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Emerging Developments and Challenges in FinTech Landscape

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ABSTRACT
Due to the rapid progress in financial technology (FinTech), the financial sector has undergone substantial changes, leading to a redesign of customer interactions and the modernization of traditional banking procedures. Consequently, there has been a noticeable surge in digital transactions worldwide. The expansion of the smartphone industry, coupled with widespread high-speed internet access, has played a pivotal role in driving this expansion. This paper explores FinTech landscape along with its evolution and impact on traditional banking sector. It also discusses the key areas where FinTech has disrupted the industry, including digital payments, lending, wealth management, and blockchain technology. Additionally, it analyzes the emerging trends in FinTech, such as crowdfunding, budgeting apps, and robo-advisory services. Furthermore, it delves into the issues faced by FinTech, including regulatory concerns and cybersecurity challenges.

KEYWORDS
Remittances; Blockchain; Robotic Process Automation; Anti-money laundering; Cybersecurity

1. INTRODUCTION

In a world marked by rapid technological changes and persistent economic uncertainties, FinTech has arisen with a significant influence on various aspects of finance. It has brought about substantial changes to traditional economic practices by effectively tackling financial inclusion challenges. Consequently, it has alleviated potential obstacles in the finance sector, including restricted access to financial services, cumbersome paperwork, concerns regarding account security and privacy, excessive manual labor, and the under-utilization of human resources. Today, FinTech has extended its reach to encompass various subfields of finance, including InsurTech, RegTech, WealthTech, risk management, and more. This has led to the delivery of efficient and innovative financial solutions for a broader and more diverse demographic across the globe.

FinTech is the portmanteau of “finance” and “technology”, highlighting the amalgamation of technology in the finance sector, thereby improving the accessibility and efficiency of financial services delivered. Figure 1 envisions this notion. The financial stability board (FSB) formally defines FinTech as “technologically enabled financial innovation that could result in new business models, applications, processes, or products with an associated material effect on financial markets and institutions and the provision of financial services” [1].

Over time, the meaning of FinTech has expanded to encompass companies that use cutting-edge technologies like artificial intelligence (AI), cloud computing, and blockchain to offer newer, innovative financial services and products [2].

Even though it has a history spanning many years, the term “FinTech” and the associated sector have only recently gained significant prominence, particularly in the 2010s, coinciding with the rise of specialized companies in this field. The widespread adoption of smartphones and the availability of high-speed internet connection has further accelerated the growth of FinTech worldwide.

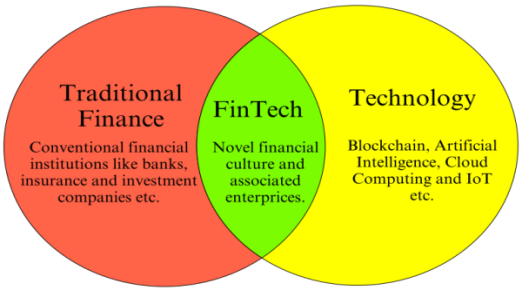

Fig. 1 An overview of FinTech

The global FinTech sector is expected to experience substantial growth by 2030, with a strong annual expansion rate. In 2021, there was a notable surge in global FinTech investments, driven by successful deals [3]. However, the following year, 2022, saw a decline in investments due to economic uncertainty in various nations and concerns about a potential recession. This paper examines the evolution and influence of FinTech on the traditional banking sector. It highlights disruptions in digital payments, lending, wealth management, and blockchain technology. Emerging trends like crowdfunding, budgeting apps, and robo-advisory services are also discussed. Additionally, it addresses regulatory and cybersecurity issues facing the FinTech industry.

Rest of the paper is organized as follows: Section II describes the FinTech evolution. Section III explores the impact of FinTech on traditional banking. Section IV discusses the technologies underpinning FinTech. Section V describes the advantages of FinTech. Section VI presents the FinTech applications. Section VII describes current trends in FinTech. Section VIII describes the challenges in FinTech. Section IX concludes the paper.

2. EVOLUTION OF FINTECH

The rise of FinTech as a powerful intersection of technology and finance was not an instantaneous occurrence. Rather, it was the outcome of a gradual transformation that spanned several years, drawing from a range of disciplines including science, technology, and the Internet. Figure 2 vividly captures this incredible journey of FinTech, underscoring noteworthy milestones that have been attained thus far and those yet to come.

