

Digital Transformation as a Driver of Financial Inclusion in Algeria (2004–2023): An Econometric Analysis Using OLS and ARDL Models

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Abstract:

This study analyzes the impact of digital transformation on financial inclusion in Algeria over the period 2004–2023 using econometric models. The analysis employs OLS as a preliminary model and ARDL to examine the dynamic relationship between financial inclusion and key variables including internet usage, mobile penetration, and GDP.

The results indicate that internet usage and mobile penetration have a positive and significant effect on financial inclusion, with mobile technology being the most influential factor. The impact of internet appears dynamic, showing delayed effects over time. In contrast, GDP does not have a significant impact.

The ARDL results reveal the absence of a long-term relationship, suggesting that the effect of digital transformation is mainly short-term. The study highlights the importance of strengthening digital infrastructure and policies to enhance financial inclusion.

Keywords: Financial Inclusion, Digital Transformation, ARDL, Algeria

Jel Classification Codes: O16, O33, G20, C22, O55

1. INTRODUCTION

In recent years, technological change has reshaped the global economy, with digitalization becoming particularly important in the financial sector. At the same time, financial inclusion has become a central component of sustainable development because it enables individuals and firms to access

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and use formal financial services more effectively. By broadening access to payments, savings, credit, and other financial products, financial inclusion can help reduce social inequalities and support more inclusive economic growth.

Financial inclusion has also gained greater international attention with the adoption of the Sustainable Development Goals, where it is linked to poverty reduction, economic empowerment, and broader participation in economic life (United Nations Development Programme, 2023; Sustainable Development Solutions Network, 2024). In this context, digital transformation has become one of the main channels through which financial inclusion can be strengthened, particularly through electronic payments, internet-based services, mobile technologies, and financial technology solutions.

In Algeria, monetary authorities, particularly the Bank of Algeria, have taken several steps to modernize the financial system and encourage financial inclusion (Bank of Algeria, 2023). Nevertheless, the level of financial inclusion remains below expectations, partly because cash continues to dominate everyday transactions and because digital financial services are still unevenly used across regions. This raises an important question about how far digital transformation can contribute to improving financial inclusion in the Algerian context.

Accordingly, this study analyzes the impact of digital transformation on financial inclusion in Algeria over the period 2004–2023. It uses econometric models to examine the relationship between financial inclusion and selected digital indicators, relying on data from international statistical sources such as the World Development Indicators and the IMF Financial Access Survey (World Bank, 2024; International Monetary Fund, 2024).

. Analytical Study of Financial Inclusion and Its Role in Achieving Sustainable Development in Algeria

Financial inclusion is widely viewed as an important element of sustainable development, since access to financial services can help households and firms participate more actively in the economy. In Algeria, the policy framework has gradually evolved in this direction through regulatory and

legislative reforms aimed at modernizing the banking sector, protecting financial consumers, and simplifying access to basic banking services.

Digital transformation has reinforced these efforts by expanding electronic payments, supporting the digitization of financial transactions, and encouraging more innovative financial solutions. Such developments are particularly relevant for remote and underserved areas, where traditional banking infrastructure remains limited.

This section examines the current state of financial inclusion in Algeria and analyzes its role in achieving sustainable development, with reference to international experiences.

2.1 Regulatory and Legal Framework for Financial Inclusion in Algeria

Algeria aims to enhance financial inclusion by integrating a larger proportion of the population into the formal financial system, encouraging the use of banking and modern financial services instead of traditional methods such as cash transactions or informal savings.

To move in this direction, Algeria has introduced legislative reforms designed to modernize banking and financial activities in line with international standards and technological change. These reforms seek to shift the financial system from a largely traditional model toward a more digital and accessible framework (Mokhtar, 2023).

