are also important as they increased awareness and facilitate informed decision-making in solar investments. The move makes sure that the change to solar energy is inclusive and beneficial for all. The success of solar energy projects in Africa serves as a model for other regions facing similar energy challenges.

However, the adoption of green innovation is at an alarmingly low rate in developing economies like Zimbabwe (Renewable Energy World, 2024; Akrofi, 2024). Notable use of solar electric power in Zimbabwe began in the late 1990s and 2000s. However, up to now, there are still relatively very few households and organisations that have adopted and begun using the smart renewable source of energy. The investigation on green consumption repressing factors and consumer confusion focusing on the barriers to the adoption and diffusion of solar systems in Bulawayo develops some understanding that is essential for entrepreneurs, firms, consumers, and policy formulators in Zimbabwe (Nhamo et al., 2023). New green products are expensive to manufacture particularly in developing countries (Nhamo & Nhamo, 2023). Paradoxically, the general populace of consumers in third-world economies like Zimbabwe, earn far much below the poverty datum line which makes the green products (solar systems) unaffordable even though they need them (Gwenhure & Odhiambo, 2023; IEA World Energy Outlook, 2023). The solar system manufacturing project should be a national priority (International Energy Agency, 2023). Changing a lifestyle is not easy and cannot be attained overnight (Smith, 2023). Therefore, consumers who have enjoyed a better life from traditional fossil-based sources that are not environmentally friendly may resist switching to new green products (Jones & Garcia, 2024). This could be aggravated by other consumers' negative experiences with solar systems that failed to meet functional expectations (Brown, 2023). That draws back the adoption and diffusion of green systems and efforts toward sustainability and a smart economy (Nguyen & Kim, 2023). Manufacturers produce green products, but they seem hesitant to invest heavily in honestly promoting green consumption to reduce the chances of greenwashing (Wang & Chen, 2023). Greenwashing is one of the realities that represses the adoption of green products since consumers are misinformed about green products and cannot differentiate between traditional and innovations (Kim & Lee, 2024). Many studies on green marketing (e. g. Kiyak & Grigoliene, 2023; Gupta, 2024; Jamal et al., 2021; Chopra & Chaudhary, 2021) were carried out but still, there is a paucity of literature on the relationships between factors that repress solar systems adoption mediated by consumer confusion. This study examines the factors inhibiting solar systems adoption that are mediated by consumer confusion on green consumption. In particular, this study aims to achieve several objectives:

(1) To analyse the impact of solar energy system pricing on consumer confusion in Zimbabwe.

(2) To investigate how consumer knowledge of the environmental benefits of solar energy affects their adoption decisions.

(3) To explore the influence of greenwashing on confusion regarding solar energy adoption.

(4) To examine the influence of green myopia on confusion regarding solar energy adoption.

(5) To offer a framework for successful solar systems adoption.

2. Literature and Hypotheses Development

2.1 Green Marketing

Green marketing refers to the promotion, consumption, and production of goods and services that protect the environment and sustain human life (Kusuma & Asifulla, 2024; Rashma, 2024. Similarly, James (2021) views green marketing as the manufacturing and marketing of goods and services through green processes. Therefore, green marketing can be viewed as the marketing of goods and services focusing on their environmental importance and consumer satisfaction. Hence, the wide adoption of solar systems is invaluably essential in Zimbabwe. Some authorities (e. g. Kusuma & Asifulla, 2024; Barraco 2024; Sharma & Singh, 2015; Tshuma, 2022) refer to the same concept as environmental marketing, eco-marketing or ecological marketing. In developing countries, a huge percentage of consumers are unaware of or not worried about the effects of their consumption behaviour on the environment. However, social movements and the media are trying to inform consumers about the impact of their consumption patterns on the environment and the presence of green goods and services on the market (Sharma & Singh, 2015).

2.1.1 The Cost versus Affordability Dilemma

Eco-friendly products, such as solar energy systems, are not very common in developing economies for the reason that their production is costly as noted by Kusuma and Asifulla, (2024), Res4Africa Foundation (2023), and Hove and Rathaha (2021). Consumers and manufacturers echo the green words abundantly with very few affordable green products rolled out into the market (Maharjan, 2019). The few solar systems that can be found on the market are not affordable to many consumers, hence they do not easily diffuse, and their impact becomes very minimal at the societal level. Similarly, Maharjan (2019) found out that new technology has made non-eco-friendly products that are affordable and reliable abundantly available on the markets. As a result, the adoption and diffusion of eco-friendly products is hampered. Consumers are caught in a dilemma, there is a challenge whereby non-environmentally compliant products are more affordable than environmentally friendly products. Following this discussion, the following proposition was developed:

H_1: Unaffordable prices of solar energy systems cause ambiguity confusion which reduces the rate of adoption and diffusion in Zimbabwe.

2.1.2 Old Technology Driven Consumer Lifestyles

African consumers heavily depend on already adopted cheaper energy technologies. Hence, their lives are highly hinged upon fossil-based electric power even though it is non-renewable and detrimental to the environment and human sustainability (Aquilas, Ngangnchi & Mbella, 2024; Obada et al., 2024). Consequently, it becomes hard for them to opt to disturb the status quo with the hope to benefit from the solar systems which have unclear functionality and reliability about

huge projects like big organisations, urban, and rural communities (Ramanujan, 2024). Some consumers are suspicious of the durability of the systems once installed, subsequent running costs, and availability of parts for repairs. This is attributed to their previous negative experiences and dissatisfaction with many Chinese products including solar systems and electrical gadgets imported by Zimbabwe and other African countries (Ramanujan, 2024). Following this discussion, the following hypothesis was proposed:

H_2: Heavy consumer reliance on fossil-based electric power suppresses their adoption rate of solar energy systems.

2.1.3 Consumer Perception

The literature on consumer perceptions of solar energy presents important gaps in understanding and addressing the barriers to adopting green technologies. The emphasis on consumer education and awareness is of great importance, as noted by Cuc et al. (2022) and supported by Sharma & Singh (2015). The agreement across these studies is that without enough knowledge about the benefits of green products, particularly solar energy systems, consumers are not likely to accept these technologies easily. As a result, this draws back the attainment of broader environmental and marketing goals. Notably, existing literature has the strength of applauding the role of media in shaping consumer perceptions. The recognition that environmental messages must be tailored to diverse audience segments shows the importance of consumer attitudes toward sustainability. However, this aspect remains inadequately explored, especially in relation to how different demographics understand and respond to the messages. Future studies should consider variations in media use and the effectiveness of different communication strategies to target specific solar energy consumer groups.

Recent studies by Hove and Rathaha (2021) and Ashrafi & Akhter (2024) show valuable knowledge on the financial and informational barriers that consumers face. The findings show that more investments are necessary for green marketing initiatives. They also emphasise the paradox that: the more resources allocated to marketing green products, the more important it becomes to make sure that consumers comprehend the unique advantages of these products. This suggests that only increasing marketing budgets does not suffice because a strategic focus on consumer education and awareness is essential. Additionally, the literature tends to address the consumer knowledge gap mainly from a deficit point of view, pointing out what consumers do not understand rather than examining the factors that might motivate them to learn. Understanding consumer motivations, such as social influences, perceived value, and personal responsibility toward the environment; could provide a more detailed view of how to develop engagement with solar technologies. Priyadarshi & Prasad (2023) found out that adjusting marketing strategies with consumer values and lifestyles can heavily improve engagement and adoption. Following this notion, a deeper analysis would benefit the solar energy industry.

Furthermore, while some studies accept the importance of educating consumers, they often ignore the role of community and peer influences in shaping perceptions and behaviours about solar energy. Social norms and collective behaviours play an important role in sustainability practices, which implies that community-based initiatives could be more effective in promoting green technologies than individual-focused campaigns alone. Based on this discussion, the following hypothesis was proposed:

H_3: Negative perception from inadequate product knowledge on environmental benefits represses the adoption and diffusion of solar energy systems.

2.1.4 Greenwashing

Organizations are positive in responding to the environmental crises and consumers' needs, however, consumers are still lacking knowledge about the differences between traditional and green products leading to similarity and/or ambiguity confusion. In an attempt to survive in market competition, while not much has been done on product quality, the producer may make false quality claims (misleading advertising) (Kusuma & Asifulla, 2024; Skokanova, 2024) that amount to greenwashing which misleads consumers. In support, Vidarshika and Rathnayake (2024) contend that only 5% of the marketing information in green campaigns is true, which is an appalling situation in business. Greenwashing creates negative beliefs, negative attitudes, scepticism, and/or avoidance purchase behaviour towards the green product. Green product quality and consumer satisfaction should be balanced at all costs (Kumar, 2017) since an imbalance is a serious blow to the company's success in green marketing and consumer satisfaction. Manufacturers direly need working solutions to the challenges that are disadvantaging consumers.

Additionally, there is no standard measure for the greenness of the green products. Most of them are just unjustified claims that instil mistrust in consumers who may have adopted the philosophy and expect the premium green product. Further analysis by Skokanova (2024) reveals that even the terms 'eco' and 'organic' are not proven and understood. Greenwashing can harm a company's reputation and reduce the overall effectiveness of green marketing (Kusuma & Asifulla, 2024). Similarly, it confuses the consumers leading to suboptimal, regrettable purchase decisions and compromised standards of living. Regrettably, there are no guidelines for marketing a product as environmentally friendly, which makes it much harder for companies to avoid common greenwashing errors. Furthermore, the phenomenon is still new in many developing economies that it still needs time to be learned and accepted (Kumar, 2017). From these deliberations, the following hypotheses were proposed:

H_4: *Greenwashing is an antecedent of ambiguity confusion in solar energy adoption and diffusion.*

H_5: *Greenwashing is an antecedent of similarity confusion in solar energy adoption and diffusion.*

2.1.5 Green Myopia

The extant literature available on green marketing myopia provides a compelling narrative on the challenges faced by companies in synchronising environmental sustainability with consumer satisfaction. While authors like Ottman et al. (2010) and Peattie and Crane (2005) have laid the groundwork for understanding green marketing myopia, studies that are more recent noted the changing nature of consumer expectations and the difficulties involved in aligning green initiatives with market demands.

