EMPOWERING WOMEN ENTREPRENEURS IN RIVERINE AREAS OF NIGER DELTA DEVELOPMENT THROUGH ACCESS TO FINANCE AND RENEWABLE ELECTRICITY

Kayode David KOLAWOLE
Department of Finance, Faculty of Management Sciences, University of Ilorin, Nigeria
kolawole.kd@unilorin.edu.ng

Muftau Adeniyi IJAIYA
Department of Finance, Faculty of Management Sciences, University of Ilorin, Nigeria
muftau@unilorin.edu.ng

Oyebola Fatima ETUDAIYE-MUHTAR
Department of Finance, Faculty of Management Sciences, University of Ilorin, Nigeria
etudaiye.mf@unilorin.edu.ng

AbdulrazaqTaiye JIMOH
Department of Finance, Faculty of Management Sciences, University of Ilorin, Nigeria
jimoh.at1@unilorin.edu.ng

OluwayomiOmotayo OLOTA
Department of Business Administration, Faculty of Management Sciences, University of Ilorin, Nigeria
olota.oo@unilorin.edu.ng

Samuel Oluwapelumi OLOFINLADE
Department of Finance, Faculty of Management Sciences, University of Ilorin, Nigeria
olofinlade.soo@unilorin.edu.ng
*Corresponding author: Kolawole Kayode David; kolawole.kd@unilorin.edu.ng

DOI:https://doi.org/10.64633/wissj.v10i3.29

Abstract

The study examined Empowering Women Entrepreneurs in Riverine Areas of Niger Delta development through Access to Finance and Renewable Electricity. Data used in the study was sourced through primary source which obtained from distribution of questionnaires of four hundred and twenty-seven (427) to women entrepreneurs in Riverine area of Niger Delta. Partial least squares structural equation modeling (PLS-SEM) technique was used to analyzed the data obtained for the study. The findings of the study revealed that commercial bank loan, microfinance bank loan and government financial support have significant impact on empowering women in riverine area of Niger Delta Nigeria. The findings of the study further revealed that solar and hydropower has significant impact on empowering women in riverine

area of Niger Delta Nigeria. The study concluded that access to finance and renewable electricity have significant impact on empowering women in riverine area of Niger Delta Nigeria. The study recommended that government should improve the financial support to women entrepreneurs in riverine area of Niger Delta Nigeria.

1. Introduction

Women are of the same importance as men in the growing of an economy. According to Gupta and Singh (2024), women is one of the backbones of any nation as they also help in creating employment opportunities, improving national income and enhancing economic productivity. However, women in riverine areas of Nigeria face significant barriers to economic empowerment, including limited access to finance and electricity. These women hardly access loans from formal financial institutions. In addition, majority of riverine areas in Niger delta lack access to electricity; a situation that has inhibited the ability of women entrepreneurs in these communities. These challenges disproportionately impact their ability to start and grow successful businesses, thereby hindering their overall socioeconomic development (Shavadze, 2024). Furthermore, empowering women entrepreneurs in the riverine areas of the Niger Delta is crucial for sustainable development, particularly through enhanced access to alternative sources of finance and renewable energy. Providing microfinance options and cooperative lending models can help women to secure the necessary capital to start and expand their businesses, fostering economic independence and community resilience. Simultaneously, integrating renewable energy solutions, such as solar power, can significantly reduce operational costs and improve productivity by ensuring a reliable electricity supply (Kato, 2023). This dual approach not only supports women-led enterprises but also promotes environmental sustainability, creating a more inclusive and prosperous economic landscape in the Niger Delta.

Women entrepreneurs in the riverine areas of the Niger Delta encounter systemic challenges that inhibit their economic empowerment, including limited access to loans from formal financial institutions and a lack of electricity, which hinders their ability to establish and grow successful businesses. Inadequate funding and poor electricity supply have over the years been unsurmountable problems to women entrepreneurs in the riverine areas of the Niger Delta. Formal financial institutions often view their businesses as vulnerable and high-risk, leading to high interest rates and stringent collateral requirements that make it difficult for women to secure necessary funding. This systemic bias perpetuates economic stagnation and limits their ability to grow their enterprises, contributing to a cycle of poverty and gender inequality (Silva, &Klasen, 2021).

