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Sowmya N
Research Scholar, Department of Commerce, Bangalore University, Bengaluru, Karnataka, India

Dr. K Nirmala
Professor, Department of Commerce Bangalore University, Bengaluru, Karnataka, India

Correspondence Author:
Sowmya N
Research Scholar, Department of Commerce Bangalore University, Bengaluru, Karnataka, India

Enhancing equity markets with fintech: Efficiency gains and system resilience in payment and settlements

Sowmya N and K Nirmala

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Abstract
There is a speedy integration of FinTech in the stock market, which has altered the means of payment and settlement by making it amazing and reliable. Fintech bridges the gap that exist in traditional processes by facilitating automation, transparency, and real-time processing to strengthen the market environment. The objectives of the study include, examining the implication of FinTech in improving the efficiency of the transaction operations in the equity market, evaluating the impacts of FinTech integration on the payment and settlement systems, exploring the opportunities that FinTech presents for the improvement of equity markets. A structured questionnaire was administered to the respondents with a total of 217 respondents which encompassed both institutional and individual investors. Furthermore, in line with this purpose, the stratified and judgmental selection is applied in a way to ensure that diverse stakeholders with practical experiences on the application of FinTech to equity transactions are included. Percentage analysis is used to illustrate the response distribution and frequency and to indicate the key areas of concern and perceived opinions of the participants. Factor analysis is applied to extract factors for the discovery of latent factors or dimensions and checking for co-linearity is done. Regression analysis is undertaken to analyse the impact of FinTech on the level of resilience and efficiency of equity markets. Findings conclude that the application of AI -driven FinTech solutions is capable of bringing about significant changes in the efficiency of the cycles of settlement, operation risks, and system's transparency in enhancing the user experience. The study also explores the potential opportunities to expand the equity market by attracting more investors through adopting for technological inventions.

Keyword: Fintech, equity market, payment and settlement mechanism, system's operational efficiency and resilience

1. Introduction
Equity markets are crucial for channelling funds from investors to companies, and to foster economic growth, these marketplaces depend upon a payment and settlement mechanism to efficiently settle transactions safely and in a timely manner (Wurgler, 2000) [34]. Traditionally, payment and settlement systems were relied on time-consuming and customarily vulnerable to inefficiencies, delays, and operational risks (Sanyaolu, Adeleke, Azubuko, & Osundare, 2024) [26]. The enlarged entanglements and large scale of global financial transactions has demanded more innovation in market structure (Agarwal, Qian, Ren, Tsai, & Yeung, 2020) [2]. FinTech, with its suite of cutting-edge technologies including blockchain, artificial intelligence (AI), machine learning (ML), and digital payment platforms, has stepped in, to meet these issues (Giglio, 2021) [8].
The growing interconnectedness of global markets mandates systems that are both efficient and resilient to disturbances (Bhatnagar, Özen, Taneja, Grima, & Rupeika-Apoga, 2022) [6]. FinTech brings automation, transparency, and real-time capabilities, resulting in shorter settlement cycles, lower costs, and improved risk management (Lavayssière & Zhang, 2024) [15]. The use of financial technology into equity markets has evolved as a disruptive force, redefining processes, increasing efficiency, satisfaction among investors, and strengthening financial system, among its various applications, fintech has made a significant contribution to payment and settlement mechanism for equity markets (Xueyan Xie, August 2022) [35]. These systems are the foundation of equity markets, allowing for the efficient transfer of

securities Fintech solutions address these shortcomings by providing innovations such as realtime settlement systems, blockchain technology, and AI-powered process automation, which expedite processes and eliminate settlement risks (Sanyaolu, Adeleke, Azubuko, & Osundare, 2024) [26]. These technologies not only strengthen transaction speed and accuracy, but they also reinforce the financial system's overall resilience by lowering systemic risk and ensuring market stability during volatile periods (Kou, 2019) [14]. Given India's swiftly expanding investor base and the raising integration of Indian markets into global financial ecosystem, the use of fintech in equities market payment and settlement systems is critical for ensuring finality of trades (Sharma, Jangir, Gupta, & Rupeika-Apoga, 2024) [29]. An automated settlement system lessens transaction costs, maintains liquidity, and builds trust among the market's participants (Runsewe, Osundare, Olaoluwa, & Folorunsho, 2024) [24]. Fintech has transformed financial system by bringing technology that are faster, more secure and scalable as well as trustworthy (Hasan, Hoque, Abedin, & Gasbarro, 2024) [10].

Technology like real-time settlement systems shrink delays by enabling trades to be cleared and settled instantly, cutting the settlement cycle from T+7 to T+2 or T+1 or even realtime. Blockchain brings transparency and immutability to the settlement process, eliminating the need for middlemen and increasing confidence among participants, it also helps with crossborder payments by standardising procedures and reducing currency conversion delays (Agarwal, Qian, Ren, Tsai, & Yeung, 2020) [2]. Using AI-driven automation and other forms of machine learning, tasks like trade matching, error detection, and reconciling are made much easier, with a significant decrease in operational expenses and a complete elimination of human interaction. (Soremekun, Abioye, Sanyaolu, Adeleke, & Efunniyi, 2024) [31]. Digital payment platforms like UPI and RTGS facilitate frictionless fund transfers, increasing liquidity and ensuring transaction settlement on time (Soni & RL, 2024) [30].