2.1.1 Financial Reform Law No. 23-09

This comprehensive law was enacted to modernize the financial system by simplifying procedures, improving banking efficiency, and enhancing the independence of the central bank. It aims to:

- Update the legal framework governing banking and financial activities.
- Strengthen supervision and regulatory oversight to reduce financial risks such as money laundering and financial instability.
- Establish new banking supervision standards to ensure transparency and efficiency.

In addition, the law promotes digital transformation and financial inclusion through:

- Accelerating the adoption of digital payment systems (internet, mobile, and card-based payments).

- Expanding access to formal financial services for a broader segment of the population.

The law also introduced the National Payments Committee (CNP), which is responsible for:

- Developing a national strategy for modern payment systems.
- Coordinating between banks, postal institutions, the central bank, and financial service providers to ensure the widespread adoption of electronic payments.

2.1.2 Finance Law No. 25-02 (2025)

The Finance Law of 2025 introduced additional regulatory measures intended to promote financial innovation and strengthen the infrastructure of financial services. It also provides a more detailed framework for the implementation of Law No. 23-09, particularly in relation to payment service providers (Aliani, 2025).

- Defining licensing conditions for payment service providers, particularly fintech companies offering digital wallets, payment applications, and money transfer solutions.
- Establishing approval mechanisms under the supervision of regulatory authorities.
- Promoting the payment of salaries and pensions through formal banking accounts, which indirectly encourages individuals to open and use bank accounts—one of the most effective tools for expanding financial inclusion.

The law also aims to introduce a national digital wallet, designed to be secure and unified, while reducing reliance on cash transactions and supporting the transition toward a modern digital economy.

The introduction of digital wallets is expected to make financial transactions easier and more secure for users. It may also help reduce the size of the informal economy, improve traceability, and strengthen compliance with financial regulations (Algeria Invest, 2025).

In this context, the Governor of the Bank of Algeria emphasized that the National Payments Committee seeks to promote diverse, efficient, and secure electronic payment methods that meet consumer expectations and

reduce dependence on cash.

Overall, Algeria is making steady progress toward transforming its payment system, fostering transparency, and supporting a more inclusive and sustainable economic system.

Table (1): Main Areas of Financial Transformation in Algeria

Area	Measure
Legislation	Enactment of Law No. 23-09 and Regulation No. 25-02
Digital Governance	Establishment of the National Payments Committee (CNP) and development of a national digital transformation strategy
Service Enablement	Adoption of digital wallets and regulation of new payment services
Financial Technology (FinTech)	Mobile transfer platforms (“Switch Mobile”) and QR-based payments in cooperation with banks
Final Objective	A modern, digital, inclusive, and accessible financial system

Source: Authors owns elaboration based on the previously cited references,2026.

In conclusion, the ultimate objective of these reforms is to expand the base of users within the formal financial system. This involves reducing the number of individuals who rely exclusively on cash transactions or lack access to bank accounts, while increasing the number of users of formal financial services. Such developments contribute to supporting economic growth, reducing poverty, facilitating access to financing, and combating the informal economy.

2.2 Financial Inclusion Indicators in Algeria

The evolution of financial inclusion indicators in Algeria can be analyzed based on the Global Findex database (2011, 2017, and 2021).

Table (2): Evolution of Financial Inclusion Indicators in Algeria (Global Findex)

Indicator	2011	2017	2021
Adults with a financial account (%)	33%	44.1%	~53%
Adults making digital payments (%)	~0%	5%	~20%

Source: Global Findex Database (2011, 2017, 2021)

Data from the World Bank's Global Findex database (2011, 2017, 2021) indicate a gradual but relatively slow improvement in financial inclusion in Algeria. The percentage of adults owning a financial account increased from 33% in 2011 to 43% in 2017, reaching approximately 53% in 2021. However, this level remains significantly below the global average, estimated at around 69%, reflecting a relatively modest pace of progress.

Similarly, the use of digital payments remains limited. The proportion of adults making digital payments did not exceed 5% in 2017 and reached only about 20% in 2021. Although this trend reflects some improvement following recent reforms, the overall level remains below expectations.

