



Modeling Financial Inclusion in Algeria: AI, FinTech, and Support Agencies as Catalysts for Access

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Received: 07/12/2025	Accepted: 29/12/2025	Published: 31/12/2025
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Abstract

In Algeria, financial exclusion is still a key problem. Despite the government reforms, microfinance programs, and digital financial services, structural, technological, as well as institutional barriers limit inclusive access. This paper reveals how AI and financial innovation combined with support and accompaniment agencies can enhance financial inclusion. Using the Financial Inclusion Potential Model (FIPM) and (AIDFI) index, the paper quantifies improvements achievable through AI adoption, FinTech solutions, digital literacy and the strengthened institutional trust. Findings reveal that coordinated technological and institutional interventions can expand access to finance and foster the sustainable economic development in Algeria.

Keywords: Financial inclusion, AI; FinTech; Support agencies; Sustainable Development.

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1. INTRODUCTION

Financial exclusion is a contemporary issue in both developed and developing economies, that restricts the ability of individuals to access to most basic financial services: savings, credit, insurance, and secure payment networks. For vulnerable populations especially women, youth, and low-income households exclusion from formal financial system deepens the cycles of poverty, limits the entrepreneurship opportunities and prevents the participation in sustainable economic growth. The continued existence of such a phenomenon does not just undermine the empowerment of individuals, but also the broader objectives of social justice, inclusive development and national competitiveness.

Over the past few years, technological innovation has proven itself as a potential game-changer in the struggle against financial exclusion. Financial technologies (FinTech), artificial intelligence (AI), blockchain, and mobile banking platforms have proven to be very promising in lowering barriers to entry, increasing access to more affordable services, and ensuring transparency. On a global scale, nations that have effectively used digital innovation have been able to experience remarkable growth in enhancing financial inclusion, transforming exclusion into inclusion, and providing opportunities to underserved populations to engage in the economy.

In contrast, Algeria continues to face structural, institutional, and cultural barriers that hinder progress toward financial inclusion. A large informal sector, insufficient digital infrastructure, low levels of financial literacy, and regulatory constraints contribute to the persistence of exclusion despite ongoing reforms. Although Algeria has initiated several modernization efforts, a significant gap remains between existing traditional financial systems and the AI-driven, digitally innovative models increasingly adopted worldwide.

Existing studies addressing financial inclusion in Algeria tend to focus on either conventional banking or microfinance, with limited integration of AI, FinTech, and digital inclusion within a unified analytical framework. This gap highlights the need for a more comprehensive and innovation-oriented approach.

Accordingly, this study addresses the following research problem:

How can artificial intelligence, financial innovation, and support agencies be harnessed together to provide practical and sustainable solutions for reducing financial exclusion in Algeria?

This study seeks to analyze the nature and persistence of financial exclusion in Algeria identifying the key structural and institutional barriers that sustain it. It aims to examine the role of artificial intelligence and financial technologies, and how to promote

financial inclusion by expanding access, reducing costs and ensuring service efficiency. In this paper, a Financial Inclusion Potential Model was developed and implemented to quantitatively measure the impact of these technological variables on inclusion outcomes. It compares the current financial inclusion performance of Algeria with an AI improved scenario to evaluate potential future improvements. Finally, the paper aims to provide evidence-based policy recommendations that can support sustainable and inclusive financial access in Algeria.

To guide the analysis, the study proposes the following hypotheses:

H1: Artificial intelligence adoption significantly improves the level of financial inclusion in Algeria by expanding access, reducing costs, and enhancing service efficiency.

H2: Financial innovation represented by FinTech solutions positively influences inclusion by providing alternative, accessible, and affordable financial services to entrepreneurs.

H3: Support and accompaniment agencies play a moderating role in strengthening the impact of AI and financial innovation by improving outreach, institutional trust, and adoption among excluded groups.

H4: The combined effect of AI, financial innovation, and support agencies produces a greater improvement in Algeria's financial inclusion potential than either factor alone.

This paper introduces a new mathematical index (FIPM) to evaluate national inclusion potential and offers an AI-based improvement scenario for Algeria. It provides practical policy insights for the government and financial institutions and fills the gap between technological innovation and development research.

