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FACTORS INFLUENCING THE ADOPTION OF HYBRID SOLAR-POWERED STOVES: PRODUCT QUALITY, PRICING AND BRAND PERCEPTION IN UGANDA

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----------ABSTRACT----------

This study examines the factors influencing the adoption of Hybrid Solar-Powered Stoves (HSPS) in Uganda, with a focus on product quality, pricing strategies, and brand awareness. Using a correlational and cross-sectional design, the research analyzes data from 196 respondents, including employees and customers of Eco Stove and Wuja Stove companies in Kampala, Wakiso, and Mukono districts. The study finds that all three variables significantly impact the adoption of HSPS, with product quality emerging as the most influential factor ($r = 0.644$, $p < 0.01$), followed by pricing strategies ($r = 0.625$, $p < 0.01$) and brand awareness ($r = 0.613$, $p < 0.01$). Regression analysis further reveals that these factors collectively explain 59.1% of the variance in adoption, with product quality as the strongest predictor (Beta = 0.543). The study highlights that while brand awareness plays a role, its effect is secondary to the critical importance of product quality and pricing strategies in driving adoption. These findings suggest that companies in Uganda's hybrid solar stove market must prioritize product improvement, competitive pricing, and effective marketing to accelerate market penetration. The study contributes valuable insights for enhancing renewable energy solutions in Uganda, offering a roadmap for overcoming barriers to adoption and promoting sustainable energy practices. Future research could explore broader market dynamics and employ mixed methods approaches to gain a deeper understanding of consumer behaviour. -------

KEY WORDS: *Product Quality, Pricing Strategies, Product Adoption*

1. INTRODUCTION

Uganda's energy sector is at a pivotal moment, with a rapidly growing population and rising demand for sustainable energy solutions. Historically, the country has been heavily reliant on traditional biomass fuels, particularly firewood and charcoal, for cooking and heating. According to the Uganda Bureau of Statistics (UBOS, 2021), 94% of Ugandan households depend on biomass, with 73% using firewood and 21% using charcoal. Other energy sources, such as electricity (1.4%) and kerosene (0.6%), are far less prevalent. The increasing demand for cooking fuels, coupled with a scarcity of sustainable alternatives, has exacerbated the supply-demand imbalance (Mugisha, Natamba, Ntambi & Bamwirire, 2018).

In response, renewable energy solutions, especially Hybrid Solar-Powered Stoves (HSPS), have emerged as a promising alternative to traditional cooking methods. HSPS combine solar energy with conventional cooking techniques, reducing reliance on biomass and offering a cleaner, more sustainable solution. Brands like Eco Stove and Wuja Stove are leading the charge in Uganda, promoting these hybrid models as innovative solutions that align with the country's environmental and energy goals (Akumu & Mugisa, 2019). The use of solar energy in cooking not only reduces carbon emissions but also aligns with Uganda's commitment to adopting renewable energy, supporting cleaner cooking practices, and improving public health (Kemigisha et al., 2018).

HSPS have several advantages, such as lower carbon emissions, less reliance on charcoal, and the ability to use alternative fuels like briquettes, volcanic rocks, and agricultural waste products such as maize cobs and coffee husks (Okot et al., 2021). These stoves are designed to consume less fuel, produce fewer emissions, and provide a more sustainable cooking solution compared to traditional methods. Moreover, they contribute to several

Sustainable Development Goals (SDGs), including zero hunger (SDG 2), good health and well-being (SDG 3), gender equality (SDG 5), clean water and sanitation (SDG 6), affordable and clean energy (SDG 7), and life on land (SDG 15) (Adanguidi et al., 2020; Devan et al., 2020).

Uganda's National Development Plan (2020/21 - 2024/25) explicitly highlights the challenges related to biomass energy, with firewood and charcoal accounting for 88% of the country's energy consumption (FAO, 2024). The country loses 120,000 hectares of forest cover annually, with 60% attributed to the use of wood fuels. This degradation incurs a cost of USD 2.3 billion, with biomass fuels contributing to a significant portion of this loss. Therefore, HSPS represent a crucial intervention to address both environmental degradation and energy sustainability (FAO, 2024). These stoves, which utilize volcanic rocks alongside charcoal and other organic materials, offer a more sustainable and long-lasting alternative to traditional charcoal, with some rocks reusable for up to eight months (Kemigisha et al., 2018).