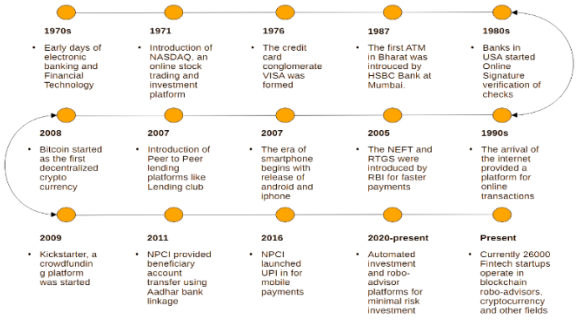

Fig. 2 Evolution of FinTech

2.1 Foundations of Electronic Banking (1970s)

In the 1970s, the inception of electronic banking marked the dawn of FinTech. A notable milestone of this era was the introduction of the NASDAQ stock exchange platform, the world's first electronic market, in America in 1971. Although the electronic trade system was not fully developed, electronic quotation systems like billboards were already in use [4]. During this time, contemporary computer models and the public Internet were still undergoing development, and the Internet was solely available to the U.S. military force as it functioned as a private network.

2.2 ATMs and Early FinTech Advancements (1980s)

During this period, there was a noteworthy rise in the number of ATMs (Automated Teller Machines) installed worldwide. The goal was to increase the accessibility and convenience of banking services for the public [5]. HSBC Bank opened Bharat's first public electronic cash dispenser system in Mumbai in 1987. However, the world's first experimental ATM was established in New York, USA 1969. Furthermore, some banks also experimented with online verification systems during this era to enhance financial transactions [6].

2.3 Internet and FinTech (1990-2000s)

The emergence of the internet for public use opened a wide range of possibilities in the modern era. It had a transformative impact on society, enabling services such as email, bulletin board systems, electronic information systems, and early e-commerce sites to become available to the general public. The introduction of online payment systems marked a significant milestone in the evolution of FinTech, making way for the widespread acceptance of online trading and electronic banking.

2.4 Innovations in Banking Technology and Smartphone Revolution (2005-2008)

This era has witnessed the extensive integration of innovative technologies into the banking sector, leading to the efficient provision of financial services. Many developing nations, particularly Bharat, have pioneered these new technologies, replacing traditional manual operations. The adoption of advanced technologies in the country's banking sector can be traced back to 2005 when the reserve bank of India (RBI) introduced the national electronic funds transfer (NEFT) and real-time gross settlement (RTGS) payment systems. These systems facilitated swift and secure financial transactions directly through banks, often completed within a single day. Simultaneously, there were significant technological advancements on a global scale, with Google introducing the Android operating system in 2007 and the release of the first-ever iPhone, marking the beginning of the smartphone era.

2.5 Revolutionary Platforms and The India Stack (2009-2022)

This period witnessed a massive surge in newer platforms that supported innovation and content creation. One such platform, 'Kickstarter', became increasingly popular and set the standard for crowdfunding platforms. The national payment corporations of India (NPCI) developed the direct beneficiary account transfer system in 2011, which achieved remarkable success and continues to draw attention worldwide. After a few years, NPCI also launched the unified payment interface (UPI), which revolutionized the financial sector and greatly contributed to the economic growth of the country [7]. This phenomenon has also given rise to new ventures and privately owned companies that have embraced the NPCI architecture, pivotal in shaping what is now commonly referred to as the India stack. It is a set of application programming interfaces (APIs) built on financial development platforms. It is open to developers, startups, and third-party users to build their products and applications.

2.6 Present, Future and Beyond

In today's ever-evolving FinTech landscape, approximately 26,000 startups are active globally, operating across a broad spectrum of areas. These areas encompass algorithmic investment advisory services, cutting-edge insurance systems, sophisticated wealth management platforms, budgeting applications, Ethereum-based decentralized applications (DApps), and more. Notably, the FinTech sector has witnessed the emergence of new and highly noteworthy

domains, including RegTech, cybersecurity, and blockchain powered Decentralized Finance (DeFi), which have garnered substantial attention and interest. Furthermore, the integration of the internet of things (IoT), artificial intelligence (AI), and blockchain technologies presents a promising opportunity for ushering in a transformative era of FinTech in the future [8].

3. IMPACT OF FINTECH ON TRADITIONAL BANKING

Banks and financial institutions have existed throughout history, predating even the renaissance era, and having roots in ancient Bharat. Over the years, they have progressively developed into the intricate banking systems we observe today. In the modern day, this sector still needs to overcome various hurdles like strict working hours, limited access to banking, tedious paperwork, and more. However, since the adoption of FinTech, the banking sector has undergone a tremendous transformation, leading to increased financial inclusion [9]. This section discusses various impacts of FinTech on the traditional banking sector.

