

Digital Finance for Sustainable Financial Inclusion

Zouhair Chiban
PHD Student in Private Law

Affiliated Institution
AbdelmalekEssaâdiUniversity
Faculty of Legal, Economic and Social Sciences – Tangier

Abstract

Digital banking can reduce the costs and geographical obstacles to payments, savings and credit, but access to technology does not necessarily lead to meaningful financial inclusion. This paper explores the conditions under which FinTech can contribute to sustainable financial inclusion in Morocco, and the legal and policy safeguards that are needed to ensure that digital finance is safe, egalitarian and sustainable. It has been conceived as a narrative appraisal of selected academic studies, mainly released between 2020 and 2026, with a focus on Morocco and the MENA region, and as a documentary investigation of the Moroccan regulatory environment. The summary shows that mobile payments, digital lending and regulated alternative-finance channels may reach rural populations, women in the informal economy and small firms. But their reach is hampered by financial capacity, connectivity, cost, unequal digital skills, mistrust and risk of fraud or inappropriate lending. Morocco already has important legislative underpinnings in the areas of payment institutions, personal data, cybersecurity, mobile payments and crowdfunding. The real challenge, therefore, is not the absence of regulation but the absence of coordinated implementation, clarity for digital consumer protection, accountable data use and impact monitoring. The article proposes an integrated framework of access-capability-trust-sustainability to provide guidance for policy and future research.

Keywords: *Fintech; Digital Finance; Financial Inclusion; Consumer Protection; Data Governance; Cybersecurity; Morocco.*

I. INTRODUCTION

Digital finance has been a crucial part of the financial-sector transition in emerging economies. Mobile payments, e-wallets, digital onboarding, data-driven credit and online financing platforms can reduce transaction costs and expand financial services beyond the traditional branch network. This potential is especially relevant for Morocco, where financial inclusion has expanded but is still uneven among rural populations, micro-entrepreneurs, women, and workers with income from the informal economy. Conversely, the studies focused on Morocco view FinTech as a chance to expand access to payments and financing, particularly for small companies and groups who face barriers due to location, documentation or costs (Ait Hbib & Makhrouf, 2025; Ed-Daoudy & Chakir, 2024; Kobiyh et al., 2024; Lakhoul & Segdali, 2024). But access is not to be confused with inclusion. Someone could sign up for a mobile account and not be able to use it confidently, affordably, or safely. Digital channels can reproduce existing disparities when clients don't have the money, reliable access, the right gadgets, or the belief in service providers. They also create added risks through opaque pricing, digital fraud, excessive data collection, automated credit determinations, or rapid access to inappropriate loans. Studies in Morocco and the wider MENA (Middle East and North Africa) region indicate that there is a recurring gap between the availability of technology and its effective appropriation by underserved users (Abouzaid & Boussedra, 2026; Elouaourti & Ibourk, 2024; Mouzoun & Ammi, 2023; Odei-Appiah et al., 2022).

The existing literature is also fragmented. Other studies have focused on adoption. Other research, however, delve on financial inclusion, sustainable finance, bank stability or the broader FinTech ecosystem. Legal and institutional difficulties are usually left as a last recommendation, not part of the causative explanation. But regulation addresses who can provide a service, how customers are notified, what data can be gathered, how mishaps are handled, and whether users have an effective remedy. Trust in digital banking is not just a psychological trait but is also partly built by enforced regulations, sound monitoring, secure infrastructure and visible redress mechanisms. This relationship can be examined by looking at the evolution of the policy environment in Morocco, including its National Financial Inclusion Strategy, payment institution framework, mobile payment rules, data protection regime, cybersecurity framework, crowdfunding legislation, Morocco Fintech Center, and formal FinTech pathway. The essay raises the following question: How can digital banking be introduced in Morocco to facilitate financial inclusion, while at the same time providing safety for consumers, responsible use of data, cybersecurity, and sustainable results? The idea is that FinTech can only contribute to sustainable inclusion if four conditions are fulfilled: (i) accessible and inexpensive services; (ii) sufficient financial and digital competence; (iii) legal and institutional trust; and (iv) outcomes that are socially and economically beneficial in the long run. The paper contributes in three ways. It starts with a transition from a technology-centric view to a holistic framework comprising of access, capability, trust and sustainability. Secondly, it links Moroccan literature on

inclusion to the applicable legislative and institutional framework. Third, it defines concentrated policy priorities by not treating each emergent technology as a separate answer.

