

Sustainable Finance, Digital Financial Inclusion, and Inclusive Growth: Evidence from Shendam LGA, Plateau State, Nigeria

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Abstract

Sustainable finance plays a pivotal role in linking circular economy (CE) aimed with financial inclusion, especially in emerging nations. The main objective of this paper was to examine sustainable finance, digital financial inclusion, and inclusive growth: Evidence from Shendam LGA, Plateau State, Nigeria. This paper employed explanatory research design, quantitative research method and a **positivist** research philosophical thought. The population of the paper consists of 5,500 active digital financial service users in Shendam, Plateau State, Nigeria. The sample size of 410 respondents was determined using the Yamane (1967) formula at a 5% level of significance and 95% confidence interval. This paper make used of homogeneous purposive sampling technique and structured questionnaires and VB-SEM facilitated by SmartPLS 4.1.1.7. 410 structured research instruments were administered but 396 were returned representing 97%. The findings revealed that sustainable finance had a positive and significant effect on inclusive growth. Digital financial inclusion had a positive and significant effect on inclusive growth. Sustainable finance and digital financial inclusion and showed a positive and significant moderating effect on inclusive growth. This empirical paper added to existing literature by using Technology Acceptance Model **to** explain theoretical linkage between sustainable financial

practices, digital access to financial services, and inclusive economic growth. This paper offered policy direction on strengthening digital financial literacy and expanding rural fintech penetration through sustainable financing instruments. This paper showed how adopting sustainable finance models and digital platforms can improve financial access and reduce exclusion.

Keywords: Sustainable, Finance, Inclusion, Inclusive, Growth

1. Introduction

In today's economic discourse, integrating inclusive growth and sustainable financing is a crucial task. Evaluating how sustainable finance affects inclusive growth metrics entails looking at how financial operations that take environmental, social, and governance (ESG) factors into account advance socioeconomic development more broadly, especially in terms of advancing equity, lowering poverty, and improving opportunities for underserved groups (Kumar & Shobana, 2025).

Inclusive growth remains a major challenge in developing economies, with 1.4 billion adults globally unbanked and 57% of Sub-Saharan Africans financially excluded (World Bank, 2022). In Nigeria, over 40% of the population lives below the poverty line despite 2.7% annual economic growth (NBS, 2023). Sustainable finance can promote equitable growth through green investments, responsible

lending, and job creation (OECD, 2021). Digital financial inclusion via mobile banking and fintech platforms offers scalable access for marginalized populations (Demirgüç-Kunt et al., 2023). Policy interventions supporting digital finance, sustainable investments, and financial literacy are needed to maximize inclusive growth (United Nations, 2022). Sustainable finance plays a vital role in linking circular economy (CE) aims with financial inclusion, especially in emerging nations. Integrating sustainable finance into the current financial institutions enables countries to expedite the attainment of the Sustainable Development Goals (SDGs) while fostering economic development and social fairness (Taera & Lakner, 2025). The principal aim of sustainable finance is to allocate financial resources towards long-term, significant initiatives, guaranteeing that financial services are available to all demographics, especially marginalized communities. This strategy promotes economic growth while simultaneously enhancing inclusiveness and resilience, the essential components of sustainable development. The advancement of digital financial inclusion holds immense potential for facilitating the provision of efficient, affordable, convenient, and accessible financial products and services to small and medium-sized enterprises and individuals with limited income (Xia & Wang, 2023). This advancement has the potential to improve the access to financial services in underdeveloped regions, while improving the efficacy of financial services for the real economy. Khera et al. (2022) found that the large-scale application of advanced technology in the finance industry and the popularization of digital financial services are the key driving forces of financial inclusion (Khera et al., 2022). Digital financial inclusion is the mechanism through which sustainable finance influence economic growth.

2. Literature Review

Conceptual Framework

Inclusive Growth

Inclusive growth aims at assuring that the benefits of economic expansion are equitably shared among all segments of society, particularly the marginalized

and disadvantaged (Mohamed & Rady, 2022). It is an approach that goes beyond simple economic measurements; it promotes the elimination of poverty, the decrease of inequality, and the improvement of general well-being. Inclusive growth can create opportunities for different segments in the society which contributes to raising the population prosperity (OECD, 2024). Inclusive growth is an economic growth process that ensures equal opportunities and benefits for all segments of society, particularly by reducing poverty, inequality, and improving overall living standards.

