Journal of Positive Sciences (JPS) eISSN: 2582-9351, https://positive-sciences.com JPS. 2026 Jan; 6(1): 53-65

Article info
Received on: 11.12.2025
Accepted on: 29.01.2026
Published on: 31.01.2026
doi: https://doi.org/10.52688/561242

Research Article

The Impact of Digital Financial Inclusion on Sustainable Economic Growth: A Comparative Analytical Study

Nagham Aziz Mohamad Ali

Technical Institute-Kut, Middle Technical University, Baghdad, Iraq

nagham.aziz@mtu.edu.iq

ABSTRACT

This study aims to analyze the impact of digital financial inclusion on achieving sustainable economic growth through a comparative analytical study of a group of countries that have experienced varying levels of development in digital financial technologies during the period (2018–2025). The importance of the study stems from the growing reliance on digital financial services as a key mechanism for promoting financial inclusion and achieving sustainable development goals. The study employs both descriptive-analytical and econometric approaches using Panel Data analysis to examine the relationship between digital financial inclusion indicators and sustainable economic growth indicators. Digital financial inclusion is measured through three dimensions: access to digital financial services, usage of digital payment systems, and the quality of digital infrastructure. Sustainable economic growth is measured through GDP per capita, employment indicators, energy efficiency, and carbon emission reduction. The findings reveal a statistically significant positive impact of digital financial inclusion on sustainable economic growth. However, the magnitude of this effect varies across countries according to their level of digital readiness and regulatory environment. The study recommends enhancing digital infrastructure, developing digital financial regulations, and improving digital financial literacy to ensure long-term economic sustainability.

Keywords: Digital Financial Inclusion, Sustainable Growth, FinTech, Digital Economy, Panel Data.

INTRODUCTION

Over the past two decades, the world has witnessed profound transformations in economic activities driven by the rapid advancement of information and communication technologies. These developments have given rise to the digital economy as one of the principal drivers of economic growth and sustainable development. Within this context, digital financial inclusion has emerged as a critical mechanism for expanding access to formal financial services through digital channels such as mobile banking, electronic wallets, internet banking, and digital payment platforms [1].

Digital financial inclusion represents an extension of traditional financial inclusion; however, it possesses greater capacity to overcome geographical and temporal barriers while reducing transaction costs and improving resource allocation efficiency [2]. Furthermore, it facilitates the integration of underserved and low-income populations into the formal financial system, thereby promoting savings, investment, and economic productivity [3].

At the same time, economic growth is no longer assessed solely through increases in Gross Domestic Product (GDP). Instead, the concept of sustainable economic growth has gained prominence as it integrates economic, social, and environmental dimensions to ensure that current development needs are met without compromising the ability of future generations to satisfy their own needs [4].

Consequently, examining the role of digital financial inclusion in supporting sustainable development pathways has become increasingly important [5]. The significance of this study is reinforced by the rapid expansion of financial technology (FinTech) applications and the growing use of electronic payment systems, alongside global efforts to achieve the United Nations Sustainable Development Goals (SDGs), particularly Goal 8 (Decent Work and Economic Growth) and Goal 9 (Industry, Innovation, and Infrastructure) [6].

This study seeks to investigate the relationship between digital financial inclusion and sustainable economic growth through a comparative analysis of developed and developing countries, aiming to identify how differences in economic structures and digital readiness influence this relationship [7].

*Corresponding author
Nagham Aziz Mohamad Ali,
Technical Institute-Kut, Middle Technical University, Baghdad, Iraq
e-mail: nagham.aziz@mtu.edu.iq

RESEARCH PROBLEM

Despite the widespread adoption of digital financial services worldwide, the developmental and economic outcomes of this transformation remain uneven across countries. While some nations have successfully utilized digital financial inclusion as a catalyst for economic growth and sustainability, others continue to face challenges related to inadequate digital infrastructure, low levels of financial literacy, and weak regulatory frameworks.

Accordingly, the research problem can be expressed through the following main question:

To what extent does digital financial inclusion contribute to sustainable economic growth, and does this impact vary according to the level of economic development and digital readiness among the countries under comparison?

The following sub-questions emerge from this central question:

1. What is the current level of digital financial inclusion in the selected countries?
2. Is there a statistically significant relationship between digital financial inclusion and sustainable economic growth?
3. How does this relationship differ between developed and developing countries?
4. What factors enhance or hinder the effectiveness of digital financial inclusion in achieving sustainable growth?

EXPERIMENTAL PROCEDURE

Thus, these are the steps taken to offer an effective solution to numerical solver accuracy, which is practically the stability and adaptive step-size optimization method in computational mathematics [8].

Six Cases: Applying the Gaussian Difference Continuous Distribution to Numerical Methods [9]

The study is the inquiry into the efficiency of the Gaussian Difference Continuous Distribution in these six significant behavioral mathematical analyses, of which, one addresses one of the causes of error and the other one discusses the minimizing lack of solver stability [10][11].