Additionally, the lack of reliable electricity in these regions exacerbates the challenges faced by women entrepreneurs, as power failures can last for months or even years (Brownson, 2023). This unreliable energy supply hinders productivity and discourages investment in local businesses. To address these issues, it is essential to explore innovative financial models and invest in renewable energy solutions, such as solar power, which can empower women and enable them to actively participate in the economic development of their communities. Hence this study explored innovative approaches to improve women's access to alternative finance models and alternative electricity channels, thereby empowering them to actively participate

in developing their immediate community economy. The next section is literature review which followed by methodology. The fourth section deals with data presentation and analysis while the section deals with conclusion and recommendations.

2.0 Literature Review

Concept of Women Entrepreneurship Empowerment

Women entrepreneurship is an important factor in the economy development, especially for the zones which face the gender question like the Niger Delta. Education, finance, renewable electricity, such assistance to empower these women can shift local economy and ensure sustainable development. Niger Delta is a region which has diverse cultural and natural endowment coupled with weaknesses like poverty, unavailable social amenities, and Health, Safety, and Environment (HSE) impact. Overcoming these difficulties through financial and energy initiatives can help women entrepreneurs get empowered and improve their livelihood and community (Bechtel, 2020).

Access to Finance

Capital is still another notable challenge to women entrepreneurs in the Niger Delta region. To start with, conventional banking channels do not empower woman or provide them with needed business attention and support, primarily because they can rarely provide collateral or embark on registered business entities. To this effect, conventional finance models of micro finance and community saving groups among others have emerged. Such models can help simplify credit accessibility in a way they differ from the traditional banking systems (World Bank, 2020). Further, accessing and managing technological finance and financial services-like, mobile money and mobile loan applications allows women, to better handle funds, create credit history and enhance financial literacy (Ojarikre, Chidera, &Aiyedogbon, 2024). The above-mentioned financial innovations liberate women through promotion of business and improvement on the finances that women can use to fund their businesses.

Availability of Electricity

Availability of electricity most especially when it is steady plays a central role in empowering women entrepreneurs. Volatility of energy supply in the Niger Delta further distorts the business development environment. The use of renewable energy sources for instance solar energy for generation of electricity is sustainable (Venukumar, Mohanlal, & Sekhar, 2023). Solar energy related projects not only offer a stable energy source but also ensures women are involved in installation, monitoring and management of energy systems a factor that improves their skill levels and self-efficiency. Therefore, such other electricity channels enhance the cost of operations and also increase prospects in growth and innovative development among women businesses.

The combination between the finance and the electricity allows woman get all the chances in different types of endeavors. Most women in the Niger Delta are involved in marketing activities like food processing, craft making and farming (Ojarikre, Chidera, &Aiyedogbon, 2024). Both the access to finance and renewable electricity helps them to improve productivity as well as expand their markets. As women adopt new technologies in their business ventures, such new businesses gain competitive advantage in the local and global markets. Further, when these activities are backed by specific training and capacity enhancement programs the over edge influence to community development is perceived.

Despite this, Niger-Delta women entrepreneurship experience is characterized by tenacity and structural difficulties. Favourable access to funds by firms and regular energy supply have been positively correlated with enhancements in commercial performance indicators, including, growth in sales revenues, profit margins and employment generation (Energia, 2020). The beneficiaries of microloan as well as renewable energy have boasted their level of confidence and business skills into their ventures to deliver improved performances. It also increases the representation of women in the business world but also provides a perfect model for emulation to the new business aspirants.