Sustainable Finance

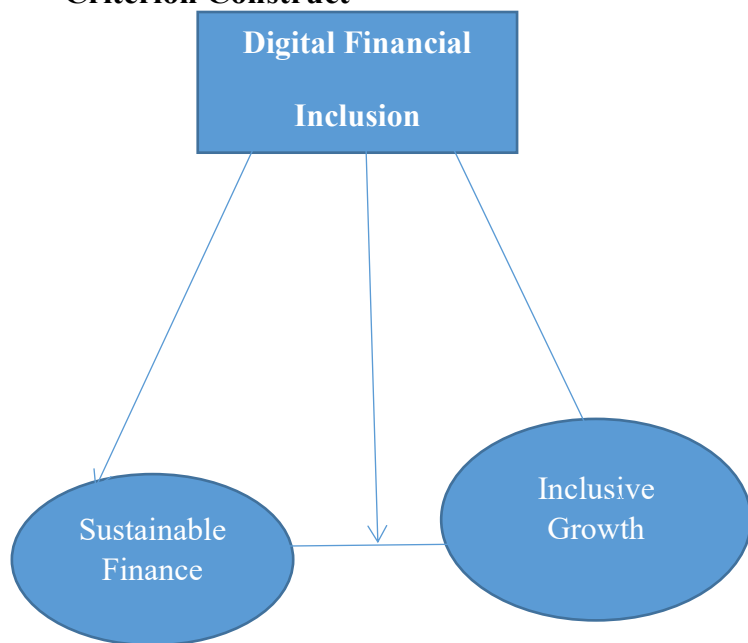
Sustainable finance refers to financial services and investment strategies that take environmental, social, and governance (ESG) factors into account when making decisions, with a focus on long-term societal and environmental benefits, as well as economic rewards. This approach is critical for developing nations, where financial institutions often struggle to support sustainable development and achieve the Sustainable Development Goals (SDGs) (Migliorelli, 2021; Aleknevičienė & Bendoraitytė, 2023). Unlike traditional finance, it prioritized long-term value creation for societal and environmental well-being. Sustainable finance refers to financial activities, investments, and policies that consider environmental, social, and governance factors in order to promote long-term economic stability, environmental protection, and social well-being.

Digital Financial Inclusion

Digital financial inclusion can be defined as achieving the goal of financial inclusion by vigorously developing digital finance to reduce the cost of financial services and expand the coverage of financial customers (Yang et al., 2022). Digital financial inclusion encompasses a variety of financial services, such as mobile payment, online loan, online insurance, online fund. On the one hand, it has expanded the coverage of financial services via the internet and established a robust financial system, especially in underdeveloped regions with scarce financial resources (Hasan et al., 2022). On the other hand, it identifies customer information through big data, reduces the potential credit discrimination of traditional financial institutions against low-income groups, and improves the risk control ability of the

finance industry (Tantri, 2021). Therefore, digital financial inclusion can provide more convenient and effective financial services for all strata and groups of society. This is conducive to improving the efficiency of financial services for the real economy and sharing the fruits of economic development for all. Digital financial inclusion is the use of digital technologies and platforms to provide affordable, accessible, and convenient financial services to underserved and unbanked populations.

Predictor Construct **Contingent Construct**
Criterion Construct



A Model of Conceptual Framework

Source: Researcher's Conceptualization (2026)

Empirical Review

Sustainable Finance and Inclusive Growth

Kumar and Shobana (2025) examined the complex relationship between sustainable finance and inclusive growth, specifically targeting the connection between financial markets and social equity. The study clarified how sustainable finance initiatives can facilitate inclusive growth by improving access to financial services, encouraging responsible investment practices, and promoting equitable economic development through a thorough review of literature, policy analysis, and empirical investigation. The research aimed to uncover

essential drivers, obstacles, and possibilities for incorporating social fairness into financial decision-making by analyzing case studies and best practices from various geographical and sectoral contexts. The project aims to evaluate the effects of sustainable finance methods on marginalised communities, vulnerable people, and underserved regions, offering insights into how financial markets might more effectively align with social justice and human rights principles. Purnamawati (2024) researched on how sustainable financial performance promotes inclusive growth when the Indonesian state is experiencing a sizeable economic impact due to the covid-19 pandemic. Independent variables used to measure inclusive growth include divisia of money, fiscal policy, and green banking, while the dependent variable is inclusive growth. Multiple regression analysis was used for statistical data on developments for the last ten years per semester. The data collection by downloading statistical information and annual financial report data and analyzed using SPSS Version 20. The study indicated that divisia of money, fiscal policy, and green banking positively affect inclusive growth. The collaboration of various elements will benefit inclusive and equitable economic growth, providing opportunities for all levels of society to take part in decision-making and the use of resources. Green banking is expected to improve its reputation in the eyes of customers for its sustainability.

HO1: There is no significant effect of sustainable finance on inclusive growth.