Furthermore, the increase in bank account ownership has not been accompanied by a significant rise in financial intermediation. Savings in formal financial institutions remained relatively low, at around 11% in 2017, while borrowing from banks was limited to approximately 3% of adults. In contrast, a large proportion of individuals relied on informal borrowing from family and relatives, estimated at around 29%. This indicates that traditional banking services remain insufficiently accessible or attractive for a significant segment of the population.

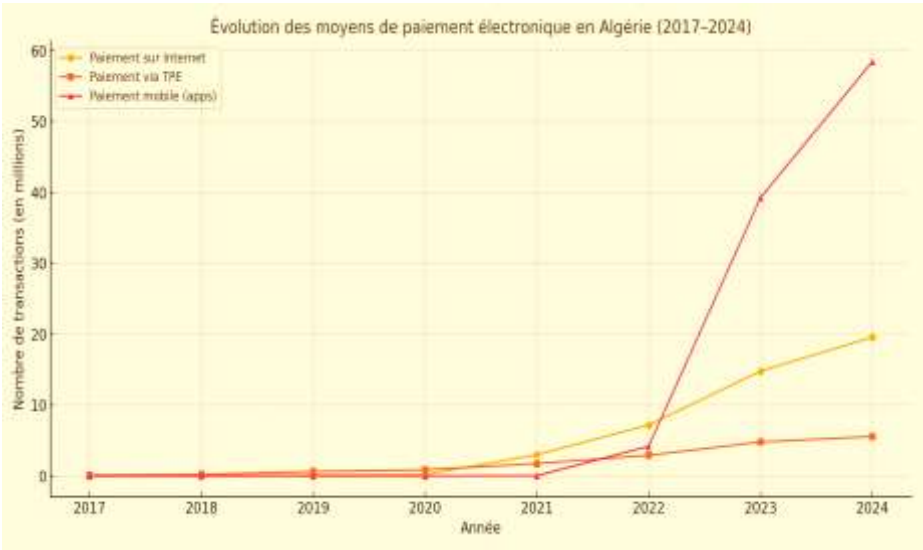
Evolution of Digital Payment Methods (2014–2024)

Digital transformation in Algeria has become a key driver of financial inclusion, as the expansion of internet access and smartphone usage has facilitated access to digital banking services and government financial applications, including electronic payments and money transfers. This has contributed to the integration of broader segments of the population into the formal financial system.

Recent legislative and technological reforms demonstrate a clear correlation between improvements in digital infrastructure and the expansion of

financial inclusion. The more efficient digital policies and electronic payment systems become, the greater the ability of individuals to participate in the financial system and contribute to sustainable economic development. The following figure illustrates the evolution of digital payment methods in Algeria over the period 2017–2024, reflecting the gradual impact of digital transformation on the national financial landscape.

Figure (1): Evolution of Digital Payment Methods in Algeria (2017–2024)



Source: Authors owns elaboration based on official data from GIE Monétique, 2026.

The above figure illustrates the evolution of electronic payment volumes in Algeria over the period 2017–2024, based on data provided by GIE Monétique. It covers three main types of transactions: online payments, payments via electronic payment terminals (TPE), and mobile payments through smartphones and applications.

First Trend: Online Payments

The first curve represents the number of online payment transactions using CIB and Edahabia bank cards. According to official statistics from GIE Monétique, a significant increase is observed after 2020, indicating a rapid expansion in digital payment adoption. The number of transactions rose from approximately 0.20 million in 2019 to 19.59 million in 2024,

reflecting a substantial acceleration in online financial activities.

Second Trend: TPE Payments

The second curve shows a steady and progressive increase in transactions conducted via electronic payment terminals (TPE). The number of transactions grew from only 122,694 in 2017 to approximately 5.58 million in 2024. This trend indicates a gradual improvement in the use of electronic payment infrastructure within commercial activities.