3.1 Novel Approaches to Banking

For an extended period, banks heavily depended on methods that involved substantial human involvement. Banking procedures were primarily paper based. However, with the emergence of FinTech and the substantial shift toward digitization, banks thoroughly reassessed their operations and swiftly transitioned to more efficient and expedient methods. In the contemporary landscape, banks are incorporating robust digital encryption into their services, granting access to their APIs for third-party integration, leveraging digital platforms for service delivery, and engaging in collaborative efforts with startups. Moreover, most banks are embracing the Banking as a Service (Baas) and open banking approaches to stay abreast of disruptive technologies in today's world. Figure 3 illustrates this transition more representatively.

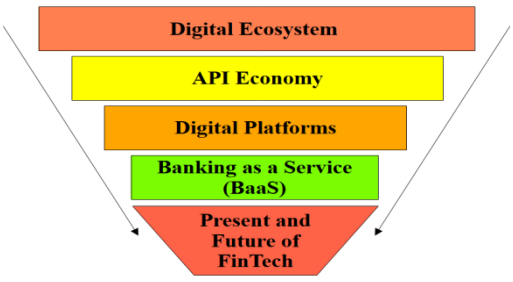

Fig. 3 New approaches to banking with the adoption of FinTech

3.2 Reduced Bank Credit Risk

Financial institutions worldwide can be classified based on their scale, workforce, capital expenditure, and influence. Typically, smaller banks have a regional or national reach, while larger commercial banks have a global presence and substantial assets and capital. These institutions' approach to FinTech development varies depending on their budget, research investments, and risk management strategies. However, studies indicate that FinTech reduces credit risk levels in all commercial banks regardless of the scale. Additionally, FinTech development aids in identifying methods to mitigate credit risk, particularly for smaller banks [10].

3.3 Fostering Competition Among Banks

Over the years, the competition between commercial banks has undergone many fluctuations. Starting with the economic liberalization of the 1990s and the emergence of Internet banking in modern times, all banks strive to gain an edge over their competitors through technological advancements and enhanced services. FinTech and other disruptive solutions have spurred this competition, resulting in shifts in the financial sector's structure, administrative costs, and market share. This ultimately leads to the disruption of large bank monopolies or duopolies. Consequently, consumers have started to experience the benefits of superior services, as banks are pressurized to update their operations to stay relevant in the market [11].

4. TECHNOLOGIES UNDERPINNING FINTECH

Within the realm of FinTech, the technology component is not merely a collaborative effort, rather a driving force behind the industry's disruptive nature. As Figure 4 demonstrates, FinTech harnesses a wealth of technologies from various tech industry segments. This section explores the essential technologies that fuel FinTech's drive.

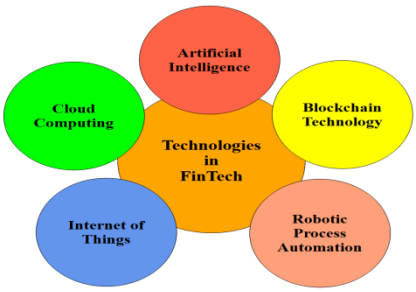

Fig. 4 The underlying technologies in FinTech

4.1 Artificial Intelligence (AI)

The world has undergone significant transformation through AI technologies. In FinTech, machine learning analyzes customer behavior using past data from databases or public repositories. Leading banks employ AI-powered chatbots, improving user engagement. Virtual assistants with natural language processing (NLP) benefit individuals with disabilities in financial access. AI aids financial institutions in credit risk assessment, fraud detection, and financial forecasting. It also helps organizations and banks understand customers better and enhance services.

4.2 Robotic Process Automation

The ascent of the internet has brought about a surge in popularity for robotic process automation (RPA), a technology designed to automate repetitive yet specific UI/UX tasks. Such tasks require vast amounts of human resources, leading to increased costs. By automating them using computers, RPA proves to be a cost-effective solution. RPA has tremendous applications in FinTech, including automated processing of financial information like accounts, bills, and statements. The insurance industry has benefited significantly from RPA by streamlining claim verification and settlements. RPA also leads to better investment efficiency and budgeting through automated portfolio tracking. RPA can even help with stock trading by keeping track of watch lists and improving stop loss prediction [12].