Digital Financial Inclusion and Inclusive Growth

In the work of Peng and Zeng (2025) explored the connection between digital inclusive finance and inclusive green growth in 270 Chinese cities from 2011 to 2021. The study used a panel dataset, individual fixed-effects models, and multiple mediation models to analyzed the results. The study findings revealed that digital inclusive finance effectively stimulates regional inclusive green growth and enhances positive transmission mainly by improving green technology innovation, increasing entrepreneurship levels, and promoting industrial structure upgrading, of which environmental-friendly technology innovation channels constitute the main contributor. The effects

of regions, administrative hierarchy of cities, financial marketization, policy support, and environmental regulation are analyzed in heterogeneity analysis. To ensure the robustness of baseline results, the study utilized two-stage least squares (2-SLS) and difference in difference (DID) approaches. Moreover, the study offers valuable insights into the environmental implications of digital financial inclusion in emerging economies. Xia and Wang (2023) assessed digital financial inclusion and quality of economic growth. The study, used China's provincial panel data, measures the quality of economic growth based on technological innovation, coordinated development, environmental protection, opening to the outside world, and people's livelihood. It verified the impact of digital financial inclusion on the quality of economic growth by utilizing the panel fixed effect model, mediation effect model, panel threshold model, and spatial Durbin model. Digital financial inclusion has a positive impact on the quality of economic growth, particularly in the eastern region and regions with high marketization. It can effectively promote the quality of economic growth by stimulating entrepreneurial vitality, and has had a positive and increasing non-linear effect on the quality of economic growth over the past few years. Moreover, digital financial inclusion can promote the quality of economic growth in neighboring regions. Therefore, the quality of economic growth can be significantly improved by expanding the coverage breadth and usage depth of digital financial inclusion.

HO2: There is no significant effect of digital financial inclusion on inclusive growth.

Moderating Role of Digital Financial Inclusion

Umar et al. (2025) examined the relationship between financial inclusion and financial stability in developing economies, with a focus on the moderating role of digital financial inclusion (DFII) and the identification of threshold effects. Using a dynamic panel analysis with a two-step System GMM estimator, the analysis covers 72 developing countries from 2012 to 2022. A composite financial stability index (FSI) is developed using Principal Component Analysis (PCA) to capture financial soundness and market depth. The inclusion

dimensions model results indicated that penetration and usability of financial services have a negative impact on financial stability (FSI). Conversely, accessibility has a positive influence on FSI. However, both indices traditional financial inclusion (TFII) and DFII in model 2 analysis revealed a negative relationship between both indices and financial stability. The results of the third moderation model show that DFII strongly moderates these TFII effects by enhancing access efficiency and transparency. A threshold effect is identified in model 5 analysis of the study, suggesting that the benefits of inclusion diminish and potentially reverse beyond a certain level. The findings suggest the need for balanced financial inclusion policies that integrate both traditional and digital financial services. Yang and Masron (2023) employed the System GMM-two step estimator and data from 118 Chinese banks from 2014 to 2021 investigate the issue. Empirical evidence suggested that banks' digital transformation has a negative impact on their profitability to some extent, but digital inclusive finance has enabled the bank to change its digital transformation behavior and enhance its operational performance. Therefore, banks must continue to strengthen their digital transformation by expanding online customer services, increasing the use of e-accounts and mobile applications, providing digital offline services, strengthening digital risk management and privacy and security controls, reducing customer psychological risk, and promoting financial inclusion. Financial inclusion should simultaneously achieve reduced financial exclusion of customers and increased financial literacy of customers. All these factors will help banks to maintain profitability by leveraging synergies with financial inclusion in the process of digital transformation.

HO3: There is no significant moderating effect of sustainable finance and digital financial inclusion on inclusive growth.

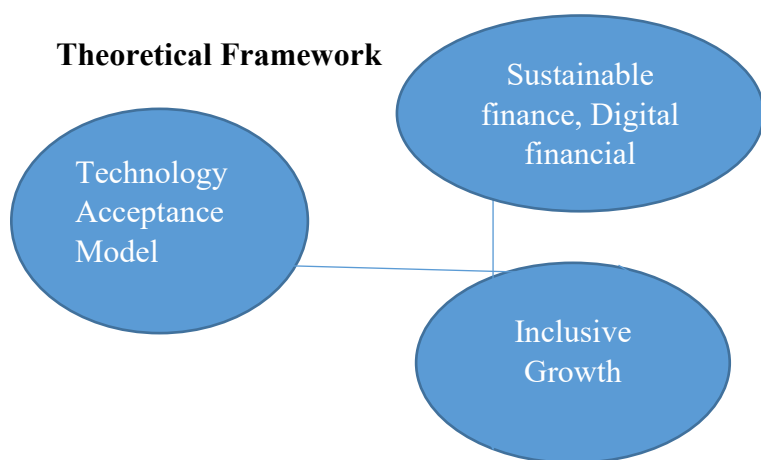


Figure 2: A Model of Theoretical Framework
Source: Researcher's Conceptualization (2026)
Technology Acceptance Model

The Technology Acceptance Model (TAM), as proposed by Davis in 1989, is backed by an emphasis on technical issues. People's behavioral goals and how they use technology are the focus of this idea. It is hypothesized that a person's actual behavior is dictated by his behavioral intent to use, which is impacted by the consumer's impression of the value of the technology. The ease of use, on the other hand, influences both attitude and perceived utility (Nadri et al., 2018). End-users' utility and user-friendliness criteria are taken into account when the TAM model is adopted (Okafor et al., 2016). The utility and perceived simplicity of use of this model influence consumer attitudes about any service. According to Evans (2018), evaluating user specifications based on perceived usefulness and simplicity of use of the

technology is more important than using other quantitative measurements.