2. THEORETICAL AND CONCEPTUAL FOUNDATIONS

2.1 Financial Exclusion: An Overview

2.1.1 Concept and Definitions

Financial exclusion is a controversial concept in academic and political circles, with researchers and institutions offering varying definitions. Broadly, it is described as the failure of individuals and businesses to obtain and utilize suitable financial products and services which address their needs (World Bank, 2025). According to recent IMF and OECD work financial exclusion is a multidimensional phenomenon that includes the barriers of affordability, accessibility, and financial services awareness. Similarly, the United Nations refers to financial exclusion as a structural and social challenge that prevents vulnerable groups from participating in the formal financial sector, thereby supporting the inequality and marginalization.

Nuanced perspectives are also provided in academic literature. Leyshon and Thrift (1995) were among the first to conceptualize financial exclusion, with spatial and institutional constraints of accessibility. Other and more recent scholars see it as a systemic problem that fails to contribute to inclusive economic growth and hinders the achievement of sustainable development goals (Mungar et al., 2025). Taken together, these definitions help to understand that financial exclusion is not simply a lack of banking services but has other social, economic, and technological layers.

2.1.2 Dimensions and Implications

According to scholars and policymakers, financial exclusion has various key dimensions:

- **Access:** Physical or digital restrictions to entering the financial ecosystem, e.g. few bank branches in the rural areas or lack of digital connectivity.
- **Affordability:** The high transaction fees, interest rates and costs of financial services that are inaccessible to low-income groups (Shirono et al., 2024).
- **Availability:** Lack of product diversity, in which services are unable to fulfil the requirements of marginalized populations, including women, youth, or micro-entrepreneurs (Gharbi & Kammoun, 2023).
- **Awareness:** Low financial literacy and distrust in formal institutions leading the individuals to rely on informal and more risky alternatives (Rehman & Mia, 2024).

These dimensions have far-reaching implications. Financial exclusion leads to continuous cycles of poverty, since it restricts saving, investment and asset accumulation opportunities (Simatele & Maciko, 2022). At the macroeconomic level, the extensive exclusion compromises the potential of the national growth, diminishes tax bases, and increases social inequality (Rubio & León, 2025).

2.1.3 Global Trends

Recent statistics indicate some achievements as well as challenges in the field of financial inclusion. The World Bank Global Findex Database (2021) states that 76% of adults worldwide currently have an account with a financial institution or a mobile money provider, as opposed 69% in 2017. Inclusion in areas like Sub-Saharan Africa, South Asia, and the Middle East has strongly been influenced by the emergence of mobile banking and FinTech solutions (Gyamerah & Tetteh, 2024). For example, Sub-Saharan Africa witnessed an increase from about 21% in 2017 to about 33% in 2021 in the ownership of financial accounts, which can be attributed to the mobile money platforms as M-Pesa (World Bank., 2021).

However, the global situation still unbalanced. As of 2022, nearly 1.4 billion people

remain excluded from formal financial systems (Adelaja et al., 2024). Women, rural populations, refugees, and informal workers are still underrepresented with gender disparities still persisting in Pakistan, Morocco, and Algeria (IMF, 2024). Furthermore, the digital divide especially in internet access, smartphone penetration, and digital literacy still contributes to inequalities (GSMA, 2024).

Looking ahead, the trends from 2023 to 2025 focus on using the digital transformation and artificial intelligence to fill these gaps. According to international reports, AI-based credit scoring and alternative data solutions have a potential to introduce millions of unbanked to the financial system through the provision of more equitable and faster access to credit. Yet, the issue of cybersecurity, regulatory policies, and ethical AI use suggest that a cautious policy should be created (Crisanto et al., 2024).

2.2 Financial Inclusion: An Overview

2.2.1 Concept and Scope

Financial inclusion today goes beyond simply providing bank accounts. It not only focuses on access, but also on the quality and use of financial services (Ha et al., 2025). True inclusion includes affordable yet dependable products and those designed to meet the needs of users (Raheem et al., 2024). It also depends on financial literacy and consumer protection since the access without knowledge or trust can lead to further vulnerabilities. Thus, financial inclusion is a multidimensional concept that integrates economic, social and the technological aspects.