Despite the promising benefits, the adoption of hybrid solar-powered stoves in Uganda remains limited, particularly in urban areas like Kampala, Wakiso, and Mukono. Factors such as product quality, pricing strategies, and brand awareness play a significant role in consumer adoption. The success of HSPS hinges on effective marketing, consumer education, and ensuring that the product meets the needs of Ugandans, particularly in rural and low-income households (Ogena & Mubiru, 2019). While the quality and cost of these stoves are competitive, their overall market penetration remains low due to challenges in brand recognition and consumer awareness. Research by Storbacka & Lehtinen (2020) and Komunda (2019) highlights the importance of product quality, pricing, and branding in driving consumer adoption of new technologies.

In Uganda, several companies, including Eco Stove, Smart Homes, UGAStove, ACE Home, and others, are leading the market for solar-powered cooking solutions. These companies aim to blend traditional cooking practices with renewable solar energy, addressing both the need for cleaner cooking methods and reducing the reliance on unsustainable biomass fuels. However, despite these innovations, brand awareness and consumer trust in hybrid solar-powered stoves remain low, limiting their widespread adoption. Therefore, understanding the factors that influence the adoption of these stoves—specifically, product quality, pricing, and brand awareness—is crucial for increasing market acceptance and overcoming adoption barriers (Mugambe et al., 2020).

This study aims to investigate the factors influencing the adoption success of hybrid solar-powered stoves in Uganda, with a focus on how product quality, pricing strategies, and brand awareness impact their market penetration. By addressing these factors, the research seeks to provide insights into how to accelerate the adoption of these stoves, contributing to a more sustainable energy future in Uganda while also supporting broader global sustainability goals. The study was guided by the following objectives: (i) To examine the effect of product quality on new product adoption of Hybrid Solar Powered Stoves in Uganda's Energy Sector, (ii) To establish the role of pricing strategies on new product adoption of Hybrid Solar Powered Stoves in Uganda's Energy Sector iii)To determine how brand awareness is associated with new product adoption of Hybrid Solar Powered Stoves in Uganda's Energy Sector. The next section reviews literature and proposes the research model. The subsequent two sections present methodology and data analysis results. Finally, the article concludes by discussing the findings, limitations and directions for future research.

2. LITERATURE REVIEW

Social Exchange Theory (SET), first articulated by Homans (1958), provides a robust framework for understanding the dynamics of human relationships, including those between consumers and product providers. SET suggests that individuals weigh the costs and benefits of relationships, opting to maintain them when perceived benefits outweigh costs. The theory also emphasizes reciprocity, with both parties in a relationship contributing to mutual gains, which is highly relevant when examining customer adoption of new products such as hybrid solar-powered stoves.

In the context of hybrid solar stoves in Uganda, SET can explain how product quality, pricing strategies, and brand awareness influence consumers' decisions to adopt and remain loyal to these new cooking technologies. Consumers will be more likely to adopt these stoves if they perceive them as offering high quality (reliable, durable, and cost-effective), competitive pricing, and strong brand recognition, all of which enhance the perceived benefits. Conversely, if the costs—such as price or inconvenience—are perceived to outweigh these benefits, adoption will be lower.

This theory is particularly relevant to understanding market penetration in the Ugandan context, where consumer decisions are not only based on the functional aspects of the product but also on relational dynamics between service providers and customers. Factors like trust, perceived reciprocity (e.g., the value gained from switching to a more sustainable option), and brand loyalty are key drivers for successful adoption. Additionally, the psychological and financial considerations consumers face in transitioning from traditional cooking methods to new technology align well with SET's focus on the cost-benefit calculus in relationship maintenance (Trepper, 2011). Thus, social exchange theory provides a valuable lens through which to analyze and understand the factors influencing the adoption success of hybrid solar-powered stoves in Uganda.

The adoption of new technologies, particularly in the renewable energy sector, is a multifaceted process shaped by various factors. In Uganda, where access to clean and affordable energy remains a challenge, the adoption of hybrid solar-powered stoves presents an opportunity to address energy shortages while reducing environmental degradation. However, the extent to which these technologies are adopted depends on several factors, including product quality, pricing strategies, and brand awareness. This literature review synthesizes existing research on these determinants and their role in the adoption of hybrid solar-powered stoves in Uganda.

Product Quality and New Product Adoption

Product quality has long been a critical determinant in the adoption of new technologies, as it directly impacts customer satisfaction, trust, and loyalty (Ejika & Ukpata, 2022; Rafi & Mushtaq, 2023). In the context of hybrid solar-powered stoves, product quality encompasses performance, reliability, durability, serviceability, and perceived quality, all of which influence consumer decision-making. Ejika and Ukpata (2022) explored the impact of product quality on customer satisfaction and loyalty, emphasizing its role as a major determinant in shaping consumer behavior. Their study, which employed a survey of 264 employees at Adama Beverages Ltd, found that high-quality products lead to greater customer satisfaction, which, in turn, enhances loyalty. The study highlighted the importance of tracking product quality as fluctuations in quality can either elevate or undermine customer satisfaction and loyalty. While Ejika and Ukpata's research focused on customer satisfaction and loyalty, it did not directly examine new product adoption, creating a conceptual gap that is addressed by the current study, which seeks to understand how product quality influences the adoption of hybrid solar-powered stoves in Uganda.