RESEARCH GAP

A review of the existing literature indicates that most previous studies have focused on the relationship between traditional financial inclusion and economic growth, with limited attention given to the digital dimension of financial inclusion. Moreover, many studies have measured economic growth using conventional indicators such as GDP without incorporating the environmental and social dimensions that constitute the foundation of sustainable economic growth.

Furthermore, the majority of previous research has concentrated on individual countries or specific regions. Comparative studies integrating digital financial inclusion indicators with economic, environmental, and social sustainability measures remain relatively scarce. This highlights the need for a contemporary comparative study capable of providing a more comprehensive assessment of the impact of digital financial inclusion on sustainable economic growth.

RESEARCH HYPOTHESES

Main Hypothesis (H1): There is a statistically significant positive impact of digital financial inclusion on sustainable economic growth.

Sub-Hypothesis (H1a): An increase in the use of digital payment systems contributes positively to sustainable economic growth through the reduction of transaction costs and improved economic efficiency.

Sub-Hypothesis (H1b): Greater access to digital financial services enhances investment opportunities and economic productivity.

Sub-Hypothesis (H1c): The quality of digital infrastructure strengthens the effectiveness of digital financial inclusion and improves its contribution to sustainable economic growth.

Main Hypothesis (H2): The impact of digital financial inclusion on sustainable economic growth varies according to the level of economic development and digital readiness among the countries under study.

*Corresponding author
Nagham Aziz Mohamad Ali,
Technical Institute-Kut, Middle Technical University, Baghdad, Iraq
e-mail: nagham.aziz@mtu.edu.iq

RESEARCH SIGNIFICANCE

Theoretical Significance

1. Enriching the academic literature on digital financial inclusion and sustainable development.
2. Developing a contemporary theoretical framework linking financial technology with sustainable economic growth.
3. Addressing existing research gaps in comparative studies across countries.

Practical Significance

1. Assisting policymakers in designing effective digital financial policies.
2. Supporting central banks in developing financial inclusion strategies.
3. Encouraging investment in digital infrastructure.
4. Contributing to the achievement of the Sustainable Development Goals (SDGs).

Research Objectives

1. To establish a comprehensive theoretical framework for digital financial inclusion and sustainable economic growth.
2. To assess the level of digital financial inclusion in the selected countries.
3. To analyze the relationship between digital financial inclusion and sustainable economic growth.
4. To identify the key determinants influencing this relationship.
5. To provide practical recommendations for enhancing the contribution of digital financial inclusion to sustainable development.

RECENT LITERATURE REVIEW

Study 1: Zhang & Li (2024)

Title: Digital Financial Inclusion and Sustainable Economic Development: Evidence from Emerging Economies

Objective: To examine the impact of digital financial inclusion on sustainable economic development in emerging economies.

Findings: The study found that increased use of electronic wallets and digital banking services significantly enhanced investment rates, reduced poverty levels, and improved resource allocation efficiency.

Interpretation: The findings suggest that financial technology acts as an effective intermediary between the financial sector and the real economy, thereby promoting long-term economic sustainability.

Study 2: Wang et al. (2023)

Title: Digital Finance and Green Growth Nexus [14][15]

Findings: The study demonstrated that digital finance contributes significantly to financing green projects and reducing carbon emissions.

Interpretation: Digital financial platforms facilitate the efficient allocation of capital toward environmentally sustainable investments, thereby supporting green growth.

Study 3: Khan & Ahmed (2023) [16]

Title: Financial Inclusion and Sustainable Growth in Developing Countries

Findings: The study reported a positive relationship between digital financial inclusion, GDP growth, and employment generation.

*Corresponding author
Nagham Aziz Mohamad Ali,
Technical Institute-Kut, Middle Technical University, Baghdad, Iraq
e-mail: nagham.aziz@mtu.edu.iq

Interpretation: Improved access to digital financial services enables small and medium-sized enterprises (SMEs) to obtain financing, thereby stimulating economic activity and employment.

Study 4: Demirgüç-Kunt et al. (2022) [17][18]

Title: Global Findex Database Report

Findings: Countries with advanced digital infrastructure exhibited higher levels of digital payment adoption and financial inclusion.

Interpretation: Digital infrastructure serves as a fundamental prerequisite for the successful implementation of digital financial inclusion programs.

Study 5: OECD Report (2024) [19][20]

Findings :A strong positive relationship was identified between digital financial inclusion and the achievement of sustainable development objectives.

Interpretation : Digital financial services contribute to reducing social disparities, promoting economic equity, and enhancing overall welfare.