2.2.2 Link with Sustainable Development

The importance of financial inclusion goes much beyond the financial sector, making it a source of sustainable development (Yap et al., 2023). It is explicitly identified by the United Nations as an enabler of a variety of Sustainable Development Goals (SDGs), especially Goal 1 (No Poverty), Goal 5 (Gender Equality), Goal 8 (Decent Work and Economic Growth), and Goal 10 (Reduced Inequalities) (UNCDF, 2023). By offering access to credit, savings and insurance mechanisms, inclusive financial systems help reduce the poverty traps (Rubio & León, 2025). Evidence of developing countries has shown that inclusive financial policy does not only ensure economic inclusion, but also social empowerment, which further supports its role as the cornerstone of sustainable development (CGAP, 2025).

2.2.3 Barriers to Financial Inclusion

Financial inclusion, despite its recognized relevance still faces major challenges. Economically, Low-income groups cannot access formal financial services due to income

instability, lack of collateral and high transaction costs (Tulu, 2023). In rural and remote regions, technological obstacles, including digital divides, poor connectivity and lack of digital literacy, are factors that hinder the progress (Wu & Peng, 2024). Institutional barriers consist of the outreach of financial institutions, inadequate regulatory systems and low levels of innovation in traditional banking models; On the sociocultural side, gender norms, mistrust in formal institutions and preference of informal financial mechanisms discourage people from participating in the formal financial systems (Łaszewski, 2024). These obstacles are especially acute in developing areas, where exclusion is overlapped by the broader structural inequalities. It is important to address these challenges in a way that will help promote innovative and context-specific solutions achieving true financial inclusion.

2.3 Innovation and Artificial Intelligence in Financial Services

2.3.1 FinTech Innovations

Financial technology (FinTech) has become one of the most revolutionary elements in combating financial exclusion (Faust et al., 2023). Mobile banking and digital wallets (e-wallets) enable individuals who lack access to traditional banks to carry out key transactions like payments, savings and remittances via smart phones (Demirgüç-Kunt et al., 2022).

Blockchain technology further increases financial inclusion by ensuring that the transaction systems are secure, transparent, and decentralized, which minimizes the use of intermediaries and lower costs (Mhlana, 2023). In the same way, digital payment systems such as QR codes and contactless payment solutions allow micro-entrepreneurs and small businesses to enter a larger market and become part of formal economies (Beck et al., 2022).

2.3.2 Role of Artificial intelligence

AI enhances the potential of transformation of FinTech through the creation of smarter, faster and more inclusive solutions (Alamsyah et al., 2025). Credit scoring is also one of the most significant contributions of AI rather than using only traditional financial history, AI models could also use other data, like mobile phone usage, utility bill payments, or even social media behavior, in order to determine creditworthiness (Pooja, 2025). This provides opportunities to those who were previously locked out due to a shortage of collateral or formal banking records (Zhang, 2025). Fraud detection, risk management and personalized advisory services further boost the trust in digital systems (Utama & Hidayat).

2.3.3 Opportunities and Risks

AI and FinTech can significantly increase inclusion by providing affordable,

scalable and easy to use financial services (UNDP, 2023). However, risks remain including cybersecurity threats, algorithmic bias as well as weak regulatory frameworks (World Bank, 2022; Pazarbasioglu et al., 2024). Overcoming these challenges requires ethical AI use, supportive regulations, cross-sector collaboration, and digital literacy investments (Loukos & Arathoon, 2025).

2.3.4 Implications for Support Agencies and Startup Ecosystems

FinTech and AI services have a direct influence on support agencies and startup ecosystems. AI-based credit assessments, Mobile banking and e-wallets are some of the tools that allow agencies to expand outreach, tailor financial literacy initiatives and offer personalized advisory services (Nayak, 2025; OECD, 2025). These solutions enhance the efficiency and the startup ecosystem helping bridge the structural gap and improving the overall entrepreneurial environment in Algeria.