Similarly, Rafi and Mushtaq (2023) examined the impact of product quality across eight dimensions—such as durability, reliability, and features—on customer satisfaction in the consumer durables sector. Their study, which surveyed 560 respondents, confirmed that product quality significantly affects satisfaction, with durability and perceived quality having the greatest impact. However, while the study focused on consumer satisfaction, it did not link product quality directly to new product adoption, which is a key gap this study aims to fill.

For hybrid solar-powered stoves, the critical aspects of product quality include performance (i.e., energy efficiency and cooking effectiveness), reliability (the ability to perform consistently under varying conditions), and durability (resilience in rural environments with limited service infrastructure). Given the long-term benefits of reduced fuel costs and improved health outcomes, the adoption of high-quality hybrid solar-powered stoves is likely to be more attractive to consumers, provided that they are satisfied with the product's performance and durability (Syahputra, Ritonga, & Hernawati, 2024). These findings underscore the need to emphasize product quality in the marketing and design of solar-powered stoves to encourage broader adoption.

Pricing Strategies and Adoption of New Products

Pricing is another crucial factor influencing consumer behavior and new product adoption. In emerging markets like Uganda, where disposable incomes are limited, the affordability and perceived value of a product are paramount considerations for potential adopters (Dutta, 2023; Pasaribu et al., 2019). The price of a hybrid solar-powered stove must strike a balance between affordability and the perceived long-term savings associated with reduced reliance on traditional fuels.

Nafuna et al. (2019) studied pricing strategies in the context of private primary schools in Uganda and found that appropriate pricing strategies—such as cost-based, competitive-based, and value-based pricing—directly influenced financial performance. The study suggested that the adoption of appropriate pricing strategies positively impacts organizational success. Similarly, Kimathi (2021) observed that pricing strategies accounted for nearly 40% of the variation in the performance of MSMEs in Kenya. While these studies primarily focused on the impact of pricing on financial performance and purchasing decisions, they provide valuable insights into how pricing strategies can be leveraged to enhance the adoption of hybrid solar-powered stoves in Uganda.

A competitive pricing strategy that aligns with local economic conditions is essential for encouraging the adoption of hybrid solar-powered stoves in Uganda. For example, if the initial cost of the stove is too high, it may deter potential adopters, despite the long-term savings from using solar energy. Conversely, a pricing strategy that reflects the economic realities of rural Ugandan households—such as subsidized pricing or microfinance options—may increase adoption rates. Thus, understanding the dynamics of pricing strategies in the Ugandan market is critical for enhancing the accessibility and affordability of these stoves.

Brand Awareness and New Product Adoption

Brand awareness is a crucial factor in the adoption of new products, as it directly influences consumer perceptions of product quality and trust. Research consistently shows that greater brand awareness fosters higher levels of trust, which in turn increases the likelihood of product adoption (Brestilliani, 2020; Arianty & Liyuwandari, 2021). In the case of hybrid solar-powered stoves, brand recognition can reduce the perceived risk associated with adopting a new technology, especially in rural and low-information contexts.

A study by Harcourt (2018) examined the role of brand awareness in the market performance of food and beverage firms in Rivers State, Nigeria. It found that brand awareness was positively correlated with customer retention and market performance. Similarly, Mante et al. (2023) explored the role of brand awareness in the performance of commercial banks, finding that higher brand recognition led to improved customer loyalty and firm performance. Although these studies did not directly focus on new product adoption, they suggest that building strong brand awareness is essential for increasing consumer confidence, which can facilitate the adoption of innovative products like hybrid solar-powered stoves.

Musiimenta and Zikusooka (2024) explored the link between brand awareness and marketing performance at Uganda Breweries Limited, finding that increased brand awareness led to higher marketing performance. This underscores the importance of visibility and recognition in driving consumer decisions. For hybrid solar-powered stoves in Uganda, developing brand awareness through targeted marketing campaigns, partnerships with local organizations, and word-of-mouth recommendations can play a pivotal role in enhancing consumer trust and encouraging adoption.

