Effect of Affordable Power Alternatives on Financial Performance of Some Selected Informal Vendors in Kebbi State, Nigeria

Sadat Ibn Adam., Garba Hayanchi

Department of Business Administration, Faculty of Management Sciences, Usmanu Danfodiyo University, Sokoto, Nigeria

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ABSTRACT

The study examined the effect of affordable power alternatives such as solar energy and mini-grid systems on the financial performance of selected informal vendors Kebbi State. Through surveys, and interviews on operational efficiency across three (3) communities (Danko, Kyabu District, and Maga), data were collected from a sample of 154 informal vendor operators from a population of 274. Mixed research approach was employed and data were assessed based on changes in income levels, operational costs, and business sustainability following access to alternative energy sources used by the vendors. The study employed regression analysis (SPSS software) to analyse the quantitative data, while table (NVivo software) was used for thematic coding of the qualitative data collected. Findings from the analysis revealed a statistically significant improvement in daily income, extended operating hours, and reduced reliance on costly fuel-based power sources. The study uncovered the transformative potential of energy access in supporting the development of grassroots businesses and offered policy recommendations for scaling such interventions in underserved regions which are suggested to be addressed through coordinated efforts among governments, private sector players, and civil society organizations.

Keywords: Affordable Power Alternatives, Financial Outcomes, Local Economies, Energy Access, Informal Vendors

INTRODUCTION

Access to affordable and reliable power and energy is fundamental to economic development, especially in rural and semi-urban communities where local vendors and small-scale entrepreneurs play a pivotal role in grassroots economic sustainability. This is evident in many conducted empirical studies, with areas having electric power and energy found to attract more businesses, leading to increased local employments (Modi et al., 2005). In many parts of Nigeria, including Danko/Wasagu Local Government Area in Kebbi State, the inadequacy of grid power and energy have significantly hindered the productivity of local vendors. Although Van-Gevelt (2014) pointed that off-grid solar energy solutions significantly increased business income and reduced operational cost. However, not every vendor owner is capable of affording the solar grid energy solution that can serve his/her business optimally. Thus some of the vendors often depend on inconsistent public supply or resort to expensive and environmentally harmful alternatives such as petrol and diesel generators to power their operations. As a result, they incur high operational costs, experience frequent business disruptions, and suffer reduced profit margins all of which negatively affect their financial outcomes and long-term sustainability.

Amidst these energy challenges, affordable power alternatives particularly solar home systems, solar mini-grids, rechargeable battery kits, power plant mini grids, and other decentralized renewable energy solutions are emerging as transformative tools. These blend of power solutions offer consistent and cleaner power at long-term and at lower costs, enabling vendors to extend their working hours, preserve perishable goods, and operate essential tools and devices that support their businesses in achieving growth, financial income and sustainability (Isenberg, 2011; Kudo et al., 2017; Arxiv, 2024). Despite the growing attention on renewable energy access in rural Nigeria, there is a lack of empirical studies exploring the direct financial impact of these alternatives on small businesses in localized settings such as the Danko/Wasagu Local Government Area.

This study therefore seeks to explore how the adoption of affordable power alternatives influence the financial outcomes of local vendors in this community. Specifically, it investigates whether such energy solutions lead to reduced operational costs, increased revenue, improved profitability, and opportunities for business expansion. By focusing on a context-specific rural area, the research aims to provide evidence-based insights that can inform energy policy, development planning, and entrepreneurial support programs.

The central research question guiding this study is: How does the affordable power alternative affect the financial outcomes of local vendors in the Danko/Wasagu LGA. To answer this, the study sets out the following objectives: to examine the extent to which affordable power alternatives reduce operational costs for local vendors; and to assess the impact of such energy solutions on revenue generation and profit margins which lead to business growth and sustainability among local vendors.

Ultimately, the study contributes to the growing body of knowledge on energy access and rural entrepreneurship by providing localized evidence on how clean and cost-effective power alternatives can be leveraged on to improve financial outcomes and support inclusive economic development in underserved communities.