2.4 The Algerian Context

2.4.1 Characteristics of Algeria's Financial Ecosystem

The financial ecosystem of Algeria is largely cash-based (over 70% of the transactions) and has a large informal sector (30-40% of GDP), limiting access to formal finance (AfricaNenda, 2024; The Global Economy, 2020). Public banks dominate the system focusing on state projects rather than SMEs or individual users (U.S. Department of State, 2024). Banking distribution is concentrated in urban areas leaving rural regions underserved (World Bank, 2024).

2.4.2 Existing Initiatives

Algeria has adopted initiatives such as microfinance, e-payment systems, wider bank card and ATM usage, and the Ministry of Knowledge Economy and Startups (Allali, 2022; U.S. Commercial Service, 2024). Regardless of these efforts, structural and implementation issues reduce their effectiveness (IMF, 2024).

2.4.3 Key Challenges

Despite the efforts, Algeria continues to deal with significant barriers to financial inclusion. Challenges include low financial literacy (Yahiaoui, 2023), uneven digital infrastructure (Lancaster, 2025), restrictive regulations, cautious institutions, and limited innovation (Baddou, 2025). Addressing these challenges requires finding AI-based, context-sensitive and technology-integrated solutions as well as institutional reform, and capacity-building initiatives.

3. METHODOLOGY

3.1 Research Design

This research adopts a descriptive analytical design supported by conceptual and

mathematical modeling to explore the possibility of applying artificial intelligence (AI) and financial innovation to improve financial inclusion in Algeria. Building on the literature on financial exclusion and the role of support and accompaniment agencies, the paper develops a conceptual framework that evaluates the potential of inclusive financial access in Algeria and its implications for startup ecosystems. The empirical background of this analysis is based on secondary data from international and national sources.

3.2 Analytical Framework: Financial Inclusion Potential Model (FIPM)

To capture the multidimensional nature of financial inclusion the study proposes the Financial Inclusion Potential Model (FIPM). The model incorporates six key variables

- A = Access to financial services
- F = Affordability of financial products
- D = Digital readiness and technological adoption
- T = Institutional trust including the effectiveness of support and accompaniment agencies in facilitating access
- AI = Adoption of artificial intelligence in financial services
- FI = Financial innovation, including FinTech and mobile banking solutions

The model is expressed mathematically as

Where each coefficient is a reflection of the relative contribution of the corresponding factor. Equal weighting is implemented due to the lack of empirical evidence in Algeria assigning differential weights and because the paper focuses on conceptual modeling rather than hypothesis testing. This approach correlates with the standard practices in building the composite indices (e.g., UNDP, OECD).

3.3 Institutional Trust and Agencies

Within the FIPM model, institutional trust (T) directly includes the role of support and accompaniment agencies. These agencies act as intermediaries between entrepreneurs and formal financial systems, increasing trust, offering advice services and accessing credit and digital financial tools. This study links the conceptual analysis directly to the practical processes that form inclusive startup ecosystems by integrating their role into the model.

3.4 Normalization of Variables

All variables are normalized on a 0–1 scale to ensure the comparability and allow the mathematical aggregation. Normalization allows diverse indicators such as AI readiness, financial access and agency effectiveness to play a significant role in

determining the overall financial inclusion potential.

3.5 Data Sources

The study relies on secondary data as its main source collected from official reports, academic literature, and policy documents issued between 2020 and 2025. These are strong sources of information on global and national trends in financial inclusion, AI adoption, FinTech innovation, and the operations of support and accompaniment agencies in Algeria.

4. RESULTS

4.1 Application of the Financial Inclusion Potential Model (FIPM)

The FIPM was applied to evaluate the potential of financial inclusion in Algeria under two scenarios: the current situation and a future scenario leveraging AI, FinTech innovations, and the active engagement of support and accompaniment agencies within institutional trust (T). Under this approach it's possible to measure the baseline exclusion and the potential improvements achievable through technological and institutional interventions.

4.1.1 Scenario 1: Current Situation

This scenario establishes the baseline conditions of Algeria's financial inclusion ecosystem by normalizing six core FIPM dimensions on a 0–1 scale.