4.3 Blockchain Technology

Blockchain plays a pivotal role in FinTech, driving cryptocurrencies and payment systems such as Bitcoin. It eliminates the requirement for transaction intermediaries, guaranteeing security through an immutable chain of encrypted blocks. While traditional digital ledgers are vulnerable to double spending, blockchain employs a distributed ledger system where every network node possesses a ledger copy, significantly raising the hurdles for fraud and tampering. In essence, blockchain promises to transform numerous industries, with FinTech being a prominent example.

4.4 Cloud Computing

Cloud computing is an indispensable component of the current technological arena, profoundly influencing numerous industries, including FinTech. It is challenging to envision banks, corporations, and financial institutions thriving in the contemporary world without the vital support of cloud storage and computing technology. Core attributes of cloud computing involve offering services on-demand, enabling universal network access through a wide array of electronic devices, and the resource pooling architecture that distinguishes cloud computing from traditional IT infrastructure. This technology affords numerous advantages, including scalability, adaptability, measurable performance metrics, and cost-effectiveness, benefiting individual users and corporate entities [13].

4.5 Internet of Things

Throughout human evolution, the fascination with interconnected machines has driven technological progress. In today's digital era, the internet of things (IoT) stands as a paradigm, seamlessly connecting digital devices via the Internet and cloud technologies. While IoT integration in FinTech is still emerging, it shows promising prospects. IoT standards facilitate banking services through wearables, enabling third-party providers to enhance their offerings. Individuals can use IoT to monitor and optimize spending, promoting prudent financial choices. IoT also drives voice activated chatbots for consumer engagement via devices like Amazon's Alexa. Biometric authentication, such as the Nymi wristband analyzing heartbeat patterns, advances account security. Future IoT applications encompass the development of intelligent, IoT-enabled homes designed for insurance risk assessment [14].

5. ADVANTAGES OF FINTECH

In addition to its financial implications for both traditional banking and non-banking entities, FinTech also encompasses social and economic advantages, as briefly depicted in Figure 5 and elaborated upon below.

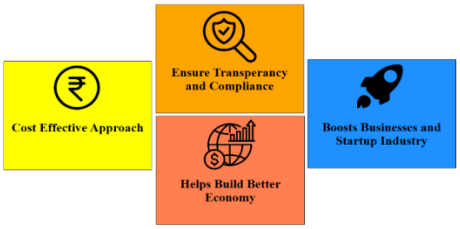

Fig. 5 The societal benefits and advantages of FinTech

5.1 Anti-Corruption

Incorporating FinTech strategies is a proactive approach to prevent credit corruption by detecting potential risks, analyzing data, and encouraging equitable growth. Research has proven that FinTech techniques, including transactional data analysis and machine learning, can aid in identifying and resolving resource mismanagement issues while improving investment efficacy. These innovations are especially advantageous for governing entities that oversee substantial asset allocation and face heightened exposure to corruption [15].

5.2 Financial Inclusion

FinTech shows promise in promoting financial inclusion for underprivileged populations as enhancing financial literacy is vital for those without banking services [16]. These communities can benefit significantly from understanding fundamental financial concepts, including formal banking, investments, and insurance. Organizations like the securities and exchange board of India (SEBI) have worked towards educating ordinary citizens and underserved communities over the past three decades. Online social networks are instrumental in encouraging broader FinTech adoption and reaching previously underserved populations. FinTech companies operating payment services have expanded their customer base by offering mobile banking, microfinance, and digital wallet solutions.

5.3 Trust and Acceptance

Researchers frequently investigate the reasons behind the ongoing utilization of FinTech-based P2P payment systems in developing countries like Bharat, aiming to understand the potential growth of digital finance systems in the coming

years. Studies indicate that trust, social acceptance, and willingness to collaborate with others are pivotal drivers of this trend. In addition, the Covid-19 pandemic and subsequent lockdowns have also amplified this growth. With limited food delivery options and reduced access to physical money transfer systems, consumers were incentivized to adopt P2P and other digital payment methods. However, this sustained usage has also cultivated consumer trust, leading to more widespread acceptance of P2P payment systems in emerging economies such as Bharat [17].

