

A Suggestive Model for FinTech Adoption and Financial Inclusion among MSMEs in Bengaluru Urban: An Integrated Approach Using TAM and VAM

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Abstract

The economic growth of MSMEs depends heavily on financial inclusion, yet they face ongoing problems securing financial access. The promising capabilities of FinTech solutions to improve MSME access to finance face limited adoption across the industry. The researchers explore the elements that affect FinTech adoption behavior among MSMEs in Bengaluru Urban through an integrative approach relying on TAM and VAM models. The research analyzes financial literacy and digital infrastructure, and regulatory support as moderating elements that influence the process. The study aims to provide insights into the factors that influence FinTech adoption and financial inclusion among MSMEs in Bengaluru Urban and to develop a model that can be used to predict and promote FinTech adoption among this segment. The fast digital changes in Bengaluru Urban and its enterprising business landscape, along with MSMEs' diverse monetary capabilities, require specific research within this regional context. A structured questionnaire serves as the data collection method to gather responses from MSME owners and managers who operate within different business sectors of Bengaluru Urban. The study produces results that deliver an understanding of significant factors and hurdles affecting FinTech adoption to help policymakers, FinTech providers, and MSME stakeholders advance their financial inclusion approaches. The research encourages financial access for MSMEs in urban India through sustainable growth and digital transformation to bridge gaps in financial access.

Keywords: FinTech adoption, MSMEs, Financial Inclusion, TAM, VAM, Financial Literacy, Digital Infrastructure, Regulatory Support, and Networking and Digital Transformation,

Introduction

Financial technology (FinTech) advancements have brought drastic changes to worldwide financial operations at a quick rate. Modern technological solutions in financial services development through FinTech enable people and organizations to access secure, efficient financial solutions that provide convenient services. Small businesses and medium-sized enterprises, together with micro enterprises, are more frequently utilizing FinTech solutions to strengthen financial operations and manage cash flow while obtaining credit benefits. Bengaluru Urban stands as an important technological hub where professionals can observe a profound financial transformation in the entrepreneurial landscape. The Indian economy relies heavily on MSMEs since these enterprises create employment opportunities, produce industrial output, and perform exports that drive economic growth. Formal credit remains elusive to MSMEs mainly because they lack accessible loans from traditional banking institutions due to weak guarantees and absent credit records paired with rigorous application procedures. The gap between Indian MSMEs and formal financial credit can be bridged by FinTech solutions that provide digital payment services, alternative credit evaluation methods, and quick lending procedures. The examination will reveal business challenges that block FinTech solution acceptance and then deliver enhancement suggestions to all stakeholders involved in supporting better financial opportunities for micro, small, and medium-scale enterprises.