Blockchain technology is the cornerstone for decentralized financial systems, emphasizing its potential to improve settlement procedures (Hattali, 2024) [11]. Blockchain minimizes settlement delays and eliminates the need for intermediaries, hence solving inefficiencies in traditional equity market (Wu, *et al*., 2024) [31]. Recent applications in payment and settlement systems highlight blockchain's potential to assure real-time data synchronization between participants, resulting in much faster and more accurate transactions (Yang, *et al*., 2023) [36]. Smart contracts hold the potential to revolutionize stock markets, especially with regard to post-trade settlement automation, by embedding predefined rules into blockchain systems. Smart contracts reduce the need for human intervention, hence speeding up and making the settlement of equity transactions more accurate. (Theodorakopoulos, Theodoropoulou, & Halkiopoulos, 2024) [32]. AI systems, which can process enormous datasets in real-time, increase the reliability of settlement procedures by detecting differences before they affect transactions (Giglio, 2021) [8].

The advent of machine learning, a branch of AI has revolutionized the financial environment by facilitating computers to autonomously analyze data, identify patterns, and provide predictions (Khedr, 2024) [12]. In the world of equity market, ML plays a critical role in improving decision-making processes, streamlining operations, and building resilience. The incorporation of ML into fintech solutions has transformed traditional payment and settlement systems, resulting in enhanced efficiency, lower operational costs, and better fraud detection methods (Mustyala, 2023) [18]. Predictive analytics powered by ML algorithms enables precise demand forecasting, dynamic risk assessment, and real-time anomaly identification, protecting the integrity of financial transactions (Obaido, *et al*., 2024) [20]. Furthermore, ML enables the automation of complex settlement processes, resulting in speedier reconciliation and fewer settlement failures. By processing massive amounts of data in milliseconds, ML model can unearth hidden insights that improve market efficiency and stability, as equity market becomes increasingly complicated, machine learning remains key driver of innovation, resulting in a smarter and more robust financial environment (Khedr, 2024) [12].

Real-time settlement systems offer a fundamental shift in the operation of equity market, guaranteeing that transactions are processed and cleared virtually immediately (Agarwal, Qian, Ren, Tsai, & Yeung, 2020) [2]. Unlike traditional settlement procedures, which can include multi-day delays, real-time solutions improve the efficiency and dependability of financial markets by decreasing settlement cycles to a matter of seconds (Giglio, 2021) [8]. This invention reduces counterparty risk and improves liquidity by exchanging cash and securities in real time, removing the uncertainty associated with delayed settlements (Milne & Ransome, 2024) [16]. The incorporation of fintech solutions, particularly those that use machine learning and blockchain technologies, has bolstered real-time settlement processes (Mori, 2016) [17]. This technology allows for the automation of transaction validation, fraud detection, and reconciliation processes, ensuring transparency and correctness (Balasubramanian, Muvva, Arcot, & Policepatil, 2024) [5]. The debut of real-time settlement technologies is also consistent with the increased demand for resilience in equities markets, by cutting systemic risks and operational constraints, these systems help to maintain financial stability (Hasan, Hoque, Abedin, & Gasbarro, 2024) [10]. As equity market adjust to increased volume and complexity, realtime settlement systems play an important role in building confidence, efficiency, and resilience in payment and settlement procedure (Mori, 2016) [17].

These technologies not only improve transaction efficiency, but also contribute to system resilience by reducing risk associated with counterparty through faster settlements, increasing market transparency, and lowering the likelihood of fraud, ensuring robustness during periods of high trading volumes or market disruptions (Almasria, Alhatabat, Ershaid, Ibrahim, & Ahmed, 2024) [4]. India's equity market, which are governed by the Securities and Exchange Board of India (SEBI), have made substantial progress in recent years (Ofir, 2021) [21].

The introduction of platforms such as the National Stock Exchange (NSE) and the Bombay Stock Exchange (BSE) has enabled high-frequency trading and increased market access (Nenavath, 2024) [19]. However, the increasing complexity and volume of transactions have brought

attention to the shortcomings of traditional settlement systems (Feyen, Frost, Gambacorta, Natarajan, & Saal, 2021) [7]. SEBI has played an important role in fostering fintech use to update these institutions (Sharma, Raut, Goel, & Kumar, 2024) [28]. Initiatives such as the deployment of T+1 settlement cycles, the promotion of blockchain-based solutions, and partnership with fintech firms have elevated India to the forefront of harnessing technology for market efficiency (Sangwan, Prakash, & Singh, 2020) [25].

Despite these advances, issues such as regulatory compliance, cybersecurity threats, and stakeholder resistance to technology adoption remains (Adeoye, *et al*., 2024) [1]. Addressing these impediments is crucial for fintech to reach its full potential in India's equity markets, while fintech solutions increase productivity, they also present hazards such as data security and regulatory arbitrage (Ali, Mijwil, Buruga, & Abotaleb, 2024) [3]. There is a need for regulators and market participants to work together to build frameworks that balance innovation and risk management, ensuring that fintech is adopted seamlessly in equity market (Bhatnagar, Özen, Taneja, Grima, & Rupeika-Apoga, 2022) [6]. Challenges to fintech adoption include stakeholders' low levels of computer knowledge, worries about cybersecurity, and high startup costs, especially in developing economies like India's. (Balasubramanian, Muvva, Arcot, & Policepatil, 2024) [5].