5.4 Reduced Operational Costs

Research indicates that adopting FinTech in capital markets offers reduced operating costs and improved accessibility. However, the aftermath of events like the Covid-19 pandemic, the Russia-Ukraine war, and the resulting global inflation have increased the risk of debt default for economies. This risk extends to major global banks and financial institutions, as evidenced by cases involving First Republic Bank, Silicon Valley Bank, and Signature Bank. Consequently, many banks are choosing to collaborate with FinTech companies rather than operate independently in the market. These partnerships enable them to adapt more swiftly to new regions, evolving policies, and emerging challenges, ultimately reducing operational costs [18].

6. APPLICATIONS OF FINTECH

FinTech has diverse applications in various financial services, including payment systems, investments, insurance, and lending etc. Figure 6 provides an overview of these applications.

6.1 Payments Infrastructure

The payment infrastructure is crucial in FinTech as it enables safe and efficient financial transactions, promotes economic growth, and facilitates financial inclusion. The growth of e-commerce and FinTechs offering paywall services is driven by increased consumerism and ease of access to finance. Various payment systems include:

Fig. 6 An overview of FinTech applications

6.1.1 Peer to peer (P2P) payments

A transformative FinTech paradigm that offers individuals and businesses a decentralized, direct, and user-friendly platform enabling swift and direct transfer of funds from account to recipients. In addition, these systems leverage mobile platforms and eliminate the need for traditional intermediaries such as banks. Moreover, P2P payment systems use a publicly shared ID, such as the UPI ID of the India stack, to seamlessly transfer funds.

6.1.2 International Money Transfers

International money transfers, frequently in the form of remittances, are the money sent by migrant workers to their families in their home country. These remittances are vital for many developing countries, especially Bharat, the largest recipient of remittances globally, with an estimated 89 billion USD, making up a significant portion of their economy [19].

6.1.3 Consumer-issuer payments

The transfer of payments between consumers and issuers is crucial in the finance industry. It facilitates secure and efficient communication between them, including financial institutions and card companies, when paying for products and services. These channels ensure seamless and reliable financial transactions by providing trustworthy payment systems. The payment industry, especially the mobile payment sector, is an ever-growing industry with a market value of 2.3 trillion USD in 2022. This growth is strongly supported by a massive number of connected smartphones, nearly 6 billion, growing daily. It is projected to grow at a 30% rate to reach 18.8 trillion USD in 2030 [20].

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6.2 Deposits and Lending

FinTech holds significant relevance in the deposits and lending sector, primarily empowering consumers to streamline the process of applying for loans and efficiently manage their account and credit information. While traditional financial institutions like banks and cooperatives have offered these services, FinTech firms provide them with enhanced flexibility, accessibility, and efficiency. Diverse lending methods widely utilized in today's global landscape include:

- Credit-based Lending
- Crypto-based Lending
- P2P Lending

The credit-based lending method requires collateral in the form of tangible assets, while crypto-based lending involves depositing cryptocurrencies. Peer-to-peer (P2P) lending has gained popularity recently, with FinTech firms such as Figure, LendingClub, and Circle offering various interest

rates and perks. Moreover, digital lending has become faster, cheaper, and more secure by leveraging the salient features of blockchain, like immutability and decentralization. Blockfi, Nexo, and Liquid Mortgage are major platforms providing blockchain-based lending services [21].

6.3 Investments

Modern investment companies have adopted a new approach to finance with the help of FinTech solutions that enable individuals and institutions to invest with greater efficiency and effectiveness. Robo-advisory services offer minimal risk investment returns, while algorithmic advice, such as tax loss harvesting and RPA-assisted portfolio tracking and management, provide better oversight. Online trading platforms and cryptocurrency exchanges have become increasingly popular due to their user-friendly interfaces and hassle-free investment services. Likewise, digital assets, including cryptocurrencies, are gaining traction among institutions and retail investors. Consequently, these transformative trends are actively shaping the future of investment practices and opportunities across the globe [21].

6.4 Risk Management

Financial institutions can improve their risk management with the help of FinTech solutions that use real-time data analytics, including anti-fraud and anti-money laundering measures. Many platforms use advanced AI and machine learning algorithms to analyze real-time transactions and identify suspicious patterns rapidly. This proactive approach reduces the need for post-complaint discovery, providing adequate protection. Moreover, these solutions effectively monitor digital transactions to combat money laundering risks associated with illegal activities, such as funding riots, drugs, and terrorism [22].