Table N°1: FIPM Variables under the Current Scenario

Variable	Normalized Value (0–1)	Description
Access (A)	0.40	Limited banking branches and digital reach
Affordability (F)	0.35	High costs of financial services for low-income groups
Digital Readiness (D)	0.30	Low internet penetration and digital literacy
Institutional Trust (T)	0.25	Weak effectiveness of support agencies for marginalized populations
AI Adoption (AI)	0.20	Minimal AI integration in financial services
Financial Innovation (FI)	0.30	Limited FinTech adoption and mobile payment usage

Source: Author's compilation

$$FIP_current = \frac{(0.40 + 0.35 + 0.30 + 0.25 + 0.20 + 0.30)}{6} = 0.30$$

This low baseline score (0.30) indicates the continued obstacles in the financial ecosystem of Algeria: limited access to banking services, high transaction costs, low digital literacy and low institutional trust (AfricaNenda, 2024; World Bank, 2024). The contribution of support and accompaniment agencies is embedded in **T**, and the low value shows their insufficient coverage and ability in current circumstances.

To assess the potential transformative role of AI and digital financial innovation, a second scenario was developed to project improvements under enhanced technological and institutional conditions.

4.1.2 Scenario 2: Future with AI & Digital Financial Innovation

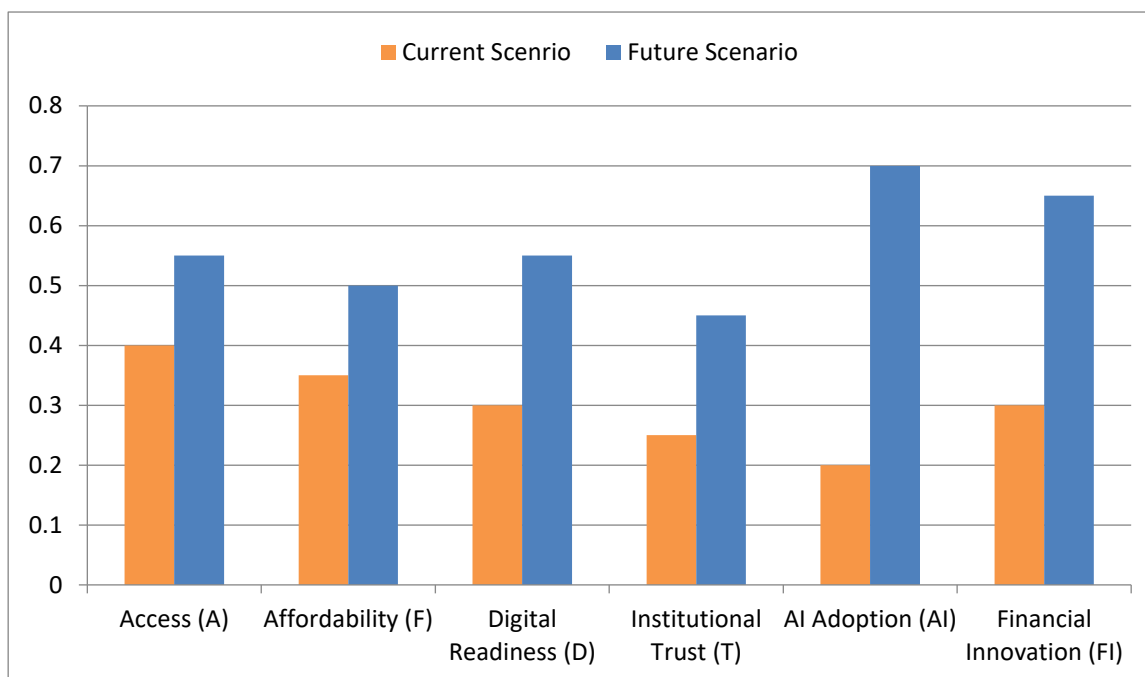
Table N°2: FIPM Variables under the Future Scenario

Variable	Improved Value (0–1)	Description
Access (A)	0.55	Expanded reach through mobile banking and e-wallets
Affordability (F)	0.50	Reduced transaction costs via FinTech solutions
Digital Readiness (D)	0.55	Better infrastructure and digital literacy programs
Institutional Trust (T)	0.45	Strengthened agency effectiveness via AI integration
AI Adoption (AI)	0.70	Widespread AI-enabled credit scoring and advisory tools
Financial Innovation (FI)	0.65	Broader use of FinTech and digital payments

Source: *Author's compilation (2025)*

$$FIP_future = \frac{0.55 + 0.50 + 0.55 + 0.45 + 0.70 + 0.65}{6} = 0.57$$

Figure N°01: Comparison of FIPM Scores Under the Current and Future Scenarios



Source: Author's compilation based on FIPM calculations (2025).