Third Trend: Mobile Payments

The third curve highlights the evolution of mobile payment transactions in Algeria. A rapid and significant increase is observed after 2022, following the official launch of mobile payment services at the end of 2021. According to GIE Monétique, transactions increased from approximately 4.19 million (during November–December 2022) to 39.28 million in 2023, and further to 58.47 million in 2024.

This strong growth was accompanied by a notable increase in the total transaction value, which reached 27.86 billion Algerian dinars in 2023 and 43.59 billion dinars in 2024. Despite being a relatively new channel compared to online and TPE payments, mobile payments have quickly become a key component of the digital financial ecosystem.

Overall, the increased use of electronic payment methods has led to a significant rise in the total value of financial transactions. These trends confirm the acceleration of digitalization, electronic transactions, and e-commerce in Algeria during the period 2017–2024, as highlighted in reports from the Bank of Algeria and GIE Monétique.

Factors Explaining the Growth

The remarkable development of electronic payment methods in Algeria, particularly since 2022, can be attributed to several factors:

- The introduction of a new legal and regulatory framework
- The launch of mobile payment services (end of 2021)
- National digital transformation policies and government support
- Increased consumer trust in digital systems
- Expansion of TPE infrastructure and improved digital networks
- Growth of e-commerce activities

This period marks a clear acceleration in the adoption of electronic payment methods in Algeria, whether through online platforms, TPE devices, or mobile applications. This trend is expected to continue in the coming years, particularly with the implementation of a national digital wallet and the formal structuring of the digital financial market.

2.3 Sustainable Development in Algeria and the Role of Financial Inclusion

Algeria faces multiple development challenges despite its commitment to the 2030 Agenda for Sustainable Development. These challenges include gaps in financial inclusion and limited economic empowerment of vulnerable groups. Financial inclusion is considered a key tool for supporting sustainable development by facilitating access to financial services and promoting economic integration.

This study aims to analyze the current state of sustainable development in Algeria and highlight the role of financial inclusion in achieving national development goals.

3. Sustainable Development in Algeria

Since the early 2000s, Algeria has adopted a strategic approach to achieving sustainable development, driven by its international commitments, particularly the adoption of the Sustainable Development Goals (SDGs) under the United Nations 2030 Agenda. This vision is reflected in the National Strategy for Environment and Sustainable Development (SNEDD 2035), which is based on the integration of economic, social, and environmental dimensions into public policies.

3.1 Economic Dimension

Despite efforts to diversify the economy, Algeria remains highly dependent on hydrocarbons, which account for more than 90% of total exports. While some progress has been made in supporting manufacturing industries and agriculture, as well as in developing infrastructure and transportation projects, weak innovation and entrepreneurship remain major obstacles to achieving structural transformation.

3.2 Social Dimension

Algeria has achieved noticeable improvements in social development indicators. The school enrollment rate exceeds 98% at the primary level,

according to data from the Ministry of National Education. Health services have also improved, particularly in reducing maternal and child mortality. The government provides extensive support programs, including housing, social assistance, and unemployment benefits. However, unemployment remains relatively high, especially among youth and women, exceeding 20% in some regions.