REVIEW OF LITERATURE AND THEORETICAL FRAMEWORK

This section presents the intellectual contributions of scholars with a view to understanding the existing state of knowledge.

Concept of Affordable Power Alternatives

In recent years, a range of affordable power solutions have emerged, particularly in off-grid and under-electrified areas. Solar home systems, portable solar-powered lanterns, and community micro-grids offer cost-effective and scalable options. Compared to diesel generators. These alternatives are quieter, cleaner, and more economical over time. The role of Non-Governmental Organizations (NGOs), development agencies, and microfinance institutions have been instrumental in financing and distributing these technologies to informal vendors.

Affordable power alternatives can be described as energy sources that are economically accessible to a broad population while also being reliable and sustainable. Sovacool (2012) conceptualized affordable power alternatives as energy solutions that minimize cost barriers for consumers and are accessible to both urban and rural populations. This idea emphasizes decentralising renewable energy (like solar home systems and mini-grids) as affordable alternatives in rural Asia. But International Renewable Energy Agency (2021) advanced that renewable energy sources like solar, wind, hydro, and biomass are the most considered affordable energy sources that remain relevance over a long term due to declining costs and low operating expenses. However, some reports have highlighted a significant drop in renewable energy costs, making them more affordable than fossil fuels in many regions.

UNDP (2016) opined that affordable power alternatives are integral part to achieving energy equity and Sustainable Development Goals (SDG 7 - Affordable and Clean Energy). The UNDP frames affordability within a larger policy context, connecting energy access to economic and social development. Jacobson et al. (2017) viewed that the concept of affordable power alternatives could be traced to technological innovation developed mainly for cost reduction and ensuring effectiveness. This technology can be in the form of innovations in storage, smart grids, and decentralized systems that contribute to affordability of power alternatives.

Furthermore, electricity is believed to be essential for the efficient operation of businesses. For informal vendors, energy access enables longer operating hours, improved product storage (especially for perishable goods), and the use of tools and equipment that enhance productivity. For instance, vendors who can refrigerate drinks or preserve food often observed higher sales. Night market sellers using solar lanterns can extend business hours and attract more customers, directly impacting daily revenue.

Concept of Financial Outcomes

Access to affordable power has a direct impact on the financial performance of informal vendors. With electricity, vendors can reduce reliance on costly fuels like kerosene or diesel, lowering their operational costs. Extended business hours and improved service delivery contribute to increased sales and higher daily income.

Additionally, savings generated from lower energy costs can be reinvested into the business, facilitating growth and diversification.

The concept of financial outcomes generally refer to the results of financial activities, often measured in terms of profitability, Return on Investment (ROI), liquidity, solvency, and overall financial performance. Scholars interpreted financial outcomes in different contexts such as corporate finance, healthcare, education, and development.

According to Kaplan and Norton(1992), financial outcomes are indicators of a firm's financial health, typically including metrics like net income, earnings per share, return on equity, and cash flow. Financial outcome is one of the four critical perspectives in performance measurement, used to evaluate profitability and shareholders' value.

Financial outcomes refer to the cost-effectiveness and its economic impact on the wider economy, often measured against quality outcomes (Drummond et al., 2015). The financial outcomes of most business are mostly evaluated using cost-benefit, cost-effectiveness, and cost-utility analysis. Banerjee et al. (2015) posit that in development and microfinance, financial outcomes refer to changes in business income, savings, and investment behaviour resulting from financial services access. Financial outcomes from microcredit were modest and varied, suggesting the need for broader impact assessment.

Lusardi and Mitchell (2014) perceived financial outcomes as referring to individual-level results from financial literacy, such as improved budgeting, reduced debt, or increased savings. However, financial literacy significantly affects personal financial outcomes such as retirement planning and wealth accumulation through business engagement.

Overview of Informal Economies

Informal economies are characterized by unregistered and unregulated economic activities. Vendors in this sector typically operate small-scale businesses with minimal capital and face challenges such as lack of infrastructure, limited access to finance, and regulatory exclusion. Despite these obstacles, informal vendors contribute significantly to employment and GDP in many developing countries. Their success however, is often constrained by the lack of reliable energy, which affects their productivity and profitability.