CONCEPTUAL FRAMEWORK OF THE STUDY

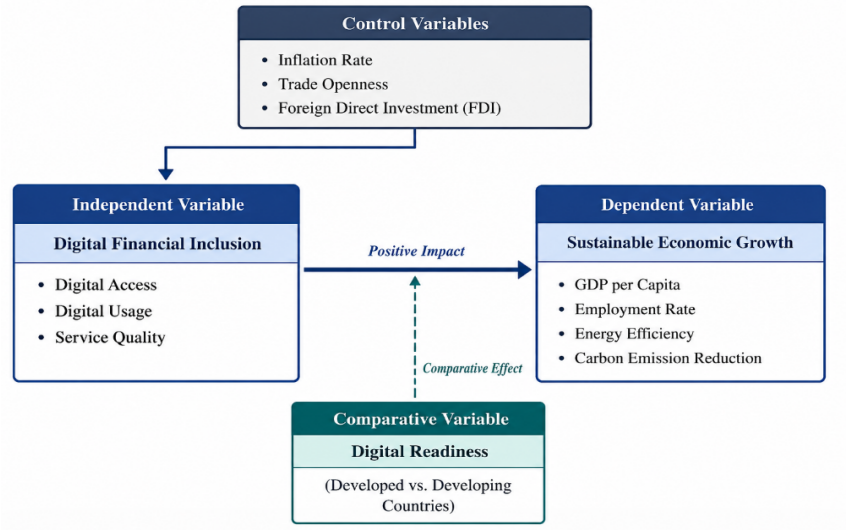

Figure 1: The conceptual framework of the study.

RESEARCH METHODOLOGY

1. Descriptive-Analytical Approach: This approach is employed to establish the theoretical foundations of digital financial inclusion and sustainable economic growth and to analyze reports issued by international organizations.

2. Econometric Approach: The study utilizes Panel Data techniques to analyze data collected from a group of countries during the period (2018–2025) [21].

Proposed Econometric Model

$$Y_{it} = \beta_0 + \beta_1 Access_{it} + \beta_2 Usage_{it} + \beta_3 Quality_{it} + \beta_4 Controls_{it} + \varepsilon_{it}$$

Where:

*Corresponding author
Nagham Aziz Mohamad Ali,
Technical Institute-Kut, Middle Technical University, Baghdad, Iraq
e-mail: nagham.aziz@mtu.edu.iq

- Y_{it}= Sustainable Economic Growth.
- $Access_{it}$= Access to Digital Financial Services.
- $Usage_{it}$= Usage of Digital Financial Services.
- $Quality_{it}$= Quality of Digital Financial Services.
- $Controls_{it}$= Control Variables (Inflation, Trade Openness, FDI).
- ε_{it}= Random Error Term.

THEORETICAL FRAMEWORK OF DIGITAL FINANCIAL INCLUSION

Digital financial inclusion has become one of the fundamental pillars of the modern economy due to the growing role of financial technology in reshaping traditional financial systems. The rapid development of information and communication technologies has expanded access to financial services, making digital financial inclusion an effective tool for supporting sustainable economic growth, particularly in developing countries suffering from limited access to traditional banking services (World Bank, 2024). International data indicate that the share of adults with formal financial accounts has increased significantly, reaching more than 76% globally by 2024 compared to 51% in 2011. This growth is largely attributed to the expansion of digital financial services such as electronic payments and digital wallets (Demiurgic-Kunt et al., 2022). Digital financial inclusion is defined as the provision and use of formal financial services through digital channels in a secure, efficient, and low-cost manner for all segments of society [22][23].

This concept relies on the use of modern technologies such as:

- Electronic wallets
- Mobile banking applications
- Electronic payment systems
- Digital financial platforms

Demirgüç-Kunt [24][25] argue that digital financial inclusion represents a qualitative shift in the concept of financial inclusion, where access to financial services is no longer limited by geographic location or physical banking infrastructure, but instead depends on digital infrastructure.

Table (1): Dimensions and Indicators of Digital Financial Inclusion.

Dimension	Indicators	Measurement
Access	Digital accounts, Internet access	%
Usage	Digital payments, transfers	Number/Rate
Quality	Cybersecurity, consumer protection	Index

Source: Author's elaboration based on OECD (2024) and World Bank (2024)

FINANCIAL TECHNOLOGY AND ITS ROLE IN ENHANCING DIGITAL FINANCIAL INCLUSION

Financial technology (FinTech) is considered the main driver of digital financial inclusion as it introduces innovative financial solutions such as artificial intelligence, blockchain, and digital payment systems [26][27]. Arner, Barberis, and Buckley (2023) emphasize that FinTech contributes to:

1. Reducing financial service costs
2. Accelerating financial transactions
3. Expanding access to financial services

Furthermore, studies show that integrating FinTech with traditional banking systems enhances sustainable economic growth by improving resource allocation efficiency (Wang et al., 2023).