II. CONCEPTUAL FRAMEWORK AND MOROCCAN CONTEXT

2.1 From financial access to sustainable inclusion

Financial inclusion is more than simply having an account. It is a question of whether consumers and enterprises can utilize and access a suitable range of payment, savings, credit and insurance services at reasonable cost and with enough protection of their interests. Digital finance refers to the supply or facilitation of these services via digital channels and data infrastructures. A more restrictive definition of FinTech is technology-enabled innovation in financial products, procedures and business structures. The two concepts are not synonymous, they overlap: not all digital banking services are a FinTech innovation, and not all FinTech products necessarily enhance inclusion. A further distinction needs to be made for a sustainable approach. There are four dimensions of sustainable financial inclusion in this article. The first is access: services must be geographically available, technically usable and cheap.

The second is capability: consumers need to know key words, costs, dangers, and complaint processes. The third is trust: providers and platforms should operate under well-defined legal limits, preserve personal data, secure transactions and provide appropriate remedies. Fourth is results: digital finance must raise users' financial resilience, not just their registrations, transaction volumes or short-term credit. When digital finance channels financing towards verifiable green activities, environmental objectives may be included, but environmental benefits should be shown rather than assumed (Bansal et al., 2024; Hasan et al., 2024; Mamun&Várallyai,2025; Tidjani&Madouri,2024).

This structure helps avoid two typical mistakes. The first is technical determinism, which assumes that the structural exclusion will be automatically removed by the mobile penetration or the artificial intelligence. The second is conceptual inflation, when any digital financial product is characterized as sustainable. A mobile loan could enhance access, but it is socially sustainable only if the customer comprehends the loan's cost and is not over-indebted. Similarly, a digital platform is not environmentally sustainable just because it is paperless. Sustainable FinTech should thus be evaluated based on real user outcomes, governance structures and realistic environmental criteria.

2.2 The Moroccan policy and legal setting

Digital banking is part of Morocco's National Financial Inclusion Strategy, which is embedded in a broader policy agenda on neglected communities and consumer safety. The Bank Al-Maghrib's idea of inclusion is defined as cheap access for households and firms, and identifies women, young people, rural inhabitants and very small enterprises as categories requiring particular attention. This policy viewpoint is important because it regards the digitalization as a means for inclusion and not an end in itself (Bank Al-Maghrib, 2021).

The legal architecture is fragmented over a series of instruments. Law No. 103-12 lays down the basic structure for credit institutions and assimilated bodies including payment institutions. Decision No. 392/W/2018 of Bank Al-Maghrib that promotes an interoperable m-wallet ecosystem is also governing the domestic mobile payment. The supervisory role of the National Commission for the Control of Personal Data Protection (CNDP) is defined in Law No. 09-08 on the processing of personal data. Law No. 05-20 on the national cybersecurity framework. Law No. 15-18 governs crowdfunding and allocates the supervisory responsibilities according to the category of operation. Institutional support has also been provided by the Morocco Fintech Center and by the FinTech pathway of Bank Al-Maghrib which outlines the orientation and authorization process for project holders (Bank Al-Maghrib, 2024, 2025).

Table 1. Selected legal and institutional pillars of digital finance in Morocco :

Instrument or initiative	Principal function	Relevance to sustainable inclusion
National Financial Inclusion Strategy	Coordinates inclusion policy and prioritises underserved groups, service quality, and consumer protection.	Positions digital finance within a broader social-policy framework rather than treating account creation as the final objective.
Law No. 103-12, as amended	Regulates credit institutions and assimilated bodies, including payment institutions, under Bank Al-Maghrib supervision.	Creates an authorisation and accountability perimeter for providers handling payments and other regulated financial services.
Decision No. 392/W/2018 on domestic mobile payment	Sets rules for the domestic m-wallet environment and interoperability.	Reduces network fragmentation and supports transfers and merchant payments across participating providers.
Law No. 09-08 on personal data protection	Regulates personal-data processing and gives the CNDP supervisory and enforcement	Supports trust in digital onboarding, identity verification, data sharing, and data-driven credit decisions.

	functions.	
Law No. 05-20 on cybersecurity	Provides a national framework for cybersecurity governance and the protection of information systems.	Reinforces operational resilience and the security expectations surrounding digital financial infrastructure.
Law No. 15-18 on crowdfunding	Regulates donation-, loan-, and investment-based crowdfunding with supervision allocated to the competent financial authority.	Allows alternative financing to develop within a defined legal framework and with risk-related safeguards.
Morocco Fintech Center and FinTech pathway	Provide coordination, guidance, mentoring, and clearer orientation toward the competent authority and authorisation route.	Can reduce regulatory uncertainty and support responsible innovation without presuming that every project should be licensed or scaled.

