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Review Article

# PROCESS INNOVATIONS IN FINANCIAL TECHNOLOGY: STRATEGIC APPROACHES AND ECONOMIC IMPACTS

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**ABSTRACT**

Fintech refers to the use of technology to improve client use and delivery of financial services organizations' offerings. It mostly works by breaking down the packages that these companies offer and creating fresh opportunities for them. Companies in finance-related industries that use fintech have used technology to lower operating costs and promote financial inclusion. Robo-advisors, transaction apps, peer-to-peer (P2P) financing apps, investment apps, and cryptocurrency apps are a few examples of fintech applications. In addition, this research article includes technical breakthroughs such as automation, artificial intelligence, and blockchain that have improved service delivery, reduced costs, and increased efficiency in the financial business. However, since banks may assist companies in more efficient resource allocation, the role of markets in providing financial operations is called into question. Therefore, statutory processes transform the global financial landscape, regulatory frameworks play a critical role in balancing process innovation with political aims. Consequently, it is recommended for future research that any upcoming studies in this area look at the possibility of a few significant economic variables influencing the relationship under investigation in the sector of financial technology.

**Keywords:** Financial technology, Bitcoin, Cryptocurrency, AI, Machine learning, Regulatory technology, Blockchain, Robotic process automation, Security and exchange commission

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## INTRODUCTION

The financial industry has a long history of development and innovation, shaped by important turning points that have shaped the industry's current structure [1]. The financial technology sector, or fintech, has grown and changed due to shifting laws, regulations, and the state of the economy [2,3]. Furthermore, the founding of the Bank of North America and the First Bank of the United States in 1791 marked the beginning of the financial industry's growth in the 18th century. Stability and economic growth were made possible by the infrastructure that a centralized banking system offered. The 19th century made it possible for state-chartered banks to proliferate quickly, which helped the fledgling nation's financial services sector grow [4]. The establishment of a system of nationally chartered banks was made possible by the National Banking Acts of 1863 and 1864, which established the framework for the Office of Comptroller of the Currency to oversee and control them [5,6].

When it first emerged in the twenty-first century, fintech originally applied to the technology found in the backend systems of well-known financial organizations, such as banks. From 2018 to 2022, there has been a shift toward consumer-oriented services [7]. These days, fintech includes a broad spectrum of industries and enterprises, such as retail banking, investment management, education, fundraising for non-profits, and fundraising. Fintech also covers the development and use of cryptocurrencies, such as Bitcoin [8]. The key to success still lies in the multitrillion-dollar market value of the standard global banking sector, even though that specific fintech sector may attract the most attention. Within the fintech industry, process innovation is essential since it increases total financial services efficiency, reduces expenses, and simplifies operations [9].

The primary background of this research proposal is the observation that the finance sector has undergone tremendous innovation due to the swift expansion of fintech. However, there is a dearth of comprehensive empirical studies assessing the wider consequences of fintech developments in this industry [10]. The historical development of fintech, the state of the economy, and its effects on the financial sector were all noted in earlier studies. Furthermore, a thorough examination that considers these various components is necessary to assess the wider effects of fintech on consumer behavior, market dynamics, and financial stability [11]. When decision-makers are fully aware of the wide-ranging and extreme consequences of the fintech sector, they can all make effective and positive changes that benefit consumers, banking institutions, and policymakers [12].

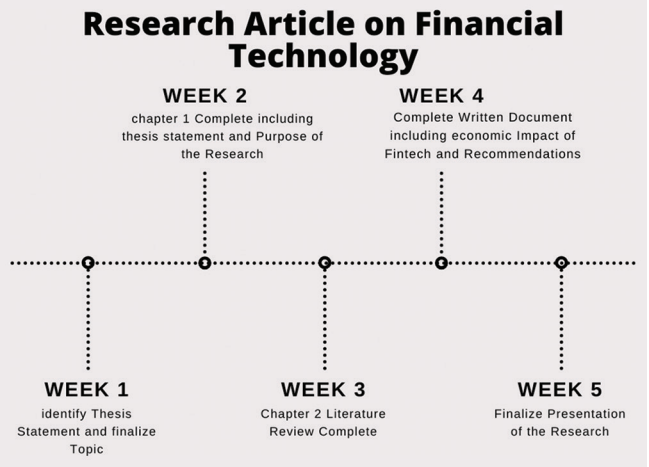
### State the Purpose

The article's goal is to assess how important technology developments in the financial services industry, such as blockchain, automation, and artificial intelligence (AI), improve service delivery, lower costs, and increase efficiency. It also investigates how the fintech business strategically employs process innovations and the resulting broader economic effects. In addition, the research identifies the macroeconomic implications of innovations such as AI, blockchain, and cryptocurrency, focusing on how they affect financial inclusion, stability, and economic growth. The study aims to provide a comprehensive understanding of how process innovations enhance industry competitiveness in the fintech sector.