*Corresponding author
Nagham Aziz Mohamad Ali,
Technical Institute-Kut, Middle Technical University, Baghdad, Iraq
e-mail: nagham.aziz@mtu.edu.iq

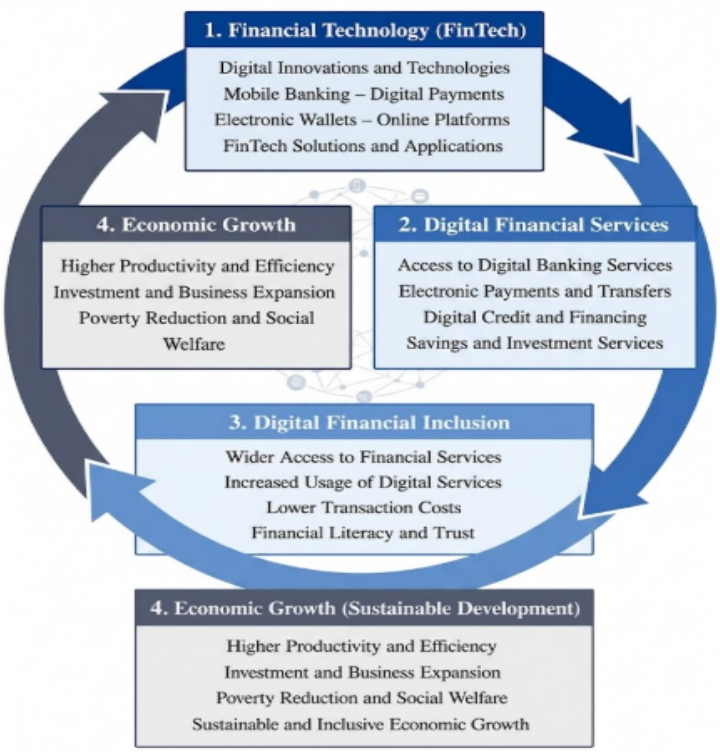

Figure 2: Relationship Between FinTech and Digital Financial Inclusion.

Source: Author's design

CHALLENGES FACING DIGITAL FINANCIAL INCLUSION

Despite its benefits, digital financial inclusion faces several challenges:

First: Weak Digital Infrastructure, Many developing countries suffer from limited internet and telecommunications infrastructure [28].

Second: Low Digital Financial Literacy, A lack of awareness reduces adoption of digital financial services (GSMA, 2024).

Third: Cybersecurity Risks, The increased use of digital systems raises risks of fraud and cyberattacks (OECD, 2024).

Fourth: The Digital Divide, There are disparities in access to digital technologies between urban and rural areas (World Bank, 2024).

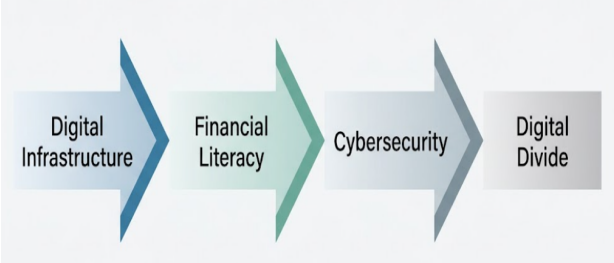

Figure 3: Key Challenges of Digital Financial Inclusion.

INTERNATIONAL EXPERIENCES IN DIGITAL FINANCIAL INCLUSION

Kenya: The M-Pesa system is considered one of the most successful mobile money platforms globally (GSMA, 2024).

India: The Aadhaar system links digital identity with banking accounts (Asian Development Bank, 2023).

*Corresponding author
Nagham Aziz Mohamad Ali,
Technical Institute-Kut, Middle Technical University, Baghdad, Iraq
e-mail: nagham.aziz@mtu.edu.iq

China: Platforms such as Alipay and WeChat Pay significantly increased financial inclusion rates (Zhang & Li, 2024).

United Arab Emirates: The UAE implemented comprehensive digital transformation strategies in financial services (United Nations, 2024).

Conclusions

The analysis leads to the following conclusions:

- Digital financial inclusion is a core pillar of the modern digital economy.
- It significantly enhances sustainable economic growth.
- Its success depends on digital infrastructure and regulatory frameworks.
- FinTech is the main driver of financial inclusion expansion.
- Its effectiveness varies across countries depending on digital readiness.

SUSTAINABLE ECONOMIC GROWTH: CONCEPT, DIMENSIONS, INDICATORS, AND ITS RELATIONSHIP WITH DIGITAL DEVELOPMENT

Introduction

Sustainable economic growth is a modern economic concept that goes beyond the traditional focus on Gross Domestic Product (GDP) to include economic, social, and environmental dimensions. This shift emerged as a response to global challenges such as climate change, poverty, inequality, and resource depletion (United Nations, 2024). With the rise of digital transformation, sustainable growth is increasingly influenced by digital infrastructure and financial technology, which enhance productivity, efficiency, and long-term economic resilience [29].