The paper explores the role of fintech adoption towards enhancing equity market infrastructure, alongside an emphasis on efficiency and system resilience. The study explores at how financial technologies can streamline payment and settlement processes while reducing systemic risks and promoting market stability through enhancing investors experience. The research effort aspires to provide actionable insights on optimizing fintech adoption in equity market by analysing empirical facts and stakeholder viewpoints for maximising the investor base though increased efficiency in transaction processing and user experience. The difficulties that come with fintech integration, such as regulatory hurdles, cybersecurity threats, and uneven technological adoption across market participants, addressing these problems is critical to maximize fintech's potential and ensuring the long-term evolution of stock market ecosystem (Koranteng & You, 2024) [13].

2. Review of Literature

(Priyadarshi, Singh, Dawadi, Dixit, & Prasad, 2024) [22] seeks to investigate the impact of FinTech applications on capital market investments, as well as to understand investor's perceptions on financial technology. The study adopts exploratory research approach, collecting primary data from 150 Indian capital market investors using an online questionnaire. In order to analyze the data, the chi-square test and mean were employed. According to the paper, aspects like simplicity of use, decreased paperwork, and security have a significant impact on investors' preferences for online investment platforms. Furthermore, the study found that middle-aged investors are more confident in using FinTech for capital market investing. The findings reflect that, while Fintech apps improve accessibility and simplicity of investment, there is no meaningful relationship between saving practices and the use of these technologies. The study suggests that FinTech applications have a significant impact on investment decisions, fostering a more open financial environment, and encouraging higher returns despite related risks.

(Balasubramanian, Muvva, Arcot, & Policepatil, 2024) [5] examines the impact of fintech in improving risk management techniques in the Indian retail banking industry. It emphasizes the huge opportunities that fintech provides for enhancing fraud detection, credit risk management, and operational efficiency. However, the author addresses the issues like as regulatory compliance, cybersecurity concerns, and the importance of a balanced approach to innovation. Examining what drives fintech adoption in Indian banks, this study uses the Technology-Organization-Environment (TOE) Framework. It underlines the need of risk mitigation techniques that are suited to India's particular regulatory context. There is a large disparity in the adoption of new technology by smaller banks, even though fintech can generate quantifiable benefits, according to the research. To completely achieve fintech's potential, the report argues that more research into the ethical issues and the need for regulatory support is necessary. It helps to better understand the impact of fintech on risk management in the Indian banking sector.

(Zhang & Zhang, 2024) [37] Covers the evolution and regulation of fintech in China, with a focus on the investment and payment industries. Highlights how China has adopted regulatory frameworks from more advanced jurisdictions while taking into account its unique market conditions. The author focuses on the issues of regulating peer-to-peer (P2P) lending business, as well as the developing complications of new fintech developments like as NFTs and the

Metaverse. They argue that a cautious regulatory approach is required to shield novice retail investors from potential hazards. The report also mentions that digital payment systems have been a huge success in China, thanks to ubiquitous smartphone use and internet access. Unlike investment-focused fintech, digital payments offer fewer dangers to financial stability, making them more appealing to consumers. Given China's established digital payment landscape, the authors discuss the predicted acceptance of Central Bank Digital Currency (CBDC). They find that, while crowdsourcing initially provided financing for micro, small, and medium-sized businesses (MSMEs), it has declined due to retail investors lack of investment risk tolerance. Overall, the findings suggest for a balanced regulatory strategy that protects investors while encouraging innovation in the fintech industry.

(Gupta, Kaur, & Yuliantiningsih, 2024) [9] Examines fintech's rapid growth and the global financial sector, it emphasizes the need for a strong regulatory framework to address the complexities and hazards connected with fintech advances. Regulatory compliance, cybersecurity concerns, and the need to safeguard consumers are among the issues mentioned by the writers. They underline the significance of adjusting current legal frameworks to account for the unique elements of fintech, particularly in South Asia. The article examines current legislative measures in India, such as the Information Technology Act and its revisions. Which seek to control online transactions and safeguard data privacy. It also highlights legislative gaps that could lead to financial

fraud, emphasizing the need for tougher restrictions. The authors offer several remedies, including strengthening regulatory collaboration, raising consumer awareness, and building complete legal frameworks geared to fintech. The article emphasizes the importance of striking a balance between encouraging fintech innovation and providing proper regulatory monitoring to protect stakeholders.

(Renduchintala, Alfauri, Yang, Pietro, & Jain, 2022) [23] Explores the enormous influence of blockchain technology on financial services. It demonstrates how blockchain may eliminate centralized governance and intermediaries, resulting in a frictionless and transparent financial ecosystem. The research shows that the demand for digital solutions has increased because to the COVID-19 pandemic, which has accelerated the rise of fintech. Additionally, it delves into the possibility of combining blockchain technology with AI and cloud computing to enhance operational security and efficiency. The paper highlights several blockchain applications, including payments, loans, and asset management. Additionally, it handles issues like regulatory compliance and scalability. The study underlines blockchain's transformational potential for transforming the future of finance.