While product quality, pricing strategies, and brand awareness each independently influence new product adoption, their combined effect is likely to be even more significant. High product quality ensures customer satisfaction, which encourages positive word-of-mouth and repeat purchases. Affordable pricing strategies make the product more accessible, while strong brand awareness builds trust and reduces perceived risks. Together, these factors create an environment conducive to the successful adoption of hybrid solar-powered stoves in Uganda's energy sector.

In conclusion, the adoption of hybrid solar-powered stoves in Uganda's energy sector is influenced by a complex interplay of product quality, pricing strategies, and brand awareness. Studies have consistently shown that high-quality products lead to greater consumer satisfaction and loyalty, while appropriate pricing strategies can make new technologies more accessible to underserved populations. Additionally, strong brand awareness fosters consumer trust, which is critical for adoption in markets with limited exposure to renewable energy products. This literature review highlights the need for further research on the specific relationship between these factors and new product adoption in the context of hybrid solar-powered stoves in Uganda. Addressing these factors holistically will be key to driving the widespread adoption of solar-powered stoves and contributing to sustainable energy access in Uganda.

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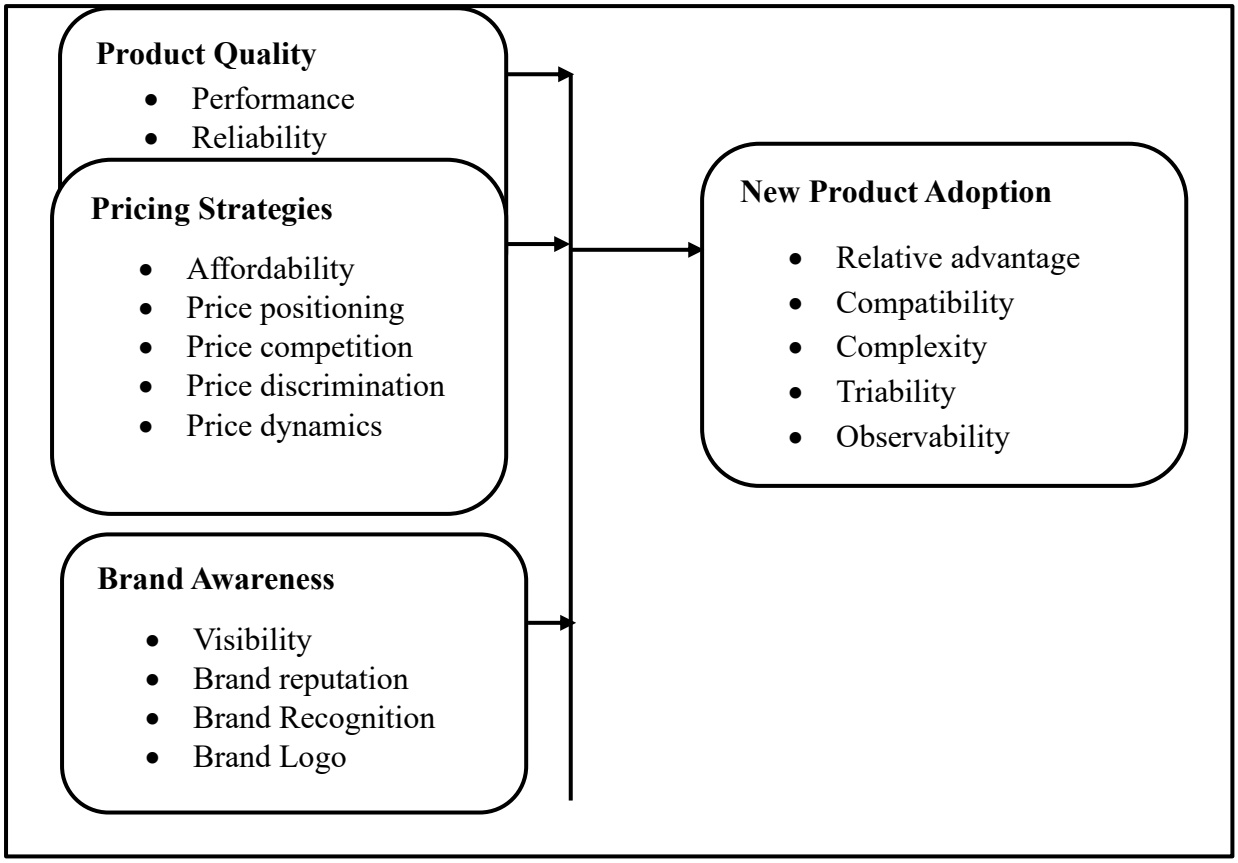


Figure 1 depicts the conceptual framework posits that new product adoption is influenced by three independent variables: product quality, pricing strategies, and brand awareness. Product quality is measured by attributes such as performance and durability (Moch & Sopiah, 2021), pricing by affordability and competition (Suharno, 2020), and brand awareness by visibility and recognition (Brestilliani, 2020). New product adoption is assessed through attributes like relative advantage and compatibility (Ramadhan, 2019).