### Thesis Statement

The financial sector examines how innovations such as blockchain technology, AI, and the automation of cryptocurrency have transformed fintech by reducing costs, enhancing accessibility to services, and increasing operational or strategic effectiveness. As a result, the financial industries increase this competitiveness by having a significant impact on economic growth, financial stability, and financial inclusion.

**Article Timeline**




## BACKGROUND AND LITERATURE REVIEW

### Define Process Innovations in Fintech

Georgie's study from 2023 (11) demonstrated to the reader how far the financial industry has advanced as a result of the financial technology roadmap's spread of artificial intelligence, machine learning, and big data analytics through a multidimensional descriptive analysis. They present a clear framework that demonstrates how these data science ideas complement one another to improve fintech [13]. The framework's validation was predicated on its impact on the financial services sector, the fintech industry, and the changing role of data scientists [14]. In addition, they discussed the drawbacks of this symbiosis, such as how AI and ML techniques relate to impending problems with technology regulation [15], AI ethics, and intelligent data use [16].

A new growing trend was detected in the fintech business and that was the regulatory technology regtech. Omarova Saule conducted research on innovation in 2020. He examined the fintech industry's regulatory technologies and noted how the financial sectors used them. AI, ML, and big data analytics were used by this regtech to automate compliance procedures and keep an eye on activities for questionable conduct [17]. Saule also researched to make sure that the rules governing the fintech sector are followed. Furthermore, Saule concluded his research by users pay fewer monetary penalties, which eventually improves fintech regulatory compliance [18].

Sardar and Kavit, digital competitors of banks that are on the list of recently emerging fintech innovations in the financial sector, conducted another study on Neo banks in 2023. They are growing in popularity among tech-savvy clients who value uniqueness and simplicity in their banking dealings. They upend the current financial system by pressuring large banks to innovate and adapt to remain competitive [19]. The authors' research concluded by demonstrating that, in comparison to traditional banks, Neo banks are becoming more widely accepted and used [20], mostly because of their excellent customer satisfaction ratings for the services they offer [21].

Fintech companies may reduce the fundamental redundancies in traditional banking systems by streamlining processes such as processing transactions, analysis of information, and customer assistance using technology such as blockchain and artificial intelligence [22]. As a result, the duration of transactions is reduced, human error is reduced, and operating expenses are reduced. Enhancements to processes also improve scalability, enabling businesses in finance to serve a wider customer base without sacrificing efficiency or quality [23]. This competitive advantage is essential in a market that is growing fast and where customers require rapid, flawless financial services. Furthermore, developments such as blockchain-enhanced transparency and AI-driven risk administration increase confidence among consumers, both of which have become essential for preserving a competitive market position [24].

### Historical Perspective of Fintech Evolution

Financial technologies, such as fintech, have been there since the beginning of financial transactions; over the past few decades, this development has increased significantly. Zeenat Zia and his colleagues in 2024 were able to understand the historical context of financial innovations through their research, which was essential for understanding how fintech has changed the financial sector and the wider implications for its sustainability [25].

Author Nguyen 2022 investigated earlier developments in the financial system using technology. Their findings indicate that the telephone and telegraph, two early financial innovations from the 19$^{th}$ and 20$^{th}$ centuries revolutionized, communication [26]. They looked into the fintech industry to identify past advancements in financial technologies. The investigation concluded that developments made it possible for economic systems to spread more swiftly and reliably, which paved the way for the development of contemporary economic systems [27]. The results of the study showed that the development of the credit card in 1950, which made it possible for consumer credit to be extended and cashless transactions to become a reality, was a significant historical event [28].