(Wurgler, 2000) [34] Analyses the effectiveness of capital allocation in 65 nations, with the goal of understanding how financial markets influence investment decision, and to examine the impact of financial systems on capital allocation efficiency, the study uses United Nations statistics on the international manufacturing industry as well as data on external investor's legal rights. Key findings show that countries with well-developed financial sectors are better at allocating resources to expanding industries and reducing investments in declining ones. The study also emphasizes the importance of minority shareholder rights and firm-specific data in improving capital allocation efficiency. The study concludes with the focus on importance of financial market mechanisms in boosting economic growth.

These studies collectively highlight the transformative potential of fintech solutions while also identifying areas for future research. Proper empirical research has not been conducted on the impact of fintech adoption in equity market enhancement through improved efficiency and system resilience in enhancing user experience. This research expands on these areas to investigate the efficiency and resilience improvements from fintech in Indian equity market payment and settlement processes for enhancing market base.

3. Research Objectives

- To assess how financial technology has altered the equities market by enhancing the system's operational efficiency and the user experience.
- To assess FinTech's role in equity market through advancements in payment and settlement systems and efficiency gains from technology adoption.
- To provide recommendations for boosting equity investor base by leveraging fintech to enhance user experience.

4. Research Methodology

Using the exploratory research methodology, the study investigates how the payment and settlement mechanism in equities markets is affected by the adoption of FinTech technologies and the resulting advantages in efficiency and system resilience. The methodology is designed to ensure an extensive analysis and reliable conclusions.

4.1 Type of Research

An empirical research approach is considered in this paper to analyse, how Fintech has benefited the equities market, particularly with regard to payment and settlement processes and user experience. The research examines existing Fintech solutions and their applications in equity market, including blockchain, AI, machine learning, and real-time payment systems. It analyses emerging trends, challenges, and possibilities related to Fintech adoption in stock market infrastructure, with a focus of efficiency and resilience. The study investigates the effects of Fintech adoption on market regulations and policymaking, with an emphasis on safeguarding systemic stability, investor protection, and market integrity.

4.2 Data Collection Technique

The data is gathered from the primary sources by constructing and distributing a well structured questionnaire. An online survey form was distributed using Google forms, and the link was distributed to equity market participants such as institutional investors and ordinary investors across Bengaluru. The secondary data is gathered from a wide range of sources, such as government and institutional papers, academic journals, public domain information, e-books, and business periodicals.

4.3 Sampling Design

Stratified and judgmental sampling method was used to select the respondents. To ensure that all perspectives are represented, respondents are further divided into stakeholder groups according to their functions, such as institutional investors and retail investors. The judgemental sampling method is used to select respondents with specific knowledge, continuous engagement, and experience in equity market and payment and settlement system. The sample consists of 217 respondents who have at least one year of expertise in investing or trading. The sample size for the study was determined according to accepted procedures for conducting factor analysis.

To obtain trustworthy and robust results, Robert F. Devellis and Joseph F. Hair recommend a sample size of 5 to 10 respondents per observed variable. A minimum of 95 respondents (19 X 5) are required to meet the lower threshold for this study, which includes 19 observed variables. A total of 217 respondents were chosen to improve the validity and reliability of the factor analysis as well as to provide adequate power for statistical testing. This sample size provides a solid foundation for discovering underlying factor structures and assures adequate representation for generalizing the results.

4.4 Data Analysis Technique

Percentage analysis provides a descriptive foundation, factor analysis explores latent variables, and regression analysis evaluates casual relationships, offering a holistic

understanding of Fintech's role in equity market enhancement. The basic characteristics of data can be defined and summarized using percentage analysis. The distributions, trends, and proportions of the replies from two different investor groups can be better understood with this analysis. Factor analysis identifies the underlying variables or factors that drive efficiency improvements and resilience in equity markets through fintech adoption. This statistical technique groups huge number of observed variables into unobserved variables and helps to identify the major factors impacting payment and settlement procedures. With the use of principal component analysis, extracted factors that explain the data's variance and shed light on the interrelationship between the variables. The effect of independent variables i.e., system's operational efficiency and user experience on the dependent variable, equity market enhancement, can be evaluated using regression analysis. Multiple regression is used to analyse how those two independent variables collectively influence a dependent variable.

5 Analysis

The study focused on deriving meaningful insights through statistical analysis of the data collected from the respondents. The collected data was meticulously prepared for analysis by addressing any missing or inconsistent entries. To make sure that the data was pertinent for factor analysis, KMO measure of sampling adequacy test was conducted, and Bartlett's Test of Sphericity was applied to check the sufficient correlations among the variables. Exploratory

Factor Analysis was used to recognise latent constructs and reduce the dimensionality of the data.

5.1 Hypothetical Model

Figure 1 depicts the hypothetical model which serves as a basis for testing the underlying relationship between dependent and independent variable. A basis for empirical validation through regression analysis is provided by the arrows, which illustrate the anticipated casual pathways. The study's overarching goal is to improve the equity market by shedding light on how the implementation of fintech solutions may boost operational efficiency in payment and settlement processes and user experience.

