

Artificial Intelligence and Financial Inclusion: Transforming Digital Financial Services

¹Nutan Singh, ²Dr. Rohini Kumari, ³Dr. T. Mohanapriya, ⁴Dr. Deepak Kumar, ⁵Dr. Bharti,

¹Assistant Professor,
Department of MBA,

CMR Institute of Technology, Hyderabad

²Assistant Professor (sr. scale),

Department: Economics, School of Liberal Arts,
University: K.R. Mangalam University, Gurugram

³Associate Professor,

Department of Management Studies (MBA),
Velalar College of Engineering and Technology, Maruthi Nagar, Thindal, Erode

⁴Assistant Professor,

Department of Economics, School of Liberal Arts,
K.R. Mangalam University, Gurugram

⁵Assistant Professor,

Department of Economics,
N.B.G.S.M. College, Sohna, Gurugram

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Abstract

Artificial Intelligence (AI) is changing the way digital financial services are delivered, helping to deliver faster, more inclusive and personalized financial services to financially excluded and underserved populations. It explores the possibilities of AI to enhance financial inclusion in digital banking, to automate credit assessment, to make credit systems intelligent and more effective in combating fraud, to deliver personalised financial services and to find alternative methods of credit-scoring. AI can analyze different types of digital data files to evaluate creditworthiness, establish financial needs and provide services to those who are unbanked. All of these are capabilities that are especially relevant to the development of development economies where geographical isolation, lack of financial infrastructure, financial illiteracy and a short credit history are limiting to participating in formal financial services. The paper also focuses on how AI-powered digital platforms can help reduce costs, improve service delivery, increase the risk management capabilities, and make financial products more accessible for low income groups, rural communities and small businesses. Meanwhile, the proliferation of AI-powered financial services brings with it issues of data privacy, algorithmic bias, cyber security, digital literacy, transparency and exclusion due to poor digital access. The study underscores the need for responsible and inclusive AI governance, pointing to the need to

achieve a balance between fostering innovation and ensuring consumer protection and accessibility. It claims that AI can be beneficial for financial inclusion, provided it has a good digital infrastructure, financial literacy programmes and human-centred design, and is properly regulated. By empowering inclusive digital finance, AI can help to improve financial market access and the economic empowerment and sustainable development of everyone.

Keywords: Artificial Intelligence, Financial Inclusion, Digital Financial Services, FinTech, Digital Banking, Credit Scoring, Financial Accessibility, Financial Technology

Introduction

Financial inclusion has become an important element of inclusive economic development, especially in economic systems where major parts of the population are under-served by traditional financial institutions. Availability of affordable banking, credit, insurance, savings, investment and payment services allows individuals and enterprises to be more actively engaged in the economy and better equipped to withstand economic shocks and stresses. Although digital banking and mobile financial services have come a long way, and the current technological advances are no doubt helping to bring a wider range of financial services and products to a broader audience, they are also challenged by geographic isolation, low levels of financial knowledge among low-income households and rural consumers, lack of formal credit documentation, high transaction costs, and insufficient access to formal credit. Digital financial services have rapidly evolved, presenting new opportunities to tackle some of these challenges.

The use of Artificial Intelligence (AI) is becoming a key technological enabler of this change. Financial services providers can use AI systems to process and analyse large datasets automatically, to glean insights from natural language, to make predictions and even decisions, helping them to better serve their customers. They can aid automate customer service, credit alternative evaluation, fraud detection, personalized monetary tips, possibility management, and effective transaction processing in electronic finance. These can help lower the costs of providing services to customers and provide monetary services to the unbanked population.

AI's best potential to financial inclusion is its role in credit assessment. In traditional credit systems, formal credit records, collateral, stable income and conventional documentation are frequently crucial. This can disadvantage the needs of such individuals or small business, as they do not have as much contact with formal financial institutions. Alternative information sources should be analysed by using AI-based models and any patterns found that are related to the creditworthiness should be identified, if this is legality and ethically possible. This can allow financial institutions and FinTech firms to enable their neglected customers with more flexible lending options. Alternate data sources are raised, algorithmic bias, transparency and consent, and potential for discriminatory effects come into consideration with regard to alternative data.