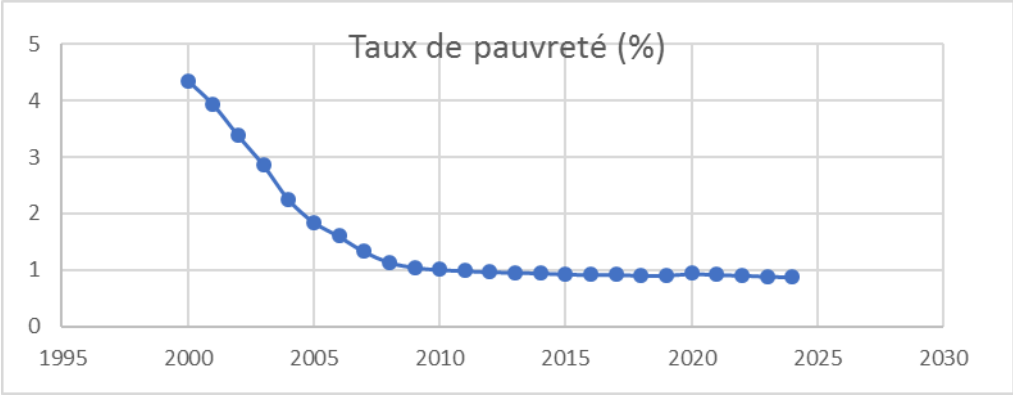
3.3 Environmental Dimension

Despite progress in environmental legislation, Algeria continues to face significant environmental challenges, particularly water scarcity, desertification, and air pollution. The country has launched renewable energy programs, notably the “Tafouk 1” project, as part of a plan to produce 15,000 MW of renewable energy by 2035. However, the implementation of environmental policies remains relatively slow.

3.4 International Indicators Assessment

According to the United Nations Development Programme (UNDP), Algeria is classified among countries with high human development, ranking 91st globally in 2023. However, in the Environmental Performance Index (EPI) published by Yale University, Algeria records relatively weak performance, particularly in air quality and environmental management. Furthermore, SDG reports indicate progress in education and health, while performance in other areas remains moderate.

Figure (2): Evolution of Poverty Rate in Algeria (2000–2024)



Source: SDG Transformation Center (2024), Sustainable Development Report: Algeria.

The figure shows a clear decline in extreme poverty in Algeria over the past two decades, reflecting the effectiveness of social policies implemented by the government. However, the stabilization of poverty rates in recent years highlights the need for more sustainable and inclusive development strategies, particularly in the context of recurring economic and health crises.

In the case of Algeria, the enrollment rate in organized pre-primary education has been declining in recent years, indicating a significant challenge in achieving Sustainable Development Goal 4, which aims to ensure inclusive and equitable quality education from an early age.

Structural Challenges

Algeria faces several structural challenges that hinder the achievement of sustainable development. These include excessive reliance on a rent-based economy, weak sectoral coordination, bureaucratic constraints, limited local governance capacity, and climate-related challenges affecting food and water security.

Future Prospects and Strategies

Algeria aims to strengthen sustainable development through several strategic initiatives, including:

- Transitioning towards renewable energy sources
- Promoting a circular economy through recycling and waste reduction
- Advancing digitalization of public administration
- Empowering vulnerable groups, particularly youth and women, through social entrepreneurship and green finance

4. Literature Review

The relationship between financial inclusion and digital transformation has received increasing attention in recent economic literature, particularly in light of rapid technological developments in the financial sector. Several studies have examined the impact of digitalization on enhancing financial inclusion across different economic contexts.

In this regard, Demirgüç-Kunt et al. (2022), using data from the Global Findex database, found that digital financial tools particularly internet and mobile technologies significantly contribute to expanding access to financial services, especially in developing countries, where they play a key

role in integrating unbanked populations.

Similarly, Ozili (2018) emphasized that financial technology (FinTech) is one of the most important drivers of financial inclusion, as it reduces transaction costs and improves access to financial services, particularly through mobile applications, thereby enhancing the efficiency of financial systems.

Furthermore, Sahay et al. (2020), in a study conducted by the International Monetary Fund (IMF), demonstrated that digital financial services especially electronic payments and mobile banking improve financial inclusion. However, their effectiveness depends on the existence of an appropriate regulatory environment and well-developed digital infrastructure.

In the Arab context, the Alliance for Financial Inclusion (2021) highlighted a positive relationship between the spread of digital technologies and financial inclusion, although this relationship varies depending on the level of digital infrastructure and financial literacy in each country.