Note. The table presents the instruments most directly connected to the article's analytical focus; it is not an exhaustive inventory of Moroccan financial regulation.

III. METHODOLOGY

The paper combines a systematic narrative review paired with a legal-documentary analysis. The academic source base was collected from the bibliography supplied with the first manuscript. Priority was given to peer-reviewed or clearly recognizable studies published predominantly between 2020 and 2026 that address at least one of four themes: FinTech adoption in Morocco; digital financial inclusion in Morocco or the MENA region; financial aptitude and exclusion; or the relationship between digital finance and sustainability. Only a few international studies were included to serve as conceptual or comparative bases. Duplicate items, weakly connected research and sources whose principal subject was outside the query of the article were removed. The legal part includes the analysis of the official Moroccan documents regulating financial inclusion, banking and payment institutions, mobile payment, personal data, cybersecurity, crowdfunding and the institutional handling of FinTech ventures. The material was coded according to four analytical categories: access opportunities, socioeconomic barriers, legal and institutional safeguards, and sustainable outcomes.

Therefore, the conclusions below constitute a crucial synthesis of the studied literature and government documents. The study does not claim to have performed interviews, a Delphi exercise or an innovative statistical model. The main shortcoming is that it cannot estimate causal influence, or represent the experience of all user groups. These questions require primary data and longitudinal studies.

IV. THEMATIC FINDINGS

4.1 Digital tools and inclusion opportunities

The reviewed literature consistently identifies mobile-based services as the most immediate channel through which digital finance can broaden access. Payments and transfers made thru mobile wallets can eliminate the need for travel, branch dependence and costs of small-value transactions. Interoperability is especially vital, since a wallet isn't very useful if users are restricted to transacting within a closed network. Morocco's domestic mobile-payment rules and interoperable infrastructure thus offer a vital basis for further adoption, especially when payment accounts may be connected to merchants, public payments, remittances and basic saving functionalities (Senyo & Osabutey, 2020; Shaikh et al., 2022).

Digital finance can help small businesses overcome limits on transactions and financing. Electronic payments create trails that could enhance business visibility, while digital application processes can ease administrative responsibilities. Lending based on FinTech and regulated crowdfunding could also offer alternatives for enterprises without traditional collateral and an established credit history. Moroccan SMEs show interest in adopting FinTech and in alternative finance. However, this should not be confused with actual and responsible access (Ed-Daoudy & Chakir, 2024). In this sense, the framework for crowdfunding introduced by law n° 15-18 is essential, because it allows for innovation, while assigning monitoring and establishing a clear legal border.

Mobile-first services may also be beneficial for women working in the informal sector and rural users by reducing reliance on distance, hours of operation or official papers at the job. Women's adoption in Morocco relies on perceived utility, convenience of use and acceptance (Ait Hbib & Makhrouf, 2025). This emphasizes a bigger discovery: good inclusion is a matter of user-journey design, not just the availability of a digital product. Simple language, easy to use interfaces, reputable cash-in and cash-out points and aid when a transaction fails can make the difference between an account being a financial tool that is actively used. So digital finance is most valuable when the technology complements rather than replaces institutions. Agent networks, customer help, financial education, interoperable payment rails and trustworthy dispute resolution make the availability of technology practical application. AI or automated scoring can help speed up decision making, but should be considered as operational tools within this ecosystem and not as independent solutions to exclusion.

4.2 Why digital access remains unequal

The first permanent obstacle is ability to pay. Users want more than just to be able to use a phone. They should be advised of fees, interest or other equivalent financing costs, repayment obligations, cautions against fraud and ramifications of disclosing personal information. Abouzaid and Boussedra (2026) underline the relationship between literacy and resilience and social access in Morocco. The interaction accounts for how the same product may improve autonomy for one user but cause confusion or vulnerability for another. The second obstacle is the digital divide. Connectivity, quality of devices, language, disability and availability of support differ between geographies and social groupings. Moving a service online doesn't address rural exclusion if the user has poor internet connectivity or has to travel to find an agent to turn cash into digital value. Gender disparities may also be maintained with unequal control over phones, identity documents, income or financial decisions inside the household. Thus, regional data indicates that FinTech can both extend inclusion and perpetuate exclusion (Elouaourti & Ibouk, 2024; Odei-Appiah et al., 2022).