Empirical research on automated teller machines (ATMs) and electronic payment systems was carried out in 2022 by Lan and his colleagues. These systems were introduced in the 1960s and 1970s. They were expanding the convenience and accessibility of financial services. Basic banking functions could be completed by customers using ATMs instead of going to a branch, and electronic payment technologies made transactions quicker and safer [29]. The Society for Worldwide Interbank Financial Telecommunication (SWIFT) [30] is a revolutionary method discovered in 1973. It offers a standardized and secure way for financial messages to be sent between institutions all around the world [31].

### Economic Theory and Innovation

Financial institutions are essential to the growth of the world economy because they offer a reliable payment system and encourage commerce and enterprise [32]. Financial innovation entails developing new financial systems, procedures, and products to satisfy new demands and take into account socioeconomic and cultural factors [33]. The competitive advantage of the financial industry is contingent upon the caliber and volume of services it provides, hence fostering wider financial advancement and economic expansion [34].

Qamruzzaman and Wei examined the connection between financial innovation, stock market expansion, and Bangladesh's economic growth using the ARDL Model. The dataset covered the period from 1980 to 2016 [35]. The study concludes that, both in the short and long run, financial innovations and economic expansion are positively and significantly correlated. This can be explained by the fact that financial innovation increases the money supply in the financial system, which in turn encourages economic growth [36].

According to Adu-Asare Idun and Aboagye's research, financial innovation has a short-term positive correlation but a negative correlation with Ghana's economic growth. The long-term adverse effect might result from technology taking the place of people in the workforce, which would increase unemployment. Only point-of-sale terminals had a major impact on economic growth in Nigeria, according to Okereke's research, which showed no significant association between ATMs, mobile banking, and online banking. To find potential mediating factors in the relationship between innovations and growth in Africa, more research is necessary [37].

Modernizing manufacturing techniques and promoting sustainable growth are two major reasons why technological innovation is a

major force behind economic expansion and human advancement. Innovation, R&D, and other related investments promote progress and competitiveness, guaranteeing the preservation of resources and the advancement of society [38]. Increased investment in technical innovation typically results in higher economic growth over the short and medium terms, according to a 2022 study by Maha Mohamed assessing the impact of technological innovation on developing countries' economic growth between 1990 and 2018. The study highlights the significance of robust policies that motivate foreign investors to provide funds for research and development in developing nations [39]. According to the Fig. 1, China, Indonesia, and the Philippines have the lowest averages of economic growth percentages utilizing financial technology, while Hungary has the greatest percentage [40].

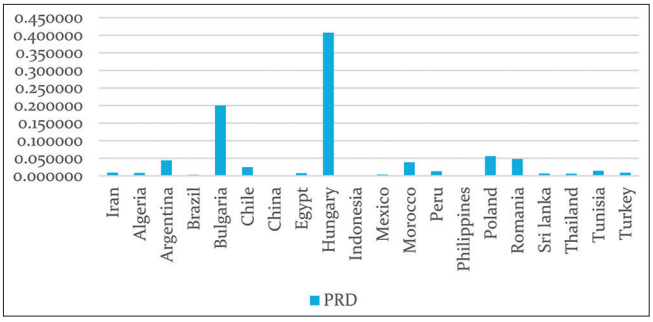



**Fig. 1: Different countries have financial growth in terms of percentage [40]**

## STRATEGIC APPROACHES IN FINTECH PROCESS INNOVATIONS

### Innovative strategies in process innovations

For SMEs, accounting and financial reporting transparency is essential since it guards against financial misbehavior, declining profits, and trouble getting funding. Digitalization in the financial sector can improve openness, make it easier to obtain outside capital, expedite administrative procedures, and provide 24-h access to the financial system [41]. In addition, programs for financial inclusion, poverty alleviation, renewable energy sources, and environmental conservation are supported by digital finance. Perceived transaction cost negatively affects the intention to utilize fintech, suggesting that service providers should work on cost-reduction strategies [42]. Fintech platforms provide financial institutions with strategic advantages such as lower operating and maintenance expenses and more service income. This study will emphasize how important it is to control fintech clients' expenses because excessive fees have the potential to deter users from utilizing the technology [43]. The study also implies that transaction cost and competitive advantage methodologies can be used to design online tactics that are responsive to geographical differences. This information can assist marketers in creating strategies for cutting costs and fostering trust, both of which will ultimately aid the banking industry [44]. Fig. 2 illustrates the strategies of reducing transaction costs [44].