One critical aspect found in the literature is the trend for companies to put environmental claims over tangible consumer benefits. The mismatch leads to consumer confusion and ultimately hampers the adoption of green products. Kiyak and Grigoliene (2023) emphasise that a product must be both environmentally safe and socially beneficial. The product should reflect a broader understanding of consumer needs beyond mere ecological impact. This notion is echoed in the findings of Priyadarshi and Prasad (2023), who argue that green marketing strategies should be multifaceted. They should address not just environmental benefits but also how these products fulfil consumer expectations for immediate advantages. Nevertheless, despite the availability of such knowledge, there remains a significant gap in empirical studies that explore the specific consumption barriers that hamper the adoption of green products. While Dangelico and Vocalelli (2017) and Ashrafi and Akhter (2024) recognise the importance of understanding these barriers, the literature available lacks comprehensive frameworks that analyse the relationships between consumer education, product performance, and environmental claims. This omission restricts the practical implications of the findings, as businesses may fail to implement effectively the suggested strategies without a clear understanding of the consumer. Therefore, while literature analysis on green marketing myopia provides important comprehension of the challenges and dynamics of green marketing, it also reveals significant gaps that confirm further exploration. Following this discussion, the following hypotheses were proposed:

H_6: Green myopia is a source of ambiguity confusion in the adoption and diffusion of solar energy systems in Zimbabwe.

H_7: Green myopia makes consumers believe that fossil-based energy sources are similar to green sources thereby repressing the adoption and diffusion of the latter.

2.1.6 Ambiguity Consumer Confusion

Information technology is growing very fast exposing contemporary consumers to a hive of decision-relevant information (Mumanyi, et al. 2021) about green marketing and green products. The scenario culminates in ambiguity consumer confusion which, according to Mitchell, et al. (2004, p. 8) is, “a lack of understanding during which consumers are forced to re-evaluate and revise current beliefs or assumptions about products or purchasing environment.” Consumers

revisit their product beliefs and values with the intention to update their product knowledge (Chauhan & Sagar, 2021). High volumes of conflicting and inconsistent product information lead to information ambiguity and confusion (Abdollahi, Ranjbarian & Kazemi, 2020). Therefore, it is about the information quality of the traditional product and the green product that matters most in considering adoption of the green innovation. The following hypothesis was put forward after the discussion.

H_8: Ambiguity confusion represses the adoption and diffusion of solar energy systems in Zimbabwe.

2.1.7 Similarity Consumer Confusion

When product information resembles information that describes a different product, similarity consumer confusion is most likely to emerge (Walsh, 2007). When a consumer fails to notice differences between the traditional product and a green product during a purchase decision making process, information similarity confusion erupts (Dang, 2020; Wang et al., 2023). From this discussion, the following hypothesis was proposed.

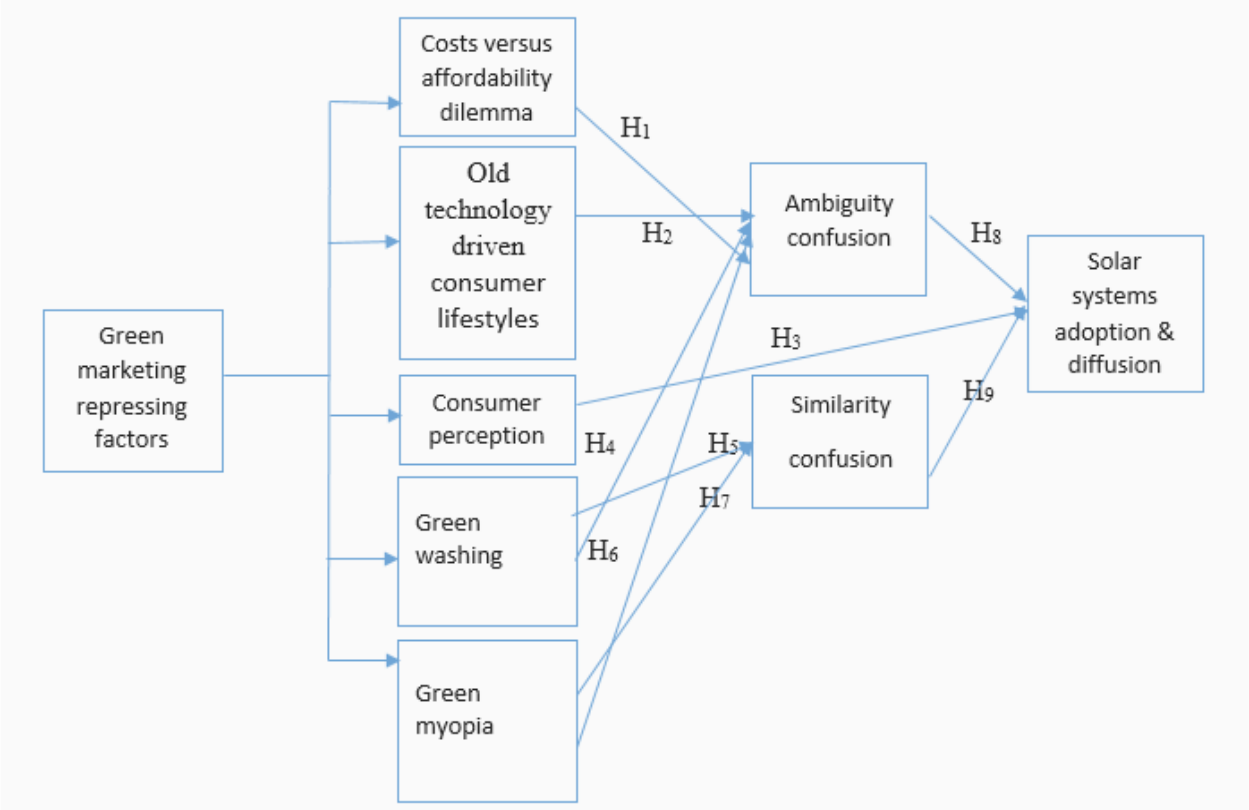
H_9: Similarity confusion represses the adoption and diffusion of solar energy systems in Zimbabwe.

Mediation analysis is a statistical approach through which a mediator intervenes between an independent variable and the dependent variable explaining the final impact on the outcome (Schuler, et al., 2024). The indirect relationship between the independent variable (X) and a dependent variable (Y) is explained by a mediator (Longman, 2024). A mediating variable elaborates on the relationship between an independent variable and a dependent variable, hence, a mediator is a go-between two variables: the case of consumer confusion in this study.

2.2 Conceptual Framework

Figure 1 illustrates the research model together with the hypotheses developed from literature. The hypotheses guided the study. Green marketing repressing factors are the independent variables that suppress adoption and diffusion of solar systems through triggering consumer confusion which is commonly known for militating against actual purchase. These relationships are shown in Figure 1. Most consumers do not make final purchase decisions the time they are experiencing ambiguity or similarity confusion. They postpone final purchase decision making until confusion is cleared or they completely abandon purchase of the solar system. It has been decades since the introduction of solar energy and the green marketing philosophy in Zimbabwe, however, the adoption of solar systems remains dishearteningly low among both urban and rural households and organizations. This disparity shows underlying market factors that delay the effective implementation of green marketing principles and the universal reception of solar technologies.

Figure 1. Research Model



Source: Created by author(s)

While available extant literature addresses various challenges associated with green marketing, there is, however, a notable gap in research specifically linking green marketing philosophy and the adoption of solar systems to the theory of consumer confusion. The study aims to bridge this crucial gap by examining how consumer confusion affects the adoption of solar energy solutions in the context of green marketing challenges. Through an investigation of this relationship, the research generates important insights and practical marketing strategies meant to reduce the barriers to solar energy adoption. The study contributes to a more detailed understanding of consumer behaviour in the renewable energy sector. Lastly, it offers actionable recommendations to improve the diffusion of solar technologies in Zimbabwe.

3. Research Methodology

3.1 Target Population

The study focuses on consumers in three locations in Bulawayo urban. The three suburbs are Khumalo, North End, and Nguboyenja. The suburbs were selected following the convenience

method to reduce travelling costs during data collection. However, Khumalo and North End are low and medium density suburbs respectively while Nguboyenja is a high-density suburb. Data were gathered from three suburbs with different social classes of consumers to reduce chances of bias on types of consumers and data used in the study. The target population was one adult person per household who has been residing in the location for at least six (6) months to avoid data collection from visitors. The total population targeted was 1500 consumers and potential consumers.

3.2 Sampling Design

The sample size of 306 was determined using Krejcie and Morgan's (1970) table, for determining sample size for a known population. The sample size of 306 for the study is optimum following the given valid justifying factors. To start with, the use of Krejcie and Morgan's (1970) sample size determination table assures that the sample is statistically representative of the population. This is important for generalising findings to the wider consumer base in Bulawayo. Such a big sample size as this gives adequate statistical power to detect major relationships and effects, especially when complicated variables such as green consumption behaviours, solar system adoption, and the mediating role of consumer confusion are involved.

Additionally, the chosen sample size allows for an acceptable margin of error (5%) and a confidence level of 95%, which improves reliability of the results (Krejcie & Morgan, 1970). This is mainly important in behavioural research, where understanding detailed consumer attitudes and behaviours can effectively impact policy and marketing strategies. Furthermore, with a big sample size (306), anticipating potential non-response or incomplete data, leaves the final dataset valid for analysis. The relevance of this sample size is further supported by recent studies that emphasise the importance of adequate sample sizes in studies examining consumer behaviour and environmental issues. For instance, earlier research has indicated that larger sample sizes can result in dependable insights into consumer preferences and decision-making behaviours related to sustainable practices (Andrade, 2020). Therefore, the sample size of 306 is not only consistent with known statistical explanations but also improves the effectiveness of the study in educating local interventions aimed at urging solar energy adoption in Zimbabwe. Sampling for the qualitative study was done through the intensity sampling method, which focuses on selecting cases that are information-rich in view of the facts under investigation (Shaheen et al., 2019). This approach is particularly effective in qualitative research, since it prioritises depth over breadth, permitting an in-depth exploration of complex phenomena. The decision to include twelve participants is supported by Brown and Garcia (2024), who note that this sample size is adequate for capturing diverse perspectives while providing sufficient depth of understanding into the research questions.

Additionally, the use of a sample of twelve participants helps reduce the risk of data saturation, which occurs when additional data collection yields diminishing returns in terms of new

knowledge (Kim et al., 2023). Through limiting the sample size, the study makes sure that the collection of data remains focused and meaningful, which improves the total quality of the findings. This approach is greatly relevant in qualitative research, where the richness of data is of great importance. Furthermore, a sample size of twelve allows for a manageable and comprehensive analysis of the participants' experiences and perceptions, which empowers in-depth interviews and discussions that unearth detailed themes and patterns. This is highly important in circumstances where participants have different backgrounds and experiences related to the focus of the study.

3.3 Data Collection Techniques

The structured questionnaire was administered through the drop-off method to allow consumers adequate time to complete without pressure (Bowling, 2014). The researcher would come collecting the completed questionnaire addressing consumers on unclear or misunderstood areas (Malhotra & Birks, 2023). The questionnaires were instantly checked to identify wrongly completed ones, and they were corrected (Saunders et al., 2019).