The improvement reflects the synergistic effect of FinTech innovations, AI and strengthened institutional support. The institutional trust variable rises to 0.45, which proves that the adoption of AI and digital financial tools by support agencies enhances their effectiveness and performance, and increases confidence among entrepreneurs (OECD, 2025).

4.1.3 Inclusion Improvement

$$\Delta FIP = FIP_{future} - FIP_{current} = 0.57 - 0.30 = 0.27$$

The increase in inclusion potential (27 point) indicates that the current financial inclusion capability is nearly doubled, emphasizing the critical role of the coordinated technology adoption and agency intervention in overcoming the structural exclusion (IMF, 2024; World Bank, 2024).

4.2 AI-Driven financial Inclusion Index (AIDFII)

The specific impact of AI, digital infrastructure, and financial literacy on the inclusion is isolated using a secondary index (AIDFII). The index is defined as

$$I = 0.35 A + 0.25 F + 0.20 D + 0.20 L$$

Table N°3: AIDFII Variables under Baseline vs. AI Scenario

Variable	Baseline Value	AI Adoption Scenario	Notes
AI Adoption (A)	0.20	0.60	Credit scoring and advisory tools
FinTech Penetration (F)	0.30	0.60	Mobile payments and digital wallets
Digital Infrastructure (D)	0.40	0.50	Internet and smartphone availability
Financial Literacy (L)	0.25	0.50	Tailored literacy programs via AI

Source: *Author's compilation (2025)*

- **Baseline AIDFII:** $I_{baseline} = 0.28$

- **AI Scenario AIDFII:** $I_{AI} = 0.415$

→ A 52% improvement in inclusion is observed. This underscores that AI-based solutions, especially when adopted by support and accompaniment agencies, can change accessibility and usability of financial services for entrepreneurs. For example, the AI-based credit scoring allows agencies to evaluate the clients without formal banking records while the AI-driven advisory platforms can provide tailored financial literacy programmes (Klapper et al., 2025).

4.3 Conceptual Regression Model

To further illustrate relationships between technological adoption, institutional support and inclusion, the following conceptual regression model was constructed

$$FI = \beta_0 + \beta_1 AI + \beta_2 FinTech + \beta_3 Literacy + \epsilon$$

Expected Signs

- $\beta_1 > 0$: AI adoption reduces barriers to credit and improves service accessibility.
- $\beta_2 > 0$: FinTech innovations expand the reach and efficiency of financial transactions.
- $\beta_3 > 0$: Financial literacy increases adoption, trust, and correct utilization of services.

In this model, Institutional Trust (T) representing support and accompaniment agencies acts as a moderating factor enhancing the effects of AI and FinTech on inclusion. Stronger agencies improve trust as well as facilitate training, digital adoption and targeted support for startups.

4.4 Descriptive Insights and Scenario Comparisons

To complement the quantitative modeling, the study provides descriptive insights based on the two scenarios applied in the Financial Inclusion Potential Model (FIPM) and the AI-Driven Inclusion Index (AIDFII). These insights indicate the current issues and the possible changes that can be effected through technology adoption and institutional support.

Current Scenario (Baseline)

The FIPM baseline score of 0.30 confirms the existence of significant structural barriers in the Algerian financial system (World Bank, 2024). The AIDFII baseline value of 0.28 indicates that the adoption of AI and digital financial literacy are underdeveloped, which restricts the general inclusion potential (AfricaNenda, 2024).