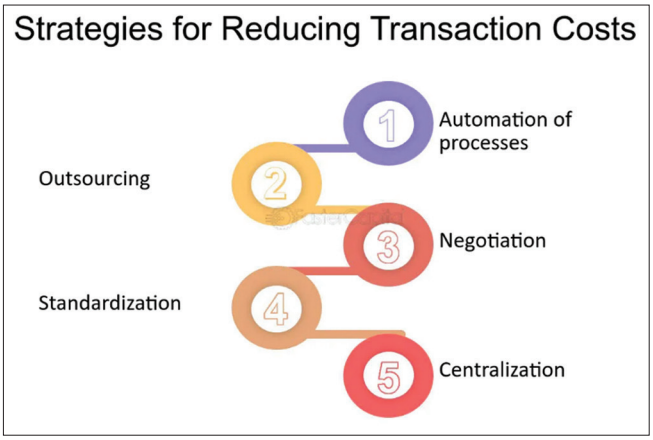



**Fig. 2: Steps for reducing transaction costs in the financial sector**

### Case study: "Fintech revolution and future of sustainable banking opportunities and risks analysis"

The fintech transformation and its potential for sustainable development in the banking sector are covered in the 2023 essay by Shilpi and Manish. It emphasizes technologies such as AI, blockchain, and mobile banking systems, which can boost efficiency, cut costs, and promote consumer happiness. Nonetheless, issues including privacy concerns, unclear regulations, and cybersecurity threats still exist [45]. Organizations must embrace digital transformation if they are to adapt to shifting consumer expectations, boost productivity, and foster greater creativity and agility [46]. It assists companies in streamlining workflows, automating repetitive tasks, lowering manual error rates, and delivering seamless digital experiences across many digital channels [47]. Organizations can generate innovative goods and services, set themselves apart from rivals, and increase customer happiness by implementing agile development approaches [48]. Fig. 3 illustrates the framework of digital bank capabilities in technology era [48].

### Challenges and opportunities

One of the primary challenges in balancing political objectives with the economic realities of fintech innovation is the rapid pace of technological advancement, which frequently exceeds the rate at which regulatory frameworks can be updated. Cryptocurrency, blockchain, and decentralized finance are innovations that have transformed how financial transactions are conducted, but their rapid development has left regulators scrambling to understand and manage the associated risks [49]. As financial services move more online, the risk of cyberattacks grows, creating another big challenge for the industry [50]. Fintech companies, especially those with sensitive financial information, are often targeted by hackers. To address this, regulatory bodies need to create cybersecurity standards that protect consumers while still allowing for new technologies to be adopted [51].

Furthermore, regulators need to guarantee that financial data is stored and processed securely, following international standards similar to the General Data Protection Regulation in Europe and other data privacy laws. Another challenge is making sure that everyone has access to financial services while keeping the market fair [52]. Fintech can help by offering affordable services to underserved populations, especially in developing countries. These services can expose vulnerable populations to predatory lending, fraud, or financial instability if not properly regulated. Therefore, regulators must establish frameworks that promote financial inclusion while also guaranteeing the safety and reliability of these services [53].

### Technology-driven changes

There have been notable developments in connectivity and communication within technology-based finance. The Internet and smartphone technology have enabled distant information transfer and engagement between businesses and customers [54]. With more than 5 billion active mobile subscriptions and about 1 billion registered mobile banking accounts as well, financial services are now more widely accessible thanks to direct and digital delivery. This mobile networking trend was observed in Fig. 4 which shows the data from 2010 to 2019. As a result, established intermediaries, especially telecom firms now have a stronger presence in developing and emerging markets. Peer-to-peer casual contact has also been made easier by online communities and other tools [55].

## ECONOMIC IMPACTS OF FINTECH PROCESS INNOVATIONS

### Productivity and Efficiency Gains

The financial sector is experiencing a transformation in productivity due to innovations in financial technology. By streamlining processes,