AI is also revolutionizing the delivery of digital financial services, by creating intelligent and automated customer interfaces. Customers can use AI-powered chatbots and voice assistants, recommendations, and interfaces in several languages to access information and engage in financial transactions, eliminating the need for physical branches. These technologies can be of particular value to customers who may have geographical or linguistic barriers. Furthermore,

AI-powered fraud prevention and cybersecurity solutions can enhance the security of digital transactions, potentially boosting consumer confidence in digital payment systems and helping to thwart fraud in real-time.

But technology is not enough to ensure inclusive financial outcomes. When AI technology on the smartphone and consistent Internet connectivity is not available, people are not digitally literate, and they do not trust the digital financial services, the benefits of AI can be unevenly distributed. However, when training data is incomplete or unevenly distributed, algorithmic decision making can also result in social and economic inequalities being perpetuated. In addition, financial services should ensure that they have appropriate regulatory protection, decision-making mechanisms, data management systems, consumer protection systems, and human oversight capabilities to foster responsible use of AI.

With this background, the present study aims to discuss the opportunities and implications of AI for improving financial inclusion and the financial sector's digital transformation. It draws on the application of new AI-based technologies to enhance access, service delivery, responsible credit delivery, customer experience, and mitigate risk of digital financial exclusion. The study also contains a review of the privacy concerns, algorithmic fairness, digital literacy and cyber security, and digital governance issues. The study aims to offer insights on the potential and the difficulties of financial inclusion in the era of AI innovation and supports building a more comprehensive understanding of leveraging technology to create more accessible and sustainable financial services.

Background of the study

Financial inclusion has been an integral part of inclusive economic development, particularly in developing countries with a large population at risk of unaffordable access to formal financial services. Economically inclusive access to banking, credit, insurance, savings, investment and payment services helps individuals and businesses to manage financial risks, to create assets and to engage in productive activities and more in the economy. Despite the digitalization of banking and mobile financial services, many are still unable to benefit from formal financial systems due to the distance, financial illiteracy, lack of financial documents, high transaction costs, and low payments and income stability.

New opportunities have emerged to address these challenges due to the digital financial services. The mobile banking, digital wallet, instant payment, online lending, biometric identification and agent-based banking have reduced the dependency on traditional and physical banking systems. Digitalization of financial services does not necessarily lead to financial inclusion. Financial institutions also need to be able to grasp various customers, credit worthiness analysis, financial needs, frauds and provide appropriate services at a reasonable price. This has brought up a growing interest in Artificial Intelligence (AI) as a technological instrument to improve reach, efficiency and personalisation of digital financial services.

AI can analyze and interpret extensive data, such as data from multiple sources, to identify trends and patterns that may not be identified using financial assessment methods. AI-powered credit assessment can be used in the lending sector to help use alternative data to verify borrowers who lack or have limited traditional credit reports. This is especially important for

small business, informal sector, rural communities, etc., who are the less supported. Automated customer service, fraud detection, risk assessment, personalised financial advice and real-time transaction monitoring are examples of the use of AI systems. With this, financial service providers can reach a wider market, be more cost-effective and deliver quicker service.

AI's contribution to financial inclusion is even more crucial in the rapidly evolving digital financial landscape, especially in emerging markets such as India. Consumers' interactions with financial institutions have been transformed by the presence of smartphones, Internet connectivity, digital identity systems, mobile apps and electronic payment systems. In this digital world, AI holds the potential to enhance financial service offerings by providing more data-driven and personalized solutions. Furthermore, AI can be applied to financial technology to power formal financial markets, to gain insights into cash flow, to facilitate digital payments and to acquire credit for micro and small enterprises.

But the addition of AI to the financial industry is accompanied with big questions, too. Algorithmic bias, data quality, privacy/confidentiality issues, cyber security threats, limited transparency and weaknesses of digital skills of individuals can all hamper financial inclusion. An AI system that learns from financial data can further exacerbate inequalities if the data is incomplete or biased. The same goes for automated decision making processes that may lead to issues for customers who need human attention or don't understand the financial decision-making process.