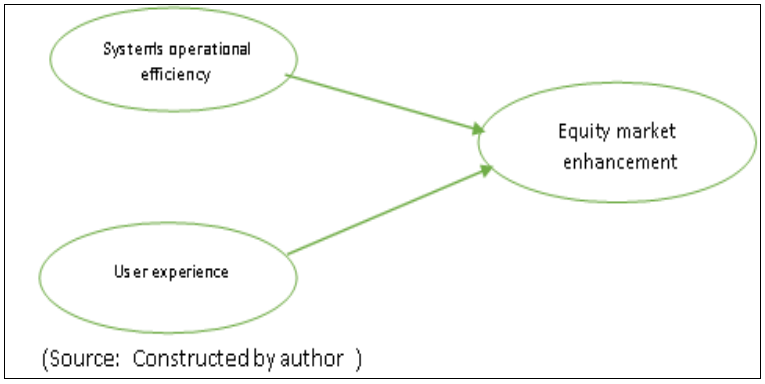


Fig 1: Hypothetical Model

5.2 Hypothesis

To measure the equity market enhancement achieved by adopting fintech into equity market for payment and settlement mechanism, the following two hypothesis are formulated.

- **H1:** There is significant relationship between system's operational efficiency and equity market enhancement.
- **H2:** There is a significant relationship between user experience and equity market enhancement.

5.3 Demographic details of the respondents

Comprehending the demographic profile of the respondents furnishes critical context for interpreting the findings. It ensures that the study captures diverse perspectives and reflects the varied experiences of equity market participants. The below table shows the basic details of 217 respondents.

Table 1: Basic details of the respondents

Demographic characteristics			Frequency	Percentage
Gender		Male	148	68.2
		Female	69	31.8
Age group (Years)		18 - 24	36	16.6
		25 - 34	98	45.2
		35 and above	83	38.2
Level of Education		Till Bachelor's Degree	96	44.2
		Master's Degree	121	55.8
Type of the Investor		Institutional investors	108	49.8
		Retail investors	109	50.2
Experience in market (Years)	stock	1 year	28	12.9
		2 - 5	42	19.4
		6 - 10	87	40.1
		More than 10	60	27.6

(**Source:** Constructed by author)

The above table 1 shows the investor's basic details. A total of 217 respondents were surveyed, of which males are 68.2% and females are 31.8%. among them, 16.6% belong to the age category of 18-24 years, 45.2% belong to 25-34 years, and 38.2% belong to 35 years and above. In that 44.2% of the investors possess the level of education till bachelor's degree, and the remaining 55.8% belongs to the category of master's degree. 49.8% of the respondents are institutional investors, 50.2% of the respondents are retail investors. 12.9% of the respondents have investing or trading experience of one year, 19.4% have experience of 2-5 years, 40.1% have experience of 6-10 years, and remaining 27.6% have experience of 10 years above.

5.4 Factor Analysis

To uncover the fundamental elements impacting how equity market participants experience the efficiency of payment and settlement processes and the robustness of the system, an exploratory factor analysis was carried out. Two hundred and seventeen investors contributed to the dataset, which included 19 manifest variables assessed using a 5-point Likert scale. After confirming that the data met the requirements for factor analysis using preliminary suitability tests like KMO and Bartlett's tests, Principal Component Analysis (PCA) was used to extract factors, retaining the components with eigenvalues greater than 1, as suggested by the Scree plot and the Kaiser criterion. The factor structure was made more interpretable by applying Varimax rotation. The final analysis of the data, indicating the retained factors and their loadings is replicated below.

Table 2: KMO and Bartlett's Test

Kaiser-Meyner-Olkin Measure of Sampling Adequacy		.966
Bartlett's Test of Sphericity	**Approx. Chi-Square**	6030.256
	Df	171
	Sig.	.000

(**Source:** Output of Factor Analysis)

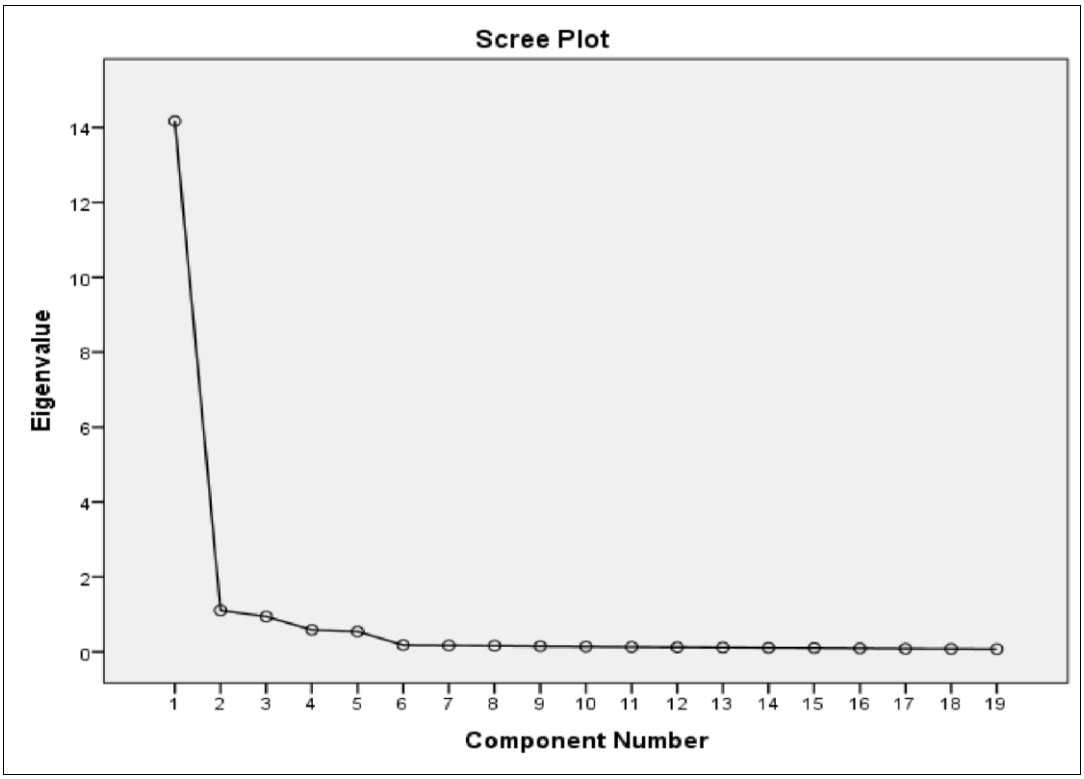
The table 2 shows, the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was 0.966, denoting an outstanding level of adequacy for factor analysis. This propounds that a substantial portion of the variance in the dataset can be credited to underlying factors. Additionally, Bartlett's Test of Sphericity was significant (χ^2 = 6030,256, df = 171, $p < 0.001$), confirming that the correlation matrix is not an identity matrix and is felicitous for factor extraction. Together, these results substantiate the appropriateness of the dataset for conducting factor analysis, as the correlations between the variables duly compact.

