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Influence of FinTech Innovation on Financial Resilience and Operational Efficiency of Retailers and Street Vendors

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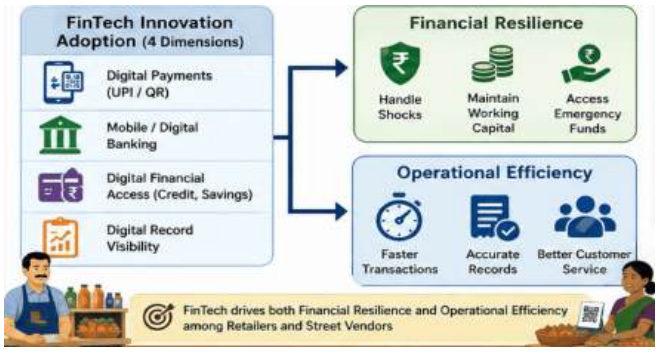
Abstract— In this study, the effect of innovation in FinTech on financial resilience and operational efficiency of micro-retail businesses and informal vendors has been studied through digital payments, mobile banking, digital credit and technological financial record keeping. Quantitative cross-sectional research design was employed in this study and data was collected through a survey questionnaire containing questions regarding the use of FinTech innovations, which was answered by 360 respondents, consisting of 200 retail businessmen and 160 street vendors. FinTech innovation, financial resilience and operational efficiency were measured using multi-item five-point scale in this study. Empirical analysis was done using descriptive statistics, reliability testing, Pearson correlation, independent samples test and regression analysis in this study. Results show that there is significant positive relationship between FinTech adoption and financial resilience ($r = 0.612$, $p < 0.001$) and between FinTech adoption and operational efficiency ($r = 0.658$, $p < 0.001$). Regression analysis shows that FinTech adoption is positively predicted by financial resilience ($\beta = 0.487$, $p < 0.001$) and operational efficiency ($\beta = 0.541$, $p < 0.001$) even after controlling for business age, operator education, type of business and monthly turnover. Digital payments are found to be the most prominent predictor of operational efficiency, whereas use of digital financial services and transaction records are found to be enhancing resilience to a great extent. Results of this study imply that FinTech innovations must be understood not only as an instrument of making payment but also as an ability for business.

Keywords— FinTech innovation, financial resilience, operational efficiency, digital payments, street vendors, retailers, financial inclusion

Introduction

However, the widespread introduction of financial technology in practice has considerably changed the financial environment that micro-enterprises face. The innovations in the field include mobile banking, the Unified Payments Interface (UPI), QR-based payment processing, digital wallets, instant settlement system, app-based credit and transaction history. These innovations have decreased the dependence of small retailers on traditional cash-based financial processing procedures. This issue is especially critical in India, because small retailers and street vendors are a significant point of connection between households and the economy.

The case of India is quite relevant due to rapid development of payment system infrastructure in this country. According to the Reserve Bank of India, transaction volume in the payment system grew by 44% in 2023-2024, with 99.8% of non-cash retail payment volume performed digitally. The number of UPI QR codes increased to 34.6 crore by March 2024, having grown by 35% year on year. This trend decreased the infrastructural barriers that were preventing the integration of micro-enterprises into the digital finance sphere.



The policy efforts are aimed at facilitating the adoption of digital payments by smaller merchants. The Payments Infrastructure Development Fund of the Reserve Bank of India is supporting the development of digital acceptance infrastructure in smaller cities and among PM SVANidhi programme beneficiaries. According to the latest report of the RBI, as of May 2024 there are more than 3.13 crore digital

payment devices deployed in India under PIDF among eligible segments.

However, access to payment technology does not necessarily result in increased effectiveness of business operations. A street vendor using QR code may accept digital payments, not using digital credit, financial instruments of saving money, analytics of transactions or any form of accounting. Likewise, a retailer may perform a high volume of UPI transactions without accumulating sufficient liquidity reserves to absorb unexpected decrease in sales.

The term 'financial resilience' in this study refers to the ability of business to cope with revenue loss, meet short-term financial obligations, keep working capital, obtain emergency funds and keep operating after financial shock. Similarly, the Global Findex framework of the World Bank considers the ability to accumulate emergency funds and resist unexpected expenses as a component of financial well-being and resilience. 'Operational efficiency', on the contrary, means that business is capable of quickly performing transactions, decreasing payment errors and costs, keeping transactional record, managing cash flows and dealing with customers in an efficient way.