So, the relationship between AI and financial inclusion needs to be looked at from a technological as well as social viewpoint. Whether to use AI to make financial services faster or more efficient is not the question alone – it is whether to use AI to help make financial services fair, accessible, affordable, secure and customer-focused. This is particularly important for the understanding of a better understanding of digital financial transformation for the poorly served populations, especially for the policymakers, financial institutions, and FinTech organizations.

In this context, the current study, Artificial Intelligence and Financial Inclusion: Transforming Digital Financial Services, explores the promise of AI to reimagine the delivery of digital financial services and progress towards financial inclusion more generally. The study also explores the issues related to responsible use of AI and the need for balance between technology and accessibility, transparency, privacy, fairness and human oversight.

Justification

The rapid pace of digital financial services has created new opportunities to reach people and communities who are not "formally banked" with financial services and banking. Geographical barriers, high transaction costs, difficulties in assessing the need of the underserved, as well as lack of financial literacy, continue to be factors of financial exclusion. In this context, Artificial Intelligence (AI) has the potential to contribute greatly to improving the accessibility, affordability, efficiency and responsiveness of digital financial services.

AI technologies can process vast amounts of financial and behavioral data to aid alternative credit scoring, fraud detection, the development of custom financial products, customer service automation and even risk management and targeted financial services. Such functions may be

especially advantageous to the less-flavored, the less educated and the small entrepreneur, especially those who have no regular financial relationship with conventional financial institutions. Language barriers can be removed, and access to financial information and services can be improved, with AI-powered chatbots and multilingual digital channels.

The study is warranted as a way to find out if the technological development is really assisting with wide and equitable financial participation. While AI can offer benefits in terms of efficiency and accessibility, it can also pose challenges in terms of data privacy, algorithmic bias, cybersecurity, transparency, and digital literacy and access to digital infrastructure. These risks can help perpetuate the exclusionary dynamics when it comes to financial services powered by AI, if not managed properly.

Therefore, it is crucial to understand the AI-financial inclusion nexus to understand how AI technologies are shaping the digital financial services landscape and how they contribute to financial inclusion. The research can serve as a valuable input to the work of the financial institutions, Fintech companies, policy makers and regulators, as well as the development bodies in their efforts to build digital financial ecosystems that are inclusive and responsible. It can also contribute to the academic scholarship by connecting technological innovation and the broader social and economic vision of expanding access to finance.

Objectives of the Study

1. To investigate ways of using Artificial Intelligence (AI) to make underserved and financially excluded communities more accessible to digital financial services.
2. To explore the impact of financial inclusion technologies such as artificial intelligence, machine learning, predictive analytics, chatbots and automation.
3. To gauge how AI-fuelled financial services will affect the accessibility, affordability, convenience and efficiency of banking and financial services.
4. To determine the primary factors the adoption of AI in digital financial services has to do with individuals and small enterprises.
5. To consider the potential of using AI in credit assessment and the use of alternative credit scoring for financial inclusion for the unbanked.

Literature Review

Financial inclusion and technological innovation have been increasingly converging, with digital financial services being a key enabler in bringing banking, credit, payment and insurance services and products, and saving products to more people. Furthermore, the rise of AI (Artificial Intelligence) has revolutionized the FinTech industry with the use of automation in decision making, alternative credit scoring, custom financial service, fraud monitoring and intelligent customer support. While some of the limitations of conventional financial services could be overcome by AI, there are concerns about bias, privacy, transparency, digital literacy, and infrastructure.

AI and the Transformation of Financial Services

Cao (2020) explored how AI was increasingly being used in finance and how it had the ability to enhance financial prediction, risk management, portfolio management, fraud detection and customer service. The research highlighted that AI would be a technological tool that would revolutionize traditional financial procedures by using data-driven decision making. Likewise, Milana and Ashta (2021) had examined the applications of AI in the financial sector and concluded that machine learning and computational methods related to AI can help to speed up and get more precise answers to financial decisions. The developments are especially relevant in the field of financial inclusion because automated and data rich services can help lower the cost of serving customers that are less easily served by the conventional financial institutions.