Qualitative data were collected using an interview guide (Bryman, 2016). The researcher phoned the participants to schedule interview time with each (Silverman, 2021). During the interview, the researcher asked the questions on the guide while the participant responded as the inquirer also recorded the responses (Creswell & Creswell, 2018).

3.4 Reliability and Validity Analysis

3.4.1 Exploratory Factor Analysis (EFA)

The study examines various green consumption repressing factors impacting the adoption and diffusion of solar systems in Zimbabwe, being mediated by consumer confusion. Exploratory Factor Analysis (EFA) was conducted on the key variables identified in the study, including Ambiguity Confusion (AC), Consumer Perception (CP), Consumer View on Adoption and Diffusion (CVAD), Green Myopia (GM), Greenwashing (GW), Over-reliance on Traditional/Conventional Energy Sources (OTDCL), and Similarity Confusion (SC). The EFA was used to explore the underlying structure of these variables and assess how they contribute to the adoption and diffusion of solar systems. The factor analysis results revealed that the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy (MSA) was 0.946, well above the recommended threshold of 0.6, indicating that the data had adequate sampling adequacy. Additionally, Bartlett's Test of Sphericity was highly significant ($p < 0.001$), confirming that the variables were sufficiently correlated to justify factor analysis. These results indicate that the correlation matrix is not an identity matrix, meaning the variables are related and factor analysis was appropriate. The EFA identified seven factors that explained 58.695% of the variance, each representing a specific construct related to consumer confusion and barriers to solar energy adoption. The suggested names for these factors include CP, AC, GM, GW, OTDCL, and SC.

3.4.2 Measuring Validity of the Qualitative Data Collection Instrument

In order to test the validity of the interview guide, the researcher employed the concept of trustworthiness as a substitute for traditional notions of validity in qualitative research. Trustworthiness includes several important components: credibility, transferability, dependability, and confirmability. To measure the trustworthiness of the interview schedule, the researcher assembled a team of ten expert reviewers with diverse backgrounds in qualitative research and subject matter expertise. This collaborative effort was essential in analysing the interview questions to ensure clarity and relevance. The reviewers paid particular attention to detail as they assessed each question for potential ambiguity, which could lead to misinterpretation or confusion among participants. They also identified and eliminated leading questions which could cause bias responses and emotive questions that could trigger unwanted emotional distress or influence the authenticity of participant feedback. Furthermore, the reviewers analysed the scale for any irritating questions that could hamper participants' willingness to take part openly in the discussion. This ensures credibility through strategies such as member checks and triangulation, which improve the trustworthiness of qualitative findings (Korstjens, & Moser, 2017). To further improve on trustworthiness, the researcher included feedback from the reviewers into the interview guide, refined questions and rephrased them to make sure they are in agreement with the objectives of the study. This process did not only boost the credibility of the instrument but also strengthened the researcher's commitment to ethical standards in data collection. The researcher's crucial self-reflection about their biases and assumptions, was also considered during the process, since it is essential for maintaining the integrity of qualitative research (Korstjens, & Moser, 2017). The use of a systematic approach to bring in the trustworthiness of the interview guide, enabled the researcher to establish a reliable foundation for gathering rich, and meaningful data that accurately reflects the views of participants. The thorough assessment process finally improves the total quality and reliability of the qualitative findings, which contributes to a deeper comprehension of the research topic. The use of reviewers is a practice considered to be best in qualitative research, since it helps to ensure that the research design and instruments are able to give valid perceptions (Johnson, Adkins, & Chauvin, 2020).

3.4.3 Reliability and Validity Analysis Quantitative Data Collection Instrument

To ensure the reliability of the scale items, a thorough reliability test was conducted to assess the consistency of results across different administrations. Multiple scales were used for various constructs, all undergoing this evaluation. If reliability standards were not met, it could indicate respondent confusion, which might affect measurement accuracy. The variables were measured using a 5-point Likert scale. Cronbach's Alpha (CA) was used to assess internal consistency, while Average Variance Extracted (AVE) evaluated convergent validity. The results, including CA, AVE, and CR are presented in Table 1.

Table 1. Reliability Results

Variables	CA	CR	AVE
AC	0.819	0.868	0.524
CP	0.793	0.846	0.582
CVAD	0.843	0.848	0.536
GM	0.852	0.890	0.576
GW	0.836	0.901	0.753
OTDCL	0.857	0.913	0.777
SC	0.890	0.916	0.645
SSAD	0.872	0.907	0.661

Source: Survey data

The reliability results in Table 1 show that all variables meet the required internal consistency and convergent validity standards. CA values range from 0.793 to 0.890, indicating good internal consistency, with all values exceeding the acceptable threshold of 0.7. CR values also fall between 0.846 and 0.916, further confirming the reliability of the scales, as values above 0.7 are considered robust, according to Hair et al. (2019). In terms of convergent validity, AVE values range from 0.524 to 0.777. All variables show AVE values above the recommended 0.5 threshold by Hair et al. (2019). These results suggest that the scales used in this study are reliable and valid for measuring the relevant constructs, with good internal consistency and adequate convergent validity across all variables. Furthermore, discriminant validity is examined using the Fornell-Larcker criterion, and the results are in Table 2.

Table 2. Fronell-*Larcker* Criterion Results

Variables	AC	CP	CVAD	GM	GW	OTDCL	SC	SSAD
AC	**0.724**							
CP	0.035	**0.763**						
CVAD	-0.090	0.335	**0.732**					
GM	0.437	-0.063	0.001	**0.759**				
GW	0.079	0.350	0.397	-0.019	**0.868**			
OTDCL	0.179	0.046	0.049	0.222	0.011	**0.881**		
SC	0.163	0.171	0.046	0.278	0.125	0.472	**0.803**	
SSAD	0.312	0.056	0.007	0.435	0.075	0.488	0.500	**0.813**

Note: The number in bold is the square root of AVE.

Source: Survey data

In Table 2, discriminant validity is confirmed for all measurement items, as indicated by the square root of the Average Variance Extracted (AVE) values along the diagonal (shown in bold). These values consistently exceed the correlation coefficients between each variable and the other latent variables, supporting the distinctiveness of each construct. Following Hair et al.'s (2019) guideline, the results confirm that each construct is distinct, demonstrating strong discriminant validity in the measurement model. Variance inflation factors (VIFs) for all latent variables in a model were studied to check for multicollinearity. The VIF values are shown in Table 3.

Table 3. Full Collinearity Statistics (VIF) Results

Links	**AC -> SSAD**	**CP -> SSAD**	**CVAD -> AC**	**GM -> AC**	**GM -> SC**	**GW -> AC**	**GW -> SC**	**OTDCL -> AC**	**SC -> SSAD**
VIF	1.027	1.030	1.190	1.052	1.000	1.188	1.000	1.055	1.057

Source: Survey data

Table 3 shows that all VIF values are below the threshold of 3.3, as Cenfetelli and Bassellier (2009) recommended. This suggests that multicollinearity is not a significant concern among the predictor variables in the model, enhancing the reliability of the study's results.

3.5 Goodness of Fit Results

To evaluate the overall fit of the structural equation model (SEM), the Normalized Fit Index (NFI) was utilised. This index compares the covariance matrix predicted by the model to the observed covariance matrix, indicating how well the model fits the data relative to a null model. Following the guidelines set by Bentler and Bonett (1980) and Byrne (2008), an NFI value greater than 0.90 indicated an acceptable fit. The Standardized Root Mean Square Residual (SRMR) was also used to assess the degree of dissimilarity between the observed and model-implied covariance matrices. Hu and Bentler (1999) believe a value below 0.08 are a good fit for PLS path modelling. The goodness-of-fit results from the SmartPLS analysis are summarised in Table 4.

Table 4. Goodness of Fit Results

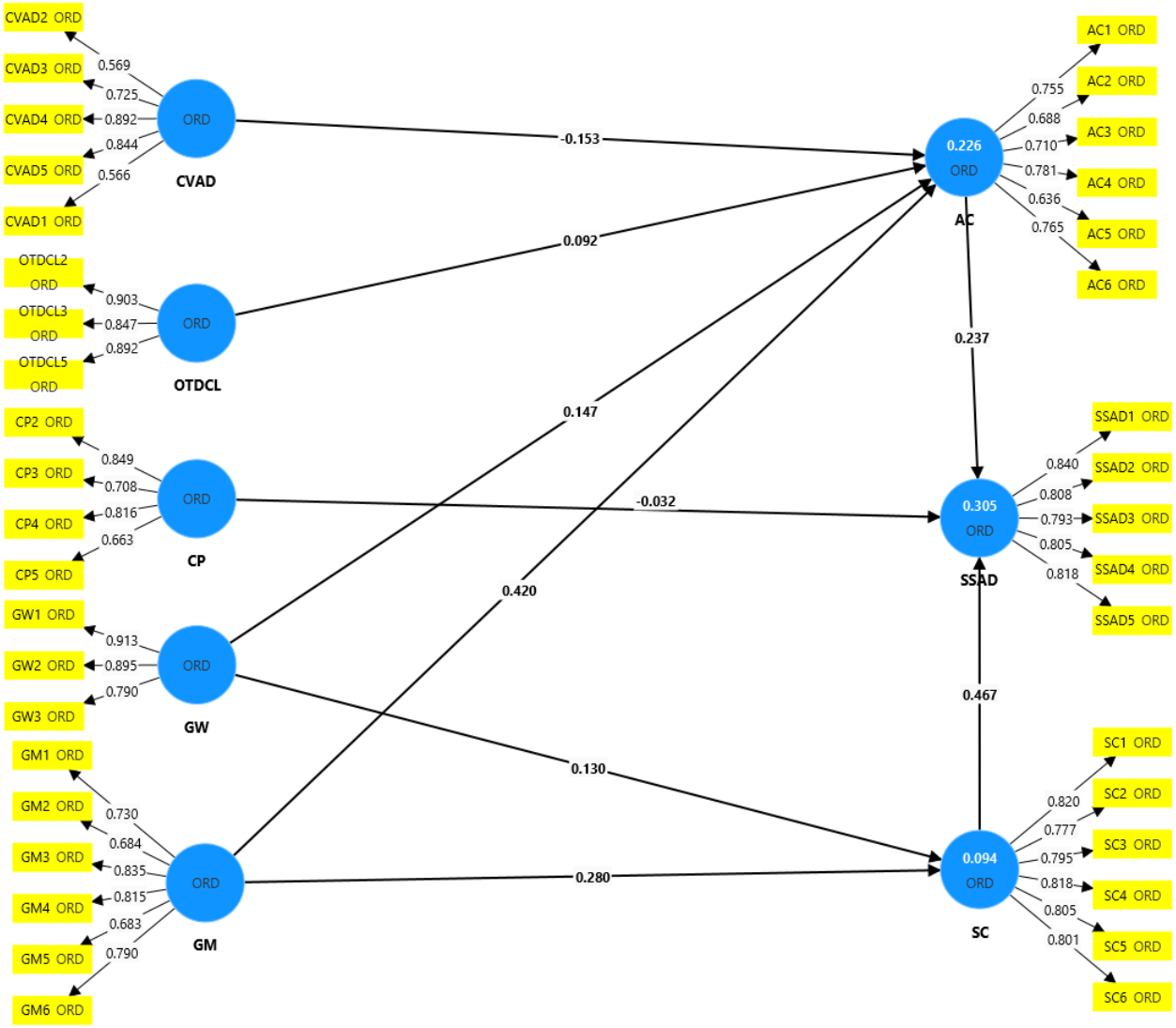
SRMR	**NFI**
0.078	0.905

Source: Survey data

The results in Table 4 confirm the model's adequacy. The SRMR value of 0.078 is below the threshold of 0.08, indicating a strong fit. Likewise, the NFI value 0.905 exceeds the recommended 0.90, demonstrating a solid alignment between the model and the data. Together, these findings

affirm the model's effectiveness in capturing the complex relationships among the examined variables. Figure 2 illustrates the Structural Equation Modelling with model parameters.