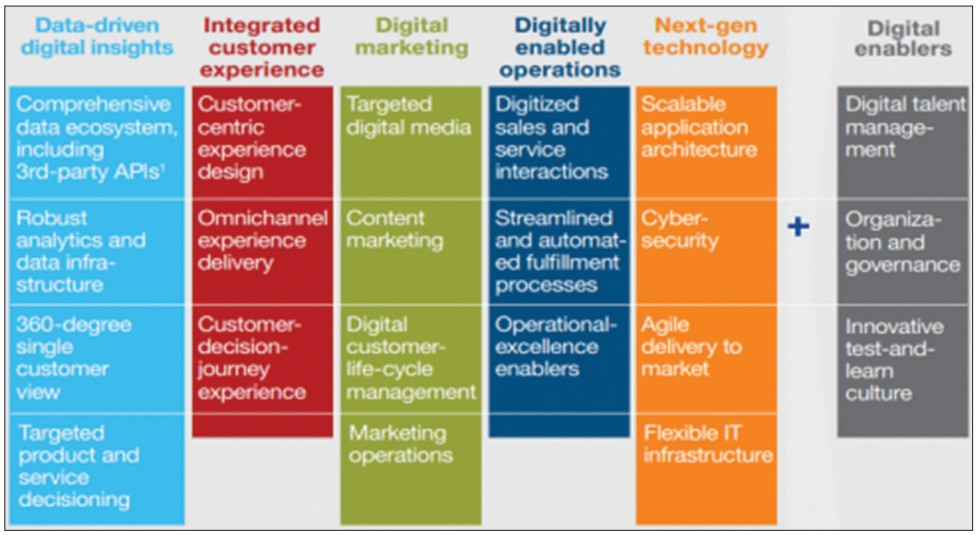



**Fig. 3: Digital capabilities of banks in the fintech era [48]**

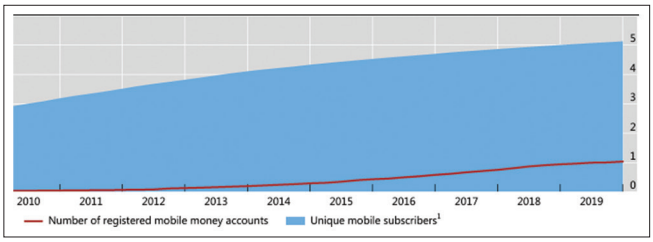



**Fig. 4: Mobile fintech growth worldwide from 2010 to 2019 [55]**

reducing human error, accelerating transactions, and significantly lowering operational costs, these advancements are driving efficiency [56]. Below are the ways these improvements occur:

*Reducing human error*

In financial processes, automation and AI play a crucial role in reducing human error. Traditional financial practices rely heavily on manual data entry, reconciliation, and decision-making, all of which are prone to mistakes. Automation systems for accounts payable can identify subtle differences in invoices, causing businesses to confirm authenticity before approving payments [57]. Automated systems using machine learning and artificial intelligence (AI) algorithms handle massive amounts of data accurately, lowering errors in financial operations and averting losses or fines. These resources are very helpful in identifying fraud.

*Speeding up transactions*

By enabling data sharing between banks and fintech companies, the open banking paradigm fosters a more cohesive and customer-focused financial environment. By doing away with limitations and silos found in conventional banking systems, it improves customer-focused services and financial transparency. By cutting out unnecessary stages and friction, open banking speeds up payment services [58]. By allowing customized suggestions based on user behavior, predicting sales trends, controlling inventory, and planning marketing initiatives, it can also enhance the eCommerce user experience. Algorithms powered by AI can potentially improve client retention and satisfaction while expediting payments and cutting expenses. AI is also a potent instrument for fraud detection, enabling the real-time reporting of suspicious transactions and improving security in the e-commerce sector [59].

*Lowering operational costs*

With the use of robotic process automation (RPA), human behavior can be automated to improve customer service, save operating expenses, and improve data quality. It can lower expenses and manual involvement by automating procedures such as investment portfolio management, fraud detection, and loan approvals. Blockchain technology can reduce the need for middlemen in business transactions [60]. In addition, by automating accounting data for internal audits, RPA can guarantee regulatory compliance. AI-enabled bots in cybersecurity can assist companies in avoiding losses. Before launching an RPA program, a business might confer with outside specialists to optimize the return investment that results from technology adoption. A skilled RPA consultant can assist in determining the best implementation strategy, provide an adoption plan, and create a scalable, future-proof system [60].