3. RESEARCH METHODOLOGY

This study utilized a correlational and cross-sectional research design to examine the relationship between product quality, pricing strategies, brand awareness, and the adoption of Hybrid Solar-Powered Stoves in Uganda. A cross-sectional design was chosen as it allows for data collection from different individuals at a single point in time, providing a snapshot of the relationships between variables (Amin, 2005; Kothari, 2017). The correlational design was employed to explore the strength and direction of relationships between the study variables without manipulating them (Creswell, 2014). The research approach was quantitative, as it allowed for the collection of numerical data that could be subjected to statistical analysis (Creswell, 2014). Quantitative research is objective, reliable, and capable of producing generalizable results.

The target population for the study included employees and customers of Wuja Stove and Eco Stove companies in Kampala, Wakiso, and Mukono districts, totaling 385 individuals. The sample size was calculated using Yamane's formula (1967), which determined a sample size of 196 respondents. This sample was proportionally distributed across staff and customers of both companies, ensuring a representative sample for analysis. A simple random sampling technique was employed to select participants, ensuring that every individual had an equal chance of being included in the study. This method is crucial for minimizing bias and ensuring the representativeness of the sample (Nicewander, 2018). Respondents were randomly selected from the list of staff and customers, guaranteeing that the study results are generalizable to the target population.

Primary data was collected using self-administered questionnaires designed to address the study's research questions. The questionnaire consisted of five sections: the first section gathered demographic information, while the remaining sections focused on the key study variables: product quality, pricing strategies, brand awareness,

and new product adoption of Hybrid Solar Powered Stoves. The questionnaire used a five-point Likert scale ranging from "strongly disagree" to "strongly agree" to capture respondents' perceptions (Sekaran & Bougie, 2010). This format allowed for easy data coding and statistical analysis.

The main tool for data collection was a questionnaire, designed to measure the key variables based on established theoretical frameworks. Product quality was measured according to Moch and Sopiah (2021), pricing strategies followed Suharno (2020), brand awareness was conceptualized by Brestilliani (2020), and new product adoption was based on Ramadhan's (2019) framework. To ensure the reliability and validity of the instruments, the study underwent a pilot test within the target companies to pretest the clarity and relevance of the questions.

Validity of the research instruments was ensured through expert judgment and the calculation of the Content Validity Index (CVI). Experts in the field of business and marketing assessed the relevance of each question, resulting in an overall CVI score of 0.88, which is above the acceptable threshold of 0.70 (Amin, 2005; Oso & Onen, 2009). This indicates that the questionnaire was valid for measuring the intended constructs.

For reliability, the study employed internal consistency methods, specifically Cronbach's Alpha, to test the consistency of responses across items within the questionnaire. A pre-test was conducted on a small sample (10% of the total sample size), and the reliability coefficient was calculated using SPSS. A Cronbach's Alpha of over 0.85 was achieved for each composite variable, indicating a high level of reliability (Sekaran & Bougie, 2010; Taber, 2018).

Data analysis was conducted using descriptive and inferential statistics. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the demographic characteristics of respondents and their opinions on product quality, pricing strategies, brand awareness, and new product adoption. This allowed the researcher to quantify respondents' views and present a clear overview of the data.

For inferential statistics, Pearson correlation and multiple regression analysis were used to explore the relationships between the independent variables (product quality, pricing strategies, and brand awareness) and the dependent variable (new product adoption). Pearson correlation was employed to determine the strength and direction of the relationship between variables, while regression analysis helped to identify the most significant predictors of new product adoption (Cohen, West, & Aiken, 2014; Oso & Onen, 2008). The statistical software SPSS version 24 was used for data analysis.

Ethical considerations were adhered to throughout the research process. Respondents were informed about the purpose of the study, and informed consent was obtained from all participants. Additionally, confidentiality and anonymity were maintained to protect the identities and responses of participants.

4. FINDINGS

The demographic profile of the 185 participants in this study was examined across four key variables: gender, age, education level, and working experience. These factors provide important context for understanding the respondents' perspectives and the credibility of their responses. The gender distribution of respondents indicated a slight majority of females (55.1%) compared to males (44.9%). This distribution reflects a relatively balanced representation of gender within the study sample.