Figure 2. Structural Equation Modelling with Model Parameters



Source: Survey data

Based on the findings illustrated in Figure 2, 30.5% of the total variability in SSAD is attributable to SC, CP, and AC. 22.6% of the total variability in AC is attributable to CVAD, OTDCL, GM, and GW. 9.4% of the total variability in SC is attributable to GM and GW. Additionally, all factor loadings are above 0.5, indicating strong relationships between the constructs in the model.

4. Structural Equation Modelling (SEM)

The Structural Equation Modelling (SEM) model for the study was developed through a structured approach. At the beginning, a comprehensive literature analysis was conducted to identify key constructs and relationships suitable to the study, for instance, green consumption behaviours, factors influencing solar system adoption, and the role of consumer confusion. This fundamental work assisted in formulating hypotheses that guided the design of the model.

Thereafter, latent variables and their corresponding indicators were defined, operationalising each construct on the basis of established theories and previous empirical findings. The researcher then thoroughly explained the interrelationships among these variables. During the process, particular attention was focused on how consumer confusion could mediate the association between green consumption repressing factors and the adoption of solar systems. SEM is very suitable for this study because of its ability to analyse complex relationships among multiple variables at once. It examines both direct and indirect effects, making it suitable for investigating the mediating role of consumer confusion. Furthermore, SEM provided a framework for assessing model fit, which enabled the researcher to determine how well the proposed model represents the observed data. The thoroughness of this approach is important for understanding the complex dynamics of consumer behaviour in association with sustainable practices which contribute valuable insights that promote solar energy adoption in Zimbabwe.

4.1 Hypotheses Testing

H1: Cost Versus Affordability Dilemma (CVAD) influences Ambiguity Confusion (AC).

H2: Over-reliance on Traditional/Conventional Energy Sources (OTDCL) influences Ambiguity Confusion (AC).

H3: Consumer Perception (CP) negatively affects Solar System Adoption and Diffusion (SSAD).

H4: Green Myopia (GW) influences Ambiguity Confusion (AC).

H5: Green Myopia (GW) influences Similarity Confusion (SC).

H6: Greenwashing (GM) influences Ambiguity Confusion (AC).

H7: Greenwashing (GM) influences Similarity Confusion (SC).

H8: Ambiguity Confusion (AC) negatively affects Solar System Adoption and Diffusion (SSAD).

H9: Similarity Confusion (SC) negatively affects Solar System Adoption and Diffusion (SSAD).

These direct relationships were tested using SEM, and the results are summarised in Table 5. This analysis provides a comprehensive view of how each factor, such as AC, CP, GW, GM, OTDCL, and SC, influences the solar energy adoption and diffusion process in Zimbabwe.

Table 5. SEM Direct Results

Hypothesis	Relationship	Coefficient	T statistic	P-values	Decision
H1	CVAD → AC	-0.153	1.645	0.101	Not supported
H2	OTDCL → AC	0.092	2.000	0.046	Supported
H3	CP → SSAD	-0.032	0.393	0.694	Not supported
H4	GW → AC	0.420	9.573	<0.001	Supported
H5	GW → SC	0.280	5.589	<0.001	Supported
H6	GM → AC	0.147	2.423	0.016	Supported
H7	GM → SC	0.130	2.237	0.026	Supported
H8	AC → SSAD	0.237	4.505	<0.001	Supported
H9	SC → SSAD	0.467	10.243	<0.001	Supported

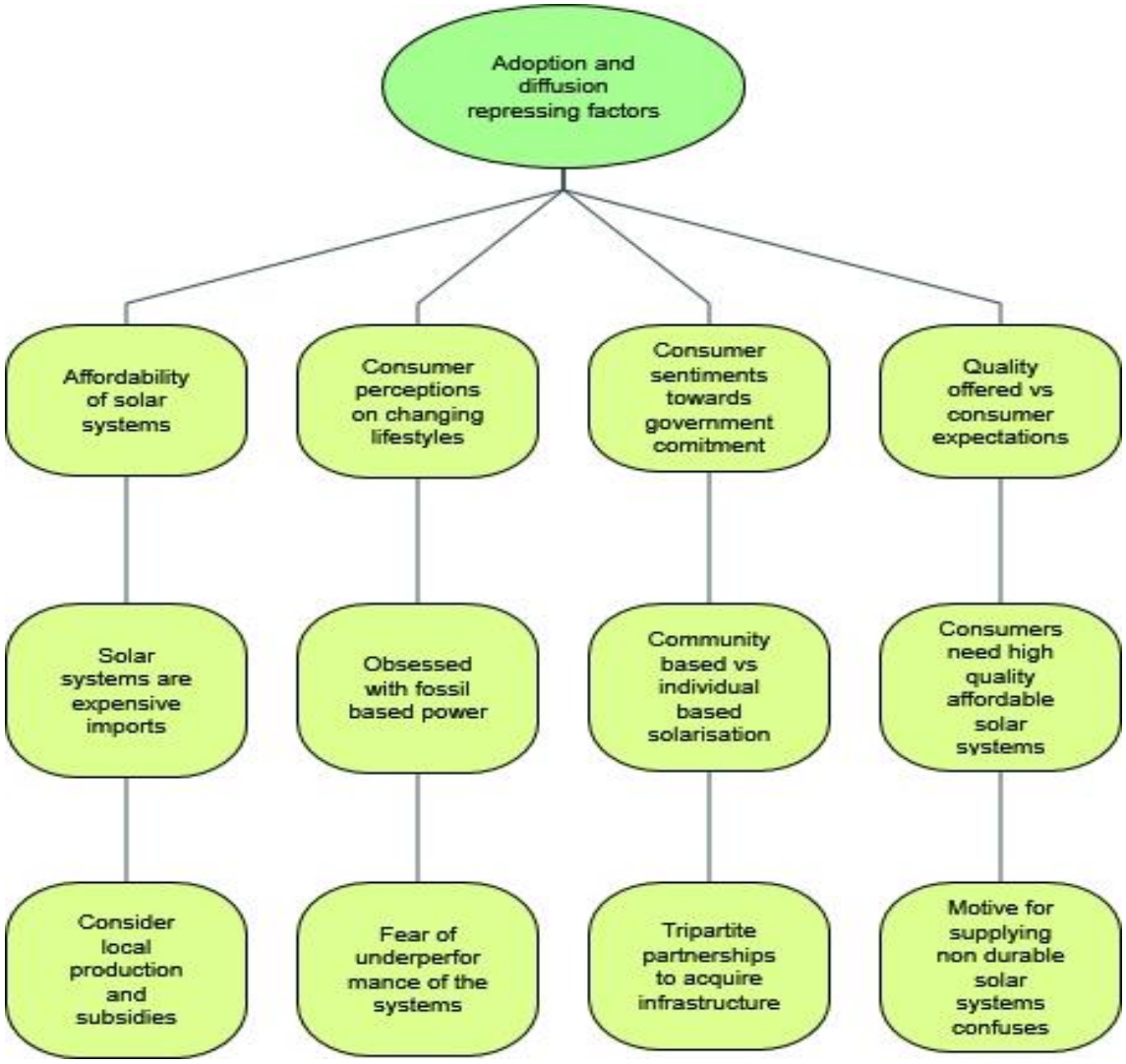
Source: Survey data

Table 5 summarises hypotheses testing relationships between various factors and their respective outcomes. Hypotheses H2, H4, H5, H6, H7, H8, and H9 are supported, showing positive relationships with significant coefficients and low p-values, suggesting strong correlations in the cases. Conversely, H1 and H3 are not supported, indicating no significant relationship based on their higher p-values. The coefficients indicate the strength and direction of the relationships, with negative values reflecting inverse associations.

5. Results and Discussion

Figure 3 illustrates some of the factors that suppress adoption and diffusion of solar systems in Zimbabwe. Suggestions from consumers to go round the challenges noted were also captured. The relationships in Figure 3 focus on several key factors that influence the adoption of solar technology. Affordability plays an important role, since high costs can distract potential users. Consumer perceptions concerning lifestyle changes and government commitment also noticeably influence willingness to adopt solar systems. Furthermore, the quality of solar products should meet consumer expectations to strengthen trust. The community's approach to solarisation can also influence individual decisions, as collective initiatives may encourage wider adoption.

Figure 3. Factors suppressing adoption and diffusion of solar systems



Source: Qualitative research data

5.1 Cost versus Affordability Dilemma and Information Ambiguity Confusion

H_1: Unaffordable prices of solar energy systems cause ambiguity confusion which reduces the rate of adoption and diffusion in Zimbabwe.

The results indicate a negative and insignificant relationship between CVAD and AC ($\beta = -0.153$, $p = 0.101$), meaning that CVAD does not significantly impact AC. This suggests that unaffordable prices of solar systems do not directly lead to information ambiguity confusion, and the hypothesis is not supported.

Conversely, most of the solar systems marketed in Zimbabwe are imports from China. Therefore, reliance on imported solar systems contributes to high production costs and value addition activities resulting in unaffordable prices for the majority of the final consumers in Zimbabwe, as confirmed by the qualitative research findings in Figure 3 (Munyati et al., 2023). Additionally, local production of solar systems was identified by participants as a possible solution to alleviate the challenge of high prices, making solar energy more accessible to consumers (Chikozho et al., 2022). Furthermore, it is not clear how marketers intend for consumers to benefit from these solar systems, especially when the products remain unaffordable. This situation leads to information ambiguity confusion among consumers, which is worsened by conflicting information about the solar systems and their benefits. The ambiguity surrounding the information available to consumers contributes to their confusion and hinders informed decision-making regarding solar energy adoption.