The concept of informal vendors also known as informal traders or street vendors is widely studied in urban environs, development economics, and sociological settings. Scholars generally view informal vendors as economic agents operating outside formal regulatory frameworks, often due to barriers like poverty, unemployment, or restrictive regulations.

Informal economics, otherwise known as urban economies is defined by Bromley (2000) as Informal vendors or individuals who sell goods or services in public spaces without formal business registration, licenses, or regulation. Bromley views informal vending as a crucial survival strategy for the urban poor, especially in developing countries, and argues for more inclusive policies.

Vendor operators are part of the informal economy, providing employment and income, especially where formal job opportunities are scarce (Chen, 2007). Chen emphasizes the interdependence of the informal and formal sectors, arguing that informal vendors contribute significantly to local economies.

Bénit-Gbaffou (2016) viewed Informal vendors as a social and spatial dynamics, defining informal vendors as actors who reshape urban space through every day practices, often navigating conflict with local authorities. Informal vendors challenge dominant narratives of urban order and raise questions about inclusion, citizenship, and urban justice. In addition, Roever and Skinner (2016) while relating the concept of informal vendors to economic regulation and policy responses advanced that Informal vendors are often marginalized by policies that seek to formalize or remove them in the name of order, hygiene, or aesthetics.

The Role of Energy Access in Economic Empowerment

Energy access refers to the availability, affordability, reliability, and sustainability of modern energy services particularly electricity and clean cooking solutions for households, enterprises, and communities.

According to the International Energy Agency(2017), energy access deals with having reliable and affordable access to clean power facilities, a first connection to electricity, and then an increasing level of electricity consumption over time to reach the regional average. Hence, access to energy is a fundamental enabler of development, influencing business, education, health, security, and economic productivity.

Economic Empowerment

Economic empowerment refers to the process by which individuals or communities increase their capacity to make economic decisions, improve their income levels, access productive assets, and reduce poverty. Kabeer (2005) buttresses that economic empowerment is the ability to make choices and transform those choices into desired actions and outcomes related to economic well-being and livelihood. This includes employment, access to credit, ownership of productive resources, and entrepreneurship.

Link between Energy Access and Economic Empowerment

i. Enhanced Entrepreneurial Activities: Access to electricity enables small and medium-sized enterprises (SMEs), especially in the informal sector, to run productive equipment (e.g., sewing machines, refrigeration, and grinding machines) for longer hours. This increases output, reduces manual labour, and improves profitability (ESMAP, 2020).

ii. Job Creation: Energy access creates employment in both energy-related sectors (e.g., solar installation) and energy-enabled businesses (e.g., agro-processing, welding). Electrified urban and rural areas have been found to attract more businesses, leading to increased local employment (Modi et al., 2005).

iii. Income Diversification: Households with energy access often engage in income-generating evening activities such as phone charging, soap making, or tailoring that are not possible without lighting and power (Peters et al., 2011).

iv. Women's Economic Inclusion: Energy access plays a transformative role in women's economic empowerment by reducing time spent on unpaid labour (e.g., firewood collection), facilitating access to information through media, and enabling home-based enterprises (UNDP, 2012).

v. Improved Agricultural Productivity: In rural areas, energy powers irrigation pumps, mills, dryers, and cold storage facilities, reducing post-harvest losses and enhancing food security and income generation for farmers.

vi. Empirical Evidence: A study by Van-Gevelt (2014) in Sub-Saharan Africa found that off-grid solar energy solutions significantly increased household income and reduced energy expenditure.

In addition, Kanagawa and Nakata (2008) observed that rural electrification in developing countries significantly boosts GDP per capita by enabling entrepreneurship and industrialization. Therefore, energy access is not just a technological input; it is a critical enabler of economic empowerment, particularly for marginalized and rural populations. Its role in fostering entrepreneurship, employment, financial outcomes and income diversification, and gender inclusion underscores its importance in poverty reduction and sustainable development agendas.