The age profile of respondents revealed a predominance of participants aged 34–41 years, who constituted 31.4% of the sample. Additionally, 25.9% were in the 26–33-year age group, and 18.9% were between 18–25 years. The study also captured a range of older age groups: 12.9% of respondents were aged 42–49 years, 8.2% were 50–59 years, and 2.7% were over 60 years. This broad age distribution highlights the diverse experience levels among the participants, contributing to a well-rounded dataset. Respondents' educational levels varied, with the majority holding a bachelor's degree (32.9%) or a diploma (22.7%). Additionally, 17.8% had completed certificate courses, and 12.5% had pursued postgraduate studies. A smaller proportion, 8.6%, had only UCE-UACE certificates, while 5.5% had no formal education (Table 4.3). This diversity in educational background suggests a varied skill set among the respondents, which is important when analyzing their insights into the study topic. The study also considered respondents' experience with Wuja Stove and Eco Stove products, which was crucial for evaluating the reliability of their feedback. As shown in Table 4.4, nearly half of the respondents (47.1%) had worked with or used the products for 1–5 years, while 30.8% had 6–10 years of experience. A smaller proportion, 16.7%, had less than a year of experience, and 5.4% had more than 10 years of experience. This distribution indicates a strong

base of respondents with substantial product experience, contributing valuable insights to the study. The demographic analysis reveals a diverse and representative sample, with a balanced gender distribution, a wide age range, varied educational levels, and a significant span of product experience. These factors enhance the study's validity and provide a comprehensive understanding of the perspectives shared by the respondents.

Descriptive Statistics Overview

The study examined the levels of product quality, pricing strategies, brand awareness, and new product adoption in Wuja stove and Eco Stove companies, with the aim of understanding the factors influencing the adoption of hybrid solar-powered stoves. Below is a summary of the descriptive findings for each construct.

Product quality was rated overall as satisfactory (M=3.54, SD=0.19). The *Reliability* dimension had the highest rating (M=3.71, SD=0.13), with respondents agreeing that reliability significantly contributes to brand image. *Durability* also rated highly (M=3.66, SD=0.16), reflecting the perception that the stoves are long-lasting and cost-effective in maintenance. *Perceived quality* (M=3.58, SD=0.19) and *Performance* (M=3.43, SD=0.22) were both rated positively, emphasizing satisfaction with the product's features and continuous innovation. However, *Serviceability* had the lowest score (M=3.32, SD=0.26), indicating room for improvement in customer support and repair services. Overall, respondents expressed positive perceptions of product quality, which appears to support the adoption of hybrid solar-powered stoves.

The level of pricing strategies was also rated positively (M=3.44, SD=0.28). *Affordability* (M=3.68, SD=0.18) was the strongest attribute, with respondents acknowledging the competitive and accessible pricing of the stoves. *Price positioning* (M=3.57, SD=0.24) and *Price competition* (M=3.39, SD=0.29) were considered effective in influencing market dynamics, though respondents were less convinced about *Price discrimination* (M=3.31, SD=0.33) and *Price dynamics* (M=3.23, SD=0.34), which may reflect concerns over the long-term stability of pricing strategies.

Brand awareness was rated moderately high (M=3.38, SD=0.26). *Visibility* (M=3.51, SD=0.22) and *Brand recognition* (M=3.47, SD=0.23) were particularly strong, suggesting effective use of media to increase market presence. However, *Brand logo* (M=3.31, SD=0.26) and *Brand reputation* (M=3.23, SD=0.31) received slightly lower ratings, indicating potential areas for improvement in strengthening brand identity and consumer trust.

New product adoption was overall rated as moderate (M=3.1, SD=0.32). The *Relative Advantage* construct (M=3.55, SD=0.27) was the strongest predictor of adoption, with respondents recognizing the superiority of hybrid solar-powered stoves over traditional alternatives. *Compatibility* (M=3.16, SD=0.29) also emerged as a significant factor, suggesting that the products meet consumer needs. However, *Triability* (M=3.01, SD=0.33) and *Observability* (M=2.91, SD=0.35) were less positively rated, indicating challenges in product trial and visibility in the market. *Complexity* (M=2.81, SD=0.38) showed the lowest scores, reflecting potential barriers to adoption due to perceived complexity of the technology. These findings highlight key factors that influence the adoption of hybrid solar-powered stoves, with product quality, affordability, and brand visibility emerging as critical drivers, while challenges remain in areas such as serviceability and product observability.

