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Challenges in Fintech Adoption among Members of Farmer Producer Organisations – An Analysis

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Aim: The purpose of this study is to determine the personal, technological, and trust-related barriers that prevent farmers in Tamil Nadu from adopting fintech. The research aims to provide insights for enhancing the utilization of fintech in the agricultural sector by analyzing these obstacles.
Study Design: The limitations that limit farmers' use of fintech were investigated using an ex-post facto research design.

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Place and Duration of Study: From March to July 2023, the research was carried out in the Tiruvallur district of Tamil Nadu, India. Due to its high concentration of banking establishments, this area was chosen for fintech adoption research.
Methodology: From four Farmer Producer Organizations (FPOs) affiliated with Krishi Vigyan Kendra (KVK), Tiruvallur, 120 farmers, 86 men and 34 women, aged 18 to 75, were chosen at random. A structured interview schedule was used to collect the data, which were divided into personal, technological, and trust-related constraints. The farmers' perspectives were used to evaluate the severity of these constraints using the Garrett ranking method.
Results: Personal constraints, such as risk aversion (average score = 65.14) and a preference for cash transactions (average score = 56.68), were found to be the most significant obstacles to the adoption of fintech. Usage was further hampered by technological issues such as restricted access to technical support (64.79) and complicated user interfaces (52.95). Concerns about trust, particularly concerns about scams and fraud (65.83), were the most significant obstacles, highlighting the need for robust security measures.
Conclusion: The results emphasize the need for targeted interventions to remove the major obstacles to the adoption of fintech, particularly by improving user-friendly designs, technical support, and security measures.

Keywords: Farmer; agricultural sector; financial technology; digital developments.

1. INTRODUCTION

The term "financial technology," or "fintech," refers to a variety of financial solutions made possible by technology [1]. A global definition of fintech is "innovations in the financial field enabled by new technologies," which integrates finance, technology management, and innovation management [2]. Payment, insurance, capital markets, crowdsourcing, wealth management, and loan services are some of these advances [2]. Digital developments, rising e-commerce, and smartphone adoption are all contributing to fintech's rise in India [3]. Indian financial services are changing as a result of fintech.

According to the EY Fintech Adoption Index 2017, mobile wallets and the Unified Payments Interface (UPI) are to blame for India's second-highest utilization of digital financial services globally. From 1 million transactions in 2016 to over 10 billion in 2023, UPI's transaction volumes have skyrocketed. In 2022, the value and number of transactions involving digital payments both increased by 91%. 42% of the 90,000 people surveyed across India had used digital payment methods (Source: Invest India). Fintech has the potential to open up new avenues for global financial inclusion, lower barriers, and democratize financing [1]. Through AI and machine learning, it improves risk assessment, fraud detection, and customer service, and through blockchain and cryptocurrencies, it increases transaction transparency and security [4].

Agriculture is one example of a sector that is undergoing a transformative wave due to fintech, particularly in India, where agriculture provides for roughly 58% of the population. Access to credit, unpredictability in the market, and the effects of climate change are among the obstacles facing the sector. Poor credit delivery, informational asymmetry, and high transaction costs are particularly problematic for marginal and small farmers [5]. A solution to these problems is essential for agricultural expansion and farmer well-being. New offerings in India's credit and risk markets can be sparked by fintech tools. Farmers can access financial services in a convenient way through mobile banking, and increasing their financial literacy helps them comprehend financial products and services better. In remote areas, adopting digital financial services increases efficiency by expanding accessibility and lowering transaction costs [6]. The adoption of fintech among farmers is constrained by a number of obstacles, despite the significant advancements and potential benefits. To effectively address these constraints and increase fintech utilization, it is essential to identify and comprehend these constraints. The purpose of this study is to determine the personal, technological, and trust gap-related barriers farmers in Tamil Nadu face when utilizing fintech services. This research aims to provide useful insights by examining these obstacles. These insights can be used by policymakers, financial institutions, and technology developers to create more inclusive and efficient fintech solutions for the agricultural sector.

2. METHODOLOGY

The Tiruvallur district in Tamil Nadu was the focus of the current study, which used an ex-post facto research methodology. According to the Tamil Nadu Fintech Policy, 2021, this district was chosen due to its significant concentration of banking establishments. It is one of seven districts that together comprise 51% of all banking establishments in Tamil Nadu. The study had a total of 120 farmers respond as respondents. A well-structured interview schedule was developed in order to collect data from these participants, who were selected at random from four prominent Farmer Producer Organizations (FPOs) that are closely associated with Krishi Vigyan Kendra (KVK), Thiruvallur. The constraints were categorized into three dimensions: personal, technological, and trust and security concerns, based on expert consultations and farmer feedback , ensuring a comprehensive approach. The farmer profile shows a lot of diversity. The majority of farmers are middle-aged (41.7 percent) and mostly male (71.7 percent). The majority (40%) have completed secondary or high school and place a high value on farming as their primary occupation (45.0%). In addition, 40 percent of farmers are considered to be small farmers, and 37.5% earn more than Rs. 2,10,000 annually, indicating a range of economic stability and resource accessibility. A specific analytical tool was used to evaluate the severity of the identified constraints and analyze the data gathered from this diverse group of farmers.