Table 3: Total Variance Explained

Component	Initial Eigen values			Rotation Sums of Squared Loadings		
	Total	**% of Variance**	**Cumulative%**	**Total**	**% of Variance**	**Cumulativ%**
1	14.174	74.599	74.599	7.772	40.905	40.905
2	1.103	5.806	80.405	7.505	39.500	80.405
3	.939	4.940	85.345			
4	.584	3.071	88.416			
5	.539	2.836	91.251			
6	.176	.929	92.180			
7	.166	.874	93.054			
8	.159	.835	93.889			
9	.146	.771	94.660			
10	.136	.717	95.377			
11	.128	.674	96.051			
12	.120	.632	96.683			
13	.112	.592	97.275			
14	.104	.546	97.821			
15	.099	.523	98.343			
16	.089	.468	98.811			
17	.080	.421	99.232			
18	.076	.398	99.630			
19	.070	.370	100.000			

(**Source:** Output of Factor Analysis)

Table 3 shows the two components which can be extracted from the data set using "Principal Component Analysis (PCA)" with eigenvalues more than 1. These components explain a sum of 80.405% of the variance in the dataset. After rotation, Component-1 explains 40.905%, and component-2 explains 39.500% of the variance, bringing an interpretable structure for the variables extracted. The remaining components contribute minimally, hence not extracted as factors.



(**Source:** Extracted from Factor Analysis)

Fig 2: Scree plot

The figure 2, Scree plot visualises eigenvalues of the PCA-extracted components. It is evident from the presence of a distinct "elbow" at the third component that the data can be largely explained by the first two components alone. These components, with eigenvalues greater than "1", account for approximately 80.405% of the total variance. Components beyond the second have eigenvalues below "1" and contribute minimal variance, and thus, were excluded from further analysis. This result is consistent with the Kaiser criterion for component retention.

Table 4: Rotated Component Matrix

Sr. No.	Statements	Factor Loading	Factor Reliability
	System's Operational Efficiency		0.971
01	The payment and settlement system efficiently detects and prevents fraudulent activities.	0.843	
02	The system efficiently manages liquidity to avoid delays and ensure seamless trading.	0.848	
03	The system aligns with regulatory frameworks, enhancing trust and security for equity market participants.	0.848	
04	The system facilitates quick settlement of short-term equity transactions.	0.840	
05	The Fintech's features and benefits have encouraged widespread adoption among investors.	0.753	
06	The payment and settlement system positively influences investment decisions.	0.743	
07	The system empowers investors by providing better control and decision-making capabilities.	0.763	
08	The system offers a high level of automation, reducing the need for manual intervention.	0.728	
09	The overall performance of the payment and settlement system is satisfactory.	0.620	
	User Experience		0.969
01	The system ensures high accuracy in processing equity transactions.	0.863	
02	The system minimizes errors during equity transactions.	0.833	
03	The system provides adequate support for managing investment portfolio.	0.837	
04	The system helps in reducing transaction costs for equity trading.	0.835	
05	The system ensures that all data related to transactions is accurate.	0.715	
06	The system enhances accessibility to equity markets for investors.	0.709	
07	The system facilitates real-time settlement of long-term equity transactions.	0.658	
08	The system enhances confidence in equity market transactions, to handle transactions securely.	0.678	
09	The system provides transparency in transaction data and operations.	0.701	
10	The system provides efficient customer support to resolve investor issues.	0.623	

(**Source:** Output of Factor Analysis and Reliability Statistics)

The table 4 reflects a19 manifest variables in the form of statements, which are analysed througah factor analysis. The results reflect the extraction of 2 latent or unobserved variables i.e., "System's Operational Efficiency" and "User

Experience", as the factors driving equity market enhancement with the adoption of Fintech. Factor loadings of every observed variable represent the correlation with the corresponding unobserved variable it is associated with. The internal consistency of the observable variables listed under each factor is measured by factor reliability, which is the Cronbach's alpha for each latent variable.