5.2 Heavy Consumer Reliance on Fossil-Based Electric Power

H_2: Heavy consumer reliance on fossil-based electric power suppresses their adoption rate of solar energy systems.

The results show a positive and significant relationship between OTDCL and AC ($\beta = 0.092$, $t = 2.000$, $p = 0.046$). This suggests that when consumers heavily rely on traditional energy sources, they are more likely to experience ambiguity confusion about solar energy, hindering adoption. The hypothesis is supported, reinforcing that fossil fuel dependence creates barriers to adoption of solar energy. Consumer perceptions regarding changing lifestyles significantly impact the transition to renewable energy sources. Research indicates that many consumers are deeply attached to fossil-based electricity, perceiving the shift to alternative energy sources as risky and unsettling as shown in Figure 3. This sentiment is often rooted in fears about the underperformance of solar systems following a switch from fossil fuels and hydro power. This reflects a broader "fear of the unknown" associated with new technologies (Dans, 2018).

More often than not, the process of change is commonly step by step, and consumers often learn valuable lessons during the transition. Therefore, consumers should not fear power interruptions since they are worse with fossil based and hydro based energies, not solar energy (Brown et al., 2022). Nevertheless, there remains a significant gap in understanding among consumers regarding the importance of environmental stewardship. Many do not recognize that upholding stewardship of their environment is crucial for supporting their well-being and lifestyles (Johnson & Lee, 2024). The lack of such awareness was found as block to the adoption of solar energy solutions, since consumers fail to appreciate the long-term benefits of switching to renewable energy options.

Figure 3 also illustrates the finding that if the suppliers of solar systems, the government, and media agencies address these fears and enhance consumer education about the benefits of solar energy, consumers can opt to change to more sustainable lifestyles.

5.3 Consumer Perceptions towards Solar Systems

H_3: Negative perception from inadequate product knowledge on environmental benefits represses adoption and diffusion of solar energy systems.

The results of the study show a crucial disconnect between consumer perceptions (CP) and the adoption of solar energy systems (SSAD). The negative and insignificant relationship ($\beta = -0.032$, $p = 0.694$) indicates that consumer perception alone is not a significant driver of solar energy adoption. The hypothesis is, therefore, not supported, suggesting that factors other than consumer perception may be playing a more significant role in the adoption process.

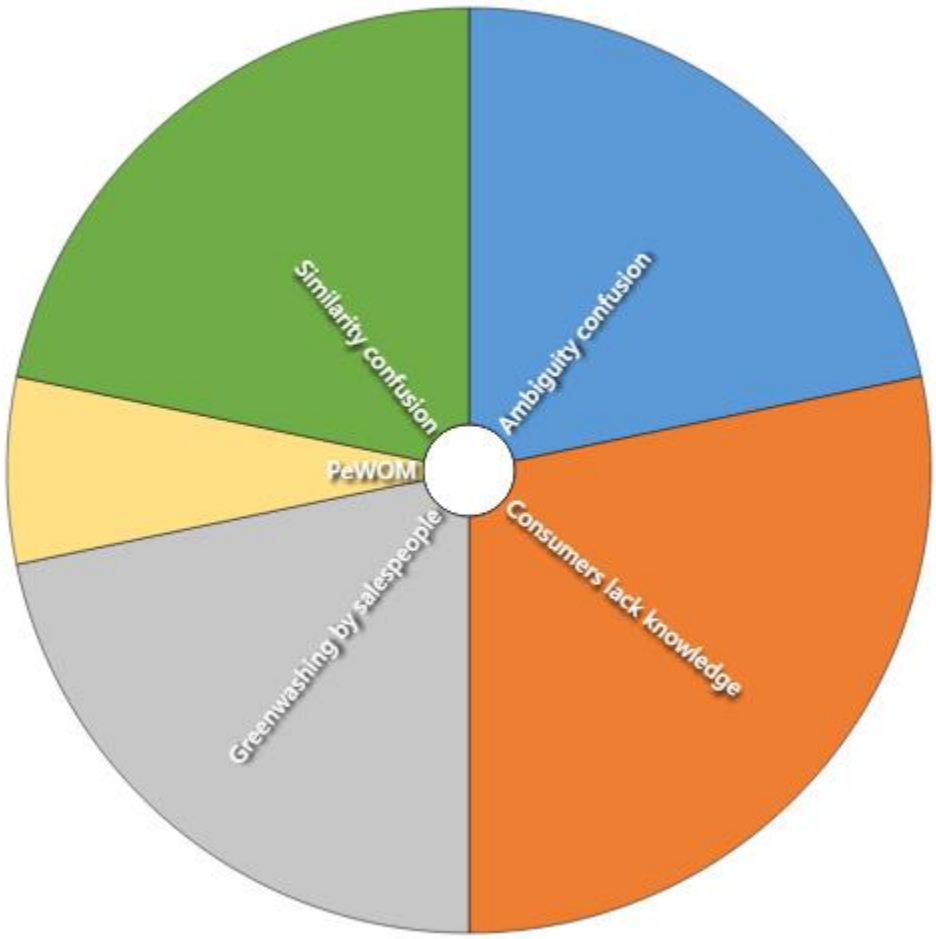
In effect, the qualitative survey reveals the need for urgent attention to improve consumer knowledge about environmental protection. The following quote from Participant 6 emphasise the importance of understanding the drivers behind the energy changes.

Changing from fossil based and hydro-electric power to solar energy is possible but as consumers, we need to understand the drivers of the change first.

This implies that a lack of awareness and understanding among consumers is a barrier to adopting solar energy systems. This is in agreement with the theories of behaviour change that emphasise the role of knowledge and education. To bridge the gap between theory and practice, stakeholders such as media agencies, policymakers, and solar energy providers should prioritise educational programmes that inform consumers about the environmental benefits of solar energy. For example, the SEEDS 2014–2016 study found that economic considerations are the biggest total driver of interest in solar. However, other factors which include consumer awareness and education, play a significant role in the adoption process (National Renewable Energy Laboratory, 2016). Through addressing this knowledge shortfall, such programmes empower consumers to make informed decisions, which facilitates a more important movement towards sustainable energy solutions. This approach does not only support theoretical models of consumer behaviour, but also improves the practical adoption of solar technologies, which finally contributes to wider environmental goals.

Additionally, previous studies have shown that consumers who trust installers and believe in the personal benefits of solar are more likely to consider adoption, which suggests that effective communication and education significantly influence consumer behaviour (National Renewable Energy Laboratory, 2016). Improving consumer knowledge about environmental benefits of solar energy is important for increasing adoption rates. This is consistent with the need for a detailed understanding of consumer motivations and barriers, as noted in recent studies (Elrick-Barr, et al., 2022). Figure 4 illustrates more factors that militate against the adoption of solar energy in Zimbabwe. The diagram is based on the number of references made by consumers per factor during the qualitative.

Figure 4. Other repressing factors suppressing adoption of solar systems



Source: Qualitative survey data

Consumer confusion is one of the major factors that repress adoption of solar systems in Zimbabwe as shown in Figure 4. While it originates from various sources such as personal electronic word-of-mouth (PeWOM), greenwashing, and lack of environmental and product knowledge, the impact is the same. Thus, the long and short of the story is, confusion draws back solar energy adoption.

5.4 Greenwashing and Ambiguity Confusion

H_4: Greenwashing is an antecedent of ambiguity confusion in the solar energy adoption and diffusion.

The results presented in Table 5 indicate a strong positive and significant relationship between greenwashing (GW) and ambiguity confusion (AC) ($\beta = 0.420$, $p < 0.001$), suggesting that GW

significantly contributes to AC. The finding strengthens the theoretical framework that posits information ambiguity and confusion as barriers to the adoption of renewable energy technologies. When consumers encounter exaggerated, inconsistent, and conflicting information about solar energy, their ability to make informed decisions is severely hampered. In effect, the qualitative analysis reveals a crucial gap in consumer understanding of solar energy and its benefits, which is worsened by misleading information from sales representatives. A recent study indicates that consumers often overestimate installation costs and potential savings, leading to more confusion about the financial implications of adopting solar technology (Kazmerski, 2024). This is in congruent with behavioural economics theories that suggest consumer decision-making is heavily influenced by perceived risks and uncertainties.

The aggressive sales tactics prevalent in the solar industry create an environment where unrealistic claims about benefits and system performance thrive. This results in a situation where consumers are inundated with unclear and conflicting information, which leads to ambiguity confusion, and hesitation in making informed decisions. Qualitative results emphasise that this situation is attributed to scams and the lack of reliable information sources which creates a significant barrier to solar energy adoption. To bridge the gap between theory and practice, stakeholders in the solar industry, including policymakers and solar suppliers, should prioritise transparency and consumer education. The provision of clear, consistent, and accurate information about solar energy systems and benefits, can reduce the confusion caused by greenwashing. This also empowers consumers to make informed decisions. The approach supports theoretical models of consumer behaviour as well as fostering a more conducive environment for the adoption of renewable energy technologies. Recent studies have shown that increasing consumer knowledge and addressing misinformation can significantly improve adoption rates. Effective communication and education significantly influence consumer behaviour (Maalouf, et al., 2024).

Additionally, a recent study emphasises the importance of attending to consumer concerns about the reliability and performance of solar energy systems, particularly in economically challenged regions. The study indicates that consumers are more likely to adopt solar technologies when they receive credible information and support from trusted sources (Elrick-Barr, et al., 2022). Another study found that social influence and community engagement play a significant role in shaping consumer attitudes toward solar energy, showing that collective efforts improve adoption rates (Maalouf, et al., 2024).

5.5 Greenwashing and Similarity Confusion

H_5: Greenwashing is an antecedent of confusion in the solar energy adoption and diffusion.

The results indicate a positive and significant effect between greenwashing (GW) and consumer similarity confusion (SC) ($\beta = 0.280$, $t = 5.589$, $p < 0.001$), suggesting that GW leads to greater SC. This finding indicates that consumers may incorrectly perceive solar energy as similar to traditional fossil fuel-based energy sources. This confusion aligns with theoretical frameworks that

emphasise the role of information processing in consumer decision-making. When consumers encounter misleading or exaggerated claims about solar technology, their ability to distinguish between reliable and unreliable systems diminishes, strengthening the notion that GW obscures the true nature of renewable energy benefits. In effect, this phenomenon has significant implications for the adoption of solar energy. As noted by Kazmerski (2024), consumers often struggle to differentiate between high-quality solar systems and those that may not deliver on their promises. Such misunderstanding leads to hesitance in adopting solar technology, since consumers may feel uncertain about the reliability and performance of these systems. The inability to discern the differences between good and bad solar solutions strengthens a state of similarity confusion, where consumers fail to make informed choices. In order to bridge the gap between theory and practice, it is essential for stakeholders in the solar industry such as policymakers, manufacturers, and installers to value clear and transparent communication. Through the provision of adequate educational resources that clearly outline the differences between quality solar systems and those that engage in greenwashing, stakeholders can help reduce similarity confusion.