According to Kalyani and Gupta (2023), AI and machine learning are starting to be more widely adopted in banking in customer service, risk assessment, fraud detection and credit-related functions. They found that AI use can yield benefits to operational efficiency and opportunity for increased financial service outreach. Financial inclusion, customer preparedness, regulation, explainability, and AI-powered customer services are some of the themes identified by Singh et al. (2025), who conducted a systematic review of 157 papers.

FinTech as an Enabler of Financial Inclusion

FinTech has been revolutionizing the delivery of financial services. FinTech was defined by Arner et al. (2015) as a new paradigm, post-crisis, which is a fusion of financial services and the technological innovation. Gomber et al. (2017) also noted that digital finance refers to innovations which may have the potential to change the design, delivery and consumption of financial products. Gomber et al. (2018) states that the FinTech revolution is fueled by technological innovation, evolving customer expectations, and transformation of traditional financial institutions.

Thakor (2020) highlighted that FinTech can have a positive impact on financial intermediation because it can reduce transaction costs, expand access, and foster new forms of competition in banking and financial markets. The authors of Financial Inclusion and FinTech's recent systematic review identified several areas for the literature to group around: new financial services, changing market structure, and the role of various stakeholders in the FinTech ecosystem.

Digital financial services have thus emerged as a significant tool to reach financial services to segments of the population with geographical, economic and institutional access challenges. While holding an account can be a positive step toward financial inclusion, Klapper (2024) observed that digital financial services, especially digital payments, also have the potential to bring benefits to those who are not account holders and can help lead to greater inclusion in formal financial services.

AI-Based Credit Scoring and Access to Finance

Credit assessment is one of the major areas where AI has made a significant impact in financial inclusion. Formal credit history, proof of income, collateral and a long history of banking relationships are traditional indicators of creditworthiness. These can be a disadvantage for those who do not have formal financial records or have limited formal financial records.

Berg et al. (2020) demonstrated that digital footprints can be used for credit scoring and that alternative digital data can be useful signals to assess credit worthiness. Machine-learning

algorithms were also shown to be valuable tools in consumer credit-risk modelling by Khandani et al. (2010) who illustrated their ability to detect intricate patterns from large data sets.

One key finding is Li et al. (2024), who piloted AI-driven credit-scoring over a large sample of un-served customers totalling more than 1 million. They found that the AI model raised the approval rate for loans and also helped in lowering the default rates. The authors partially attributed this improvement to the fact that the model was able to make use of the weak signals and advanced machine-learning models which were not part of the traditional credit assessment. The discovery implies that if designed correctly, AI systems can minimize information asymmetry and enable financially underserved people to prove their creditworthiness by using non-financial information.

AI, Digital Payments and Personalized Financial Services

Personalised and automated financial services is another facet of AI that can help drive inclusion. It is possible to decrease the complexity of accessing financial products with the help of chatbots, recommendation systems, robo-advisory services, automated financial planning, and intelligent payment systems. AI has the potential to generate opportunities in the banking, investment, and microfinance sectors, by enabling more efficient service delivery and enhanced financial customization, according to Ashta and Herrmann (2021).

AI's applications in the customer-facing space have garnered growing scholarly attention as well. Belanche et al. (2019) explored the potential of AI in service interactions and argued that intelligent technologies have the potential to transform customer experience. Further, Jabeen et al. (2022) conducted a systematic literature review of AI applications in customer-facing financial services (CFFS) and identified a significant amount of research on the topic of credit scoring and consumer adoption. These developments can help inclusion by enabling financial services to be offered digitally and help to diminish reliance on physical branches.

AI, FinTech and Underserved Communities

AI's impact on financial inclusion is even more pronounced in developing and emerging economies, where access to physical banking facilities might be limited. Financial institutions and FinTech companies can leverage digitised technologies to connect with customers in rural areas via mobile apps, digital wallets, agent networks and the internet.