Future Scenario (With AI and Financial Innovation)

The projected FIPM score of 0.57 and AIDFII improvement to 0.415 illustrate the transformative potential of AI and FinTech when coupled with strengthened support agencies. Specifically, the scenario shows that

- Through digital channels and mobile banking access to financial services can be improved.
- Affordability barriers decrease with lower transaction costs resulting from FinTech solutions.
- Institution trust increases with AI-based credit assessment and the personalized advisory service.
- Financial literacy intervention supported by AI tools increase the proper use of financial services.

4.5 Scenario Comparison

The 27-point Δ FIP improvement and 52% increase in AIDFII indicate the synergistic interaction of technology, literacy and agency intervention (CGAP, 2025). These findings indicate that, although AI and FinTech are strong facilitators of inclusion their effectiveness depends on the active engagement and capability of support and accompaniment agencies.

Table N°4: Comparison of FIPM and AIDFII Across Scenarios

Aspect	Current (Baseline)	Scenario Future FinTech	Scenario (With AI & Improvement) / Δ
FIPM Score	0.30	0.57	+0.27
AI-Driven Inclusion Index (AIDFII)	0.28	0.415	+0.135 (52%)
Access (A)	0.40	0.55	+0.15 (38%)
Affordability (F)	0.35	0.50	+0.15
Digital Readiness (D)	0.30	0.55	+0.25
Institutional Trust (T)	0.25	0.45	+0.20
AI Adoption (AI)	0.20	0.70	+0.50
Financial Innovation (FI)	0.30	0.65	+0.35

Source: Author's compilation based on FIPM and AIDFII calculations (2025)

4.6 Hypotheses Exploration

To explore the study's hypotheses, FIPM, AIDFII, and conceptual regression model were applied to measure the impact of AI adoption, FinTech innovations, and institutional trust on financial inclusion. H1 predicted that AI adoption has significant positive effects on inclusion, H2 that FinTech solutions positively influence inclusion and H3 that the combined effect of AI and FinTech represent greater improvements than either factor alone, and H4 that the combined effect produces a greater improvement than any single factor. The scenario analysis and indices were tested against these hypotheses: the significant improvements in FIPM ($\Delta = 0.27$) and AIDFII (52% increase) under the future scenario signify strong support of all three hypotheses, showing that AI and financial innovation, in particular, when combined with active agency engagement, enhance the inclusion potential in Algeria.

5. DISCUSSION

This paper examined the current state of financial inclusion in Algeria and how AI and FinTech innovations can help to improve it with the engagement of support and accompaniment agencies. The findings offer both descriptive and quantitative insights of the structural, technological and institutional factors shaping access to financial services.

- **Structural and Institutional Insights**

The baseline FIPM score of 0.30 and AIDFII value of 0.28 confirm the presence of

structural barriers in the financial ecosystem of Algeria. Insufficient digital readiness, limited physical access to financial services, low institutional trust and high transaction costs, all restrict the effective use of financial tools. These findings are consistent with previous literature that emphasizes the multidimensional nature of financial exclusion which includes economic, technological and institutional layers. The low institutional trust score emphasizes existing constraints of support and accompaniment agencies to facilitate inclusion indicating an urgent need for capacity-building and targeted interventions.

- **Technological Opportunities**

The scenario analysis demonstrates that AI and FinTech innovations are potent enablers of financial inclusion. The AI adoption emerged as the factor with the greatest potential impact as it improves credit assessment capabilities and provides personalized financial services. FinTech solutions, such as mobile banking and digital payment systems reduce the transaction costs and improve access, especially in the underbanked areas. The results reveal that digital readiness is essential, without sufficient technological infrastructure and literacy the benefits of AI and FinTech cannot be fully realized.

- **Role of Support and Accompaniment Agencies**

Institutional trust represented by the effectiveness of support agencies, acts as a critical moderating factor. By integrating AI and digital financial tools into their services, agencies can raise confidence in the ecosystem, simplify access to financial services and offer guidance for startup development. The combined modeling results prove that technological innovation cannot be translated into measurable improvements in financial inclusion without agency involvement.

- **Contribution to Startup Ecosystem Development**

In addition to financial inclusion focus the paper points to the broader implications for the startup ecosystem in Algeria. With the help of AI and FinTech to improve access to finance, support agencies can enable entrepreneurs launch, scale, and sustain ventures more effectively. The results highlight the need to integrate digital and institutional innovation in the startup support schemes to synchronize the micro-level interventions with systemic ecosystem improvements.