6.5 RegTech

Regulation technology, referred to as RegTech, represents a transformative subdomain within the FinTech sector, harnessing advanced technologies to manage regulatory compliance effectively. Its applications span diverse industries, including healthcare, gaming, and finance. RegTech plays a pivotal role in safeguarding patient data privacy and ensuring pharmaceutical safety in healthcare. Within the gaming and media sectors, it ensures that users adhere to age verification and responsible gambling standards. Furthermore, financial institutions worldwide are increasingly adopting RegTech solutions to navigate their industry's continually evolving legal frameworks [23]. For instance, banks utilize RegTech to authenticate their customers through eKYC (electronic Know Your Customer), a growing technology in the digital finance realm for identity verification. Since third-party FinTech companies provide RegTech services, traditional financial institutions, and other companies can concentrate on product development without becoming overly entangled in complex regulatory compliance processes.

7. CURRENT TRENDS IN FINTECH

The widespread adoption of digital technology, particularly in developing economies, has given rise to modern platforms and tools incorporating FinTech principles. Within this context, we explore various recent trends shaping the FinTech landscape.

7.1 Crowdfunding Platforms

FinTech has significantly altered the way money is transferred among investors, enabling direct transactions without relying on traditional lending institutions. This has opened up a potential avenue for businesses and individuals to pool their resources from friends, clients, and fans to finance their projects. Platforms like Kickstarter, Patreon, and GoFundMe have democratized crowdfunding for broader audiences, reshaping traditional fundraising dynamics. Additionally, platforms like Patreon enable artists and content creators to monetize their work by providing exclusive content in exchange for tips from fans. Moreover, crowdfunding platforms, including Ethereum-based initial coin offerings (ICOs) and security token offerings (STOs), provide a more accessible approach to entrepreneurial financing. In market value, crowd funding is projected to grow at a 15% rate throughout 2021-30 to reach 200 billion USD around 2025, portraying promising prospects for the entire crowdfunding industry [24].

7.2 Cryptocurrencies and Blockchain

Fintech-based ventures like Coinbase have empowered consumers to engage in cryptocurrency trading, including popular options such as Bitcoin, Ether, and Litecoin. These platforms serve as exchange and trading hubs, enabling users to buy, sell, and exchange digital currencies peer-to-peer. Cryptocurrencies operate on decentralized networks that use blockchain technology to ensure the security of transactions. In such decentralized systems, transactions are validated by network nodes using cryptographic methods and recorded on the blockchain rather than relying on a central authority. This technology enhances transparency, security, and traceability. Blockchain also offers services that combat illegal counterfeiting by enabling the verification and tracking of the origin and history of goods, making it challenging for counterfeiters to manipulate or replicate products [20].

7.3 Budgeting Apps

Budgeting apps have emerged as popular FinTech Services expected to proliferate in the coming years despite being relatively new and holding a smaller market share. In the past, consumers tracked and managed their expenses through notes or spreadsheets, which incurred tedious paperwork, manual labor, and other challenges. In this context, budgeting apps are software tools designed to help individuals and businesses manage their finances by tracking income, expenses, and savings goals. These apps offer an array of features, including expense categorization, budget creation, bill reminders, and financial insights. In addition, users can

monitor their spending patterns, set financial goals, and make informed decisions to achieve better financial health. Popular budgeting apps like Mint from Intuit, PocketGuard, and Personal Capital can even connect to the consumer's bank account to download the transactions automatically and classify the money spent to help manage their budget efficiently. Moreover, support for wearables and mobile compatibility makes their services more accessible and efficient, coupled with intelligent alert systems [24].

7.4 Investments and Opportunities in FinTech

According to KPMG [25], the global FinTech market is forecasted to exceed 2 trillion USD by 2030, experiencing an annual growth rate of 13.9%. However, the trajectory of this trend saw a shift in 2020 due to the COVID-19 pandemic and its subsequent effects, as illustrated in Figure 7. In 2021, the global FinTech sector recorded its highest-ever investment of 210 billion USD, with a proliferation of investment deals. Conversely, the following year, 2022, witnessed a decline of 40 billion USD in investments, primarily attributed to economic instability in various countries and concerns about a potential recession. Nevertheless, FinTech remains poised to offer promising investment opportunities in the future, with emerging sectors like RegTech attracting significant investments. In emerging economies, FinTech investments have reached unprecedented levels. For instance, in Bharat, FinTech is the second top investment sector, attracting $5.65 billion USD in 2022, next to e-commerce.