Theoretical models and Framework

There are several theories propounded by various scholars in related field with a view to explaining the connection between available and affordable sources of power and income generation among vendors operating in local economies. In this section, four relevant theories are presented each with a divergent view on power affordability and financial income of vendors in local economies as highlighted below.

The Sustainable Livelihoods Framework (SLF) analyzed how informal vendors use different types of capital (human, financial, physical including electricity) to improve their well-being. The SLF theory was propounded by Chambers and Conway (1992) with a view that access to affordable power is a form of physical capital that can enhance their income-generating activities. Modi et al. (2005) postulated in his Energy Access and Development Theory that improved access to energy (especially affordable and renewable sources) is strongly linked to economic development, especially in informal sectors of developing economies. Similar notion was advanced in Capability Approach which was propounded by Sen (1999) that access to affordable energy enhances people's capabilities, determining their real freedoms to achieve desired outcomes. This enables better business outcomes and improve in the quality of lives particularly on informal vendors. However, Isenberg (2011) propounded the "Entrepreneurial Ecosystem Theory" which put forth that affordable power alternatives are part of the infrastructure that supports local vendors (entrepreneurs) in achieving business growth, financial income and sustainability.

Despite the fact that these theories have strong propositions on power affordability, sustainability, flexibility, and income generation in the local economic business practices, this study adopts Entrepreneurial Ecosystem Theory for its direct link with the phenomenon in question (alternative power sources/usages and financial outcomes) considering how vendors operate in local economies like Danko, Kyabu and Maga (Danko Chieftaincy Area). This further explains the significance of these sources of powers, its affordability and opportunity for financial gain to rural vendors' specifically in achieving a sustainable business practice. This underscores the yardstick for determining the payment rate to acquire these power alternatives as well as the financial gains that could likely be attributed to these businesses.

These propositions have justified linking the theory to local economic context which often faces the constraints of formal power supply. However, this indicates that those businesses with the wherewithal to afford the said power energy (Solar energy, generator backed power and Mini-grid systems) thrives in their business pursuits (gain high financial outcomes such as profit increase, cost reduction, and growth in sales) than those lacking behind.

Review of Empirical Studies

This section reviews empirically conducted studies of previous scholars in the related field. This review covers geographic relevance (Africa, Nigeria), types of vendors or sectors (retail, food, services), and type of power alternatives used (solar, generators, hybrid) while observing financial performance such as profit increase, cost reduction, and growth in sales.

Grogan and Sadanand (2013) studied electricity and informal employment in India. The study found out that households with access to reliable electricity were more likely to engage in informal income-generating business activities, especially women operating home-based businesses. Lee and Wolfram (2020) conducted research on Solar Mini-Grids and Village Economies in Tanzania. The findings revealed that affordable solar mini-grids led to the creation of new informal businesses and increased income for existing vendors. Similarly, Van-Gevelt (2014) in Sub-Saharan Africa found that off-grid solar energy solutions significantly increased household income and reduced energy expenditure. These studies highlighted the significance of solar energy in creating business-customer service. The studies underscore the relevance of commitment to maintaining daily financial income ensuring operational efficiency and business continuity.

Alstone et al. (2015) conducted research on impact of energy on productivity of informal markets. Findings from the study revealed that street vendors and market traders used energy-efficient lighting and appliances (solar or rechargeable) in recording higher evening sales and longer operating hours. Similar to Kudo et al. (2017) in their study on microenterprise performance in Kenya found out that off-grid solar energy improved productivity, extended working hours and increased incomes for informal vendors and small businesses. This study also reported spillover effects on home-based microenterprises using the same solar devices. However, Ojokoh and Afolayan (2020) examined solar energy and small businesses in Nigeria. The study revealed that use of solar powered energy helped Nigerian informal businesses lower operational costs and increase sales, especially for market-based vendors and hair salons, recording a support for small business owners.