**Growth and Stability**

For growth and stability, fintech process innovations have a significant economic impact, especially when it comes to promoting investment, financial market stabilization, and financial inclusion. Individuals from underprivileged backgrounds can now access critical monetary services thanks to technological advancements that use mobile banking, blockchain, and AI-driven financial services [61]. This extension of access encourages innovations in economics, especially in nations with poor infrastructure where a major portion of the population was formerly excluded from the official financial system [62]. Therefore, we observe that these innovations have drawn greater investment, both through the capital influence of software and by generating new operational opportunities for investors [63]. Automation, faster transaction processing, and better risk management have lowered transaction costs and made investment processes more efficient. This has strengthened capital markets and supported financial growth across borders [64].

In addition, innovations such as blockchain guarantee transparency and security in financial markets, reducing fraud and errors, which contributes to a more stable financial environment. By improving risk management, we can reduce systemic vulnerabilities. Fintech also enables real-time regulatory oversight, supporting more resilient financial institutions and markets [65]. To summarize, these innovations support economic stability, lessen vulnerabilities, and drive long-term growth by transforming financial systems into more inclusive, efficient, and reliable frameworks [66].

**Case Studies**

There are many successful case studies one of them is Square, which was founded in 2009, and revolutionized payment firms by supporting small businesses to accept card payments with the help of a simple mobile device attachment [67]. Its innovative point-of-sale system, square register, presents solutions for inventory and investment management,

sales tracking, and customer engagement and entrepreneurs, driving financial inclusion and economic growth [68].

Another successful case study is a company like Robinhood that emerged in the year of 2013 and challenged traditional brokerage firms by offering a commission-free trading mobile app. Robinhood ended the cost of trading and delivery of the products and provided access to financial markets for retail investors, Robinhood has attracted millions of users, especially younger generations providing easy access to a variety of investment options has contributed to greater financial literacy and participation in the stock market [69]. Similarly, social finance is the firm that was launched in 2011, started to provide easy loans to students refinancing companies, and has since expanded to offer a range of financial products. Furthermore, SoFi's innovative approach to lending has enabled it to offer competitive rates and attract a diverse customer base [70].

For more than a century, the significance of market- and bank-based financial systems has been discussed by financial economists. Banks can enhance capital pooling, corporate control, information gathering, risk mitigation, and transaction simplicity. The role that markets play in supplying financial functions is questioned, nevertheless. Banks may lessen the issue of free riders by helping businesses allocate resources more effectively and flourish by establishing long-term partnerships and privatizing information. Studies by Jayaratne Strahan Dehejia and Lleras-Muney examined the effect of finance on US economic growth. They discovered that real per capita growth rates were accelerated and bank lending quality was improved by branch reorganization. They could not discover any proof, meanwhile, that branch reform increased lending. Instead, they found that by improving bank loan quality and capital allocation efficiency, branch reform boosted economic development. While financial development promotes growth, Dehejia and Lleras-Muney found that it also commonly leads to indiscriminate loan expansions that have unfavorable effects [71].

## BALANCING POLITICAL OBJECTIVES AND ECONOMIC REALITIES

The global banking landscape is being continuously reshaped by statutory procedures, making the function of regulatory frameworks more important than ever. Globally, governments and regulators are attempting to strike a balance between the rapid rate of process innovation and political objectives such as consumer protection and economic stability. This is important because, even though these innovations have positive economic effects, some risks and uncertainties must be properly managed. In this section, we will investigate how rules are evolving to meet these developments and examine the consequences of such harmony on economic policies and the public sector [72].

### Regulatory Frameworks

Federal and state regulatory agencies in the US are in charge of banks, savings associations, and fintech businesses. Fintech companies are required to provide fair, transparent, and compliant financial services [73], which are ensured by the Consumer Financial Protection Bureau (CFPB). Fintech businesses, federal savings associations, and national banks are all subject to regulations by the Office of the Comptroller of the Currency (OCC). The Federal Reserve Board of Governors manages payments, keeps an eye on bank-holding corporations, and makes sure all federal rules are followed [74]. Securities markets, which include crowdfunding websites and other fintech businesses providing financial goods related to investments, are governed by the Securities and Exchange Commission (SEC) [75]. For residential mortgage loans, the Federal Housing Finance Agency (FHFA) is in charge and finding the ways of fintech [76]. Regarding financial and commodity futures and options, the Commodities Futures Trading Commission (CFTC) [77] works to safeguard the public against deception, manipulation, and abusive tactics [78].