Theoretical Review

The theory of role congruity was propounded byEagly Alice and Karau Steven in 2002, this theory assumes that prejudice occurs when a mismatch is perceived among characteristics that are traditionally linked with a group. Moreover, Eagly and Karau's (2002) opined in their theory of role congruity of preconception against women leaders provides a convincing clarification for the prejudice experienced by female entrepreneurs. This hypothesis holds that prejudice against women originates from the idea that women are unfit to hold leadership roles, which are often filled by men. Men are frequently thought of as possessing characteristics such as persuasiveness, independence, belligerence, and decisiveness, whereas women are thought of as showing compassion, helpfulness, kindness, and empathy (Heilman, 2001). According to Wang et al. (2021), these prejudices reduce the efficacy of female entrepreneurs, devalue their, and heighten the danger of stereotypes (Hoyt & Murphy, 2016).

Empirical Review

Pronin et al. (2004) revealed in their study that when women are challenged with these stereotype threats, they often dissociate themselves from these treats thereby achieving greater performance.

George and Thomachan (2018) in their study conducted in India which focuses on financial inclusion and women empowerment, revealed that finance improves the activities of women through availability of loans and insurance.

In 2017, Oke, Adeyemo, and Agbonlahor conducted an empirical investigation of microcredit repayment in Southwestern Nigeria. An empirical analysis of microcredit repayment in Southwestern Nigeria is presented in this study. Data was gathered from 200 members of microfinance institutions (MFIs) in the study area using a multi-stage stratified random selection approach. The factors influencing microcredit repayment were identified using linear multiple regression. Group members of microfinance nongovernmental organisations contributed an average of 772.62 per week and borrowed an average of 23.55.25 annually. They typically pay 90% of their microcredit when it's due. The following factors were examined because they have a significant impact on repayment: income, distance between home and bank, amount of business investment, sociocultural expenses, amount of loan borrowed, access to business information, penalty for being late to meetings, cooperative society membership, number of days between loan application and disbursement, and poverty indicator. Repayment was found to be hampered by poverty. However, the study backs up conclusions about the creditworthiness of microfinance group members. According to the study, members' status will improve if they are affiliated with microfinance institutions.

The existing literature highlights the critical role of access to finance and electricity in promoting women's entrepreneurship and economic empowerment (Andriamahery, &Qamruzzaman, 2022; Kato, 2023; Ojarikre, Chidera, &Aiyedogbon, 2024). However, there is a paucity of research focusing on the specific challenges faced by women entrepreneurs in riverine areas and the strategies needed to address these challenges. This research project aims to fill this gap by providing empirical insights that can inform the design of targeted interventions to empower women in these underserved communities.

3.0 Methodology

This study adopts a quantitative research design, utilizing a survey approach. The target population is women entrepreneurs in selected riverine areas of Nigeria. The sample size was determined using the Taro Yamane (1967) formula, and a simple random sampling technique was employed to select the respondents. The sample size of the study was four hundred and twenty-seven (427) which was obtained from four hundred and ninety-eight (498) questionnaires that was distributed to women entrepreneurs in Riverine area of Niger Delta. The research instrument was a structured questionnaire consisting of three sections: demographic information, independent constructs (access to finance and access to electricity), and dependent constructs (entrepreneurial activities and business performance). A 7-point Likert scale was used to measure the variables. The validity of the instrument was established through face, content, and construct validity (using average variance extracted and discriminant validity). Reliability was assessed using Cronbach's alpha and composite reliability.

The data was analyzed using the partial least squares structural equation modeling (PLS-SEM) technique, which includes the PLS-Algorithm and Bootstrapping methods. This approach allows for the examination of the direct and indirect relationships among the variables, as well as the development of a comprehensive strategy for enhancing women's access to finance and electricity in riverine areas.

4.0 Data Presentation and Analysis

4.1 Response Rate of the Respondents

The study recorded high response rate from the respondent with over 400 observations. The result of the response rate of the respondents is presented in table 4.1 below. The study administered more than 498 questionnaires. The valid responses that were recorded was 427 giving around 86% response rate which is high enough to draw vital findings from the results of the study and to generalize from the findings of the study.