3. Methodology

This paper employed explanatory research design, quantitative research method and a **positivist** research philosophical thought. The population of the paper consists of 5,500 active digital financial service users in Shendam, Plateau State, Nigeria (National Bureau of Statistics, 2023). The sample size of 373 was determined using the Yamane (1967) formula at a 5% level of significance and 95% confidence interval plus 10% of 373 are 37 = 410 respondents as recommended by Fox (2022) for non-response allowance. This paper make used of homogeneous purposive sampling technique, structured questionnaires measured on five Likert scale from strongly agree to strongly disagree from 5-1, anonymity of respondents as procedural remedies to common method bias and Variance Inflation Factor (VIF) as statistical remedy to common method bias. This paper was analyzed using VB-SEM including measurement model (Outer model) and structural model (Inner model) facilitated by SmartPLS 4.1.1.7. This study tested the research hypotheses by rejecting the null hypothesis (H₀) when p-value < 0.05 significance level and failing to reject the null hypothesis (H₀) when p-value > 0.05 significance level and t-test and confidence interval was used for confirmation.

Table 1: Reliability Analysis

Constructs	No. of Items	Cronbach's α	Reliability Level
Sustainable Finance (SF)	5	0.892	Good–Excellent
Digital Financial Inclusion (DI)	5	0.895	Good–Excellent
Inclusive Growth (IG)	5	0.897	Good–Excellent

Internal consistency of each construct in Table 1 was assessed using Cronbach's Alpha (α). The widely accepted threshold for acceptable reliability is $\alpha \geq 0.70$ (Nunnally, 1978), while $\alpha \geq 0.80$ is considered

good and $\alpha \geq 0.90$ is excellent. All three constructs demonstrate excellent internal consistency ($\alpha > 0.88$), well above the 0.70 benchmark. This confirms that the survey items measuring each construct are

highly correlated and reliably capture the intended latent variable, thereby validating the measurement instrument for subsequent inferential analysis.

Data Analysis Results

Data Presentation

Table 2: Response Rate

Number of questionnaire administered	No of Questionnaire Returned	No of Questionnaire not returned	Percentage of retrieval rate
410	396	14	97%

Source: Field Survey, 2026

Table 2 showed that out of the 410 questionnaires that were administered on the respondents, 396 were properly filled and returned while 14 were not returned. The 396 that were properly filled and returned represent 97 percent retrieval rate. Data cleaning was carried out determining missing values and outliers, hence, there were no missing values and outliers.

Data Analysis Results

Three demographic variables were captured: Gender, age group, and level of education. Frequency distributions are presented in Table 3.

Table 3: Demographic Profile of Respondents

Category / Group	Frequency	Percent (%)	Valid %	Cumulative %
Gender Distribution				
Male	204	51.5	51.5	51.5
Female	192	48.5	48.5	100.0
Total	396	100.0	100.0	—
Age Group Distribution				
18–25	88	22.2	22.2	22.2
26–35	117	29.5	29.5	51.7
36–45	97	24.5	24.5	76.2
46–55	59	14.9	14.9	91.1
56+	35	8.8	8.8	99.9
Total	396	100.0	100.0	—
Educational Level Distribution				
Secondary	49	12.4	12.4	12.4
Undergraduate	143	36.1	36.1	48.5
Postgraduate	138	34.8	34.8	83.3
PhD	66	16.7	16.7	100.0

Category / Group	Frequency	Percent (%)	Valid %	Cumulative %
Total	396	100.0	100.0	—

Source: Field Survey, 2026

The study surveyed 396 respondents in Table 3 with a near-balanced gender distribution of 51.5% male and 48.5% female, minimizing gender-induced response bias. The dominant age cohort was 26–35 years (29.5%), followed by 36–45 years (24.5%), with 76.2% of respondents aged between 18 and 45 years, reflecting a predominantly younger, economically active sample. The relatively low representation of respondents aged 56 and above (8.8%) is acknowledged as a potential limitation regarding generalisability to older demographics. Educationally, 70.9% of respondents held

undergraduate or postgraduate qualifications, with 83.3% having attained at least a degree-level education, indicating a highly literate and financially aware sample. This educational profile strengthens the validity of responses relating to sustainable finance, digital financial inclusion, and inclusive growth. Overall, the demographic characteristics reflect a balanced, informed, and well-positioned sample, lending credibility to the data and supporting the analytical procedures applied in the study.