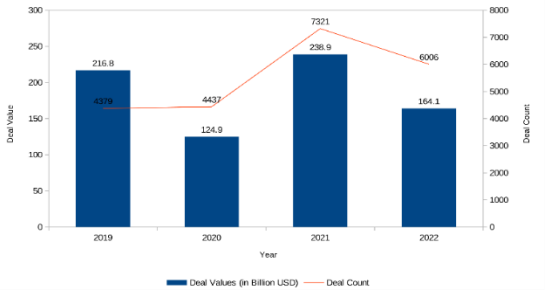

Fig. 7 Global FinTech investment trend

8. CHALLENGES IN FINTECH

With substantial investments pouring into innovation and technology worldwide, it becomes imperative to address the challenges that accompany this progress. FinTech is no exception in this regard, as it frequently faces significant concerns and issues. Figure 8 highlights various challenges associated.

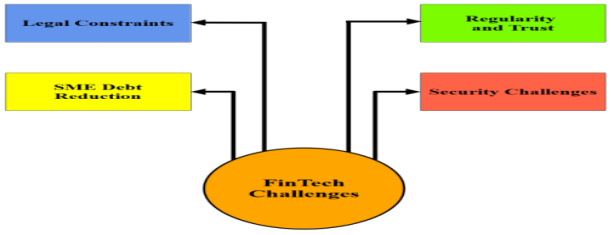

Fig. 8 Challenges and issues faced in FinTech

8.1 Crowd Funding Platforms

The FinTech disruptors encounter legal hurdles in lending due to their overreliance on forecasting future events rather than concrete evidence. With the capacity to lend substantial sums of money without confirming the borrower's financial status, FinTech firms disrupt the conventional dynamic between finance and the law. This poses challenges, especially in developing economies like Bharat, particularly in the case of foreign app-based lending services. In addition, raising and managing capital to support lending operations can be challenging for startups. Furthermore, dealing with loan defaults and collections is another challenge faced by FinTech lending firms.

8.2 Reduced Use of SME debt

Recent research has revealed that small and medium-sized enterprises (SMEs) are finding it increasingly difficult to secure bank loans due to the rise of FinTech-based Internet banking. In the present scenario, FinTechs primarily rely on hard information that is easily quantifiable data, such as transaction details. However, it fails to consider the importance of soft information, which is based on human interactions and is critical in securing credit. Such absence of soft information can negatively impact decision-making related to loans. For example, following the near collapse of Silicon Valley Bank in 2023, smaller regional banks in the southern states of the USA, with a traditional focus on trust and personal relationships, raised concerns about safety and bankruptcy. Such failures highlight the flaws in FinTech and risky lending decisions, including funding unsupported foreign startups [26].

8.3 Need for Regularity and Trust

Numerous FinTech companies operate globally, offering services akin to banks and financial organizations without adhering to the same regulations. Some FinTech startups have been observed to exhibit non-compliance with regulations concerning their treatment of employees and customers, particularly in areas such as lending practices, working hours, and adherence to insurance policies. These issues are compounded by the fact that relatively few regulatory bodies are in place to monitor and enforce compliance within the FinTech sector. In addition, some startups may not account for future financial risks like bankruptcy and debt default, leading to a swift business closure. Furthermore, FinTechs must improve their transparency levels to maintain ethical business conduct with their key stakeholders [26].

8.4 Security in FinTech

Although FinTech companies invest significant resources in cybersecurity, they can still fall prey to hacking attacks. Even with advanced security measures, human negligence can leave an entire network vulnerable to attackers. With critical financial transactions at stake, robust security measures are crucial for bank accounts, cryptocurrency trading, and exchange platforms. The recent theft of 600 million USD

from Poly Network, a leading global crypto company, serves as a stark reminder of the importance of heightened security. The quantum algorithms with the potential to crack encryption exponentially faster pose a newer challenge to the FinTech and technological landscape, creating a security gap after the quantum leap. To tackle such emerging challenges, researchers are working on more secure post quantum computing algorithms.

9. CONCLUSION

The financial services industry has undergone a profound transformation in the way global financial transactions are conducted, primarily driven by the emergence of FinTech. FinTech companies are harnessing cutting-edge technologies to enhance the efficiency and accessibility of financial services. Overall, this paper has offered a comprehensive understanding of the global FinTech revolution. It has shed light on the FinTech infrastructure, its evolution, and the solutions it offers. Additionally, the paper has outlined the present trends, investments, and prospects within the FinTech market. Furthermore, it has examined the various challenges intertwined with the growth of FinTech.