- **Interpretation of Quantitative Findings**

AI adoption produced the largest inclusion gains (+0.50) confirming H1 that AI significantly improve financial inclusion, while FinTech adoption lowered barriers and increased affordability confirming H2. The combined effect of AI and FinTech nearly

doubled inclusion potential validating H3 regarding their synergistic impact.

Overall, the discussion emphasizes that comprehensive measures are necessary to address sustainable financial inclusion and strengthen the startup ecosystem in Algeria using a coordinated approach that assumes the adoption of technology, institutional support and literacy interventions. The findings highlight that technological solutions are not enough but effective engagement and capacity of support and accompaniment agencies are essential to transform AI and FinTech innovations into real-world financial access improvements.

6. CONCLUSION

Financial exclusion in Algeria still constrains economic participation and entrepreneurial development. Despite some positive development in recent reforms and digital initiatives, the results of this study reveal that structural barriers, such as limited access, affordability, constraints, low digital readiness and weak institutional trust, are the primary challenges to achieving meaningful financial inclusion. The baseline scores of the FIP and AIDFII models prove that the existing ecosystem requires coordinated technological and institutional interventions.

The scenario analysis reveals that AI-driven tools, FinTech innovations, and strengthened support and accompaniment agencies can help improve financial inclusion, nearly doubling its potential. AI adoption produces the most significant impact, improving the credit assessment, personalizing advisory services, and reducing information asymmetry. These technologies, along with improved digital infrastructure, expanded financial literacy and increased institutional trust, form a strong foundation for modernizing the Algerian financial system and enabling access to financial services.

Grounded in the findings of this study and supported by the quantitative models, several strategic priorities emerge for policymakers and ecosystem actors

- **Promote Open Banking and FinTech Innovation:** Empower local FinTechs to develop AI-based credit scoring system, digital budget tools and alternative data based solutions that increase accessibility and affordability for the wider population.
- **Strengthen Strategic Partnerships:** Foster partnership between FinTechs, telecom operators and support agencies to increase mobile payment adoption and develop a dynamic and competitive digital financial ecosystem.
- **Integrate Digital Services With Financial Literacy:** Ensuring that citizens receive basic training when providing them with digital financial services that will enable them to adopt and use these services effectively and securely.
- **Expand access to credit through AI:** Develop tools that leverage alternative

forms of data such as mobile transactions or utility usage to enable more individuals particularly underserved populations and entrepreneurs to expand their microcredit options.

- **Enhance Institutional Capacity of Support Agencies:** improve the skills and resources of Algerian support agencies to guide citizens with AI based tools and build trust in the digital services.
- **Build Secure Data-Sharing Networks:** Develop safe and privacy focused systems that enable financial institutions and FinTechs to exchange information making it easier to access credit and support financial inclusion.

Algeria can shift toward a more innovative, integrated and inclusive financial ecosystem by adopting these technologies driven and institutionally supported measures. The combined evidence from FIP and AIDFII models shows that the coordinated action, with a central focus on AI, FinTech, institutional trust, and digital literacy, is necessary to facilitate equal access to finance and supporting the development of a dynamic startup ecosystem. Ultimately, these changes could lead to sustainable economic growth and make Algeria a leader in digital financial innovation in the region.

Future Research

While this study provides a quantitative basis for understanding the role that AI, FinTech and support agencies play in shaping financial inclusion in Algeria, future research could expand on these findings in several important ways. FIPM and AIDFII models could be tested further and empirically confirmed using household-level or firm-level data across other regions. Further research can be conducted to examine the internal capacities and operational challenges of support and accompaniment agencies to better understand their readiness for the AI integration. Comparative studies with other developing economies could also be useful in establishing contextual factors that either accelerate or hinder technology enabled inclusion. Longitudinal study tracking the adoption of AI-driven financial tools over time would provide more insights on the behavioral shifts, trust formation and ecosystem evolution. These extensions would further enhance the understanding of how digital transformation can be sustainably embedded in the financial and the entrepreneurial landscape of Algeria.

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