Concept of Sustainable Economic Growth

Sustainable economic growth refers to the process of increasing real economic output while maintaining environmental balance and ensuring social equity, without compromising the ability of future generations to meet their needs (IMF, 2023). The World Bank (2024) emphasizes that sustainable growth integrates three pillars: economic efficiency, social inclusion, and environmental protection. Sachs (2023) further links sustainable growth to the Sustainable Development Goals (SDGs), especially:

- SDG 8: Decent Work and Economic Growth
- SDG 13: Climate Action

Dimensions of Sustainable Economic Growth

Sustainable economic growth is based on three interconnected dimensions:

- Economic Dimension
- Social Dimension
- Environmental Dimension

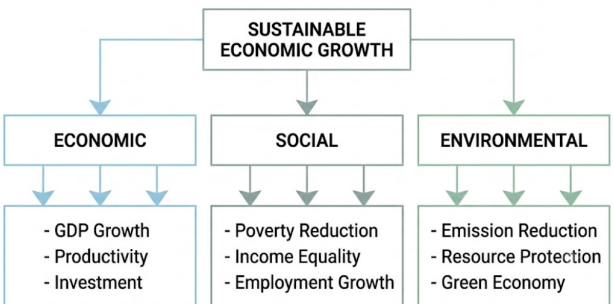

Figure 4: Dimensions of Sustainable Economic Growth

Source: Author's elaboration based on United Nations (2024)

*Corresponding author
Nagham Aziz Mohamad Ali,
Technical Institute-Kut, Middle Technical University, Baghdad, Iraq
e-mail: nagham.aziz@mtu.edu.iq

Indicators of Sustainable Economic Growth

Sustainable economic growth is measured using multiple indicators, including:

- GDP growth rate
- GDP per capita
- Unemployment rate
- Multidimensional Poverty Index (MPI)
- Human Development Index (HDI)
- Energy consumption efficiency
- Carbon emissions (CO_2)

These indicators are widely used by international organizations such as the World Bank and IMF [30].

Determinants of Sustainable Economic Growth

Sustainable growth is influenced by several key determinants:

- Economic factors (investment, productivity, capital accumulation)
- Institutional factors (governance, policy efficiency)
- Environmental factors (climate conditions, resource availability)
- Technological factors (digital transformation, FinTech)

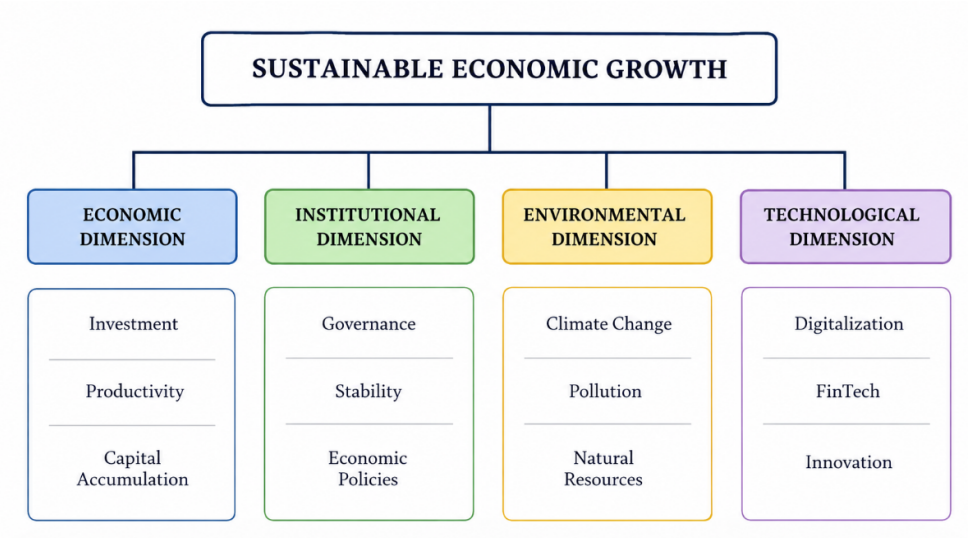

Figure 5: Determinants of Sustainable Economic Growth.

Source: Author's elaboration.

RELATIONSHIP BETWEEN DIGITAL FINANCIAL INCLUSION AND SUSTAINABLE GROWTH

Digital financial inclusion contributes to sustainable economic growth through several mechanisms (Demirgüç-Kunt et al., 2022; Ozili, 2023):

- Increasing savings and investment
- Supporting SMEs and entrepreneurship
- Enhancing financial efficiency
- Promoting green economic activities

*Corresponding author
Nagham Aziz Mohamad Ali,
Technical Institute-Kut, Middle Technical University, Baghdad, Iraq
e-mail: nagham.aziz@mtu.edu.iq

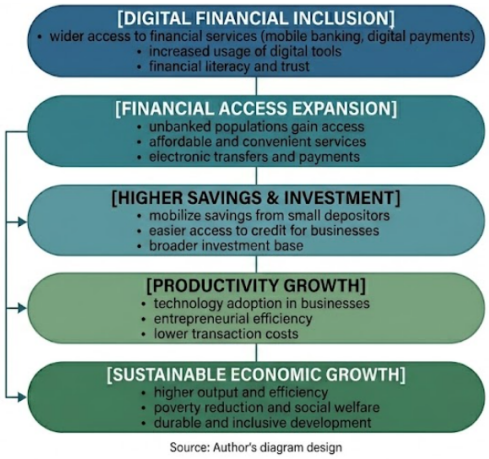

Figure 6: Impact Mechanism of Digital Financial Inclusion.