Table 4: Assessment of Normality

Indicators (Observed)	Mean	Median	Observed min	Observed max	Number of observations used	Standard deviation	Excess kurtosis	Skewness	Missing Values
DL1	2.930	3	1	5	384	0.687	0.382	0.043	0
DL2	2.901	3	1	5	384	0.609	0.395	0.123	0
DL4	3.398	3	1	5	384	0.662	0.077	-0.056	0
DL5	3.263	3	1	5	384	0.662	0.259	0.136	0
DL6	3.057	3	1	5	384	0.686	-0.049	0.023	0
DT1	2.883	3	1	5	384	0.624	0.511	0.024	0
DT3	2.747	3	1	5	384	0.622	0.018	0.106	0
DT4	2.995	3	1	5	384	0.621	0.458	0.003	0
FR1	3.479	4	1	5	384	0.739	0.097	-0.258	0
FR3	3.143	3	1	5	384	0.72	0.138	-0.096	0
FR4	3.331	3	1	5	384	0.679	0.273	-0.071	0
FR5	3.474	4	1	5	384	0.692	0.275	-0.380	0

Source: SmartPLS v. 4.1.1.7

For normal uni-variate distribution, the values between -2 and +2 for asymmetry and kurtosis are considered acceptable to attest normality of data (George & Mallery, 2005). From Table 4 it is evident that values for skewness and kurtosis are in the

acceptable range hence indicating that the data are normally distributed and can be used for further analysis.

Table 5: Internal Consistency and Convergent Validity Report

Unobserved Latent Constructs	Observed Latent Constructs	Factor Loadings	Composite reliability (rho_c)	Average variance extracted (AVE)
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Digital Financial Inclusion	DI1	0.856	0.944	0.772
	DI2	0.877		
	DI3	0.878		
	DI4	0.892		
	DI5	0.889		
Inclusive Growth	IG1	0.839	0.929	0.722
	IG2	0.83		
	IG3	0.859		
	IG4	0.861		
	IG5	0.859		
Sustainable Finance	SF1	0.874	0.94	0.757
	SF2	0.886		
	SF3	0.865		
	SF4	0.853		
	SF5	0.87		

Source: SmartPLS v. 4.1.1.7

Criteria: All the factor loadings met the threshold of at least 0.708 (Hair et al., 2014). The result of this study in Table 5 showed that the threshold of

composite reliability (CR) was > 0.7 and convergent validity (AVE) was > 0.5 have been met.

Table 6: Discriminant Validity using Fornell-Larcker Criterion

Unobserved Latent Construct	1	2	3
Digital Financial Inclusion	0.879		
Inclusive Growth	0.397	0.850	
Sustainable Finance	-0.001	0.385	0.870

Source: SmartPLS v. 4.1.1.7

Fornell-Larcker criteria of discriminant validity established discriminant validity among constructs at a point where the squared AVE in the diagonal in Table 6 is greater is higher than the correlation with other constructs (Fornell & Larcker, 1981).

Table 7: Discriminant Validity using Heterotrait and Monotrait (HTMT) criterion

Unobserved Latent Construct	1	2	3
Digital Financial Inclusion			
1. Inclusive Growth	0.430		
2. Sustainable Finance	0.024	0.421	
3. Digital Financial Inclusion x Sustainable Finance	0.089	0.476	0.056

Source: SmartPLS v. 4.1.1.7

The Heterotrait–Monotrait (HTMT) in Table 7 ratio looked into the correlation between variables, paralleling the disattenuated variable score. According to Henseler et al. (2015), the threshold value of HTMT should be ≤ 0.9 . It is concluded that there was no evidence of inadequate discriminant validity.

Table 8: Discriminant Validity using Cross-Loading Criterion

Observed Latent Construct	Digital Financial Inclusion	Inclusive Growth	Sustainable Finance
DI1	0.856	0.333	-0.018
DI2	0.877	0.34	0.027
DI3	0.878	0.322	-0.016
DI4	0.892	0.376	-0.001
DI5	0.889	0.367	0.002
IG1	0.341	0.839	0.326
IG2	0.320	0.83	0.315
IG3	0.303	0.859	0.329
IG4	0.398	0.861	0.329
IG5	0.316	0.859	0.336
SF1	0.017	0.317	0.874
SF2	-0.016	0.370	0.886
SF3	0.010	0.312	0.865
SF4	-0.001	0.337	0.853
SF5	-0.013	0.333	0.870

Source: SmartPLS v. 4.1.1.7

Table 8 showed that the unobserved latent constructs such as sustainable finance, digital financial

inclusion and inclusive growth that have cross-loadings bolded greater than the coefficient not bolded. This means that the unobserved latent constructs have discriminant validity.