2.1 Analytical Tool

The Garrett ranking method was used to determine the severity of the constraints identified in the study. Because it arranges constraints according to their relative severity from the perspectives of the respondents, this method was chosen because it is superior to simple frequency distribution.

The following steps are included in the procedure:

1. It was asked of farmers to rank the constraints.
2. Using Garrett's formula, which can be found below, these rankings were then converted into numerical scores.

Percent position = 100 * (Rij – 0.5)/Nj

Where:

Rij = rank given for ith constraint by jth individual

Nj = number of constraints ranked by jth individual

3. A Garrett and Woodworth (1969) table is used to convert the percentage position of each rank into scores.
4. The individual respondent scores are combined and averaged.
5. Finally, these mean scores are used to rank the constraints according to their relative severity.

3. RESULTS AND DISCUSSION

3.1 Personal Constraints to Fintech Usage

Individual factors that restrict an individual's capacity or willingness to adopt digital financial services are referred to as "personal constraints on fintech usage." Personal attitudes, knowledge gaps, and a lack of familiarity with technology all contribute to these obstacles. Due to the experiences, beliefs, and circumstances of each individual, these constraints can vary greatly. Table 1 displays the personal constraints and ranks associated with them.

A complex interplay of factors hindering adoption among farmers in Tamil Nadu is revealed by the

Table 1. Personal constraints of fintech usage

S.No	Personal constraints	Total score	Average Score	Final rank
1	Lack of awareness of fintech services	6068	50.56	IV
2	Risk aversion	7817	65.14	I
3	Lack of proficiency in using fintech	6195	51.62	III
4	Limited digital literacy	4208	35.06	VI
5	Preference to cash transactions	6802	56.68	II
6	Reluctance to use modern technologies	4910	40.91	V

ranking of personal constraints in fintech usage. The top two choices, risk aversion (65.14) and preference for cash transactions (56.68), highlight deeply ingrained financial habits and trust issues. These results are in line with Vandana and Mathur's finding [7] that farmers' perceptions of risk and security concerns are major obstacles to the adoption of fintech. This suggests that improving adoption rates necessitates addressing these issues. Following proficiency (51.62%) and awareness (50.56), there is a need for greater exposure to fintech services and education. This suggests that interventions aimed at boosting digital literacy and familiarity with fintech platforms could significantly lower these obstacles.

Reluctance to use modern technologies (40.91) and low digital literacy (35.06) rank lower, which is interesting. This suggests that technological adoption may be easier than anticipated once trust issues and security concerns are addressed. To allay farmers' concerns about the dangers of digital financial services, efforts ought to prioritize establishing trust and ensuring robust security measures. These findings are also supported by the study by Mathur [7], which emphasizes the significance of security in the adoption of digital financial services. In a similar vein, Su et al. [8] emphasize the significance of financial education in lowering farmers' perceptions of risk and increasing their adoption of fintech.

3.2 Technological Constraints to Fintech Usage

Barriers to the adoption of digital financial services' infrastructure and tools are examples of technological constraints on fintech use. Limitations in technology availability, difficulties with accessibility, and difficulties with the usability of fintech solutions are all examples of these constraints. Inadequacies in technology infrastructure, compatibility issues, and the requirement for user-friendly designs are all common causes of these obstacles. The technological constraints and their ranks are shown in Table 2.

The order of technological barriers to fintech use reveals a complex web of factors that prevent farmers in Tamil Nadu from adopting the technology. The primary obstacle, limited access to technical support (64.79), highlights the need for comprehensive support systems to assist users. The next significant constraint is the complexity of user interfaces (52.95), highlighting the importance of intuitive and user-friendly design to increase accessibility. The next point, insufficient language localization (49.54), emphasizes how crucial it is to provide services in local languages to improve usability.