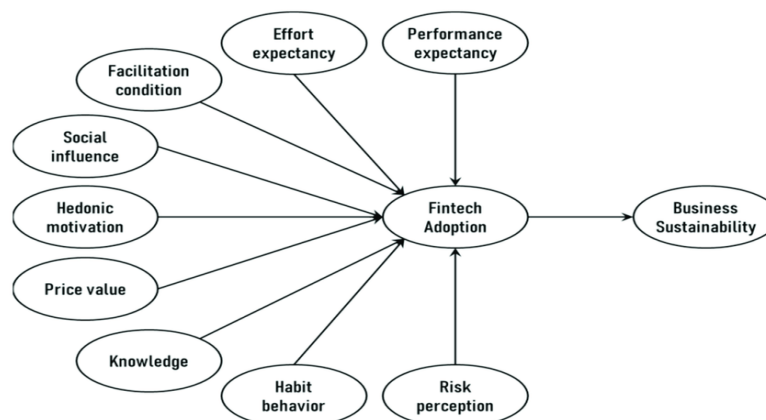


Chart: 1

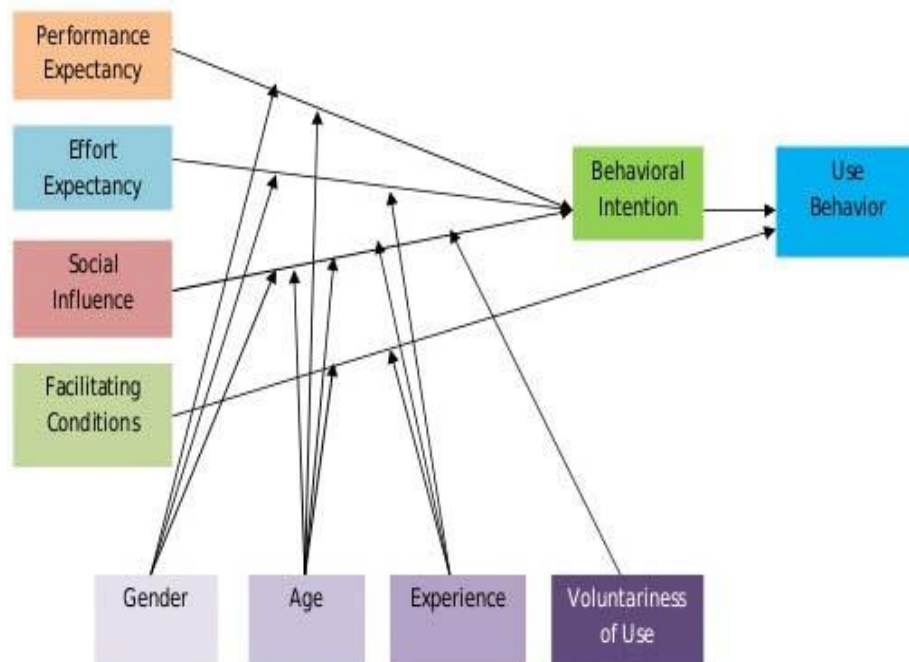
The diverse businesses within the MSME sector of Bengaluru Urban include information technology firms as well as manufacturing operations and retail outlets together with service providers. Research on FinTech adoption determinants together with its financial inclusion impacts becomes vital because more businesses implement digital solutions. Perceived usefulness and perceived ease of use are major determinants of technology adoption in the TAM framework, yet the VAM framework uses perceived value principles through functional, emotional, and social value elements. FinTech adoption helps MSMEs overcome three major challenges by resolving inefficient bookkeeping and delayed payments and providing better credit facilities access. Digital payment technology boosts business speed because it delivers improved transaction processing and much faster money movement. The data-driven technology of FinTech lending platforms uses machine learning algorithms paired with analytics to evaluate creditworthiness, thus enabling new loans to MSMEs regardless of their limited credit history. Digital wallets, together with peer-to-peer lending platforms and automated financial management tools, have gained acceptance among MSME businesses in Bengaluru. UTI Investment Trust The research investigates how MSMEs make FinTech adoption choices considering their assessments of ease of use as well as their security concerns alongside trust factors and costs involved.

Research Background

The Indian government functions actively to support digital financial services within its nationwide financial inclusion initiatives. Formal financial service access remains difficult for MSMEs despite Indian governmental initiatives. The combination of mostly informal credit sources and low financial understanding creates obstacles to MSMEs' developing in the long term. Modern FinTech innovation moves toward Bengaluru Urban due to its well-known startup culture and technical proficient business landscape. Many FinTech companies operating in this city provide customized services to MSMEs by developing automated accounting platforms and digital lending platforms along with investment advisory platforms. The services work to streamline financial operations and cut down costs while enhancing credit availability. Different

groups of MSMEs at various scales and their industrial classifications alongside their digital preparedness level determine how readily they adopt these solutions. This research investigates the FinTech adoption behavior of MSMEs in Bengaluru Urban through an integrated use of TAM and VAM theoretical models. The adoption decisions of MSMEs regarding FinTech solutions depend heavily on their perception of risk, their level of trust and regulatory considerations, and their perceived value assessment. The research analyzes how FinTech adoption enhances access to credit while improving payment systems and financial management practices within MSMEs for better financial inclusion. Schueffel (2016) built an official scientific FinTech definition through an extensive review of more than 200 academic documents, along with reports from the industry and articles. Digital platforms, together with blockchain and artificial intelligence and big data tools, enable technology-driven solutions to enhance efficiency levels and customer satisfaction. FinTech operates to modernize financial industry operations through state-of-the-art technological consolidation.