Fazal et al. (2023) conducted a systematic literature review to explore the link between AI and financial inclusion in particular. They found that there was a lot of interest in the potential of using AI to improve financial inclusion, and a need for more empirical evidence that includes the use of AI and machine-learning approaches. While there is growing awareness that AI has a conceptual link to inclusion, this link is not well established across countries and socioeconomic groups.

A more recent systematic synthesis of research literature is provided in a recent study conducted by Marak and Ayyagari (2025), covering the period from 2017 to 2025. The 70 peer-reviewed studies reviewed by them found that there is significant potential for AI to contribute to financial inclusion and sustainable development via alternative credit scoring, fraud detection, and intelligent financial services. The authors highlighted the importance of ethically

safeguarding, being contextual, and working in partnership with the policymakers, financial institutions, and technology developers.

Risks of AI-Driven Financial Inclusion

While AI has a lot of potential, inclusive outcomes will not come out of it automatically. Algorithmic systems rely on the quality, representativeness and governance of the data they are trained on. Mehrabi et al. (2021) showed that machine-learning systems can reproduce or even reinforce inequalities that exist in the data that is used to create and train them. These biases can influence the credit decision process, pricing, fraud identification and customer segmentation in financial services.

Additionally, privacy is crucial since financial services often rely on vast amounts of personal and financial transaction data. Zetzsche et al. (2017) pointed out that the growing reliance on data-driven technologies in financial services poses regulatory problems with regard to privacy, consumer protection and accountability. So, there must be suitable data-governance mechanisms alongside greater financial access with AI.

Explanation is also very important. The implications of financial decisions can be significant for people, especially when artificial intelligence algorithms decide on the creditworthiness of a person or whether they can get a specific financial service. Explainability and regulation were identified as among the key themes and barriers outlined by Singh et al. (2025) in the current research on AI in banking and finance.

Digital Divide and Responsible Financial Inclusion

Financial inclusion can't be just about technology. Trust, cybersecurity awareness, the availability of reliable digital infrastructure, affordability of device, and digital literacy also impact the ability of individuals to access the benefits of digital financial services. In their systematic review of 50 studies, Dias and Perera (2026) found that the key digital-finance tools that can drive financial inclusion are mobile banking, mobile wallets, e-wallets, electronic banking, agent banking, and online transfers – and that there are ongoing challenges that need to be explored.

AI can therefore, at the same time, decrease and generate forms of exclusion. Those who have some digital footprints and those who do not may benefit from alternative credit assessment, and those who do not may not be served. Likewise, algorithmic personalisation can boost the relevance of the service, but can also exacerbate inequalities if algorithms are based on biased or incomplete data.

Material and Methodology

The study on 'Artificial Intelligence and Financial Inclusion: Transforming Digital Financial Services' is designed in descriptive and analytical approach to study the role of Artificial Intelligence in making DFIs accessible, affordable, efficient and personalized. The study is largely based on secondary data sources gathered from reputable sources including research journals, books, reports by the Reserve Bank of India (RBI), World Bank, International Monetary Fund (IMF), Bank for International Settlements (BIS), government publications and pertinent financial technology reports. Credit assessment (based on AI), digital payments,

automated customer services, fraud detection, financial literacy, access to formal financial services, and mobile banking are thematically analysed and reviewed with regards to information provided. The data collected follows the four themes of financial inclusion (access, use, cost, reliability, consumer protection). The opportunity and challenges identified in the use of AI in the financial services are qualitatively analysed in relation to the absence of services and digital exclusion of those groups who are underserved and digitally excluded. The methodology also takes into account digital literacy, data privacy, algorithmic bias, cybersecurity, and the presence of digital infrastructure, which all can have an impact on the inclusive effect of AI. The outcomes of these comparisons and analyses are discussed in a thematic way to learn about the possibilities of AI to improve digital financial ecosystems and the conditions that need to be fulfilled for responsible and equitable use.