First latent variable, System's Operational Efficiency is related to how fintech adoption facilitates for enhancement in payment and settlement mechanism for equity market and efficiency gains through fintech adoption, which reflects a high reliability of 0.971 and related factor loadings of its manifest variables shows that these items reliably measure the impact of fintech adoption on system's operational efficiency, including aspects like fraud detection efficiency, liquidity management, regulatory support, settlement speed, adoption rate, influence on investment, investor empowerment, automation level, and user satisfaction.

The second latent variable, User Experience is related to how the investors experience the fintech adoption in payment and settlement mechanism of equity market and the technology efficiency gains, which also reflects a high reliability of 0.969 and related factor loadings of its manifest variables shows that these items reliably measure the impact of fintech adoption on users experience in efficiency gains, and payment and settlement mechanism, including aspects like, transaction accuracy, reduced error rates, portfolio management support, transaction costs, data accuracy, market accessibility, real time settlement, investor confidence, data transparency, customer support efficiency.

Table 5: Reliability Statistics

Cronbach's Alpha	No. of Variables
0.981	19

Source: Result of Reliability Statistics

Table 5 outlines a reliability value of 0.981 for 19 manifest variables was obtained when Cronbach's Alpha was used to evaluate the scale. This indicates excellent internal consistency, confirming the reliability of the instrument for examining the system's operational efficiency and user experience related to advancements in payment and settlement mechanism, and efficiency gains resulted from fintech adoption for equity transactions.

5.5 Regression Analysis

It was employed to investigate the influence of independent variables- system's operational efficiency and user experience on the dependent variable, equity market enhancement. This methos was used to quantify the extent to which advancements in Fintech contribute to the improvement of equity markets through efficient payment and settlement systems and efficiency gains from technology adoption. The analysis incorporated diagnostic tests to ensure the reliability of the model, including checks for multicollinearity, normality, and linearity. The overall model's explanatory power was evaluated using the coefficient of determination (R^2), while the relative importance of each independent variable was assessed through standardized coefficients (Beta values) and their statistical significance (p-values).

Statistically the equation of regression can be expressed as follows

$Ý = \alpha + \beta\ 1\ X\ 1 + \beta\ 2\ X\ 2 + ei$

Where,

Ý = Equity Market Enhancement

α = Constant

X 1 = System's Operational Efficiency **X 2** = User Experience

β 1 & β 2 = Regression coefficients of Two Factors

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.936[a]	.876	.874	.2587

a. Predictors: (Constant), System's Operational Efficiency, User Experience

Source: Output of Regression Analysis

Table 6 portrays the regression model demonstrating a strong predictive relationship between the independent variables, user experience and systems operational efficiency, and the dependent variable, equity market enhancement. Improvements in operational efficiency and user experience greatly help to boosting equities markets, as indicated by the very strong positive connection (R-value: 0.936). The model demonstrates strong explanatory power, as evidenced by the R^2 value of 0.876, which indicates that 87.6% of the variation in equity market enhancement is explained. Due to the addition of predictors, the model's robustness is further confirmed by the corrected R^2 of 0.874, which shows low overestimation. Furthermore, with a standard error of only 0.2587, it is clear that the data points that were actually measured are in excellent agreement with the regression line. The results underscore the critical role of technological and operational improvements in advancing equity market systems.

Table 7: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.025	.080		.310	.757
	Systems operational efficiency	.512	.049	.512	10.443	.000
	User experience	.466	.050	.455	9.285	.000

a. Dependent Variable: Equity Market Enhancement

(**Source:** Output of Regression Analysis)

Table 7 showing regression coefficients shed light on how system operational efficiency and user experience, as independent variables, affected equity market enhancement, the dependent variable. The constant term (B = 0.025, p = 0.757) indicates that when all predictors are at zero, the equity market enhancement value is negligible and statistically insignificant. For systems operational efficiency, the unstandardized coefficient (B = 0.512) signifies that for every one-unit increase in this variable, equity market enhancement improves by 0.512 units, holding other factors constant. Its standardised coefficient (Beta = 0.512, p < 0.001) confirms its significant positive impact. Similarly, user experience has as unstandardized coefficient (B = 0.466), indicating a 0.466-unit increase in equity market enhancement per one-unit increase in user

experience. It's standardized coefficient (Beta = 0.455, $p < 0.001$) also highlights a strong and statistically significant influence. Both predictors have high t-values (10.443 and 9.285) and very low p-values ($p < 0.001$), demonstrating their critical role in explaining equity market enhancement.