"The third is lack of trust. Users may be put off digital services by fear of fraud, hidden charges, misuse of data or absence of a human interlocutor. The exclusionary effect of a failed transaction is greater where the complaint procedure is not easy to follow, or where responsibility is shared between a bank, a payment institution, a telecoms provider and a technical subcontractor. Trust must therefore be reinforced by explicit contracts, provider identity, quick error correction and consistent liability distribution. In conclusion, increased access can result in increased financial risk. However, speed dulls consideration and increases the likelihood of repeated borrowing, even though automated credit can approve modest loans quickly. Alternative data could be used to evaluate the creditworthiness of loan applicants who do not have traditional collateral; yet, it could also be used to penalize individuals who do not have digital traces or to repeat societal inequalities that already exist. According to Anton and Afloarei Nucu (2024) and Banna et al. (2021), the international evidence on digital inclusion and financial stability is inconclusive. Furthermore, FinTech-based inclusion may alter the incentives for risk-taking rather than reducing risk since it may modify the incentives for taking risks. Therefore, in order to achieve sustainable inclusion, it is necessary to take into consideration appropriateness, affordability, and financial resilience.

4.3 Legal and institutional safeguards

4.3.1 Authorisation, supervision, and consumer protection

A credible digital-finance ecosystem requires a clear regulatory perimeter. The primary legal framework for the oversight of credit and payment institutions is Law No. 103-12, and the FinTech roadmap issued by Bank Al-Maghrib enables project owners select the relevant path. This explanation is important because the term FinTech embraces activities with widely varying risk profiles. A budgeting app, a payment service, a loan platform, and an investment platform shouldn't be legally the same. Regulation should be proportionate and should distinguish between them, while ensuring that regulated activity cannot be offered to the public without the proper authorization.

Consumer protection needs to be before, during and after the transaction. Users need simple and comparable information on price, fees, repayment, data use and the legal standing of the service before contracting. Interfaces should not employ manipulative design in usage and should reasonably provide cancellation or correction. After an issue, customers require a complaint channel visible, time-bound and able to coordinate the different parties involved. These criteria are particularly relevant for first time users and low value transactions as complicated procedures may make the cost of redress more than the amount lost.

4.3.2 Personal data and automated decisions

Personal data is crucial for digital banking in areas like identity, fraud protection, personalization of services and credit evaluation. Law No. 09-08 sets the general Moroccan framework for the processing of personal data and gives the CNDP the obligation for oversight. Its principles on specified aim, proportionality, security and the rights of data subjects are clearly relevant to digital onboarding and data sharing. The CNDP further underlined that the processing of personal data by artificial intelligence is still subject to Law No. 09-08 (CNDP, 2025).

But compliance should not be limited to formal notice. A sustainable strategy includes data minimization, intelligible privacy information, regulated access and documented retention durations. Where automated tools are used to make choices about credit or accounts, suppliers should be able to explain the primary elements in a way the user can comprehend, give relevant human review and test models for unreasonable discrimination. These precautions are policy recommendations, not an assertion that Moroccan law has a complete sector-specific structure for algorithmic decision-making.

4.3.3 Cybersecurity and operational resilience

Cybersecurity is a condition of inclusion because a serious incident can destroy trust among users who are only beginning to adopt digital finance. Law No. 05-20 provides a national cybersecurity framework, while financial supervision and payment-system oversight add sectoral responsibilities. Providers should combine strong authentication, secure development, transaction monitoring, incident-response procedures, business-continuity planning, and control of cloud or other third-party dependencies. Consumer communication also matters: warnings should be specific and understandable, and users should know immediately how to block access or report a suspected fraud.

4.3.4 Crowdfunding as an example of regulated innovation

Conversely, Morocco's crowdfunding framework shows how innovation can be embedded in financial regulation without being seen as unfettered experimentation (Autorité Marocaine du Marché des Capitaux, 2021). Law No. 15-18 makes a distinction between the types of crowdfunding and entrusts Bank Al-Maghrib or the Moroccan Capital Market Authority with the control according to the operation. This paradigm is relevant for small-business finance because it combines market entry with well-defined duties. Its inclusive value will depend on implementation, including risk disclosure, platform governance, project screening, complaint management, and financial knowledge of contributors and project holders.

4.4 Sustainability beyond green labelling

Sustainability must begin with the durability and quality of inclusion. A service is socially sustainable when its customers may continue to use it without incurring disproportionate costs, loss of control over their data or detrimental debt. It's economically sustainable where suppliers can serve low-income clients without hidden costs or shaky business strategies. It is institutionally sustainable when the duties are explicit across banks, payment institutions, platforms, telecommunication networks and technology vendors as services move from one to another.