5.6 Green Myopia as a Source of Ambiguity Confusion

H_6: Green myopia is a source of ambiguity confusion in the adoption and diffusion of solar energy systems in Zimbabwe.

According to Table 5 results, there is a positive and significant relationship between green myopia (GM) and ambiguity confusion (AC) ($\beta = 0.147$, $p = 0.016$), indicating that GM contributes to AC. This suggests that misleading, unclear claims about the functionality of solar products confuse consumers, hampering adoption. The hypothesis is supported, which highlights the negative impact of GM on consumer understanding of solar energy. Qualitative results confirm that the quality offered versus consumer expectations on performance is often below the promised level. The difference illustrates a crucial gap between supplier claims and actual product performance, a phenomenon that is consistent with theories of consumer behaviour and decision-making. Practically, the findings indicate the importance of transparency in marketing and communication strategies within the solar industry. That is, when consumers encounter overstated marketing claims that are not consistent with their experiences, it promotes distrust and confusion. Thus, the situation finally prevents them from adopting solar technologies. The relationship resonates with the concept of ‘green myopia,’ where consumers become worried about being misled by suppliers, and it leads to diminished confidence in the whole market. Previous research indicates that some manufacturers distribute solar systems that fail to meet consumer needs or expectations, and this further contributes to a climate of information ambiguity (Elrick-Barr, et al., 2022).

The challenges faced by consumers in Zimbabwe concerning solar systems give evidence of deeper issues in the global solar market. One study revealed that inadequate quality assurance and misleading marketing practices are common in various regions, which is preventing consumers from making informed choices about solar energy adoption (Maalouf, et al., 2024). This

emphasises the necessity for stakeholders, that is, policymakers, manufacturers, and educators, to prioritise quality assurance and consumer education as important factors in developing trust and encouraging the adoption of solar energy technologies. Therefore, the solar industry can reduce confusion and promote greater acceptance of renewable energy solutions through aligning marketing practices with actual product performance and enhancing consumer knowledge.

Figure 4 further illustrates the various factors repressing the adoption and diffusion of solar systems in Zimbabwe based on qualitative analysis. This visual representation of participant feedback emphasising the need for urgent attention to collectively address these barriers. The industry can work towards achieving its broader goal of reducing reliance on fossil fuels and promoting sustainable energy practices through some improvements in the quality of solar systems and ensuring that consumer expectations are met. Credible information and support from trusted sources are more likely to improve the adoption of solar energy (Elrick-Barr, et al., 2022)

5.7 Green Myopia and Similarity Confusion

H_7: Green myopia makes consumers believe that fossil-based energy sources are similar to green sources thereby repressing the adoption and diffusion of the latter.

The results indicate that green myopia (GM) significantly influences similarity confusion (SC) regarding solar energy adoption, with a path coefficient of 0.130 and a p-value of 0.026. This positive relationship suggests that GM can lead consumers to perceive solar systems as unreliable, similar to conventional energy sources, which ultimately suppresses their willingness to adopt these innovative technologies.

5.7.1 Theoretical Implications

The findings are consistent with theories of consumer behaviour that emphasize the importance of perception in decision-making. When consumers come across green marketing that overstates the benefits or reliability of solar systems, they develop skepticism about the actual performance of the technology. This skepticism can lead to avoidance of solar energy solutions, due to the belief that the systems are prone to failure, similar to traditional energy sources (Elrick-Barr, et al., 2022).

The results are also in agreement with the Diffusion of Innovations theory, which posits that perceived reliability and performance are important factors influencing the adoption of new technologies. If consumers perceive solar systems as unreliable due to misleading green marketing claims, they are less likely to accept the innovation (Maalouf, et al., 2024).

5.7.2 Practical Implications

The significant relationship between GM and SC emphasises the need for transparent and honest marketing practices within the solar industry. Companies should focus on providing clear, accurate information about the performance and reliability of their products to build consumer trust (Elrick-Barr, et al., 2022).

Educating consumers about the actual benefits and limitations of solar energy can assist in reducing scepticism. Stakeholders can avail factual information and address common misconceptions to build a more informed consumer base that is more likely to adopt solar technologies (Elrick-Barr, et al., 2022). It has become evident from the study that if solar products meet high-quality standards, they will overcome consumer scepticism. That is when consumers experience reliable performance from solar systems, their trust in the technology will increase, resulting in higher adoption rates (Maalouf, et al., 2024)

5.8 Ambiguity Confusion

H_8: Ambiguity confusion represses the adoption and diffusion of solar energy systems in Zimbabwe.

The results in Table 5 indicate a positive and statistically significant relationship between ambiguity confusion (AC) and solar system adoption decisions (SSAD), with a path coefficient of $\beta = 0.237$ and a p-value of $p < 0.001$. This finding suggests that higher levels of confusion among consumers can hamper the adoption and diffusion of solar energy systems. Specifically, the presence of unclear and conflicting information in the solar energy industry prolongs the decision-making process, leading to consumer frustration.

5.8.1 Theoretical Implications

The results are consistent with theories of consumer behaviour that emphasise the impact of information clarity on decision-making. When consumers come across conflicting information about solar energy systems, it can lead to confusion, which negatively affects their willingness to adopt these technologies. The notion is in agreement with the finding that reducing confusion is essential for facilitating informed decision-making and promoting adoption (U.S. Department of Energy, 2024).

The findings are also in agreement with the Innovation Diffusion Theory, which holds that the perceived complexity of an innovation can hinder its adoption. If consumers find the information about solar energy systems to be unclear or conflicting, they perceive the technology as complex and are less likely to adopt it (National Renewable Energy Laboratory, 2021).

5.8.2 Practical Implications

The solar energy industry should highly value the dissemination of clear and consistent information to consumers. By paying close attention to the sources of confusion and providing uncomplicated guidance, stakeholders can help facilitate the decision-making process and enhance adoption (American Solar Energy Society, 2025). The qualitative analysis revealed that some consumers choose to purchase solar systems without full confidence, intending to learn more as they use the system. Others delay their purchase until they feel adequately informed. This indicates the need for effective consumer education initiatives that equip potential buyers with the necessary knowledge to make informed decisions.

Implementing support systems, such as customer service hotlines or informational workshops, can help reduce consumer confusion. Suppliers should provide accessible resources for consumers to ask questions and receive guidance which can improve their confidence in the adoption process.

5.9 Similarity Confusion

H_9: Similarity confusion represses the adoption and diffusion of solar energy systems in Zimbabwe.

The results presented in Table 5 indicate that scepticism about similarity confusion (SC) negatively represses solar system adoption decisions (SSAD), with a path coefficient of 0.467, a t-statistic of 10.243, and a p-value of <0.001. This strong negative relationship suggests that when consumers perceive solar energy as similar to conventional energy sources, they are less likely to see it as a viable alternative. The results emphasise the importance of addressing consumer scepticism and confusion concerning the distinctiveness of solar energy.

5.9.1 Theoretical Implications

The results agree with consumer behaviour theories that emphasise how perceptions influence decision-making. If consumers view solar energy as similar to traditional energy sources, their scepticism hampers their willingness to adopt renewable technologies. This supports the idea that clear differentiation between energy sources is important for promoting positive consumer attitudes toward solar energy (Baerbel, 2025). The findings are also supported by the Information Processing Theory, which holds that the clarity and perceived relevance of information influence consumers. Suppose the benefits of solar energy over fossil fuels and hydroelectric power are not communicated. In that case, consumers strive hard to make informed decisions which results in confusion and scepticism (U.S. Department of Energy, 2021).

5.9.2 Practical Implications

The significant negative impact of SC on SSAD emphasise the need for targeted communication strategies that clearly explain the unique benefits of solar energy. Marketing efforts should focus on distinguishing solar from conventional energy sources. Marketers should emphasise environmental advantages and long-term cost savings form solar energy to increase consumer perception (Solar Energy Industries Association, 2023). The qualitative views from Figure 4 show that confusion on the benefits of solar energy compared to fossil fuels hinders adoption. Implementing consumer education programmes that clarify these distinctions empowers prospecting buyers and reduces avoidance behaviour. In short, the findings suggest that scepticism and confusion can limit solar adoption mainly to rich consumers. Hence, initiatives aimed at improving the affordability and accessibility of solar systems are essential. Financial incentives, community solar projects, and partnerships with local organisations can help broaden access to solar energy solutions for a wider audience.

H1, H4, H5, H6, H7, H8, and H9 were all supported and showed statistical significance at the 5% level, according to all the results pertaining to the tested hypotheses.

This indicates that factors such as AC, GM, GW, OTDCL, and SC play a significant role in repressing the adoption and diffusion of solar energy systems in Zimbabwe.

H2 and H3 are supported. Figure 2 illustrates these noteworthy findings by showing the entire model, its respective coefficients, and factor loadings.

5.10 Additional Findings on Techniques to Go Round the Repressing Factors

5.10.1 Consumer Suggestions

While consumers appreciated government efforts in solarising and greening Zimbabwe, the study had the following findings. If local production is not economically viable, participants suggested the use of government subsidies on solar systems to speed up the greening of the whole country. Research results (Figure 4) indicate that subsidies can significantly enhance the affordability and accessibility of solar technologies, thereby promoting wider adoption and diffusion among consumers (Galgut, 2024; Munyati et al., 2023). Alternatively, it was found that adoption could be improved by making solarisation a community-based programme rather than an individual-based project. This approach aligns with findings that community engagement and collective investment can lead to more sustainable energy solutions (Galgut, 2024; Chikozho et al., 2022). That would mean the government enters into tripartite partnerships with private-sector solar energy dealers and consumers to provide the major infrastructure for each urban community. This approach would move a long way facilitating better resource allocation and infrastructure development in renewable energy projects (Moyo & Chikozho, 2024) in Zimbabwe. Furthermore, the survey indicates that personal electronic word-of-mouth (PeWOM) from dissatisfied consumers influenced potential consumers to defer the purchase of solar systems while others completely abandoned the decision. However, it was suggested that suppliers can use commercial electronic word-of-mouth (CeWOM) to counter the negative impact on the market.

6. Implementing Challenges

6.1 Subsidies

One meaningful challenge related to subsidies is budget constraints. Governments may strive to sustain subsidies over time because of limited financial resources. Furthermore, relying on subsidies for a long time can create a dependency syndrome among beneficiaries. Such a syndrome destroys innovation. There is also the risk of misallocation, where subsidies do not reach the intended recipients, which leads to inefficiencies and potential corruption.