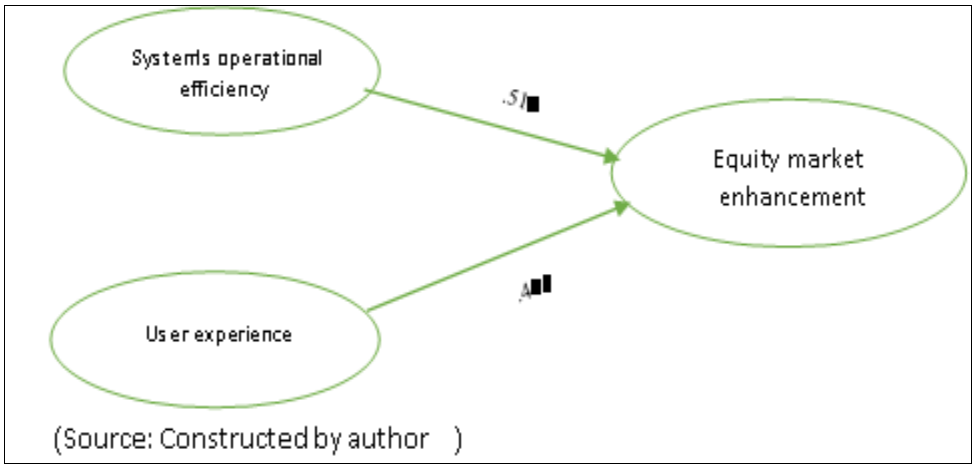


Fig 3: Result of Hypothetical Model

6. Findings of the Study

The analysis replicates that, increased operational effectiveness, system resilience, and Fintech adoption has dramatically changed payment and settlement systems in equity market. The main findings indicates that technologies like blockchain and artificial intelligence (AI) have increased efficiency by enabling quicker settlement cycles, lower transaction costs, and fewer errors. Furthermore, the integration of real-time settlement systems and fraud detection technologies powered by AI has enhanced market transparency and stability, ensuring resilience during periods of market disruptions and high trade volumes.

Factor analysis explores two latent variables namely System's Operational efficiency and User Experience, by analysing 19 manifest variables. regression analysis demonstrates a robust positive correlation between equity market enhancement, user experience, and system operational efficiency. But issues like cybersecurity risks, regulatory barriers, and unequal technology adoption continue to exist, underscoring the necessity of focused interventions to fully realize FinTech's promise in equities markets. These observations highlight how important FinTech is to create a strong, diverse, and effective equity market ecosystem.

7. Suggestions: Charting a Path Forward

In order to adequately utilize the transformative power of Fintech in the equities market, it is more important to address the identified concerns and strengthen the payment and settlement systems. This can be done by admitting the underlying suggestions given here, the regulatory framework that governs the use of FinTech should be fortified. In order to ensure the safe incorporation of technologies like blockchain and artificial intelligence while safeguarding market players, regulatory agencies such as SEBI should create comprehensive policies that stile balance between the need for innovation and risk management. All market participants-including retail investors and smaller brokerage firms must be pushed to use cutting-edge technology like real-time settlement systems, predictive analytics, and AI-driven automation. To reduce the high upfront implementation costs that often deter smaller players in the stock market, financial incentives or subsidies could be offered.

Giving this great importance to cybersecurity allows to reduce some potential risks and ensure that, such growth in reliance on our digital systems, market stability continues intact. Solving technological and operation-based issues among regulators, the Fintech firms and with the market players through cooperating ensures integration at one phase without disrupting the already creatively aligned solutions in the whole ecosystem will facilitate for market expansion. Financial literacy initiatives must be launched to educate stakeholders, especially retail investors, regarding the working and benefits of Fintech in equity markets. A huge investor base can be generated by capturing investors from rural background by creating awareness campaigns to bridge the gap, and to gain trust for participating in the equity market. Lastly, benchmarking global best practices is recommended, as it facilitates for exposure to successful Fintech integration in other leading markets would help India to adopt proven strategies and foster global interoperability to keep its equity markets competitive at the international edge. These suggestions would create a balanced, secure, and efficient financial ecosystem that would propel equity market enhancement and long-term growth.

8. Conclusion

Adoption of Fintech in the equity market was the starting point of a revolutionary period that has revolutionized the payment and settlement systems with extraordinary strength and efficiency. This paper demonstrates how advanced technologies like blockchain, artificial intelligence, and real-time settlement systems are transforming the traditional market activities through minimizing the transaction time and costs, as well as errors while raising the participant confidence and transparency levels. Definitely, faster settlements, high accuracy, and increased client satisfaction are achievements, but still, they present challenges in terms of security risks, regulatory requirements, and most importantly, acceptance in an unequal way among

stakeholders. These challenges can also be seen as advantages because they open up opportunities for development and cooperation. Measures like reforms in the regulatory framework, encouraging investments in technology, and enhancement of investors' knowledge about the financial system will go a long way in building the equity market into a more efficient, effective, and safer one. In conclusion, Fintech serves as a tool to alter the nature of the equity markets instead of simply updating them. Thus, embracing innovation and overcoming the challenges mentioned above, the interests of all stakeholders can establish a stable and sustainable environment that develops new business opportunities and adapts to global trends.

9. Cope for further Research

There are many opportunities for further research because of the dynamic interaction between Fintech and equity market. Further research can be employed through adding some more relevant variables to the existing study, which proves to be remarkable in understanding the impact of fintech adoption on equity market enhancement. A more representative sample that includes regulators, Fintech innovators, and international investors would help better grasp the role of Fintech in the equities market, where richer data can be reflected. This research can also include a more diverse range of both emerging and developed markets and thus be able to provide some comparative insights and global benchmarks.

This would help to determine the proper methods and approaches for countries like India to adjust to global standards while fostering domestic concepts. Some of the issues discussed in this research, such as cybersecurity threats, loopholes in regulations, and resistance by stakeholders, could be viewed as the topic of future study. It can provide hands-on solutions for easy Fintech adaptation by examining how these issues can be effectively mitigated. Assessing Fintech's ESG impacts on stock markets may open up new research avenues on how technology innovations are aligned with ethical investment requirements and sustainability goals. Future research can further elucidate the nuances of Fintech adoption by probing these areas, thereby gaining more profound insights and paving the way for a more intelligent and robust ecosystem for the equity market.

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