In Grogan and Sadanand (2013) study, findings depicted that access to reliable and affordable electric power and energy has increased income generating activities in many communities. Implying that formal electric power supply has the tendency to serve household made stalls and businesses alike due to its efficiency. This view does not correspond with that of Van-Gevelt (2014); and Alstone et al. (2015) whose findings were off grid solar system energy including solar rechargeable: increased street vendors and market traders' income, reduced energy expenditure and recorded high sales and longer operating hours.

In addition, Kudo et al. (2017); and Ojokoh and Afolayan (2020) similarly found that affordable power alternatives such as solar grid system, hybrid and renewable energies have improved productivity, business sustainability and financial appreciation. However, Lee (2020) noted that the use of these alternatives power options have led to the creation of new business, efficient management of the existing ones and found to be financially rewarding. These studies present inadequate contextual, geographical as well as methodological gaps which need to be addressed by the current study.

RESEARCH METHODOLOGY

Research Design

This study employed a mixed-methods approach combining quantitative surveys and qualitative interview to capture both measurable financial changes and contextual experiences in the businesses.

Sample Size and Sampling Procedure

The study has a population of 274 vendors who use one form or mixed sources of power apart from the national grid (electricity) in their daily business operations. This was as a result of the survey carried out across three communities in Danko Chiefdom (Danko, Maga, and Kyabu). The study's sample size was determined by Krejcie and Morgan (1970) formula for calculating sample size from the survey population thus:

$$S = \frac{X^2 \text{ x } N \text{ x } P \text{ x } (1 - P)}{d^2 \ (N - 1) + \ X^2 \text{ x } P \ (1 - P)}$$

Where:

S = Sample size

N = Population size (274)

P = Population proportion (0.5 given)

d = Margin of error (usually 0.05)

X2 = Chi-square value for 1 degree of freedom at the desired confidence level (for 95% confidence level, X^2=3.841).

Hence:

$$S = \frac{3.481 \text{ x } 114 \text{ x } 0.5 \text{ x } (1 - 0.5\ )}{0.05^2(114 - 1) + \ 3.481 \text{ x } 0.5 \ (1 - 0.5)}$$

S = 153.5

S ≈ 154

Hence, 154 is the sampled respondents. Stratified random sampling technique was used to ensure adequate representation by gender, type of trade, and access to power alternatives.

Data Collection

A survey using closed-ended questions is used to collect data on daily incomes, expenses, and hours of operations, and energy use before and after adopting affordable power alternatives. Furthermore, an in-depth interview that explored vendors' experiences, perceptions of power access, and coping strategies were also conducted.

Data Analysis Technique

Descriptive and inferential statistical tools like simple linear regression analysis, and response assessment through percentages were used to analyse the study's data (quantitative survey and qualitative interview). Thus, regression model was used with the aid of SPSS version 26.0 to analyse the quantitative data obtained through structured questionnaire, while qualitative data collected through interview were thematically coded using NVivo to identify recurring patterns and narratives, estimating the effect of power alternatives on financial income of informal vendors, operating hours, and operational efficiency. Reliability of the data was carried out using Cronbach alpha and Composite reliability value of 0.70 and above and 5.0 and above respectively. In addition, convergent validity was measured on the Average Variance Extracted (AVE) value of 0.5 and above acceptable threshold.

RESULTS AND DISCUSSIONS

This section presents and analyses the data collected.

Quantitative Analysis

Table 1: Descriptive Analysis and Correlation Matrix

Variables	N	1 2	M	SD
Power Alt.	154	- 1	3.85	0.72
Fin. Perf.	154	0.62 1	3.92	0.81

Source: SPSS output, 2025

Table 1 presents descriptive statistics for the dependent variable (Financial performance) and the independent variable (Affordable Power Alternatives). The result therein indicates that respondents generally reported moderate to high scores on both constructs, with acceptable variation across items. The affordable power alternatives composite was positively and significantly correlated with the financial outcomes composite ($r = .62$, $p < .001$), suggesting that improvements in energy affordability is associated with stronger financial performance among vendors.