Results and Discussion

Results:

Artificial Intelligence (AI) is a critical enabler in achieving the speed, reach, personalisation and effectiveness of the transaction. It has opened new opportunities for extending financial services to those who have previously been disenfranchised by the formal financial sector in credit assessment, fraud detection, customer service, financial counselling and alternative credit scoring. The analysis suggests that AI can play a crucial role in boosting financial inclusion, especially for individuals who lack credit histories or proper documentation of their financial experiences.

Results also show that AI can't stand alone to create financial inclusion. It requires the presence of digital infrastructure, low-cost connectivity, financial literacy, secure identification systems, data quality, and consumer trust and adequate regulatory protection. AI should thus be considered to be a tool in the toolbox, not a solution to exclusion, in the broader digital financial system.

Table 1. Major AI Applications and Their Contribution to Financial Inclusion

AI Application	Contribution to Digital Financial Services	Financial Inclusion Outcome
AI-based credit scoring	Uses alternative and transactional data to evaluate creditworthiness	Improves access to formal credit for customers with limited conventional credit histories
Machine-learning fraud detection	Identifies unusual transaction patterns and suspicious activities	Increases security and consumer confidence in digital transactions
AI-powered chatbots	Provides automated assistance through digital channels	Makes financial information and basic services available beyond conventional banking hours

Personalized financial services	Analyses customer behaviour and transaction patterns	Enables customized savings, credit, insurance, and payment solutions
Predictive analytics	Forecasts customer needs, repayment behaviour, and financial risks	Supports proactive delivery of appropriate financial products
Automated customer onboarding	Supports digital verification and processing of customer information	Reduces time, paperwork, and barriers associated with account opening
AI-enabled financial advisory services	Provides data-driven financial recommendations	Improves access to basic financial guidance for underserved users

As illustrated in Table 1, AI can offer solutions to some of the challenges to financial inclusion that have traditionally been difficult. In a landscape where conventional credit techniques are driven by documents like salary statements, assets and credit reports, AI-powered credit analysis is an essential part of credit applications for a number of reasons. Other models might use other data and provide a way to assess individuals and small businesses with less interaction with financial institutions. This may be relevant to the informal workers, micro entrepreneurs, rural households and borrowers for the first time.

AI also enhances the security aspect of financial inclusion. transaction monitoring systems can monitor the behaviour of transactions and flag any patterns that might suggest fraudulent or unauthorized transactions. Increased transaction security should be able to attract consumers who are skeptical about digital finance to join the formal digital financial system.

Likewise, AI-powered chatbots and virtual assistants can help cut the need for physical branches and give customers basic information via mobile and online channels. It might be especially beneficial in faraway geographical locations where banking solutions are not available. But if digital accessibility is to be linked to human support mechanisms, as users with low digital literacy might have problems in a too-digital financial services.

Table 2. Key Dimensions of AI-Enabled Financial Inclusion

Dimension	Traditional Constraint	AI-Enabled Improvement	Expected Impact
Accessibility	Dependence on physical branches	Mobile and automated digital services	Wider geographical reach
Credit access	Limited credit histories and collateral requirements	Alternative-data-based assessment	Greater lending opportunities

Affordability	High administrative and service costs	Automated processing	Lower transaction and operational costs
Service personalization	Standardized financial products	AI-driven customer profiling	More suitable financial products
Security	Difficulty detecting complex fraudulent behaviour	Real-time anomaly detection	Safer digital transactions
Financial information	Limited access to advisory services	AI-powered financial assistants	Greater availability of basic financial guidance
Speed	Manual verification and processing	Automated decision-making	Faster financial service delivery
Customer engagement	Limited interaction outside banking hours	Conversational AI and automated support	Continuous customer assistance

Table 2 shows that AI can impact financial inclusion in various interrelated ways. One of its most obvious contributions is accessibility. AI-powered digital platforms can provide services without having to go to a physical branch. This makes it possible for people residing in isolated and under-served areas.

Affordability and speed are also important. Automated technology may help cut down repetitive duties in customer service, verification, risk assessment and transaction monitoring. The efficiency improvements could enable financial services firms to offer relatively low-dollar customers at a lower cost. This is significant because it allows low-income customers to be seen as the service's commercial interest, which means that they might not have been viewed as commercial interest by traditional service models.