REFERENCES

1. I. Ramlall, (2018). Fintech and the financial stability board, in Understanding Financial Stability, Emerald Publishing Limited, 71–81.
2. R. Rupeika-Apoga and E. I. Thalassinos (2020). Ideas for a regulatory definition of fintech.
3. M. Barroso and J. Laborda (2022). Digital transformation and the emergence of the fintech sector: Systematic literature review, Digital Business, 2(2), 100028.
4. K. Garbade (1978). Electronic quotation systems and the market for government securities, Federal Reserve Bank of New York Quarterly Review, 3(2), 13–20.
5. A. G. Konheim (2016). Automated teller machines: their history and authentication protocols," Journal of Cryptographic Engineering, vol. 6, no. 1, pp. 1–29, 2016.
6. F. Giglio et al. (2021). Fintech: A literature review, European Research Studies Journal, 24 (2B), 600–627.
7. K. Dattani (2019). Governtrepreneurism for good governance: The case of aadhaar and the India stack area. 52(2), 411–419.
8. A.-L. Mention (2019). The future of Fintech.
9. X. Vives (2017). The impact of fintech on banking, European Economy, 2(1), 97–105.
10. Y. Zhang, S. Ye, J. Liu, and L. Du (2023). Impact of the development of fintech by commercial banks on bank credit risk. Finance Research Letters, 103857.
11. P. Bejar, K. Ishi, T. Komatsuzaki, I. Shibata, J. Sin, and S. Tambunlertchai (2018). Can fintech foster competition in the banking system in latin america and the caribbean?, Latin American Journal of Central Banking, 3(2), 100061.
12. K. N. Kumar and P. R. Balaramachandran, (2018). Robotic process automationa study of the impact on customer experience in retail banking industry, Journal of Internet Banking and Commerce, 23(3), 1–27.
13. M. Cheng, Y. Qu, C. Jiang, and C. Zhao (2022). Is cloud computing the digital solution to the future of banking?, Journal of Financial Stability, 63, 101073.
14. T. Nakashima (2018). Creating credit by making use of mobility with fintech and IoT, IATSS Research, 42(2), 61–66.
15. F. Su and C. Xu (2023). Curbing credit corruption in china: The role of fintech, Journal of Innovation & Knowledge, 8(1), 100292.
16. P. K. Ozili (2023). Determinants of fintech and bigtech lending: the role of financial inclusion and financial development, Journal of Economic Analysis, 2(3), 66–79.
17. B. Savitha, I. T. Hawaldar, and N. Kumar (2022). Continuance intentions to use fintech peer-to-peer payments apps in India, Heliyon, 8(11).
18. Y. Wang, S. Xiuping, and Q. Zhang (2021). Can fintech improve the efficiency of commercial banks?—an analysis based on big data, Research in international business and finance,55, 101338.
19. A. C. Lyons, J. Kass-Hanna, and A. Fava (2022). Fintech development and savings, borrowing, and remittances: A comparative study of emerging economies, Emerging Markets Review, 51(1),100842.
20. B. Karadag, A. Akbulut, and A. H. Zaim (2022). A review on blockchain applications in fintech ecosystem, in 2022 International Conference on Advanced Creative Networks and Intelligent Systems (ICACNIS), 1– 5, IEEE..
21. T. Renduchintala, H. Alfauri, Z. Yang, R. D. Pietro, and R. Jain (2022). A survey of blockchain applications in the fintech sector, Journal of Open Innovation: Technology, Market, and Complexity, 8(4), 185.
22. M. Hasan and A. Hoque (2023). Fintech risk management and monitoring, in Novel Financial Applications of Machine Learning and Deep Learning: Algorithms, Product Modeling, and Applications, 3–16.
23. D. W. Arner, J. Barberis, and R. P. Buckey (2016). Fintech, regtech, and the reconceptualization of financial regulation Nw. J. Int'l L. & Bus., 37 (1), 371.
24. A. Mehrotra and S. Menon (2021). Second round of fintech-trends and challenges, in 2021 2nd International Conference on Computation, Automation and Knowledge Management (ICCAKM), 243–248, IEEE.
25. B. O'Neill (2021). Total fintech investment tops 210 billion dollars as interest in crypto and blockchain surges. Feb 2021.https://kpmg.com/xx/en/home/insights/2023/02/pulse-of-fintech-h2-2022-global-insight.html
26. F. Fasano and F. Cappa, (2022). How do banking fintech services affect sme debt?, Journal of Economics and Business, 121,106070.

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