Table 4.1 Response Rate

Validity	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid Questionnaires	427	85.7	85.7	85.7
Invalid Questionnaires	71	14.3	14.3	100.0
Total	498	100	100	

Source: Field Survey, 2026

4.2 Descriptive Statistics of the Responses Relating to Research Objective One and Normality test

Table 4.2 Descriptive Analysis and Normality Test

	Mean	Standard Deviation	Excess Kurtosis	Skewness	Number of Observations Used
Microfinance Bank Loans	4.321	0.739	-0.493	-0.696	427.000
Microfinance Bank Loans2	4.293	0.675	-0.804	-0.432	427.000
Commercial Bank Loan	4.105	0.961	-1.542	-0.324	427.000
Commercial Bank Loan 2	4.398	0.756	1.100	-1.134	427.000
Cooperative Support	4.714	0.658	1.104	-2.678	427.000
Cooperative Support2	4.394	0.736	0.106	-0.956	427.000
Non-governmental Support	4.291	0.727	0.031	-0.695	427.000
Non-governmental Support2	4.239	0.656	-0.746	-0.295	427.000
Solar	4.183	0.801	-0.891	-0.481	427.000
Solar2	4.296	0.769	0.518	-0.877	427.000
Hydropower	4.429	0.732	0.668	-1.083	427.000
Hydropower2	4.297	0.752	-0.336	-0.717	427.000
Economic Empowerment	4.351	0.791	1.366	-1.168	427.000
Economic Empowerment2	4.143	0.836	1.054	-0.879	427.000

Source: Field Survey, 2026

Table 4.2 above shows the descriptive analysis and normality test result that captures the responses of the objective relating to access to finance, electricity and women empowerment. The mean score which shows the average responses from the respondents indicated that the lowest and highest average responses are 4.105 and 4.714. This shows that the responses are above average score of 2.5 for a 5-point Likert scale. Hence, most of the responses relating to access to finance, renewable energy and women empowerment are highly strongly agreed to by the respondents. Considering the standard deviation which shows the possibility of variations to the responses given by the respondents, the lowest and highest responses are well below 1. Hence, the response given by the respondents can be relied on as it has low possibility of variation. The kurtosis and skewness of the data indicated that all values are well within the +/- 1 to +/- 3 value. Therefore, the data gathered for this study is normally distributed. This implies that the data obtained for this study is statistically valid enough to be used to draw findings relating to access to finance, renewable electricity and women empowerment.

4.4 Objective and Hypothesis One Restatement

Objective: Empowering Women Entrepreneurs in Riverine Areas of Niger Delta development through Access to Finance and Renewable Electricity.

Ho1: There is no significant relationship between Access to Finance, Renewable Electricity and Empowering Women Entrepreneurs in Riverine Areas of Niger Delta development.