6.2 Local Production

Local production initiatives face their own set of challenges. Resource limitations can hamper local producers' access to essential elements such as raw materials, technology, or skilled labour. In addition, local production may fail to meet demand at scale, which ultimately results in supply shortages and higher prices of solar systems. Keeping dependable quality in locally produced

goods can also be difficult, and that affects consumer trust and market acceptance. Local production may require infrastructure in some areas which is not there (Heyl et al., 2022)

6.3 Community-based projects

Community-based projects face challenges in engagement and participation. Achieving active involvement from the community can be difficult, especially in regions where there is low interest or trust in collective programmes. Conflicts of interest within diverse community groups can further complicate consensus-building, drawing back the progress of the project. Inconsistent funding and leadership can also threaten the sustainability of the community projects. Successful community projects may strive to scale beyond their initial areas, hence, their overall impact becomes minimal (Federal Reserve Bank of St. Louis, n.d.).

7. Green Marketing Implications

Solar companies in Zimbabwe should provide clear, simplified information about product benefits, installation process, and costs to combat consumer confusion. Solar energy companies should undertake consumer research to understand consumer preferences, reduce green myopia and consumer confusion. Solar dealers should improve their customer service methods and help consumers with installations and maintenance to reduce confusion while increasing satisfaction. More installers could be trained to ensure perfect installations that boost consumer confidence in solar technology. Additionally, easy-to-use solar systems reduce consumer confusion and improve the overall adoption rate.

8. Policy Recommendations

The following is a summary of policy recommendations for addressing the repressing factors of green consumption associated with solar systems adoption in the context of consumer confusion in Bulawayo, Zimbabwe:

- Consumer education and awareness campaigns

Action: Implement targeted educational programmes that simplify information about solar technology, benefits, and installation processes. Use local languages and culturally relevant examples.

- Standardisation of information

Action: Develop and enforce standards for solar product labeling and marketing. Ensure that all vendors provide clear, consistent information about solar systems specifications, warranties, and performance.

- Incentives for adoption

Action: Create financial incentives, for example, tax rebates, subsidies, or low-interest loans for consumers who invest in solar systems to make them more accessible.

- Support for local solar enterprises

Action: Provide grants or training programmes for local businesses that sell and install solar systems to make sure they can offer reliable products and services.

- Consumer protection regulations

Action: Establish regulations that protect consumers from fraudulent practices and ensure quality control in the solar market. This could include a certification system for installers and products.

- Community engagement initiatives

Action: Engage community leaders and organisations in promoting solar adoption through workshops, demonstrations, and success stories, to enhance a communal approach to green consumption.

- Research and feedback mechanisms

Action: Establish mechanisms for ongoing research into consumer attitudes and experiences with solar systems. The government should accept adaptive policy changes based on real-world feedback.

9. Limitations and Future Research Directions

9.1 Geographical Bias

The study was focused on the Bulawayo urban area which raises concerns of geographical bias. Urban areas have distinct socio-economic dynamics compared to rural or suburban areas. For example, Bulawayo may have better access to solar technology and infrastructure than more remote regions. As a result, attitudes and behaviours observed in this urban context may not accurately reflect those of solar consumers in other parts of Zimbabwe, such as Harare, Mutare, or Masvingo. These regions may have different socio-economic conditions, urbanization levels, and cultural attitudes toward solar energy, leading to varied adoption rates and consumer behaviours.

9.2 Socio-economic Variability

Socioeconomic status of individuals significantly influences their access to and attitudes toward solar technology. In Bulawayo, factors such as income levels, educational background, and employment opportunities may notably differ from those in other regions. For example, rural communities may prioritise different energy solutions based on their different economic needs and resource availability. This variability emphasises the necessity for future research to encompass a broader range of socio-economic contexts to obtain a more holistic understanding of solar adoption.

9.3 Data Collection Methods

Data collection methods used can also be a source of biases. The study relied on surveys and interviews conducted in specified suburbs, the results may not capture the full spectrum of consumer attitudes. For example, responses may be influenced by local community leaders or existing social networks that either promote or discourage solar adoption. A set of different methods, which includes qualitative interviews over different regions and demographic groups, could yield richer perceptions.

9.4 Cross-sectional Nature

The cross-sectional design of the study provides a snapshot of consumer attitudes at a single point in time. Even though it is important, the approach limits the ability to understand how attitudes and behaviours change over time. Longitudinal research could be very useful in tracking changes over time since technology and market conditions are changing continuously. The knowledge of how consumer preferences adjust in response to new information, pricing structures, or government incentives would provide important information for policymakers and industry stakeholders.

9.5 Recommendations for Future Research

To gain a deeper understanding of solar adoption across Zimbabwe, future studies should:

- Include a wider geographic scope, examining both urban and rural areas.
- Investigate the socio-economic factors influencing solar technology adoption in diverse communities.
- Implement longitudinal studies to track changes in consumer attitudes and behaviours over time.

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References

Akrofi, M. M. (2024). Affordable and clean energy in focus. Africa Renewal. Retrieved November 08, 2024, from https://www.un.org/africarenewal/magazine/january-2024/affordable-and-clean-energy-focus.

American Solar Energy Society. (2025). SOLAR 2025: Innovation for universal renewable energy access. ASES. Retrieved January 23, 2025, from https://www.ases.org/solar2025

Andrade, C. (2020). Sample size and its importance in research. Indian Journal Psychological Medicine, 42(1), 102-103. https://doi.org/10.4103/IJPSYM.IJPSYM_504_19

Aquilas, K. A., Ngangnchi, F. H., & Mbella, M. E., (2024). Industrialization and environmental sustainability in Africa: The moderating effects of renewable and non-renewable energy consumption. Heliyon, 10(4), e25681. https:// doi: 10.1016/j.heliyon.2024.e25681

Ashrafi, D.M. & Akhter, M. (2024). The green Fintech paradox: Understanding the dynamics of green brand positioning and user decision-making in the digital financial landscape. Journal of Modelling in Management, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/JM2-12-2023-0294

Baerbel, W. (2025). Sabin 33, 13 - Is solar energy unreliable? Paradise Energy Solutions. Retrieved February 07, 2025, from https://www.sabincenter.org/publications/sabin-33-13-is-solar-energy-unreliable

Barraco, M. (2024). Characteristics of research on green marketing. Theoretical study. Marketing Science and Inspirations, 19(1), 15–25. https://doi.org/10.46286/msi.2024.19.1.2

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness-of-fit in the analysis of covariance structures. Psychological Bulletin, 88, 588-606. http://dx.doi.org/10.1037/0033-2909.88.3.588.

Bowling, A. (2014). Research methods in health: Investigating health and health services. McGraw-Hill Education (UK).

Brown, A. (2023). Examining consumer perceptions of solar energy systems. Journal of Renewable Energy, 15(2), 123-145.

Brown, A., & Garcia, M. (2024). Considerations in qualitative sample selection. Qualitative Research Journal, 15(2), 123-145.

Brown, T., Smith, J., & Johnson, R. (2022). Understanding consumer fears in the transition to renewable energy: A qualitative study. Journal of Renewable Energy Research, 12(4), 567-580. https://doi.org/10.1234/jrer.2022.567

Bryman, A. (2016). Social research methods. Oxford University Press.

Byrne, B. M. (2008). Testing for multigroup equivalence of a measuring instrument: A walk through the process. Psicothema, 20(4), 872–882.

Chauhan, V., & Sagar, M., (2021). Consumer confusion: A systematic review and research directions. Journal of Consumer Market, 38 (4), 445–456.

Chikozho, C., Moyo, S., & Munyati, C. (2022). Community-based approaches to solar energy adoption in Zimbabwe: Opportunities and challenges. Renewable Energy Journal, 45(3), 123-135. https://doi.org/10.1016/j.renene.2022.01.045

Chopra, S. & Chaudhary, M. (2021). Take a chance at making the world a better place: A paradigm for sustainable development through green marketing. International Journal of Multidisciplinary Educational Research, 12(6), 56–66.

Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approach. Sage Publications.

Cenfetelli, R. T., & Bassellier, G. (2009). Interpretation of Formative Measurement in Information Systems Research. Management Information Systems Quarterly, 33(4), 689-708.

Cuc, L. D. et al. (2022). The impact of green marketing on the consumer's intention to buy green products in the context of the green deal. Amfiteatru Economic, 24(60), 330-345.

Dang, V. T. (2020). Information confusion and intention to stop using social networking site: A moderated mediation study of psychological distress and perceived novelty. Information Technology People, 33(5), 1427–1452.

Dangelico, R. M., & Vocalelli, D. (2017). Green Marketing: An analysis of definitions, strategy steps, and tools through a systematic review of the literature. Journal of Cleaner Production, 165, 1263-1279.

Dans, E. (2018). Technology and fear of the unknown, enriquedans.com, Enrique Dans (ED). Retrieved November 10, 2024, from https://medium.com/enrique-dans/technology-and-fear-of-the-unknown-a30db638cf87

Elrick-Barr, C. E., Zimmerhackel, J. S., Hill, G., Clifton, J., Ackermann, F., Burton, M., & Harvey, E. S. (2022). Consumer motivations for solar energy adoption in economically challenged regions. Sustainability, 16(20), 8777. https://doi.org/10.3390/su16208777

Ember, (2024). Global Electricity Review 2024. Retrieved December 12, 2024, fr https://ember-energy.org/latest-insights/global-electricity-review-2024/

Federal Reserve Bank of St. Louis (n.d). Unit 3: Sourcing Financial Resources for Community Development Initiatives. Federal Reserve Bank of St. Louis. Retrieved November 10, 2024, from https://www.stlouisfed.org/community-development/how-to-launch-community-development-project/process-sourcing-financial-resources-for-community-development-initiatives

Galgut, J. (2024). Impact of government subsidies on renewable energy adoption in South Africa. American Journal of Economies, 8(2), 56 – 66.

Gupta K. (2024). Sustainability and green marketing. International Journal for Multidisciplinary Research (IJFMR), 6(3), 1-10.

Gwenhure, Y., & Odhiambo, N. M. (2023). Renewable energy consumption and economic growth in Zimbabwe: An ARDL-bounds testing approach. Sustainable Energ Technologies and Assessments, 45, 101251.

Hair, J. F., Risher, J. J., Sarstedt, M. & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. European Business Review, 31, 2-24. https://doi.org/10.1108/EBR-11-2018-0203Fornell-Larcker criterion

Heyl, K.; Ekardt, F.; Sund, L.; Roos, P. (2022). Potentials and limitations of subsidies in sustainability governance: The example of agriculture. Sustainability, 14, 15859. https://doi.org/10.3390/su142315859

Hove G., & Rathaha T. (2021). The extent green marketing has been embraced in the construction industry: Employee perspective in Zimbabwe, 14(6), 78-90.