At the level of developing countries, Beck et al. (2016) confirmed that economic growth does not necessarily lead to improved financial inclusion unless accompanied by targeted policies that enhance access to financial services. This finding is consistent with the results obtained in the Algerian case.

Focusing on Algeria, several studies and reports, including those of the Bank of Algeria (2023), indicate a gradual improvement in financial inclusion indicators. However, this progress remains limited compared to other countries, mainly due to the low adoption of digital financial tools and the continued reliance on cash transactions.

Overall, the literature confirms the positive role of digital transformation in enhancing financial inclusion. However, the extent of this impact varies depending on economic and institutional contexts. Therefore, this study aims to empirically test this relationship in the Algerian case using econometric analysis.

5. Econometric Analysis

5.1 Model Framework

To test the hypotheses developed in the theoretical section, this study employs the Ordinary Least Squares (OLS) model as a preliminary step to analyze the relationship between digital transformation and financial inclusion in Algeria. This model allows for identifying the direction and nature of the relationship between the variables.

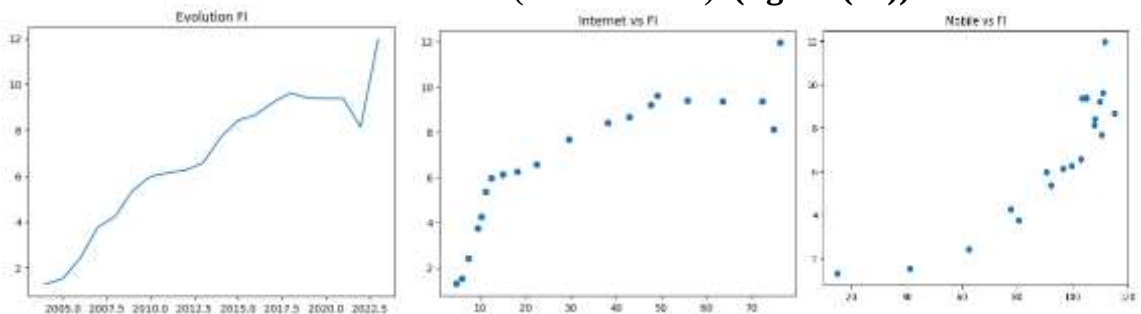
Financial inclusion (FI_ATM) is used as the dependent variable, while internet usage (INTERNET), mobile phone penetration (MOBILE), and gross domestic product (LGDP) are considered as independent variables.

However, the application of the OLS model requires the fulfillment of certain assumptions, particularly the stationarity of time-series data. Therefore, the Augmented Dickey-Fuller (ADF) test is conducted to determine the integration order of the variables. The results indicate that some variables are non-stationary at level, which necessitates the use of a more appropriate model, namely the Autoregressive Distributed Lag (ARDL) model (Pesaran et al., 2001), which is suitable for analyzing relationships involving a mixture of stationary and non-stationary variables.

5.2 OLS Results

The estimation results of the OLS model indicate a high explanatory power, with an R^2 of 0.933, meaning that approximately 93.3% of the variation in financial inclusion is explained by the independent variables. The F-statistic (73.79) is statistically significant at the 1% level (Prob = 0.000), confirming the overall validity of the model.

Regarding individual variables, internet usage (INTERNET) has a positive and statistically significant effect (Prob = 0.000), and mobile phone penetration (MOBILE) also shows a positive and significant impact (Prob = 0.002). In contrast, GDP (LGDP) does not have a statistically significant effect (Prob = 0.932). **(figure (04))**



Source: Authors' calculations based on OLS estimation results.

The OLS results should be interpreted as preliminary evidence, since the presence of non-stationary variables may lead to biased or spurious relationships in time-series analysis. Therefore, the ARDL approach provides a more appropriate framework for examining the dynamic relationship between digital transformation and financial inclusion.

Stationarity Test (ADF Test)

The Augmented Dickey-Fuller (ADF) test was conducted to examine the stationarity of the time-series data (Dickey & Fuller, 1979).