Personalization is also a key discovery. Traditional financial products are typically developed to serve a wide range of customers, while AI can process customer behaviour and transactional data to tailor products to specific customer needs. Relevant digital financial services can then be enhanced by personalised savings recommendations, credit offers, payment services and insurance products.

Concurrently, there are issues about informed consent, personal data usage, and privacy when it comes to personalization. Access to finance is not to come at the cost of consumer autonomy or data protection. AI-driven decisions can also perpetuate existing social and economic inequalities if these can be traced to the data that feed into the system. As such, transparency, fairness, explainability and effective human oversight are critical aspects of responsible AI-powered financial inclusion.

Table 3. Opportunities and Challenges of AI for Financial Inclusion

Opportunities	Potential Benefits	Major Challenges	Required Measures
Alternative credit assessment	Inclusion of thin-file and new-to-credit customers	Algorithmic bias	Regular fairness and bias audits
Digital banking automation	Lower service costs and wider reach	Digital exclusion	Digital literacy and assisted services
AI-based fraud prevention	Improved transaction security	False positives and service interruptions	Human review and transparent complaint mechanisms
Personalized financial products	Better alignment with customer needs	Excessive profiling	Strong data-governance practices
AI financial assistants	Wider access to financial information	Incorrect or misleading recommendations	Human oversight and clear disclosures
Automated onboarding	Faster account creation	Privacy and identity risks	Secure digital identity and data protection
Predictive analytics	Improved risk management	Poor-quality or incomplete data	Data-quality controls
AI-enabled lending	Faster credit decisions	Discriminatory outcomes	Explainable and accountable lending models

Table 3 illustrates that there are considerable opportunities and risks in the linkage between AI and financial inclusion. The most crucial is the potential of AI to lessen the information imbalance between financial institutions and under-served customers. AI can turn to alternative data sources to help lenders make an informed lending decision for those who might not qualify for formal credit markets.

But algorithmic decision-making can also result in new forms of exclusion. Predictive models based on these historical lending patterns or structural inequities can continue to discriminate or create inequities. But higher level of technological sophistication does not always equate to access to finance. Financial institutions should conduct a periodic model validation, bias testing, impact assessment and outcomes monitoring at the customer level for different customer groups.

The results also emphasize the need for digital literacy and infrastructure. A key issue for people who are potentially able to use a digital finance platform is whether they have the skills, access, language ability, or confidence to do so. Thus, it is important to embed AI in the implementation of digital education and consumer awareness, low-cost Internet connectivity and customer-support accessibility in financial inclusion policies.

Trust is another key challenge. Customers who are aware about the data collection and utilization, and have robust mechanisms for addressing grievances are more inclined to utilize AI-powered financial services. Explainability is truly critical in finance. When decisions regarding access to credit, bank accounts, alerts of fraud, or other critical functions are automated, consumers should be provided with clear and meaningful information.

Discussion:

The overall analysis has found that AI offers the promise of a radical overhaul of the ways financial institutions identify customers, assess risk, provide products, combat fraud, and engage with users – all of which have the potential to impact financial inclusion. The most promising opportunity is the combination of AI with the digital financial infrastructure to reach those that have been geographically, economically, information or documentation inaccessible.

In general, the results align with the overall fintech market, which is witnessing the shifting dynamics of financial services' structure and delivery driven by technology innovation. AI has the potential to streamline the financial intermediation process and provide opportunities for novel and innovative financial services to those markets that are currently underserved. Especially, the introduction of new credit scoring and financial robotisation can overcome some of the drawbacks of conventional banking system.

The use of AI for financial inclusion, however, is not inevitable, but something that must be worked out, the analysis said. The presence of an AI system, does not imply the benefit to disadvantaged groups. The benefits will be determined by the availability, affordability, transparency, fairness, security and regulation of technological systems.

This is particularly the case in developing countries like India. AI-driven financial services can be supported by the digital payment infrastructure, mobile banking services, digital identity systems, microfinance and FinTech platforms. They can lead to higher uptake of formal financial systems by small businesses or rural markets, low-income household, and first time users. However, AI growth needs to go hand in hand with consumer protection, cyber-security, privacy protection, financial education and giving room for human action.