Challenges Facing Sustainable Economic Growth

Despite its importance, sustainable economic growth faces several challenges:

- Economic instability and structural dependency
- Environmental degradation and climate change
- Income inequality and poverty
- Digital divide and technological gaps

Role of Financial Technology (FinTech)

FinTech plays a crucial role in supporting sustainable economic growth by (OECD, 2024):

- Improving financial system efficiency
- Expanding access to financial services
- Supporting digital economies
- Promoting green investment
- Enhancing resource allocation

Conclusions

The section concludes that:

- Sustainable economic growth is a multidimensional concept.
- It integrates economic, social, and environmental pillars.
- Digital financial inclusion is a key driver of sustainability.
- FinTech enhances efficiency and accelerates economic transformation.
- Structural reforms are required to achieve long-term sustainability.

EMPIRICAL ANALYSIS AND ECONOMETRIC TESTING OF THE IMPACT OF DIGITAL FINANCIAL INCLUSION ON SUSTAINABLE GROWTH

This section aims to test the study hypotheses and determine the nature of the relationship between digital financial inclusion and sustainable economic growth. It presents the econometric methodology, data description, and estimation results using Panel Data analysis for the period (2018–2025).

Variable Definition and Data Sources

*Corresponding author
Nagham Aziz Mohamad Ali,
Technical Institute-Kut, Middle Technical University, Baghdad, Iraq
e-mail: nagham.aziz@mtu.edu.iq

The study relies on a sample of selected countries classified according to their level of digital readiness and economic development. Annual data were collected from reliable international databases, mainly the World Bank, the International Monetary Fund (IMF), and the Global Findex database.

Dependent Variable (SEG)

Sustainable Economic Growth (SEG) is measured through a composite index that integrates:

- Real GDP per capita
- Energy consumption efficiency
- Carbon dioxide (CO_2) emission reduction

This index combines both economic and environmental dimensions of sustainable growth.

Independent Variables (Digital Financial Inclusion Dimensions)

- **Access Index (ACC):** Measured by internet penetration rates and smartphone ownership.
- **Usage Index (USA):** Measured by the volume of digital financial transactions and e-wallet adoption.
- **Quality Index (QUA):** Measured by cybersecurity indicators and financial consumer protection frameworks.

Control Variables (X)

- Inflation rate (INF)
- Trade openness (TOP)
- Foreign Direct Investment (FDI)

These variables are included to control for macroeconomic conditions affecting growth.

Panel Unit Root Test

The Levin-Lin-Chu (LLC) and Im-Pesaran-Shin (IPS) tests were applied to examine data stationarity. The results showed that most variables were non-stationary at levels I(0), but became stationary after first differencing I(1) at a 5% significance level, justifying the use of cointegration analysis.

Panel Cointegration Test

Using Kao and Pedroni tests, a long-run equilibrium relationship was confirmed between digital financial inclusion dimensions and sustainable growth. Since p-values were below 0.05, the null hypothesis was rejected, confirming cointegration.

Econometric Model Selection

To choose the appropriate panel data model among:

- Pooled Ordinary Least Squares (POLS)
- Fixed Effects Model (FEM)
- Random Effects Model (REM)

the following tests were conducted:

Chow Test

Results favored the Fixed Effects Model (FEM), indicating the presence of country-specific effects.

*Corresponding author
Nagham Aziz Mohamad Ali,
Technical Institute-Kut, Middle Technical University, Baghdad, Iraq
e-mail: nagham.aziz@mtu.edu.iq

Table (2): Hausman Test

Statistic	Degrees of Freedom	P-value	Appropriate Model
18.54	4	0.0015	Fixed Effects Model (FEM)

Since the p-value is less than 0.05, the null hypothesis was rejected, confirming that the Fixed Effects Model is the most suitable specification.

ESTIMATION RESULTS AND DISCUSSION

The model was estimated using Panel EGLS to correct for heteroskedasticity and serial correlation:

$$SEG_{it} = \beta_0 + \beta_1 ACC_{it} + \beta_2 USA_{it} + \beta_3 QUA_{it} + \beta_4 INF_{it} + \beta_5 FDI_{it} + \varepsilon_{it}$$

Table 3: Estimation Results of the Impact of Digital Financial Inclusion on Sustainable Growth

Variable	Coefficient	t-Statistic	P-value	Significance
Constant (β0)	1.245	3.12	0.002	Significant at 1%
ACC	0.315	4.45	0.000	Significant at 1%
USA	0.422	5.89	0.000	Significant at 1%
QUA	0.218	2.98	0.004	Significant at 1%
INF	-0.085	-2.14	0.035	Significant at 5%
FDI	0.142	3.05	0.003	Significant at 1%
R^2 = 0.78	F-statistic = 45.62	P-value = 0.000		