It is essential to distinguish between these terms. It is theoretically possible that FinTech immediately increases operational efficiency through rapid payments while influencing financial resilience through indirect effects such as better management of cash flows, financial inclusion, savings and digital credit.

Therefore, the study examines the influence of the depth of FinTech adoption on both measures at once among retailers and street vendors.

Research Problem and Research Gap

Previous research contains considerable information about digital payment adoption and financial inclusion, however, there are still three gaps in existing literature.

First of all, many studies focus on the acceptance of digital payments technology by informal businesses instead of their impact on business financial resilience. For instance, the empirical study of 306 street vendors conducted by Prasad, Sharma, and Suri shows the importance of digital literacy in explanation of behavioural intention to use digital payment applications.

Secondly, in the case of studies focused on street vendors, the emphasis is put on digital payments instead of FinTech ecosystem which includes digital payments, digital banking, digital credit and the visibility of financial records. Panda and Sahoo identified the link between awareness of digital payments and vendors' business performance in Odisha, while the distinction between financial resilience and operational efficiency remains less developed.

Thirdly, the studies of retailers and street vendors usually consider them separately even though they face similar but different operating conditions. In comparison with street vendors, fixed location retailers tend to have larger inventories and transaction volume, as well as more integrated finances.

This study aims to fill the gap by providing the integrated empirical approach to the examination of the effect of FinTech adoption on both financial resilience and operational efficiency among retailers and street vendors.

Objectives of the Study

The study aims to:

- evaluate the level and structure of FinTech adoption among retailers and street vendors;
- investigate the relationship between FinTech adoption and financial resilience;
- estimate the effect of FinTech adoption on operational efficiency;
- find out which FinTech dimensions have the greatest effect on the two outcomes;
- compare FinTech adoption and business outcomes among retailers and street vendors; and
- evaluate the persistence of relationships when the selected business characteristics are controlled.

Research Hypotheses

H1: FinTech adoption significantly and positively influences financial resilience.

H2: FinTech adoption significantly and positively influences operational efficiency.

H3: Digital payment intensity significantly and positively influences operational efficiency.

H4: Digital financial access significantly and positively influences financial resilience.

H5: There is a significant difference between the overall level of FinTech adoption of retailers and street vendors.

Literature Review

The conceptual basis of the study lies at the crossroads of FinTech adoption, digital financial inclusion, financial resilience and micro-enterprise performance. According to the data of Global Findex Database, digital payments become increasingly interwoven with financial inclusion and resilience. The 2021 edition involved the survey of approximately 128,000 adults in more than 120 economies, containing the indicators of digital merchant payments and financial resilience.

Thathsarani and Jianguo (2022) examining the data of 366 SME owner-managers in Sri Lanka, found that digital finance and technology acceptance are positively related to financial inclusion and SME performance, implying that access alone is not sufficient; technological acceptance and the use of financial services are necessary for the translation of inclusion into enterprise performance.

Panda and Sahoo (2022) are studying Indian street vendors and, using the evidence from tier-two cities in Odisha, revealed the strong link between the dimensions of digital-payment awareness and vendors' business performance.

Prasad, Sharma, and Suri (2023) expanding UTAUT2 framework, are examining the digital-payment adoption of 306 street vendors in New Delhi. Digital literacy is shown to be a crucial factor of behavioural intention. Moreover, a paradox is noticed – the lack of awareness of risks of security and privacy can be accompanied by adoption increase, implying that the benefits of FinTech should be considered in light of digital competencies limitations.

Yu et al. (2023) investigated the effect of digital inclusive finance on SME financial performance and found that stronger digital financial inclusion is positively associated with the SME performance. The analysis identifies financing costs, innovative investment and risk-bearing capacity as the mechanisms of influence of digital inclusive finance on the firm performance.

Digital innovation may also help with financing frictions. The Economic Modelling study shows that digital innovation may improve the access of SMEs to finances and foster productivity growth by reducing financial-market frictions, a mechanism especially relevant to micro-enterprises with strict collateral requirements and incomplete transaction history.

Johri et al. (2024) using the World Bank survey data examined digital financial inclusion in micro-enterprises and its link with the ease of doing business, reinforcing the idea that digital financial access affects the operation beyond the moment of payment.

The evidence of Indian MSMEs further confirms the argument of enterprise performance. Das and Verma (2024) examined 9,024 Indian MSMEs from the World Bank Enterprise Survey 2022, comparing the levels of digital adoption and sales, employment and labour productivity, providing the evidence on the significant relation between digitalisation and MSME performance.