Digital finance can also help with environmental goals by facilitating access to capital for renewable energy, resource efficiency or climate-resilient businesses. This is a relevant possibility for the overall green-finance agenda in Morocco (Ourhalouch et al., 2024). But the environmental value of FinTech has to be accounted for by capital use and validated results. Green labeling, automatic ESG scores or paperless operations are not adequate proof. We need clear eligibility standards, audited disclosures, and protection from greenwashing." The environmental footprint of data centers, devices and digital infrastructure should be acknowledged too.

V. DISCUSSION AND POLICY PRIORITIES

The synthesis supports a basic conclusion: technology extends the variety of conceivable services, but law, capability and institutional architecture decide whether those services are inclusive. Many of the core building blocks of a digital-finance ecosystem are already in place in Morocco. The issue for policy is to align these components as a cohesive system for user safety and inclusion. This analysis suggests four priority.

5.1 Design inclusion around effective use

Policy should be based on active, beneficial use, not account numbers. Mobile wallets and payment accounts need to be interoperable, inexpensive for small transactions, and supported by strong agent and merchant networks. Interfaces must be able to support low bandwidth, plain language and users requiring aided service. Rather than offering mere general understanding, financial education should be associated with practical decisions such as identifying a cost, evaluating credit offers, protecting a code, or lodging a complaint.

5.2 Build trust by design

Consumer protection, privacy and cyber security should be built into the product design. Standardized short-form disclosures could aid in comparing fees and repayment circumstances. Define explicitly who is liable for transactions that are fraudulent or fail. Complaint procedures should be integrated across providers and should produce supervisory data on reoccurring concerns. Minimum governance expectations for data-driven credit should include lawful and proportionate use of data, model documentation, discriminatory testing, relevant human review and explanations tailored to non-specialist users.

5.3 Coordinate innovation under proportionate regulation

The Morocco Fintech Center and Bank Al-Maghrib's FinTech pathway can help decrease confusion, by enabling innovators know which is the competent authority and what requirements apply. Their efficiency will hinge on the coordination between Bank Al-Maghrib, the AMMC, the CNDP, the cybersecurity authorities and other relevant entities. Controlled pilots are a valuable way to evaluate new models but they should have clear objectives, eligibility criteria, consumer safeguards, data-management procedures and exit requirements. We should not refer to the existence of institutional support as such before an official framework is put in place that sets up a regulatory sandbox.

5.4 Measure sustainable impact

Impact indicators should be disaggregated by gender, territory, age, enterprise size, and income source. Useful measures include active usage, transaction cost, failed transactions, complaint resolution, fraud losses, credit affordability, repeat borrowing and changes in household or business resilience. Environmental claims should include distinct indications for qualified activities and validated results. Better public data would also allow academic study to analyze longitudinally who embraces digital finance, who drops it and who benefits.

These priorities also help to identify the role that public-private cooperation can play. Public authorities should establish legal standards, oversee risks and protect users. Financial institutions and FinTech firms should innovate within those standards. Telecommunications and infrastructure providers should enable reliable access. Civil-society or educational actors can help tailor services to specific communities. Collaboration is useful only as long as one can assign responsibility. A multi-actor ecosystem should not turn into a system where no one is responsible to the user.

VI. CONCLUSION

Digital finance can enhance financial inclusion in Morocco by reducing distance, transaction costs and some of the documentary or administrative constraints associated with traditional services. Mobile payments, digital onboarding, alternative finance and data-enabled procedures offer considerable opportunities for rural consumers, women in the informal sector and small companies. But the evidence reviewed here does not support the idea that digitization is necessarily inclusive or sustainable.

Good design, financial capacity, legal and institutional trust and great long-term performance are the crucial components. Morocco has already put in place major foundations for its National Financial Inclusion Strategy, regulations for payment institutions and mobile payments, regulations for personal data and cybersecurity, crowdfunding legislation and new frameworks for coordinating FinTech projects. The next phase should be coordinated implementation: greater consumer information, effective complaints, accountable data use, operational resilience, proportionate oversight and impact measures beyond registrations or transaction amounts.

This article is not quantifying causal effects and has the limitations of a review-based approach. Future research should include user surveys, interviews, provider data and longitudinal indicators to compare the experience of women, rural households, informal workers and minimum enterprises. Such research would help policymakers distinguish between digital access that merely changes the channel and digital inclusion that increases financial resilience and sustainable development.

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