Fourth is limited offline functionality (44.91), indicating the importance of using fintech services without constant internet access. Interestingly, limited access to a dependable internet connection (37.79) ranks lowest in the surveyed area, suggesting that although internet connectivity is generally available, other technological issues are more pressing for farmers. This is in line with the findings of Bouteraa et al. [9], which emphasize that effective engagement with fintech services requires adequate resources like smart devices, internet access, and expert advice. Customers may have difficulty effectively engaging with fintech services without these enabling conditions. The agricultural community's adoption of fintech services and their efficient use could be significantly enhanced by mitigating these constraints. Improve the technological landscape for farmers by focusing on comprehensive support systems, user-friendly designs, localized services, offline functionality, and other key areas.

Table 2. Technological constraints of fintech usage

S. No	Technological constraints	Total score	Average Score	Final rank
1	Insufficient language localization	5945	49.54	III
2	Limited access to reliable internet connection	4535	37.79	V
3	Complex user interfaces	6355	52.95	II
4	Limited offline functionality	5390	44.91	IV
5	Limited access to technical support	7775	64.79	I

Table 3. Security concerns of fintech usage

S.No	Security constraints	Total score	Average Score	Final rank
1	Concerns about data privacy and security	6255	52.12	II
2	Lack of regulatory clarity	4530	37.75	V
3	Fear of fraud and scams	7900	65.83	I
4	Doubts about dispute resolution and customer support	5890	49.08	III
5	Absence of physical interaction and documentation	5425	45.20	IV

3.3 Trust and Security Concerns

Fintech usage is hindered by trust and security issues, such as doubts about the reliability and security of digital financial services. These obstacles frequently result from a lack of faith in digital systems, worries about the security of financial and personal information, and doubts about the dependability of fintech providers. For user trust and secure adoption of fintech solutions, it is essential to address these constraints. The technological constraints are listed in Table 3 along with their respective rankings.

Concerns about online fraud rank 65.83 out of a possible 100 when it comes to the security constraints farmers in Tamil Nadu face when using fintech. Priya and Anusha's concerns [10] highlight a significant trust gap that calls for extensive user education and robust security measures. Additionally, the lack of government support and difficulties in gaining investor trust further impede sector expansion. Farmers' trust in and use of fintech services can be significantly enhanced by addressing these issues through tailored educational programs, improved cybersecurity, and active government involvement. Concerns regarding data privacy and security come in close second (52.12), highlighting the need for open data protection procedures and efficient communication. The importance of accessible and sympathetic customer service is emphasized by the fact that questions about dispute resolution and customer support rank third (49.08%).

The lack of physical interaction and documentation (45.20) suggests the need for hybrid solutions when making the switch from traditional to digital banking. Interestingly, the lowest rating, 37.75, indicates that immediate security concerns take precedence over more general regulatory issues, providing policymakers with an opportunity to create regulations that are specific and clear. According to Prastyanti et al.,[11], reestablishing digital ethics in fintech and ensuring fairness, transparency, accountability, and access to digital banking require addressing ethical issues. Providers of fintech can construct a digital financial ecosystem that is more trustworthy and inclusive by placing these ethical considerations first.

4. CONCLUSION

This study reveals a complex interplay of personal hesitations, technological limitations, and trust-related concerns as the primary barriers to fintech adoption among farmers in Tamil Nadu. Digital financial services are significantly discouraged by ingrained financial habits and security concerns, according to the findings. Inadequate support and cumbersome interfaces are just two technological issues that make the problem even worse. Deep-seated worries about fraud and data privacy also make it hard to trust and be accepted. An overhaul of the strategic plan is required to overcome these obstacles. Technological obstacles can be overcome by putting an emphasis on user-centric design enhancements like simplified interfaces and localized support. Building transparent, dependable frameworks and improving security measures will help restore trust and reduce concerns. Additionally, specialized educational programs have the potential to close knowledge gaps and cultivate a user base that is better informed. Fintech solutions can be more effectively integrated into the agricultural sector by addressing these areas comprehensively, unlocking their potential to drive growth and enhance financial inclusion throughout Tamil Nadu.

5. LIMITATIONS OF THE STUDY

The study's focus on the Tamil Nadu district of Tiruvallur could hinder it from accurately representing the experiences of farmers in other areas with differing socioeconomic and infrastructure circumstances. It's possible that the 120 farmers in the sample, representing four

FPOs, may not entirely represent the range of experiences found in the larger farming community. Furthermore, the study only takes into account attitudes and circumstances from a particular time period, thus it might not account for the effects of later adjustments to laws, regulations, or the state of the market.

6. FUTURE PROSPECT

Future studies should examine regional differences in FPOs' adoption of fintech in Tamil Nadu and other regions, offering insights into how usage is influenced by local circumstances. Studies with a longitudinal design may be able to monitor how fintech is changing farmers' financial security. Furthermore, comprehensive qualitative research may reveal individual experiences and obstacles, providing a deeper comprehension of the difficulties in implementing fintech in agriculture.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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