Table 2: Construct Reliability and Validity

Latent Variable	Cronbach Alpha Value	Composite Reability (rh0-a)	Average Variance Extracted (AVE)
Power Alt.	0.84	0.629	0.581
Fin. Performance	0.88	0.737	0.137

Source: SPSS-output, 2025

Composite Reliability and Average Variance Extracted (AVE) were assessed to establish construct validity as analysed in Table 2. However, in determining internal consistency, Cronbach's alpha was computed. The financial performance construct yielded a Cronbach's alpha of 0.88, indicating high reliability. On the other side,

the affordable power alternatives construct recorded an alpha of 0.84, also exceeding the recommended 0.70 threshold (Nunnally, 1978). In addition, the Table presents Average Variance Extracted (AVE) which assesses the convergent validity of the latent variable. Convergent validity revealed the extent to which items within a given variable relate to one other and how they measure the same underlying concept (0.581 considered normal while 0.137 low). This means that 58.1% of the variance in the indicators measuring affordable power alternatives is explained by the construct itself, and 13.7% of the variance is explained by the financial performance construct thus, the majority is due to measurement error. This usually happens as a result of low factor loading from the indicators, multidimensional constructs or items which are assumed to be reliable but conceptually cohesive (Pirouz, 2006). Hence, convergent validity is established for affordable power alternatives but is inadequately established for financial performance.

In terms of composite reliability, the two variables showed a relatively composite reliability, with financial performance and alternative power options having 0.737 and 0.629 respectively.

The results herein showed that the study's latent variables exhibited a strong construct reliability, and satisfactory convergent validity, suggesting that the variables are valid and reliable.

Table 3: Coefficient of Determination Score

Latent Variable	R-square	Adjusted R-square
Fin. Outcome	0.38	0.37

Source: SPSS output, 2025

R-square indicates the proportion of variance explained by the predictors; Adjusted R-square accounts for sample size and number of predictors. Therefore, with 0.38 as in Table 3 suggests that affordable power alternative has accounted for 38% variation in financial performance of informal vendors. This means that the remaining 62% of the variation may be attributed to other factors not captured in the model. Overall, the result indicates that the model has reasonable explanatory relevance in explaining outcomes among informal vendors.

However, the adjusted R-square value of 0.37, which is marginally lower than R-square value of 0.38, showed that after adjusting for sample size and number of predictors, the model still explains approximately 37% of the variation in financial performance. The minimal difference between R-square and adjusted R-square suggest that the model is stable and not over fitted.

Table 4: Regression Results

Predictor	N	Stand. Err.	β	t-statistics	P-value
Constant	154	0.19	1.24	6.53	0.000
Fin. Perf.	154	0.07	0.62	8.21	0.000

Source: SPSS output, 2025

In determining the statistical relationship between affordable power alternative and financial performance of informal vendors, Table 4 presents analysis thus: t-statistics value (8.21) was found to be greater than the recommended threshold (±1.96), while the p-value (0.000) was discovered to be less than the recommended threshold (0.05), indicating that affordable power alternatives significantly affect the financial performance of informal vendors in Danko/Wasagu Local Government Area, Kebbi State of Nigeria. However, with the coefficient value (β=0.62), this further indicates that the extent of the effect is high and positive.

Qualitative Analysis

Table 5: Analysis of Qualitative Data (Responses from Interview)

Research Question	Response Category	Frequency	Percentage (%)
How has affordable power helped your business?	To meet up with daily operations	67	43.5
	Improved financial performance	87	56.5
Would you recommend affordable power solutions? Why?	Yes – efficient and effective	104	67.5
	No – expensive and lacks guarantee	50	32.5
Has your income changed since switching to alternative power?	Yes – by 10% and above	125	81.2
	No – no positive change	29	18.8
Do you use electrical equipment that require reliable power?	Yes	49	31.8
	No	105	68.2
Have you switched to a more affordable power source in the past 12 months?	Yes	88	57.1
	No	66	42.9

Source: Field Responses, 2025

The qualitative evidence reinforces the quantitative results. Most respondents (56.5%) noted that affordable power alternatives improved financial performance, while 43.5% highlighted operational support. Additionally, 81.2% reported income growth of 10% or more since adopting affordable power alternatives, consistent with regression findings that energy affordability drives financial performance.