The results indicate that the financial inclusion variable (FI_ATM) is stationary at level, whereas internet usage (INTERNET), mobile phone penetration (MOBILE), and gross domestic product (LGDP) are non-stationary at level.

Table (3): Results of the Augmented Dickey-Fuller (ADF) Stationarity Test for the Studied Variables

Variable	Prob.	Stationarity
FI_ATM	0.000	Stationary
INTERNET	0.79	Non-stationary
MOBILE	0.53	Non-stationary
LGDP	0.36	Non-stationary

Source: Authors' calculations based on econometric analysis outputs.

The results indicate that the data consist of a mixture of stationary and non-stationary time series. This justifies the use of the ARDL model, which is an appropriate econometric approach when variables are integrated at different orders, provided that none of them is integrated of order two (Pesaran et al., 2001).

Based on these findings, the ARDL model was used to examine the dynamic relationship between the variables. The model selection criteria indicate that the optimal specification is:

ARDL(0,2,0)

Table (4): ARDL Model Estimation Results

Variable	Coefficient	Prob.	Significance
INTERNET (L0)	0.097	0.158	Not significant
INTERNET (L1)	-0.274	0.034	Significant
INTERNET (L2)	0.238	0.008	Significant
MOBILE	0.104	0.000	Significant

Source: Authors' calculations based on econometric analysis outputs.

The estimation results indicate that mobile phone penetration (MOBILE) has a positive and statistically significant effect on financial inclusion, with a probability value of (Prob = 0.000). This highlights the crucial role of mobile technology in facilitating access to financial services.

Regarding internet usage (INTERNET), the results reveal a dynamic impact. The coefficient is not statistically significant in the current period (L0), while it becomes negative and statistically significant in the first lag (L1) at (Prob = 0.034), and turns positive and significant in the second lag (L2) at (Prob = 0.008). This suggests the presence of a delayed dynamic effect of digital transformation, indicating that internet usage requires a certain adjustment period before positively influencing financial inclusion.

Bounds Test (Cointegration Test)

The Bounds Test was conducted to examine the existence of a long-run relationship between the variables (Pesaran et al., 2001).

Table (5): Summary of the Bounds Cointegration Test Results

Test	Result	Decision
Bounds Test	No strong evidence of a long-run equilibrium relationship	Short-run relationship

Source: Prepared by the authors based on econometric analysis outputs

The results of the Bounds Test indicate the absence of strong evidence of a long-run equilibrium relationship among the variables. This suggests that the relationship between digital transformation and financial inclusion in Algeria is mainly a short-run relationship.

This implies that the impact of technology appears gradually and temporarily, and therefore requires continuous policy support in order to

generate a sustainable long-term effect.

Diagnostic Tests

The diagnostic tests support the robustness and reliability of the estimated model. The White test indicates the absence of heteroskedasticity, suggesting that the variance of the residuals is stable (White, 1980). Moreover, the Breusch-Godfrey test shows no evidence of autocorrelation in the error terms, which strengthens the reliability of the model (Breusch, 1978; Godfrey, 1978).

In addition, the Variance Inflation Factor (VIF) results remain within acceptable limits, suggesting that multicollinearity among the explanatory variables is not severe.

Discussion of Results

The empirical results indicate that digital transformation contributes to improving financial inclusion in Algeria, although the nature of this effect differs across digital indicators. The preliminary OLS results suggest a positive and statistically significant relationship between digital variables and financial inclusion. However, since some variables are non-stationary at level, the OLS findings should be interpreted with caution and considered only as preliminary evidence.

The ARDL results provide a more appropriate interpretation of the dynamic relationship between the variables. Mobile phone penetration has a positive and statistically significant effect on financial inclusion, suggesting that mobile technology plays a direct and important role in expanding access to financial services. This result can be explained by the widespread use, accessibility, and relatively low cost of mobile technologies compared to traditional banking channels.