4.4.1 Assessment of Measurement Model

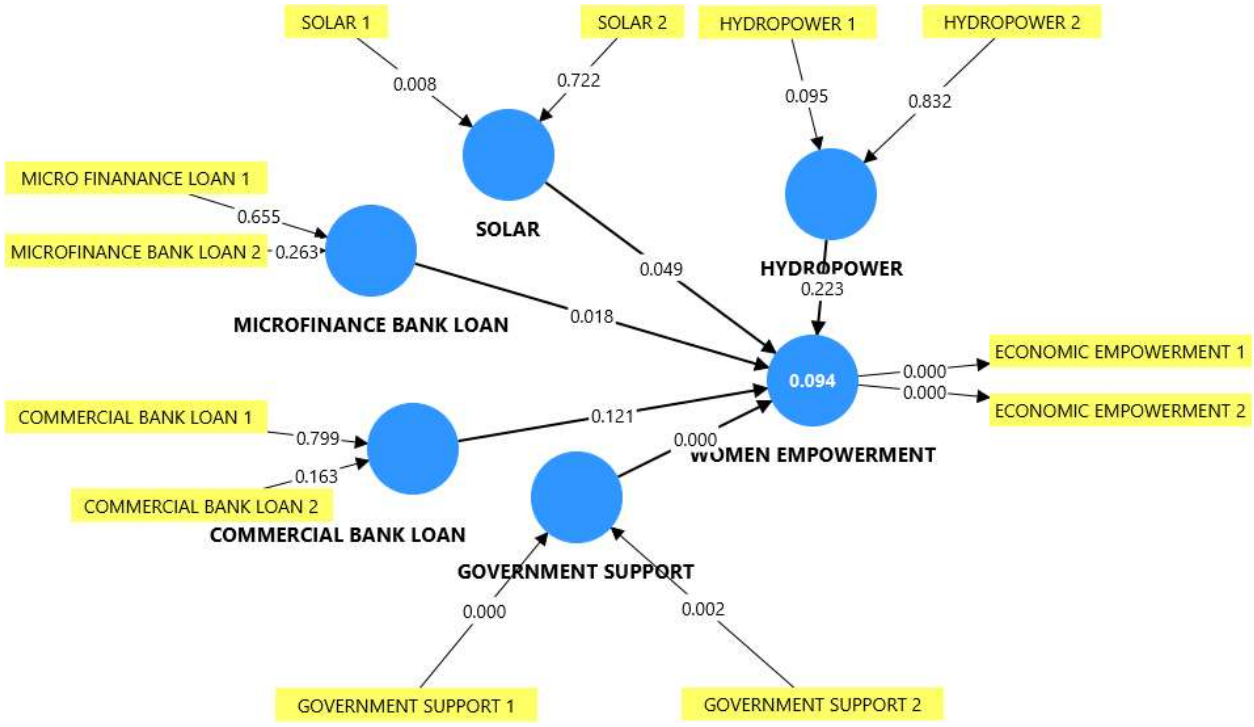


Figure 1: A path model of Empowering Women Entrepreneurs in Riverine Areas of Niger Delta development.

Source: Field Survey, 2026

Figure 1 depicts the structural relationship path model of the measures and latent variables involved in this study. The model shows clearly that all measures are fit for the study as they are all above 0.5 average loading expected of a measure. The model shows that the independent variable access to finance and renewable electricity which is broken down into five, which are, microfinance bank loan, commercial bank loan and government financial support representing access to finance as well as solar and hydropower which serves as measurements for renewable electricity. The dependent variable is women empowerment proxied by economic empowerment. This model helps for easy understanding of the relationship between access to finance, renewable energy and women empowerment.

Table 4.4 Construct Reliability and Validity

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Women Empowerment	0.989	0.990	0.990	0.880
Access to Finance	0.785	0.785	0.903	0.823
Renewable Electricity	0.947	0.949	0.966	0.905

Source: Field Survey, 2026

Table 4.4 shows the construct validity and convergent validity result of the study. The table shows that all the Cronbach alpha values for each construct are above 0.7. The rho_A values as well as the composite reliability Values are also well above the 0.7 benchmark. This validates the reliability of the construct of the study. Hence, the result of the study as well as the findings drawn on the study is reliable. Also, the average variance extracted (AVE) values are well above the 0.5 thresholds indicating that convergently, the constructs of the study measures what it purports to measure.

Table 4.5 Discriminant Validity

	Women Empowerment	Access to Finance	Renewable Electricity
Women Empowerment	0.938		
Access to Finance	0.863	0.907	
Renewable Electricity	0.892	0.872	0.951

Source: Field Survey, 2026

Table 4.5 shows the discriminant validity of the study which ensures that the construct of the study distinctively measures what is purport to measure. The result shows that all the diagonal values which are the square root of the AVE are higher when compared with itself than their correlation values with other variables. This shows that each variable considered in the study distinctly measures what it purports to measure without depending on other variables.