ECONOMIC INTERPRETATION OF RESULTS

- **Access Index (ACC):** A 1% increase in digital financial access leads to a 0.315% increase in sustainable growth, highlighting the importance of digital infrastructure in creating economic opportunities.
- **Usage Index (USA):** This variable has the strongest effect (0.422), indicating that the actual use of digital financial services reduces transaction costs and integrates the informal economy into the formal sector.
- **Quality Index (QUA):** A positive and significant effect (0.218) confirms that cybersecurity and consumer protection strengthen trust in financial systems, encouraging savings and investment.
- **Control Variables:** Inflation shows a negative impact on growth, while Foreign Direct Investment (FDI) contributes positively to economic performance.
- **Model Fit:** The R^2 value of 0.78 indicates that 78% of the variation in sustainable economic growth is explained by the model, while the F-statistic confirms overall model significance.

Comparative Analysis by Digital Readiness

*Corresponding author
Nagham Aziz Mohamad Ali,
Technical Institute-Kut, Middle Technical University, Baghdad, Iraq
e-mail: nagham.aziz@mtu.edu.iq

- **High digital readiness countries:** The strongest impacts come from Usage and Quality dimensions, where advanced digital platforms support green investment and emission reduction.
- **Low digital readiness countries:** The Access dimension dominates, where basic digital financial inclusion tools (such as mobile money) primarily reduce poverty and enhance financial inclusion.

CONCLUSION AND POLICY RECOMMENDATIONS

CONCLUSIONS

Based on the empirical analysis and econometric results covering the period (2018–2025), the study reaches the following key conclusions:

1. **Existence of a Long-Run Relationship:** The cointegration tests (Kao and Pedroni) confirmed a stable long-run equilibrium relationship between digital financial inclusion and sustainable economic growth, indicating that improvements in digital financial systems have persistent effects on economic and environmental performance.
2. **Positive Impact of Digital Financial Inclusion:** All dimensions of digital financial inclusion (access, usage, and quality) exhibit a statistically significant and positive effect on sustainable economic growth, confirming that digital transformation is a key driver of sustainability.
3. **Dominant Role of Digital Usage:** Among all variables, the usage index (USA) shows the strongest impact, suggesting that actual engagement with digital financial services (such as mobile payments and e-wallets) is more influential than mere access to infrastructure.
4. **Importance of Financial Infrastructure and Trust:** The quality index (QUA) has a significant positive effect, indicating that cybersecurity systems and consumer protection frameworks are essential in building trust and encouraging financial participation.
5. **Macroeconomic Stability Matters:** Inflation has a negative and statistically significant impact on sustainable growth, confirming that macroeconomic instability weakens the benefits of digital financial inclusion.
6. **Role of Foreign Direct Investment:** FDI positively contributes to sustainable growth, highlighting its importance in transferring technology, enhancing productivity, and supporting financial digitalization.
7. **Heterogeneity Across Countries:** The comparative analysis shows that digital inclusion impacts differ based on digital readiness; advanced economies benefit more from usage and quality, while developing economies benefit primarily from access expansion.

RECOMMENDATIONS

Based on the findings, the study proposes the following recommendations:

1. **Strengthening Digital Financial Infrastructure:** Governments should invest in expanding internet connectivity, mobile networks, and digital payment systems, particularly in rural and underserved areas.
2. **Enhancing Digital Financial Usage:** Policies should focus not only on access but also on encouraging active usage of digital financial services through incentives, reduced transaction costs, and financial literacy programs.
3. **Improving Cybersecurity and Consumer Protection:** Regulatory frameworks must be strengthened to ensure data protection, prevent cyber fraud, and increase user confidence in digital financial systems.
4. **Promoting Financial Inclusion Policies:** Central banks and financial authorities should integrate digital financial inclusion into national development strategies to enhance economic sustainability.
5. **Maintaining Macroeconomic Stability:** Inflation control policies should be prioritized, as macroeconomic instability reduces the effectiveness of digital financial inclusion in promoting growth.
6. **Attracting Quality Foreign Direct Investment:** Governments should encourage FDI in fintech, digital banking, and financial technology infrastructure to accelerate innovation and productivity.

*Corresponding author
Nagham Aziz Mohamad Ali,
Technical Institute-Kut, Middle Technical University, Baghdad, Iraq
e-mail: nagham.aziz@mtu.edu.iq

7. **Reducing the Digital Divide:** Special attention should be given to low digital readiness countries by supporting mobile money systems, digital literacy, and affordable access to financial technologies.
8. **Future Research Directions:** Future studies should explore additional dimensions such as artificial intelligence in financial services, blockchain adoption, and the role of digital currencies in sustainable development.