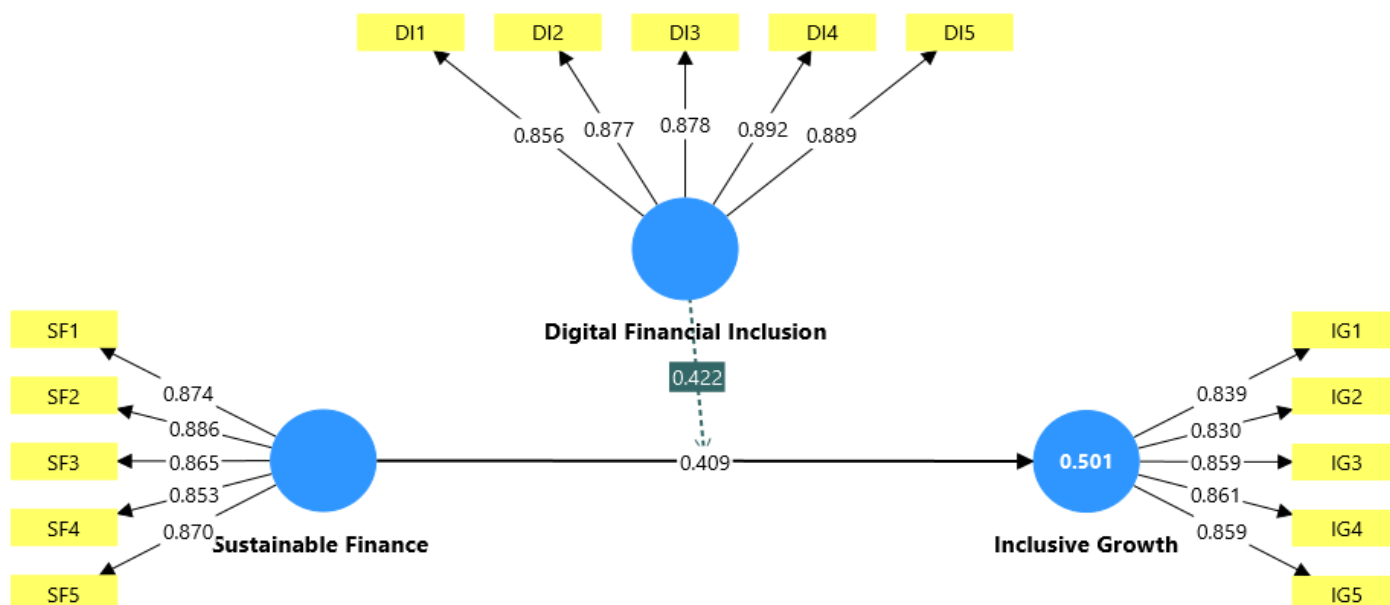


Figure 3: Structural Model
Source: SmartPLS v. 4.1.1.7

Factor loading show how well an item represents the underlying construct. According to Hair et al. (2014) indicators loading must be at least 0.708. Figure 3 showed the retained indicators of three constructs of sustainable finance, digital financial inclusion and inclusive growth. The model shows that sustainable finance (SF) has a positive and significant effect on inclusive growth (IG), with a path coefficient of 0.409, indicating a moderate direct relationship.

Digital financial inclusion (DI) is well-measured (loadings ~0.856–0.892) and explains 42.2% of its variance ($R^2 = 0.422$), while the model explains 50.1% of Inclusive Growth ($R^2 = 0.501$), showing good predictive power. The indicator loadings for SF (0.853–0.886) and IG (0.830–0.861) are all strong, confirming reliable measurement. Overall, the result suggests that improving sustainable finance significantly enhances inclusive growth, and the model has moderate-to-strong explanatory power.