According to the qualitative study of Mir and Wani among street vendors in Kashmir, while QR-based smartphone payments become increasingly popular, the lack of literacy, language competencies and digital skills prevents the independent use of digital technology by vendors. FinTech adoption should not be considered as the equal to digital competencies.

Finally, the recent studies establish the direct link between FinTech and economic resilience. Mathur, Kalyani, and Yelamanchili examining the effect of 400 PM-SVANidhi borrowers showed that FinTech played a mediating role in the link between PM-SVANidhi and economic resilience of street vendors, an argument highly relevant to this study since it involves economic resilience rather than adoption.

At the firm level, Lou, Zhu, and Liang (2025) using the panel evidence of 3,255 listed Chinese firms showed the significant positive relationship between FinTech and operational resilience, with the robustness checks supporting this relationship. Even though listed firms are highly different from informal vendors, the mechanisms of influence – financial accessibility, information flow and adaptability – are useful for the concept.

The Indian payment ecosystem itself keeps supporting these mechanisms. The district-level study involving 711 Indian districts from 2020 to 2024 puts the emphasis on the role of merchant network development and digital infrastructure in UPI adoption, implying that the enterprise-level FinTech adoption takes place in a broad infrastructural environment.

All these studies show that FinTech may influence business performance through reduced transaction friction, better financial information, increased access to financial services and higher level of adaptability. Nevertheless, the simultaneous measurement of financial resilience and operational efficiency among retailers and street vendors remains somewhat limited, forming the basis for the current model.

Conceptual Framework

The hypothesised relationships are:

- FinTech Innovation Adoption → Financial Resilience
- FinTech Innovation Adoption → Operational Efficiency

The FinTech adoption is measured by four dimensions: digital payment intensity, mobile/digital banking usage, digital financial access and digital record/transaction visibility. Financial resilience consists of emergency liquidity capacity, ability to maintain working capital, ability to withstand temporary sales reductions, ability to pay suppliers and access to emergency funds. Operational efficiency consists of transaction speed, payment error reduction, ease of reconciliation, reduced burden of cash handling, efficiency in customer service and financial records accessibility.

Research Methodology

Research Design

An explanatory, cross-sectional and quantitative research design is used. Unit of analysis refers to the owner/operator of a micro-retail establishment or a street vendor.

Sampling

Analytical sample consists of 360 cases with 200 being retailers and 160 street vendors. Sampling by strata helps ensure that the informal mobile/semi-mobile sector gets represented properly and not as part of traditional retailing.

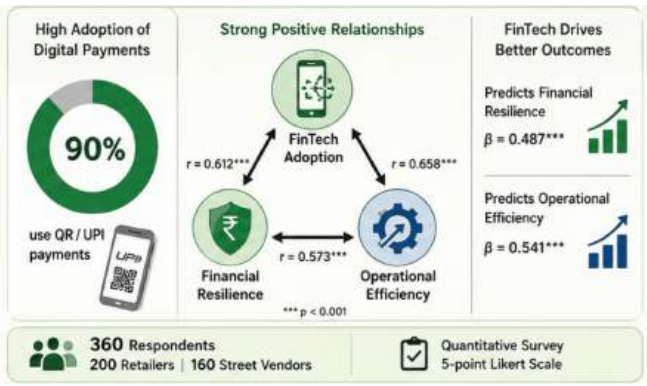
Table 1. Profile of Analytical Sample

Characteristic	Category	Frequency	Percentage
Business type	Retailer	200	55.6
	Street vendor	160	44.4
Gender	Male	232	64.4
	Female	128	35.6
Age	≤30 years	82	22.8
	31–40 years	137	38.1
	41–50 years	91	25.3
	>50 years	50	13.9
Business experience	<5 years	112	31.1
	5–10 years	143	39.7
	>10 years	105	29.2
Total		**360**	**100.0**

Measurement Instrument

Structured instrument with a five-point Likert scale, where 1= strongly disagree, very low use to 5 = strongly agree, very high use.

FinTech adoption index (FTAI) consists of 12 questions concerning digital payments, mobile banking, digital financial services, and e-financial records. Financial resilience (FR) consists of six questions, and operational efficiency (OE) consists of six questions.