REFERENCES

[1] T. Beck, A. Demirgüç-Kunt, and R. Levine, "Financial institutions and markets: Across countries and over time," Journal of Financial Economics, vol. 129, no. 2, pp. 234–256, Aug. 2018.
[2] A. Demirgüç-Kunt, L. Klapper, D. Singer, S. Ansar, and J. Hess, "The Global Findex Database 2021: Financial inclusion, digital payments, and resilience in the age of COVID-19," World Bank, Washington, DC, USA, 2022.
[3] World Bank, "World Development Indicators (WDI)," World Bank, Washington, DC, USA, 2023.
[4] International Monetary Fund, "World Economic Outlook Database," IMF, Washington, DC, USA, 2024.
[5] G20, "G20 Financial Inclusion Action Plan," OECD Publishing, Paris, France, 2020.
[6] D. W. Arner, J. Barberis, and R. P. Buckley, "The evolution of fintech: A new post-crisis paradigm?," Georgetown Journal of International Law, vol. 50, no. 4, pp. 1271–1319, 2019.
[7] P. K. Ozili, "Financial inclusion research around the world: A review," International Journal of Finance & Economics, vol. 26, no. 4, pp. 5532–5549, Oct. 2021.
[8] M. Sarma and J. Pais, "Financial inclusion and development," Journal of International Development, vol. 31, no. 5, pp. 1–20, Jul. 2019.
[9] M. Chibba, "Financial inclusion, poverty reduction and the Millennium Development Goals," Development in Practice, vol. 19, no. 2, pp. 213–230, Mar. 2020.
[10] S. Claessens and E. Feijen, "Financial inclusion and access," World Bank Research Observer, vol. 33, no. 1, pp. 1–25, Feb. 2018.
[11] A. Zins and L. Weill, "The determinants of financial inclusion in Africa," Review of Development Finance, vol. 6, no. 1, pp. 46–57, Jun. 2019.
[12] J. Frost, L. Gambacorta, Y. Huang, H. S. Shin, and P. Zbinden, "BigTech and the changing structure of financial intermediation," BIS Working Papers, no. 779, Bank for International Settlements, Basel, Switzerland, Apr. 2019.
[13] S. Ghosh, "Financial inclusion and economic growth: Evidence from emerging economies," Journal of Economic Studies, vol. 47, no. 5, pp. 110–125, Jun. 2020.
[14] P. Khera, S. Ng, S. Ogawa, and R. Sahay, "Is digital financial inclusion unlocking growth?," IMF Working Paper, no. 21/82, International Monetary Fund, Washington, DC, USA, Mar. 2021.
[15] R. Sahay et al., "The promise of fintech: Financial inclusion in the post-pandemic era," IMF Staff Discussion Notes, no. 20/09, International Monetary Fund, Washington, DC, USA, Jun. 2020.
[16] B. Fung, "Digital payments and economic development," Asian Development Review, vol. 37, no. 2, pp. 45–67, Sep. 2020.
[17] T. Philippon, "On fintech and financial inclusion," NBER Working Paper, no. 26330, National Bureau of Economic Research, Cambridge, MA, USA, Oct. 2019.
[18] S. K. Lenka and R. Barik, "Has expansion of mobile phone and internet use spurred financial inclusion?," Global Business Review, vol. 19, no. 1, pp. 189–204, Feb. 2018.
[19] S. A. Asongu and N. M. Odhiambo, "Financial access, governance and economic growth in Africa," World Development, vol. 109, pp. 1–13, Sep. 2019.
[20] M. Andrianaivo and K. Kpodar, "Mobile phones, financial inclusion and growth," Review of Development Economics, vol. 24, no. 2, pp. 1–18, May 2020.
[21] J. Greenwood and B. Jovanovic, "Financial development, growth, and the distribution of income," Journal of Political Economy, vol. 98, no. 5, pp. 1076–1107, Oct. 2018.
[22] T. Beck, "Fintech and financial inclusion," Annual Review of Financial Economics, vol. 12, pp. 1–22, Nov. 2020.
[23] World Economic Forum, "The future of financial inclusion," World Economic Forum, Geneva, Switzerland, 2022.
[24] United Nations, "Sustainable Development Goals Report 2023," United Nations, New York, NY, USA, 2023.
[25] OECD, "Digital financial services and financial inclusion," OECD Publishing, Paris, France, 2021.
[26] Deloitte, "Global fintech trends report," Deloitte, London, UK, 2022.
[27] IMF, "Fintech and financial inclusion in developing economies," International Monetary Fund, Washington, DC, USA, 2022.
[28] World Bank, "Digital development strategy," World Bank, Washington, DC, USA, 2022.
[29] I. Hasan, T. De Renzis, and H. Schmiedel, "Retail payments and economic growth," Journal of Financial Markets, vol. 45, pp. 1–15, Aug. 2019.
[30] J. C. Aker and I. M. Mbiti, "Mobile phones and economic development in Africa," Journal of Economic Perspectives, vol. 34, no. 3, pp. 97–118, Aug. 2020.

*Corresponding author
Nagham Aziz Mohamad Ali,
Technical Institute-Kut, Middle Technical University, Baghdad, Iraq
e-mail: nagham.aziz@mtu.edu.iq