These technologies bring additional dangers, such as cybersecurity concerns, data privacy issues, convergence challenges, and market volatility, notwithstanding their benefits [79,80]. As a result, regulatory agencies play a critical role in enabling well-established fintech businesses to innovate while making sure they do so within a framework that safeguards consumer interests and economic stability [81,82]. To ensure the stability and security of financial transactions, regulatory frameworks are essential. These regulations aid in ensuring that financial institutions adhere to guidelines that safeguard customers, lower risks, and maintain market integrity [83].

### Public Sector and Economic Policy

The creation of digital infrastructure, a government's digitalization strategy, and federal financial administration information technology (FMIS) are prerequisites for integrating the use of fintech in public finance [84]. Core public sector computer networks can be strengthened and efficiency increased with a thorough digitization strategy. However, the public sector challenges risks and difficulties, such as institutional and technological strengths of finance ministries, technological shortcomings in FMIS, and structural flaws in PFM IT systems [85]. There are difficulties in implementing digital money, especially with crypto assets. Strong technical, technological, and data infrastructures should be established by fintech payments to carry out operational procedures in a seamless, effective, and timely manner. Users' transaction data should be secure, and their right to privacy should be protected by the system [86].

New policy alternatives may also become available with improved digital systems processing capabilities and more information access [87]. Rethinking the structure of tax policy is possible when data on taxpayers' income, spending, and wealth can be promptly tracked and consolidated [88]. Technology that makes it possible to electronically track and tag each consumer transaction may open the door to more creative and progressive consumption tax schemes [89].

## FUTURE TRENDS AND STRATEGIC RECOMMENDATIONS

### Emerging trends

The landscape of the fintech business will change significantly in the future. Anticipate developments in personalized financial services, such as a rise in the application of AI and ML [90]. Cryptocurrencies and blockchain technology will transform traditional finance by providing safe and open substitutes. Initiatives for open banking will promote cooperation between banks and fintech companies, enhancing the consumer experience [91]. To stop cyberattacks and data breaches, cybersecurity will be given top attention. In addition, the fintech sector will target underprivileged groups with an emphasis on financial inclusion [92]. Furthermore, automation of compliance procedures will be possible through regulatory technology solutions, and sustainable finance which addresses social and environmental issues will gain traction. In general, the fintech sector will spur more innovative development and advancements in the banking business [93].

Financial services are changing thanks to artificial intelligence (AI), which offers improved fraud detection, personalized consumer experiences, and better analytics [94]. Large volumes of data can be swiftly analyzed by AI models, which can then be used to forecast consumer and market trends. Chatbots and virtual assistants powered by AI offer individualized client support and can identify odd trends in transactions [95]. The second significant technical development in the financial sector is blockchain technology, which offers smart contracts and supply chain finance as well as efficiency, security, and accountability in financial operations [96]. Blockchain technology enables smart contracts, which are self-executing contracts with the agreement's contents explicitly put into code [97]. The open banking system, which enables outside developers and businesses to create apps and services around financial institutions, is also the third new trend in the financial industry [98]. This promotes a creative and competitive financial ecosystem [99].

It is also advised that regulators and governments implement laws and regulations that guarantee financial sector stability. This will advance

the financial inclusion agenda in SSA and boost trust in the system. Technology use seems to be strongly on the rise in Africa, especially among the younger generation [100]. Sub-regions can capitalize on this trend by aggressively pursuing policies linked to financial inclusion, which would ultimately convert this growing reliance on technology into economic development [101,102].

## CONCLUSION

The research will confirm that financial inclusion promotes economic expansion. Greater capital formation, deposit mobilization, and loan availability may result from easier access to financial services, which could encourage more investment, job creation, and economic growth. Therefore, any actions that may strengthen the macroeconomic foundations and, in particular, lower lending rates, could advance the financial inclusion agenda when lending to assist the private sector's productive activities.

This will establish the advantageous circumstances required for financial institutions to employ technology to readily and reasonably offer services to the public. This study will not consider the possibility that any other factors could alter the association between innovation and growth. Consequently, it is recommended that any upcoming studies in this area look at the possibility of a few significant economic variables influencing the relationship under investigation.

## CONFLICTS OF INTERESTS

No conflict of interest regarding the publication of this article from the author Dhaher Mohammed Alshammari's side. The author used no personal, professional, or financial relationship to present this review article. The author does not have any financial interests, funding sources, or affiliations that would be construed to impact the conclusions or interpretations made in this review.

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