DISCUSSION OF FINDINGS

Based on the empirical evidences, the study's results revealed that affordable power alternatives significantly improve financial outcomes among informal vendors. In the study area (Danko/Wasagu LGA), informal vendors with access to cheaper and more reliable energy sources often reports higher financial performance, likely due to reduced operating costs and extended business hours. These results was further supported by evidences from qualitative output indicating that affordable power alternatives such as solar grid systems, power plant mini systems, and other forms of renewable energy systems as alternatively used by local vendors in the study area have improved their financial performance and have strongly support the operationalization of their businesses.

The qualitative assessment (output) that buttressed the findings, revealed that 80.9% of those who use affordable power alternatives in area characterized by the total absence of formal power system (electric power and energy) particularly Danko/Wasagu LGA communities often report daily income of 10% or more, this is also consistent with the quantitative side, (regression analysis) confirming a positive, significant relationship ($\beta = 0.62$, $p < .001$), with affordable power alternatives accounting for 38% of the financial outcomes variance. Hence, this convergent evidence has reaffirmed the findings therein.

These results in addition, coincide with prior researches such as Kumi (2017); Aklin et al. (2018); and Arxiv et al. (2024), which underscored the role of affordable energy in stimulating local economies, enhancing financial performance in various businesses and fostering entrepreneurial resilience. The strong reliability of the constructs (Cronbach's alpha > 0.84) has further supported the robustness of the findings.

From a policy perspective, the study highlights the significance of expanding access to affordable and sustainable formal energy sources for financial performance of informal vendors in local economies. Doing so will not only improve individual financial performance, but will also strengthen broader economic activities that foster resilience and overall economic development.

CONCLUSIONS AND RECOMMENDATIONS

The study has succeeded in affirming the quintessence of affordable power alternatives in transforming informal vendors' businesses through improving productivity, extending business service hours, reducing operational costs, and enhancing financial outcomes which contribute to the vitality of the local economies. To maximize its effect on wider coverage, stakeholders should focus on expanding access through financing mechanisms, supportive policies, and capacity-building initiatives. Ensuring energy solutions are inclusive, scalable and sustainable. These will be most effective ways to unlock the full potential of informal vendors in economic development.

Although some technicalities and lack of literacy may limit the effective utilization of opportunities attach to local economies as some regions lack supportive policy frameworks or infrastructure for clean energy deployment however, coordinated efforts among governments, private sector players, and civil society organizations can address it particularly, if well devised and structured.

Limitations of the Study

Despite the contributions of this study to understanding the relationship between affordable power alternatives and financial performance of informal vendors, some limitations should be acknowledged.

The study adopted a cross-sectional research design, which captured respondents' perceptions at a single point in time. Consequently, the study is limited in its ability to establish causal relationships between affordable power alternatives and financial performance, as changes over time were not observed. Furthermore, although affordable power alternatives significantly influenced financial performance, the model explained only 38% of the variation in financial outcomes. This indicates that other relevant factors, such as access to finance, managerial capability, market conditions, and government policies, were not included in the model. Finally, the study examined only one explanatory variable, which may not fully capture the complex dynamics between energy access and business performance.

Suggestions for Further Studies

Based on the findings and limitations of this study, the following suggestions are proposed for future research.

Future studies should employ a longitudinal research design to examine the long-term effect of affordable power alternatives on financial performance. This would provide stronger evidence regarding causality.

Researchers are encouraged to extend the scope of future studies to include formal SMEs and larger enterprises to enable comparative analysis and enhance the generalizability of findings.

Further research should incorporate additional explanatory variables such as access to credit, technological adoption, entrepreneurial skills, and regulatory support to improve the explanatory power of the model.

Lastly, future studies may explore the role of policy and institutional frameworks, including government incentives, public–private partnerships, and energy financing mechanisms, in promoting sustainable energy adoption among informal businesses.

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