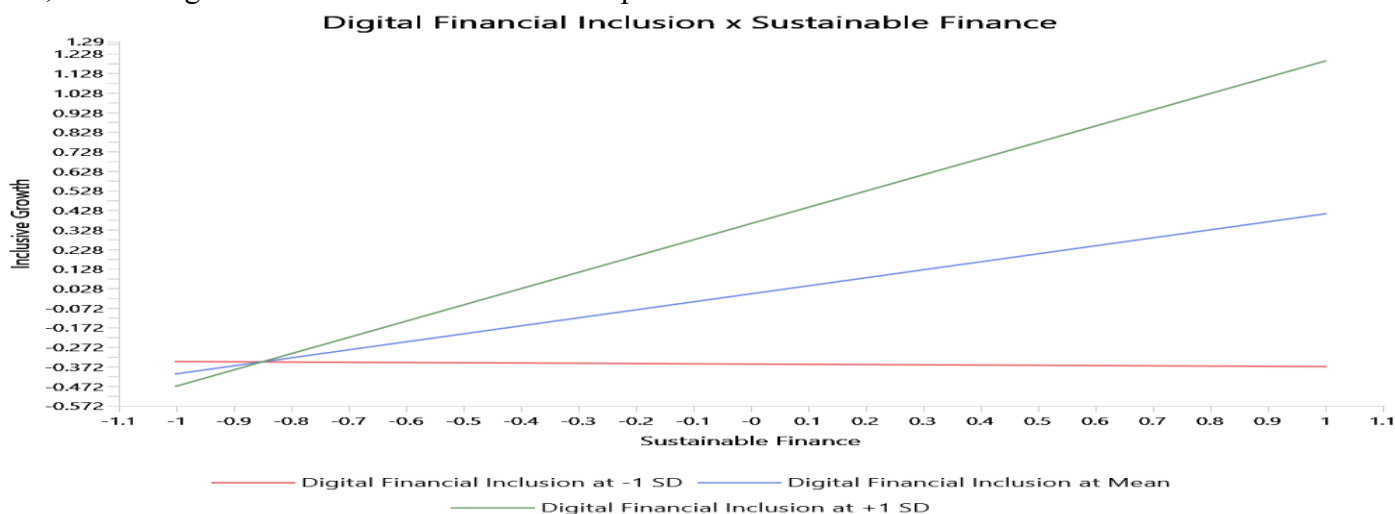


Figure 4: Simple Moderation Plot Analysis
Source: SmartPLS v. 4.1.1.7

The interaction plot in Figure 4 showed that digital financial inclusion (DI) moderates the relationship between sustainable finance (SF) and inclusive

growth (IG). In summary, as sustainable finance increases, inclusive growth also increases, but the strength of this effect depends on the level of digital financial inclusion. At high DI (+1 SD), the relationship is strongest, indicated by the steep upward slope, meaning sustainable finance significantly boosts inclusive growth. At the mean level of DI, the effect is moderate and positive. However, at low DI (-1 SD), the relationship is almost flat, suggesting that sustainable finance has

little or no impact on inclusive growth when digital financial inclusion is weak. Overall, this implies that digital financial inclusion enhances (strengthens) the positive effect of sustainable finance on inclusive growth, confirming a strong positive moderation effect.

Table 9: Assessing Path Coefficient and Direct Hypotheses Testing

Research Hypotheses	Path Relationship	B	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Lower Confidence Interval	Upper Confidence Interval
HO1	Sustainable Finance -> Inclusive Growth	0.409	0.412	0.039	10.384	0.000	0.333	0.488
HO2	Digital Financial Inclusion -> Inclusive Growth	0.359	0.359	0.039	9.205	0.000	0.282	0.435

Source: SmartPLS v. 4.1.1.7

Key: SF–Sustainable Finance; DI-Digital Financial Inclusion, IG- Inclusive Growth

Table 10: Assessing Path Coefficient and Interaction (Moderation) Effect

Research Hypotheses	Path Relationship	B	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Lower Confidence Interval	Upper Confidence Interval
HO3	Digital Financial Inclusion x Sustainable Finance -> Inclusive Growth	0.422	0.420	0.035	11.988	0.000	0.348	0.487

Source: SmartPLS v. 4.1.1.7

Key: SF–Sustainable Finance; DI-Digital Financial Inclusion, IG- Inclusive Growth

Test of Research Hypotheses

Test of Hypothesis One

The result from the path coefficient Table 9 revealed that sustainable finance had a probability value (p-value) of $0.000 < 0.05$ which implies that sustainable finance had a significant effect on inclusive growth. Therefore, the null hypothesis is rejected. The t-value **10.384** is far above 1.96, indicating a strong and

statistically significant effect. The interval 0.333-0.488 is entirely positive and does not include zero, confirmed a significant positive effect.

Test of Hypothesis Two

The result from the path coefficient Table 9 indicated that digital financial inclusion had a p-value of $0.000 < 0.05$ which implies that digital financial inclusion had a significant effect on inclusive growth. Therefore, the null hypothesis is rejected. The t-value 9.205 is extremely high above 1.96, showing a very strong and highly significant relationship. Also, the interval 0.282-0.435 fully positive indicated a strong and reliable positive relationship.

Test of Hypothesis Three

The result from the path coefficient Table 10 showed that digital financial inclusion had a p-value of $0.000 < 0.05$ which implies that sustainable finance and digital financial inclusion had a significant moderating effect on inclusive growth. Therefore, the null hypothesis is rejected. The t-value 11.988 well above 1.96, confirmed a strong and significant effect. The interval 0.348-0.487 is entirely positive and does not include zero, confirmed a significant positive effect.

Table 11: Coefficient of Determination (R^2)

Unobserved Latent Construct	R-square	R-square adjusted
Inclusive Growth	0.501	0.497

Source: SmartPLS v. 4.1.1.7

The results in Table 11 revealed that 50.1% variance in inclusive growth is explained by sustainable finance and digital financial inclusion. According to Cohen (1988), R^2 values of 0.02, 0.13, and 0.26 are considered weak, moderate and substantial

respectively. This means the variance in inclusive growth is substantial.

Table 12: Effect Size (F^2)

Unobserved Latent Construct	F^2	Magnitude
Digital Financial Inclusion	0.256	Small
Sustainable Finance	0.335	Large
Digital Financial Inclusion x Sustainable Finance	0.391	Large

Source: SmartPLS v. 4.1.1.7

Criteria: According to Cohen (1988) and Hair et al. (2019). It is assessed as; 0.02 = small, 0.15 = medium and 0.35 = large. Table 12 showed small, large and

large effect sizes of 0.256, 0.335 and 0.391 for digital financial inclusion, sustainable finance and digital financial inclusion x sustainable finance respectively.