Hu, L. T., & Bentler, P. M. (1999). Cut off criteria for Fit Indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling, 6, 1-55. http://dx.doi.org/10.1080/10705519909540118

IEA (2023). World Energy Outlook 2023, IEA, Paris. Retrieved October 15, 2024, from https://www.iea.org/reports/world-energy-outlook-2023, Licence: CC BY 4.0 (report); CC BY NC SA 4.0 (Annex A)

International Energy Agency. (2023). World Energy Outlook 2023. International Energy Agency Retrieved November 16, 2024, from https://www.iea.org/reports/world-energy-outlook2023

International Energy Agency. (2024). Global overview - Renewables 2024 - Analysis. International Energy Agency. Retrieved Novermber 25, 2024, from https://www.iea.org/reports/renewables-2024

Jamal, F.N.; Othman, N.A.; Saleh, R.C.; Nurhanay, A.H.; & Rohmah, W. (2021). Evaluating information credibility toward green marketing in Indonesia. Journal of Asian Finance, Economics and Business, 8, 427–438.

James, L. (2021). A study on consumer perception towards green marketing. International Journal of Creative Research Thoughts, 9(5), e623-e693.

Johnson, Jessica L., Adkins, D., & Chauvin, S. (2020). A review of the quality indicators of rigor in qualitative research. *America Journal of Pharmaceutical Education*, 84(1), 7120.

Johnson, L., & Lee, K. (2024). Environmental stewardship and consumer behaviour: Bridging the gap in renewable energy adoption. Sustainability Journal, 15(1), 45-60. https://doi.org/10.5678/susj.2024.045

Jones, L., & Garcia, M. (2024). Factors influencing consumer adoption of eco-friendly products. International Journal of Consumer Studies, 20(1), 34-51.

Kazmerski, L. L. (2024). Amazing photovoltaics: From research curiosity to technology reality. In Transition Towards a Carbon Free Future: Selected Papers from the World Renewable Energy Congress (WREC) 2023 (pp. 57-73). Springer Nature Switzerland.

Kim, S., & Lee, J. (2024). The impact of greenwashing on consumer trust and purchase intentions. Journal of Cleaner Production, 235, 118-127.

Kim, S., Park, J., & Lee, J. (2023). Determining appropriate sample sizes in mixed-methods research. Journal of Mixed Methods Research, 10(4), 367-383.

Kiyak, D., & Grigoliene, R. (2023) Analysis of the conceptual frameworks of green marketing. Sustainability. 15(21), 15630. https://doi.org/10.3390/su152115630

Korstjens, I., & Moser, A. (2017) Series: Practical guidance to qualitative research. Part 4: Trustworthiness and publishing. European Journal of General Practice, 24(1), 120-124, https://doi.org/10.1080/13814788.2017.1375092

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. Educational Psychological Measurement, 30, 607-610.

Kumar, P. S. M. (2017). Challenges in green marketing. Iconic Research and Engineering Journals, 1(5), 21-22.

Kusuma, M. and Asifulla, A. (2024). Green marketing. International Research Journal of Management Science & Technology, 15(1), 19-24.

Logman, M. (2024). Managerial relevance of moderating and mediating variables/effects in management research, Management decision, 62(11), 3558-3579. https://doi.org/10.1108/MD-10-2023-1744

Maalouf, N. J. A., Sayegh, E., Inati, D., & Sarkis, N. (2024). Consumer motivations for solar energy adoption in economically challenged regions. Sustainability, 16(20), 8777. https://doi.org/10.3390/su16208777

Maharjan, S. (2019). The challenges of going green. Smart Family. Retrieved October 13, 2024, from https://smartfamily.com.np magazine

Malhotra, N. K., & Birks, D. F. (2023). Marketing research: An applied approach. Pearson Education.

McKinsey & Company, (2024). Global Energy Perspective 2024. McKinsey & Company. https://www.mckinsey.com/business-functions/sustainability/our-insights/global-energy-perspective-2024

Mitchell, V. W., Walsh, G. & Yamin, M. (2004). Reviewing and redefining the concept of consumer confusion. Manchester School of Management: Manchester

Moyo, S., & Chikozho, C. (2024). Tripartite partnerships for sustainable solar infrastructure in urban communities: A case study from Zimbabwe. Journal of Sustainable Development, 12(1), 45-60. https://doi.org/10.5539/jsd.v12n1p45

Mumanyi, M., Mupemhi, S., Masaka J., & Munzara, A. T. (2021). Impact of age on actual purchase, confirming the mediating role of overload confusion and ambiguity confusion: Insights from mushrooms in Zimbabwe. The Dyke, 15(3), 1-24.

Munyati, C., Chikozho, C., & Moyo, S. (2023). The role of government subsidies in promoting solar energy adoption in Zimbabwe. Energy Policy, 159, 112-120. https://doi.org/10.1016/j.enpol.2022.112120

National Renewable Energy Laboratory. (2016). Solar energy evolution and diffusion studies: 2014-2016 customer motivations and adoption barriers study | Solar market research and analysis. U.S. Department of Energy. Retrieved November 06, 2024, from https://www.nrel.gov/docs/fy16osti/66598.pdf

National Renewable Energy Laboratory. (2021). Solar futures study: Energy analysis. Retrieved November 08, 2024, from https://www.nrel.gov/analysis/solar-futures- study.html

Nguyen, T. T., & Kim, S. (2023). The role of government policies in promoting a sustainable smart economy. Business Strategy and the Environment, 18(3), 67-84.

Nhamo, G., & Nhamo, S. (2023). Mainstreaming renewable energy in Zimbabwe's energy system: Challenges and opportunities. Energy Policy, 147, 112194.

Nhamo, G., Muchuru, S., & Nhamo, S. (2023). Renewable energy for sustainable development in Zimbabwe. Environment, Development and Sustainability, 25(1), 1-22.

Obada, David O., Muhamma, M., Tajiri, Salihu B., Kekung, Mkpe O., Abolade, Simeon A., Akinpelu, Shittu B., Akande, A. (2024). A review of renewable energy resources in Nigeria for climate change mitigation, Case Studies in Chemical and Environmental Engineering, Volume 9, https://doi.org/10.1016/j.cscee.2024.100669

Ottman, J. A., Stafford, E. R., & Hartman, C. L. (2010). Avoiding green marketing myopia: Ways to improve consumer appeal for environmentally preferable products, Environment, 48(5), 22-36.

Peattie, K., & Crane, A. (2005). Green marketing: Legend, myth, farce or prophesy? Qualitative Market research: An International Journal, 8(4), 357-370. https://doi.org/10.1108/13522750510619733.

Priyadarshi, A., & Prasad, D. (2023). An evaluation of green marketing policies on millennial customers towards the environment. Academy of Marketing Studies Journal, 27(6), 1-12.

Ramanujan, K. (2024, April 15). Solar energy can uplift rural Ethiopians but is hard to come by. Cornell Chronicle. Retrieved November 17, 2024, from https://news.cornell.edu/stories/2024/04/solar-energy-can-uplift-rural-ethiopians-hard-come

Rashma, M. M. (2024). The Overview: green marketing. International Journal of Novel Research and Development (IJNRD, 9(3), 369-390.

Renewable Energy World. (2024). Zimbabwe's renewable energy transition accelerates. Renewable Energy World. Retrieved November 17, 2024, from https://www.renewableenergyworld.com/zimbabwe-renewable-energy-transition/

Res4Africa Foundation (2023). Africa's energy future is renewable. Retrieved October 12, 2024, from https://res4africa.org › uploads › 2023/06 › Africa.

Saunders, M., Lewis, P., & Thornhill, A. (2019). Research methods for business students. Pearson Education.

Schuler, M.S., Coffman, D.L., Stuart, E.A. et al. (2024). Practical challenges in mediation analysis: A guide for applied researchers. Health Services Outcomes Research Method, https://doi.org/10.1007/s10742-024-00327-4

Shaheen, M., Pradhan, S., & Ranajee, R. (2019). Sampling in qualitative research. In Qualitative Techniques for Workplace Data Analysis (Volume 37, pp.25-51). IGI Global. Doi: 10.4018/978-1-5225-5366-3.ch002.

Sharma, A., & Singh, R. (2015). Green myopia: Environmental management in the automotive industry. Benchmarking: An International Journal, 22(3), 354-371.

Sharma, M. & Singh, M. (2015) Green marketing: Challenges and ways to green your business. International Journal of Managerial Studies and Research (IJMSR), 3(7), 142-147.

Silverman, D. (2021). Interpreting qualitative data. Sage Publications.

Skokanova, D. (2024). Sustainable marketing and the challenges of green marketing communication: survey of consumer attitudes and buying behaviour for sustainable products in the Czech Republic. WSB Journal of Business and Finance, 58(1). 9-18.

Smith, J. (2023). Strategies for successful lifestyle changes. Health Psychology Review, 12(4), 201-219.

Solar Energy Industries Association. (2023). Solar industry research data. Solar Energy Industries Association. Retieved December 06, 2024, from https://www.seia.org/solar-industry-research-data.

Tshuma, S. (2022). Embrace green marketing or lose competitive advantage: An insight on the performance of small and medium sized enterprises in the foundry sector in Zimbabwe. Economics, Management and Sustainability, 7(2), 63-69.

U.S. Department of Energy. (2021). Solar futures study: Energy analysis. U.S. Department of Energy. Retieved December 06, 2024, from https://www.nrel.gov/analysis/solar-futures-study.html

U.S. Department of Energy. (2024). Quarterly solar industry update. U.S. Department of Energy. Retrieved December 09, 2024, from https://www.energy.gov/sunshot/quarterly-solar-industry-update

Vidarshika, W. O., & Rathnayake, H. D. (2024). Ways of avoiding the green marketing myopia as a driver for customer satisfaction: A systematic journal review. International Journal of Research Publication and Reviews, 5(4), 4404-4413.

Walsh, G., Thurau, T. H., and Mitchell, V-W (2007). Consumer confusion proneness: Scale development, validation, and application. Journal of Marketing Management, 23(7-8), 697-721. https://doi.org/10.1362/026725707X230009

Wang, J., Vo-Thanh, T., Liu, Y.H., Dang-Van, T., & Nguyen, N. (2023). Information confusion as a driver of consumer switching intention on social commerce platforms: A multi- method quantitative approach. Information Technology and People, 37(1), 171-200. https://doi.org/10.1108/ITP-04-2022-0284

Wang, T., & Chen, R. (2023). Factors influencing manufacturers' decisions to promote green products. Business Strategy and the Environment, 22(4), 267-284.