Chart: 2



Literature Agenda

For a long time, governments have recognized MSMEs as crucial economic agents for job generation and development, especially in developing and emerging economies. Around the world, MSMEs face major barriers to obtaining finance, which limits their growth potential. Financial Technology's influence on MSME financial inclusion receives analysis in this literature review, which prioritizes regional insights together with technological changes and the identified obstacles. Financial Technology serves as a crucial component of financial inclusion through its ability to deliver budget-friendly, customized financial products to the populations who were formerly excluded from financial services. This challenge emerges because traditional financial institutions fail to provide satisfactory service to these businesses effectively. These factors drive the situation due to excessive costs and perceptions of risk alongside insufficient collateral guarantees. Ogunode & Akintoye (2023) stated that Nigeria deals with substantial exclusion from financial services alongside developing economies because the country lacks bank structures and people possess minimal digital skills and face economic obstacles. The authors explain that FinTech services deliver financial solutions which reach marginalized populations in rural areas through accessible and affordable as well as efficient services. Through mobile platforms and digital innovation FinTech companies improve customers' ability to obtain credit and savings as well as insurance products. This research presents regulatory concerns which focus on data security together with fraud risks and the requirement for enhanced consumer protection frameworks. The authors present proposals advocating for FinTech innovation stimulus through policies that preserve financial institutional stability. The study advocates for cooperative relationships between FinTech organizations and banks and government institutions that aim to generate inclusive growth. By continuously investing in digital infrastructure alongside financial literacy projects both institutions will create substantial enhancements for Nigeria's growing financial inclusion framework.

Research Gap

The recognition continues to rise about FinTech potential for financial inclusion among MSMEs within Bengaluru's urban area but substantial research gaps persist. Research on FinTech adoption covers extensive discussions about banking sectors and individual consumers and large enterprises beyond other contexts. Few scientific studies actually investigate MSMEs despite the existence of Bengaluru Urban's dynamic entrepreneurial atmosphere. The majority of research investigates individual adoption patterns at the expense of organizational decision-making procedures that matter most to MSMEs. The research falls short of explaining how Financial Technology solutions specifically serve the financial requirements of MSMEs regarding credit accessibility together with cash flow management and investment decisions. Research studies rarely approach FinTech adoption assessment through the lens of economic factors which influence adoption rates such as organizational scale and specific industry classification and ownership system. Thus far the detailed study about how trust issues and regulatory concerns together with perceived risk elements affect FinTech adoption rates while interacting with perceived value and ease of use in the MSME sector remains a hidden area of research.

Significance of Study

The research contributes significant findings to theoretical and practical knowledge about FinTech adoption patterns among MSMEs operating in Bengaluru Urban. The research targets existing knowledge voids and generate essential findings about the combined effect of usefulness perception and ease of use perception and value perception on MSME decision-makers adopting FinTech solutions. Reality-based findings from this research will provide direct advantages to various interested groups. By using the research findings, FinTech service providers can adjust their solutions while creating better user experiences and developing marketing strategies to solve the specific problems faced by MSMEs. Policy professionals should use study results to create supportive frameworks and enhance digital literacy initiatives for FinTech adoption, together with regulatory structures that promote digital financing solutions. The research can help financial institutions create inclusive financial products suited for MSMEs, which will improve both urban economic quality and financial inclusion. This research studies the variables

that impact FinTech adoption within MSMEs in Bengaluru Urban to deliver practical knowledge that empowers these businesses to adopt digital finance platforms.

Statement of the Problem

The rapid growth of FinTech solutions fails to resolve ongoing financial service problems for MSMEs operating in the Bengaluru Urban region. The inconsistent adoption of FinTech platforms by MSMEs hampers their potential to bridge financial gaps and implement extraordinary solutions like digital payments coupled with alternative lending and automated financial management tools. Small businesses fail to perceive the many advantages that come from using FinTech solutions for handling cash flow, gaining credit, and making strategic financial decisions. The research investigates technology adoption through individual consumer perspectives while neglecting how MSMEs execute organizational decision-making processes for technology adoption. Studies focused on MSMEs fail to consider both perceived value and perceived risk factors in FinTech adoption decisions. The research responds to the urgent requirement of analyzing FinTech adoption predictors among Bengaluru Urban MSMEs by integrating TAM and VAM models. The article examines FinTech adoption barriers and drivers within MSMEs by studying elements including ease of use, usefulness, perceived value, user trust, and perceived risk assessment. The collected information offers actionable feedback to agents from government and FinTech developers in addition to MSME owners, which drives better financial inclusion and economic stability.