Table 13: Collinearity Statistics

Unobserved Latent Construct	Variance Inflation Factor (VIF)
Digital Financial Inclusion	1.008
Sustainable Finance	1.003
Digital Financial Inclusion x Sustainable Finance	1.011

Source: SmartPLS v. 4.1.1.7

There is no multicollinearity in the data analysis of statistics showed that this assumption has been met

as, VIF scores in Table 13 were well below 3.3 (Statistics = 1.008, 1.003 and 1.011) for digital financial inclusion, sustainable finance and digital financial inclusion x sustainable finance respectively. Variance Inflation Factor (VIF) value should be ≤ 3.3 (Diamantopoulos & Siguaw, 2006).

This study is free of common method bias because the entire independent unobserved latent construct had VIF values less 3.3.

Table 14: Model Fit

Fit Indices	Saturated model	Estimated model
SRMR	0.038	0.036
d_ ULS	0.171	0.154
d_ G	0.088	0.080
Chi-square	204.197	186.587
NFI	0.951	0.956

Source: SmartPLS v. 4.1.1.7

The model fit results in Table 14 indicated that both the saturated and estimated models demonstrate a good overall fit. The SRMR values (0.038 and 0.036) are below the recommended threshold of 0.08, suggesting minimal residual differences and a strong fit. Similarly, the d_ ULS and d_ G values are low in both models, indicating small discrepancies between the observed and model-implied correlations. The Chi-square values show a reduction from the saturated to the estimated model, implying an improvement in model parsimony. Additionally, the NFI values (0.951 and 0.956) exceed the acceptable benchmark of 0.90, confirming a very good model fit. Overall, the estimated model provides a slightly better and more efficient representation of the data, supporting the adequacy of the model for further analysis.

Discussion of Findings

Sustainable finance had a significant effect on inclusive growth. This study agrees with the study conducted by Purnamawati (2024). The study indicated that divisia of money, fiscal policy, and green banking positively affect inclusive growth. This study also agrees with the Technology Acceptance Model (TAM), as proposed by Davis in 1989 that hypothesized that a person's actual behavior is dictated by his behavioral intent to use, which is impacted by the consumer's impression of the value of the technology. Sustainable finance to

inclusive growth had a moderate contribution with beta value of 0.409.

Digital financial inclusion had a significant effect on inclusive growth. This paper is consistent with the work of Peng and Zeng (2025). The study findings revealed that digital inclusive finance effectively stimulates regional inclusive green growth and enhances positive transmission mainly by improving green technology innovation, increasing entrepreneurship levels, and promoting industrial structure upgrading, of which environmental-friendly technology innovation channels constitute the main contributor. This paper is consistent with the Technology Acceptance Model (TAM), as proposed by Davis in 1989 that hypothesized that a person's actual behavior is dictated by his behavioral intent to use, which is impacted by the consumer's impression of the value of the technology. Digital financial inclusion to inclusive growth had the least contrition with beta value of 0.359. Digital financial inclusion and sustainable finance had a significant moderating effect on inclusive growth. This paper is in tandem with the findings of Umar et al. (2025). The results of the third moderation model show that DFII strongly moderates these TFII effects by enhancing access efficiency and transparency. This paper is also in tandem with the Technology Acceptance Model (TAM), as proposed by Davis in 1989 who hypothesized that a person's actual behavior is dictated by his behavioral intent to use, which is impacted by the consumer's impression of the value of the technology. Sustainable finance and digital

financial inclusion to inclusive growth had the highest contribution with beta value of 0.422.

Conclusion and Recommendations

The paper concluded that sustainable finance led to improvement in inclusive growth of digital financial service users. The paper also concluded that digital financial inclusion significantly led to increase in inclusive growth of digital financial service users. The study concluded that sustainable finance and digital financial inclusion promoted inclusive growth of digital financial service users.

Recommendation

The following recommendations were made:

1. Financial institutions and fintech companies should deliberately integrate Environmental, Social, and Governance (ESG) criteria into the design and delivery of digital financial products.
2. Governments and central banks should develop and enforce policy frameworks that explicitly tie digital financial inclusion targets to sustainable development outcomes. This includes creating incentive structures such as tax relief and concessional funding for financial service providers.
3. Government agencies, NGOs, and financial institutions should co-invest in targeted digital and financial literacy programs particularly for women, rural dwellers, and micro-entrepreneurs enabling them to make informed use of sustainable digital financial products.

Contribution to knowledge

This empirical paper added to existing literature by using Technology Acceptance Model to explain theoretical linkage between sustainable financial practices, digital access to financial services, and inclusive economic growth. This paper offered policy direction on strengthening digital financial literacy and expanding rural fintech penetration through sustainable financing instruments. This paper showed how adopting sustainable finance models and digital platforms can improve financial access and reduce exclusion.

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