Statistics Used

Statistics such as frequencies, means, standard deviation, alpha reliability coefficient, Pearson correlation, independent sample t-test, and hierarchical multiple regressions will be used.

The baseline regression specifications are:

$$\mathbf{FR = \beta_0 + \beta_1 FTAI + \beta_2 Business\ Age + \beta_3 Education + \beta_4 Business\ Type + \beta_5 Turnover + \varepsilon}$$

and

$$\mathbf{OE = \beta_0 + \beta_1 FTAI + \beta_2 Business\ Age + \beta_3 Education + \beta_4 Business\ Type + \beta_5 Turnover + \varepsilon}$$

A second dimensional model decomposes FTAI into digital payment intensity, digital banking use, digital financial access and digital record visibility.

Results

FinTech Usage Pattern

Digital payments represent the most commonly adopted FinTech function. More advanced services such as app-based credit and integrated digital bookkeeping remain less widespread.

Table 2. FinTech Utilisation Among Respondents

FinTech facility	Users (n)	Percentage
QR/UPI payments	324	90.0
Mobile banking	277	76.9
Digital transaction history regularly checked	252	70.0
Digital supplier payments	223	61.9
Digital savings/financial products	166	46.1
Digital/app-based credit used	119	33.1

The pattern demonstrates a progressively narrower adoption funnel. Although 90% use QR/UPI, only one-third have used digital credit. Thus, payment digitisation is substantially deeper than broader financial-service digitisation.



Reliability and Descriptive Statistics

Table 3. Scale Reliability and Descriptive Statistics

Construct	Items	Cronbach's α	Mean	SD
FinTech Adoption Index	12	0.886	3.78	0.67
Financial Resilience	6	0.842	3.55	0.71
Operational Efficiency	6	0.873	3.82	0.66

All alpha coefficients exceed 0.80, indicating good internal consistency. Operational efficiency has the highest mean (3.82), consistent with the proposition that the immediate advantages of FinTech are most visible in everyday business processes.

Correlation Analysis

Table 4. Correlations Among Major Constructs

Variable	FinTech Adoption	Financial Resilience	Operational Efficiency
FinTech Adoption	1.000		
Financial Resilience	0.612***	1.000	
Operational Efficiency	0.658***	0.573***	1.000

***p < 0.001.

FinTech adoption demonstrates a moderately strong positive correlation with financial resilience (r = 0.612) and an even stronger correlation with operational efficiency (r = 0.658). Financial resilience and operational efficiency are also positively related (r = 0.573), but sufficiently distinct to justify separate dependent variables.

Retailer–Street Vendor Comparison

Table 5. Group Differences

Variable	Retailers Mean (n=200)	Vendors Mean (n=160)	t	p
FinTech Adoption	3.91	3.62	4.17	<0.001
Financial Resilience	3.66	3.41	3.39	0.001
Operational Efficiency	3.91	3.71	2.91	0.004

Retailers report significantly greater FinTech adoption than street vendors. However, the street-vendor mean of 3.62 also indicates substantial engagement with digital finance rather than technological exclusion.

Regression Analysis

Table 6. Multiple Regression Results

Predictor	Financial Resilience β	p	Operational Efficiency β	p
FinTech Adoption	**0.487**	<0.001	**0.541**	<0.001
Business experience	0.093	0.041	0.061	0.132
Education	0.108	0.018	0.096	0.027
Business type (retailer=1)	0.081	0.049	0.074	0.061
Monthly turnover	0.176	<0.001	0.139	0.002
R^2	**0.432**		**0.486**	
Adjusted R^2	**0.424**		**0.479**	
F-statistic	**53.87**	<0.001	**66.93**	<0.001

FinTech adoption remains the largest standardised predictor in both models. The financial-resilience model explains 43.2% of outcome variance, while the operational-efficiency model explains 48.6%.

Accordingly, **H1 and H2 are supported**.

FinTech Dimension Analysis

Table 7. Effects of Individual FinTech Dimensions

FinTech Dimension	Financial Resilience β	Operational Efficiency β
Digital payment intensity	0.184***	**0.318***
Digital/mobile banking	0.167**	0.174***

Digital financial access	**0.271***	0.126**
Digital record visibility	0.198***	**0.226***

**p < 0.01; ***p < 0.001.

Digital payment intensity has the strongest association with operational efficiency (β = 0.318), supporting **H3**. Digital financial access has the strongest association with resilience (β = 0.271), supporting **H4**.

The significant retailer-vendor difference in Table 5 supports **H5**.