In contrast, the effect of internet usage appears to be dynamic rather than immediate. The current value of internet usage is not statistically significant, while its lagged values show significant effects. The first lag is negative, whereas the second lag becomes positive and significant. This suggests that internet usage may require an adjustment period before producing a positive effect on financial inclusion. Such a delay may reflect the time needed for individuals, institutions, and financial service providers to adapt to digital

tools.

GDP does not show a statistically significant effect on financial inclusion. This finding suggests that economic growth alone is not sufficient to promote financial inclusion unless it is accompanied by targeted financial policies, digital infrastructure development, and institutional reforms. In the Algerian context, this may be explained by the structure of the economy, which remains strongly dependent on hydrocarbons and does not automatically generate inclusive access to financial services.

Furthermore, the Bounds Test does not provide sufficient evidence to confirm the existence of a long-run equilibrium relationship among the variables. This indicates that the effect of digital transformation on financial inclusion in Algeria is mainly short-run. Therefore, achieving a sustainable impact requires continuous policy efforts, particularly in the areas of digital infrastructure, financial literacy, electronic payment systems, and regulatory modernization.

Conclusion

This study aimed to analyze the impact of digital transformation on financial inclusion in Algeria over the period under study, using several econometric models, including the Ordinary Least Squares (OLS) model and the Autoregressive Distributed Lag (ARDL) model (Pesaran et al., 2001), along with a set of statistical and diagnostic tests.

The empirical results show that digital transformation plays an important role in enhancing financial inclusion. Both internet usage and mobile phone penetration have a positive and statistically significant effect on financial inclusion. However, this effect is not immediate; rather, it follows a dynamic pattern, particularly in the case of internet usage, where the positive impact appears after a certain time lag.

The results also show that mobile phone penetration is the most influential factor in promoting financial inclusion. This can be explained by the accessibility, ease of use, and widespread diffusion of mobile technology compared to other digital tools, making it an effective instrument for integrating financially excluded populations.

In contrast, GDP does not show a significant effect in the final model. This indicates that economic growth alone is not sufficient to achieve financial

inclusion, unless it is supported by adequate digital infrastructure and appropriate digital policies.

Regarding the nature of the relationship between the variables, the Bounds Test results indicate the absence of a long-run equilibrium relationship. This means that the effect of digital transformation on financial inclusion in Algeria remains mainly short-term and requires continuous policy efforts in order to generate sustainable long-term outcomes.

Overall, the study confirms that digital transformation represents a key lever for enhancing financial inclusion. However, fully realizing its potential requires an integrated approach combining technological development, economic policies, and institutional reforms.

Limitations of the Study

This study has several limitations that should be taken into consideration. First, the analysis relies on a limited number of explanatory variables, which may affect the comprehensiveness of the results. Second, the relatively short time period may limit the generalizability of the findings.

Moreover, data availability for certain digital and financial indicators remains limited, which may affect the accuracy of the econometric analysis. In addition, although the ARDL model is appropriate for this type of analysis, it remains limited in capturing complex institutional relationships that are difficult to quantify.

Policy Recommendations

Based on the findings of this study, several recommendations can be proposed to enhance financial inclusion in Algeria.

First, it is necessary to strengthen investment in digital infrastructure, particularly by expanding internet coverage and improving its quality, given its crucial role in supporting digital financial services.

Second, public authorities should promote the use of mobile technology as a channel for delivering financial services, through the development of innovative financial applications and the simplification of access procedures, especially for low-income groups.

Third, financial and digital literacy should be improved among individuals, as limited awareness and weak digital skills remain major barriers to

effective financial inclusion.

In addition, a flexible regulatory framework should be established to support innovation in the digital financial sector, while ensuring consumer protection and strengthening trust in electronic transactions.

Finally, it is important to adopt long-term policies that integrate digital transformation into national development strategies, in order to ensure sustainable financial inclusion and support economic development.

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