Inferential Statistics

The study aimed to explore the relationships between product quality, pricing strategies, brand awareness, and new product adoption in Uganda's Hybrid Solar Powered Stove sector. Correlation and regression analyses were employed to test these relationships. Pearson's correlation analysis was used to determine the strength and significance of the relationships among the study variables. The results reveal positive and significant correlations at the 0.01 level between all variables. Specifically, product quality showed a strong positive relationship with new product adoption ($r = 0.644$, $p < 0.01$), suggesting that higher perceived product quality is associated with greater adoption of new products. Similarly, pricing strategies ($r = 0.625$, $p < 0.01$) and brand awareness ($r = 0.613$, $p < 0.01$) also demonstrated significant positive effects on new product adoption. These findings highlight that all three factors—product quality, pricing strategies, and brand awareness—play crucial roles in the adoption of Hybrid Solar Powered Stoves in Uganda's energy sector, particularly for the Wuja and Eco Stove brands.

To further understand the extent to which these variables drive new product adoption, a linear regression model was employed. The results indicated that product quality, pricing strategies, and brand awareness together significantly predicted new product adoption ($F = 14.230$, $p < 0.01$). The model explained 59.1% of the variance in new product adoption (Adjusted $R^2 = 0.591$), with product quality emerging as the strongest predictor (Beta = 0.543), followed by pricing strategies (Beta = 0.411) and brand awareness (Beta = 0.268). These findings suggest

that while all three factors contribute to the adoption of Hybrid Solar Powered Stoves, product quality has the most significant influence.

In conclusion, the study confirms that product quality, pricing strategies, and brand awareness are key determinants of new product adoption in Uganda's Hybrid Solar Powered Stove market. Together, these factors account for a substantial portion of the variation in adoption rates, underscoring the importance of strategic management in promoting new technologies in the energy sector.

5. DISCUSSION, INPLICATIONS AND LIMITATIONS

This study sought to explore the relationship between product quality, pricing strategies, brand awareness, and new product adoption in Uganda's Hybrid Solar Powered Stove market, particularly focusing on Wuja stove and Eco Stove Companies. The findings indicate that all three variables—product quality, pricing strategies, and brand awareness—have a significant influence on the adoption of new products in Uganda's energy sector. These results align with prior literature on technology adoption and market performance, underscoring the importance of strategic management in the renewable energy sector.

Effect of Product Quality on New Product Adoption

The correlation and regression analyses revealed a strong positive relationship between product quality and new product adoption, with product quality emerging as the most significant predictor. Specifically, a one-unit increase in product quality was associated with a positive change in new product adoption ($r = 0.644$, $p < 0.01$). The descriptive statistics indicated that product quality was perceived as good, suggesting that Wuja stove and Eco Stove Companies offer products that meet customer expectations to some degree.

These findings resonate with previous research by Nziramasanga et al. (2021), who emphasized that product quality plays a crucial role in the adoption of renewable energy technologies like hybrid solar-powered stoves. Additionally, studies by Ejika and Ukpata (2022) and Rafi and Mushtaq (2023) have demonstrated that product quality is a significant determinant of customer satisfaction and loyalty, which in turn drives adoption. Consumers are more likely to embrace new technologies when they perceive the product to be of high quality, reliable, and durable. In the context of hybrid solar-powered stoves, product quality may also signify energy efficiency, safety, and cost-effectiveness, which are important for consumers in Uganda's energy sector.

Role of Pricing Strategies on New Product Adoption

Pricing strategies were also found to have a significant positive effect on new product adoption, with a correlation coefficient of 0.625 ($p < 0.01$). Regression analysis further confirmed that pricing strategies play a crucial role in consumer decision-making, with a positive change in pricing strategies leading to increased adoption of new products. The descriptive results showed that the pricing strategies in Wuja stove and Eco Stove Companies were perceived as high, suggesting that these companies employ pricing strategies that resonate with consumers and influence their purchasing behavior.

This finding aligns with previous studies, such as Nafuna et al. (2019), who identified a significant relationship between pricing strategies and financial performance, highlighting the importance of setting competitive prices. Similarly, Kimathi (2021) found that pricing strategy significantly affects the performance of MSMEs, with a well-positioned pricing strategy leading to higher consumer acceptance. Furthermore, Syed and Ahmad (2021) argued that pricing strategies, especially those that reflect cost and perceived value, have a substantial impact on consumer purchasing decisions. In the case of hybrid solar-powered stoves, pricing can be a critical factor in determining whether consumers will adopt these products, especially in a market like Uganda, where affordability is a key consideration.