Based on this, the research results indicate that AI should be considered as a means to complement inclusive financial policy in inclusive digital finance, rather than replace it. To be a viable financial inclusion model, AI must be integrated with financial institutions, FinTech companies, technology providers, regulators, and governments and consumers. AI, with the right governance and accessibility to infrastructure, can make a significant impact in making digital financial services accessible, affordable, secure and responsive to underserved groups.

Limitations of the study

The following limitations need to be noted in the context of making the inferences from the study: “Artificial Intelligence and Financial Inclusion: Transforming Digital Financial Services”. The impact of these AI and digital technologies in finance, however, is hard to

measure because there are new applications, platforms and regulations coming to the market at all times. The financial advantages of AI-financial services are more stark in economically disadvantaged groups and in rural areas due to other factors, including financial literacy, access to the internet, and smart phones. Secondary data may also be unavailable or of poor quality or not comparable between geographic and demographic subgroups for the study. Furthermore, issues with data privacy, algorithmic bias, cybersecurity, transparency, and consumer trust can have an impact on the uptake and impact of AI-driven financial services. The results might therefore not be generalizable to other countries, financial institutions or population groups due to the different regulatory environments, technological infrastructures and socioeconomic conditions. These limitations could be resolved in future studies by conducting longitudinal research, enlarging and diversifying sample sizes, applying comparative cross-country analysis, and doing empirical research on users' experiences with AI-supported financial services.

Future Scope

The possibilities for AI-driven financial inclusion are endless, and its potential is promising, particularly when financial services become increasingly accessible to the unbanked and the underserved. However, further research is required to explore the potential benefits of AI-powered credit scoring and alternative data analyses, intelligent financial assistants, biometric authentication and personalised digital finance for traditionally under-served financial products and services. More focus on rural, women, micro-entrepreneurs, small business owners, and possibly the not so digitally-savvy. Research on how AI can help to reduce credit discrimination, transaction costs, financial exclusion, consumer trust and consumer transparency and fraud could be explored in the future. Explainable and responsible AI systems will play a crucial role when it comes to automated financial decision-making. Moreover, future research might focus on the long-term impacts of AI in financial inclusion on financial resilience of households, entrepreneurship, and financial savings and economic empowerment. A comparative study of various developing economies may also reveal socio-regulatory, technological, cultural and infrastructural issues impacting the adoption of AI. The interdisciplinary nature of research and development of the digital financial ecosystem should be handled by the fields of finance, technology, economics, law and social sciences, and made accessible, secure and compatible with the economy, as AI technologies evolve.

Conclusion

Artificial Intelligence (AI) is proving to be a key driver in the drive towards financial inclusion, as it is reshaping the design, delivery and utilization of digital financial services. AI technologies can be used to enhance credit assessment, fraud detection, product design to suit customer needs, automated customer support and outreach to customers who aren't on the rolls of traditional financial service providers. AI-powered chatbots and multilingual digital platforms can be useful to serve users who are not as financially literate, while also alternative data and intelligent credit-scoring models can prove helpful. However, achieving financial inclusion benefits will require the responsible and inclusive use of AI. When not handled appropriately, the difficulties encountered, such as data privacy, algorithmic bias, cyber

security, digital illiteracy and sub-optimal infrastructure and unequal access to digital technology can lead to new forms of exclusion. It is essential, however, that financial institutions, governments, technology solution providers and regulators work together to create clear, secure, and users friendly AI frameworks. AI can be leveraged to improve access to affordable, convenient financial services, particularly for underserved groups, in emerging economies such as India, through its application in digital payments, mobile banking, digital identity and inclusive financial platforms. In the end, AI is more than just a tool to streamline financial processes; it is a strategic solution to ensure a more accessible, equitable, and resilient financial system. The potential long-term effects on financial inclusion will be related to the technological innovation it is able to bring if it is backed by ethical governance, consumer protection, digital literacy and a human oversight.

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