4.4.2 Multicollinearity

Table 4.6 Inner VIF Values

	Women Empowerment	Access to Finance	Renewable Electricity
Women Empowerment			
Access to Finance	2.137		
Renewable Electricity	2.163		

Source: Field Survey, 2026

Table 4.6 shows the multicollinearity test result using the variance inflation factor (VIF). This test the independent construct against other independent construct to ensure that no two independent variables measure the same thing. Considering the result obtained, the values are well below 5 which is the benchmark for checking for multicollinearity. This shows that the independent variables used in the study measures distinct concepts and does not measure the same thing. Therefore, there is no multicollinearity concern in the study. This helps to assess various aspects of access to finance, renewable electricity and women empowerment.

4.4.3 Assessment of Structural Model

4.4.3.1 Test of Hypothesis

Table 4.7 Bootstrapping Results Showing Path Coefficient for Structural Model

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Access to Finance -> Women Empowerment	0.775	0.774	0.021	33.253	0.000
Renewable Electricity -> Women Empowerment	0.997	0.995	0.018	54.148	0.000

Source: Field Survey, 2026

Table 4.7 shows the bootstrapping path coefficient result of the study. It presents the beta values/mean, the standard deviation of the paths, the t statistics as well as the p-values of each path which shows that significance of each path. The result above indicated that access to finance have positive and significant effect on women empowerment with T statistics of 33.253 which is well above 1.96 for a 95% confidence interval study as well as a p-value of 0.000 which is well below the 0.05 significant level threshold. Similarly, renewable electricity has significant effect on women empowerment with beta value of 0.997, t values above 1.96 and p-values below 0.05. This implies that access to finance and renewable electricity have significant effect on empowering women in riverine area of Nigeria.

Table 4.8 Coefficient of Determination Score

	R Square	**R Square Adjusted**
Women Empowerment	0.984	0.984

Source: Field Survey, 2026

Table 4.8 indicate the coefficient of determination score for the overall model of the study. This is depicted as R square (R^2). The R square value obtain is 0.984 which shows that access to finance and renewable electricity causes up to 98.4% variation in empowering women. This implies that changes in women empowerment are 98.4% caused by access to finance and renewable electricity. The R square adjusted values of 0.984 which is the same as the R square shows that the model is effective in measuring women empowerment.

Table 4.9 Assessment of the Effect Size (f^2)

	Women Empowerment	Access to Finance	Renewable Electricity
Women Empowerment			
Access to Finance	13.825		
Renewable Electricity	14.716		

Source: Field Survey, 2026

Table 4.9 shows the effect size of the study (f^2) which depicts the size of the effect that each independent variable has on the dependent variable. An effect size of or above 0.02 is considered small effect size, an effect size of or above 0.15 is considered moderate effect size, while an effect size of or above 0.35 is considered large effect size. The study shows that access to finance has effect size on women empowerment while renewable electricity has large effect size on women empowerment. This shows that solar and hydropower which are measures of renewable electricity contributes more to economic empowerment than access to finance which are measured with commercial bank loan, microfinance bank loan and government support.

5.0 Conclusion and Recommendations

The study concludes that commercial bank loan, microfinance bank loan and government financial support which are measurement for access to finance have significant impact on empowering women in riverine area of Niger Delta Nigeria. The study further concludes that renewable electricity which was measured by solar and hydropower has significant impact on empowering women in riverine area of Niger Delta Nigeria. The study therefore concluded that access to finance and renewable electricity have significant impact on empowering women in riverine area of Niger Delta Nigeria. The study recommends that government should improve the financial support to women entrepreneurs in riverine area of Niger Delta Nigeria. In addition, the banking institutions should be encouraged to finance the activities of women in riverine area of Niger Delta Nigeria. Finally, efforts should be made by government in improving supply of electricity as it was shown to impact significantly on empowering women in riverine area of Niger Delta Nigeria.

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Funding

This research is funded by the Tertiary Education Trust Fund (TETFund) Institution-Based Research (IBR) Grant. The Grant Funding Number is UIL/IBR/15.1/31. We also wish to acknowledge University of Ilorin for facilitating the grant.