Association between Brand Awareness and New Product Adoption

Brand awareness was found to be positively associated with new product adoption, though it contributed less to the overall variance in adoption compared to product quality and pricing strategies. The regression results showed that an increase in brand awareness led to a corresponding increase in product adoption, but with a smaller effect size (Beta = 0.268). Descriptive statistics further revealed that brand awareness in the context of Wuja stove and Eco Stove Companies was perceived as good, indicating that while customers are familiar with these brands, the level of recognition may still be growing.

This outcome is consistent with the findings of Brestilliani (2020), who asserted that brand awareness plays a pivotal role in shaping consumer trust and purchasing decisions. Similarly, Arianty and Liyuwandari (2021) found

that brand awareness positively influences consumer choices, as consumers are more likely to adopt products from brands they recognize and trust. Harcourt (2018) further demonstrated that brand awareness positively affects customer retention and brand extension, which are critical for market growth. Although brand awareness alone may not be sufficient to drive adoption, it serves as an important precursor to building trust and familiarity with new products. In the case of hybrid solar-powered stoves, increasing brand awareness could lead to higher levels of consumer trust, which may subsequently boost adoption rates.

Integrated Effects of Product Quality, Pricing Strategies, and Brand Awareness

The combined effect of product quality, pricing strategies, and brand awareness on new product adoption was substantial, with these three variables explaining 59.1% of the variance in adoption rates (Adjusted $R^2 = 0.591$). The high level of explanatory power indicates that these factors collectively have a strong influence on the adoption of hybrid solar-powered stoves in Uganda. Product quality was the most significant predictor, followed by pricing strategies and brand awareness, suggesting that while all three factors are important, product quality plays the most critical role in driving adoption. This finding is consistent with previous research that highlights the multidimensional nature of technology adoption, where factors like product quality, affordability, and brand recognition work together to influence consumer decisions (Syahputra, Ritonga & Hernawati, 2024; Kimathi, 2021).

In the context of Uganda's energy sector, where the adoption of renewable energy technologies is still in its nascent stages, it is essential for companies to focus on improving the perceived quality of their products, offering competitive pricing, and building strong brand awareness to facilitate market penetration and growth.

Implications for Hybrid Solar-Powered Stove Companies

For companies operating in Uganda's hybrid solar-powered stove market, these findings offer several strategic insights. First, ensuring the high quality of products is paramount, as it directly influences consumer adoption. Companies should invest in continuous product improvement, focusing on features such as energy efficiency, durability, and ease of use. Second, competitive pricing strategies are crucial for attracting consumers, particularly in a price-sensitive market. Companies should adopt pricing strategies that reflect the value of their products while remaining affordable for a broad consumer base. Lastly, while brand awareness is important, its impact on adoption is somewhat secondary to product quality and pricing strategies. Therefore, companies should continue to invest in marketing and visibility efforts but recognize that brand awareness alone will not drive adoption unless combined with high-quality products and competitive pricing.

The findings of this study confirm that product quality, pricing strategies, and brand awareness are significant predictors of new product adoption in Uganda's Hybrid Solar Powered Stove market. Companies in this sector must adopt a holistic approach, improving product quality, refining pricing strategies, and enhancing brand awareness to maximize adoption rates. These strategies will not only help companies penetrate the market but also contribute to the broader goal of promoting sustainable energy solutions in Uganda.

Limitations of the Study

This study encountered several limitations that may affect the generalizability and robustness of its findings. Firstly, attrition was a challenge, as not all respondents fully completed the questionnaires due to reasons such as travel, illness, or refusal to participate. Although the sample size was intentionally increased to mitigate this, some missing data may have impacted the results. Secondly, the reliability of the findings, particularly through test-retest methods, was limited. The researcher addressed this by using Cronbach's alpha to measure internal consistency, though it may not fully capture temporal stability (Leech et al., 2015).

Thirdly, the study relied exclusively on a quantitative approach, which limited responses to structured, close-ended questions. This constrained the depth of responses, though additional copies of the survey were distributed to reduce non-responses. Fourthly, availability issues among respondents hindered timely data collection. However, follow-up efforts helped mitigate this challenge. Finally, the study's reliance on Social Exchange Theory limited the understanding of adoption behaviors, as it primarily focused on cost-benefit analysis without considering cultural, social, and environmental factors. A more comprehensive approach incorporating multiple theoretical frameworks could provide a richer understanding (Venkatesh et al., 2003).

Suggested Areas for Future Research

Future studies should broaden the scope by including more companies in Uganda's Hybrid Solar Powered Stove market to allow for broader generalization. Additionally, a mixed-methods approach combining qualitative and

quantitative techniques could provide deeper insights into how product quality, pricing strategies, and brand awareness influence adoption (Creswell & Plano Clark, 2018).

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