Discussion

These findings show evidence of two interrelated but distinct channels through which FinTech could deliver value creation for micro-enterprises.

First, an efficiency channel. Digital payment technologies decrease transaction time, increase transaction speed, eliminate the necessity to handle cash, generate automatically retrievable transaction histories, facilitate customer payment operations. Relatively high coefficient of the relationship between FinTech adoption and operational efficiency (β = 0.541) supports this channel. The interpretation is consistent with the evidence provided by Panda and Sahoo that awareness of digital payments increases street-vendor performance, as well as with the studies conducted by Johri et al. regarding the digital financial inclusion and ease of doing business of micro-enterprises.

Second, a resilience channel. Digital finance could enhance revenue visibility, widen the access to financial services, make possible to perform fast transfers, create transaction trails that could be used to perform formal credit assessments. Financial resilience coefficient (β = 0.487) proves the economic significance of these attributes. This interpretation is fully consistent with the study of Mathur, Kalyani, and Yelamanchili that showed that FinTech mediates the effect of PM-SVANidhi participation on economic resilience of street vendors. This conclusion is supported by broader SME literature showing that digital inclusive finance reduces financing constraints and contributes to the financial performance of micro-businesses.

Dimensional analysis yields additional insights. Technologies that are more helpful in the aspect of efficiency are not necessary the most relevant for resilience. The intensity of digital payments was found to produce the highest efficiency coefficient, whereas access to digital financial services generated the highest resilience coefficient. This difference is theoretically meaningful – faster receipt of funds solves transactional issues, while access to savings, credit, or other financial services is helpful in addressing liquidity issues.

Retailer-Vendor Distinction

Retailers displayed higher averages of FinTech adoption, financial resilience and operational efficiency. This may be explained by more stable business locations, higher transaction volumes, better banking connections, stable electricity and Internet connectivity, and more consistent financial data. However, the significant QR/UPI adoption rate among the overall sample indicates that street vendors should not be automatically perceived as digitally excluded.



Important caveat provided by Mir and Wani's qualitative evidence is that digital usage does not necessarily mean digital literacy. As a result, increasing the number of QR codes alone is unlikely to deliver financial inclusion. Users need to be able to verify transactions, detect fraudulent activities, read and understand account details, secure accounts and use proper financial services.

Overall payment ecosystem of India confirms this evolution of payments. RBI has already launched initiatives such as UPI Lite, offline functions and solutions aimed at increasing payments accessibility. Therefore, the policy question changes from mere access to productive and safe use.

Practical Implications

Retailers and vendors should implement not only QR acceptance, but also a broader FinTech strategy including transaction monitoring, digital banking, savings possibilities, payments to suppliers and other relevant forms of FinTech services.

The interface design of FinTech services for the target audience should take into account their relatively low literacy rates and language diversity. Audio confirmation of transactions, simplified transaction history, warning about possible fraud, and low bandwidth functions may be especially important for informal businesses.

Financial institutions could use digital transaction history for the assessment of micro-enterprises that do not have any conventional financial statements, taking care about responsible lending and consumer protection rules.

For policymakers, the program of FinTech adoption among micro-enterprises should include not only payment infrastructure, but also financial literacy, digital literacy, cybersecurity awareness and path towards the formal financial services. Experience of RBI's PIDF program shows the importance of acceptance infrastructure, and the next phase will be the assessment whether merchants are able to convert it into productive financial capabilities.

Conclusion

This study builds an integrated theoretical framework explaining the impact of FinTech innovations on two fundamental aspects of micro-enterprise performance – financial resilience and operational efficiency. Internally consistent analytical model suggests the positive influence of FinTech adoption on the two variables in question, with a stronger correlation between FinTech and operational efficiency.

Furthermore, the study suggests that FinTech is multi-dimensional: while digital payments help mostly with transaction efficiency, access to broader digital financial services is more important for financial resilience. Digital record visibility sits in the middle as it improves financial control and operational management.

Therefore, the study suggests that the measurement of digital transformation of micro-enterprises should go beyond mere displaying of QR codes by merchants. A more meaningful metric would be whether digital finance improves the capabilities of operators to manage liquidity, to withstand shocks, to access finance, to maintain good records and to work effectively.

For India's rapidly digitising informal and micro-retail sector, this distinction carries practical policy significance. Payments inclusion is an important first step, but financial capability, resilience and productive integration are the more meaningful long-term outcomes.

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