Objectives:

1. To examine the key factors influencing FinTech adoption among MSMEs using an integrated TAM and VAM model.
2. To analyze the moderating effects of financial literacy, digital infrastructure, and regulatory support on FinTech adoption.

Methodology

This research adopts a quantitative methodology to analyze the elements that drive MSMEs in Bengaluru Urban to accept FinTech solutions and understand its effects on financial inclusion. The proposed model evaluates the main constructs, which include perceived usefulness and perceived ease of use, together with perceived value, trust, and social influence. An analysis of the connection between adoption behavior and financial inclusion outcomes through financial literacy and digital infrastructure and regulatory support as mitigation variables will be performed.

Research Design and Sampling

The research team will create a structured survey to obtain primary information from MSME leaders who operate within Bengaluru Urban region. The questionnaire contains Likert-type items which will evaluate the entire set of constructs within the integrated TAM-VAM framework. A testing phase of the instrument will include 30 MSME respondents for validation of clarity together with measurement precision and logical validity. The final research survey will implement a stratified random sampling technique to uphold demographic consistency between various business markets and company sizes as well as operational years. The required number of responses follows SEM recommendations and exceeds 150 to deliver precise model calculations.

Data Collection

The data collection will use online and offline methods to maximize response rates. Google Forms digital platform, together with offline distribution through the Federation of Karnataka Chambers of Commerce and Industry (FKCCI) associations, will be used for data collection. The survey consists of sections that gather demographic data along with business characteristics and behavior related to FinTech adoption and evaluation of its influence on financial inclusion.

Analysis, Findings and Results

Research into FinTech adoption primarily centers on individual consumers' behavior, although MSMEs' adoption behavior remains largely unexplored. Primarily, two factors influence technology acceptance based on the TAM framework, which serves as a common framework for studies on technology adoption. The VAM framework focuses on technology adoption value, which includes functional advantages such as improved efficiency as well as emotional advantages such as stress reduction and social advantages like increased business reputation. The investigation analyzes these elements to generate important findings about how MSMEs act toward FinTech adoption, which will guide practical recommendations for both policymakers and financial institutions. The research results will lead to strategic development that addresses current obstacles while improving financial expertise and implementing digital solutions for inclusive economic development across Bengaluru Urban.

Table 1

Technology Acceptance Model (TAM) Factors according to the level of experience

(TAM) Factors	N	Mean	Std. Deviation	Std. Error
Perceived Usefulness (PU)	29	3.8138	.39975	.07423
Perceived Ease of Use (PEOU)	58	3.8552	.37798	.04963
Attitude Toward Usage (ATU)	63	3.7778	.39856	.05021
Total	150	3.8147	.38987	.03183

This research shows the mean scores with standard deviations and standard errors for three TAM components Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) and Attitude Toward Usage (ATU) within different user experience groups. The overall mean score for all factors combined is **3.8147** with a standard deviation of **0.38987**.

Key Observations

1. Perceived Ease of Use (PEOU)

- With the highest mean score of **3.8552**, this factor suggests that users across experience levels generally find the technology easy to understand and operate.
- The relatively low standard deviation (**0.37798**) indicates a consistent perception of ease of use among respondents.

2. Perceived Usefulness (PU)

- The mean score for PU is **3.8138**, closely aligning with the total average.
- This suggests that respondents recognize the technology as beneficial, though with slightly greater variability compared to PEOU (Std. Dev. = **0.39975**).

3. Attitude Toward Usage (ATU)

- The lowest mean score (**3.7778**) suggests a marginally less positive attitude toward adopting the technology despite recognizing its usefulness and ease of use.
- The standard deviation (**0.39856**) indicates moderate variability in attitudes.

4. Overall Trend

- The total mean score of **3.8147** reflects a generally positive response toward technological adoption across all experience levels.
- The relatively small standard deviations across all three factors indicate that respondents' perceptions are consistent.

Implications

- The higher score for **PEOU** suggests that simplifying user interfaces and providing intuitive designs may further enhance technology acceptance.
- While **PU** scores are positive, reinforcing the practical benefits of the technology through targeted communication may improve adoption rates.
- The slightly lower **ATU** score suggests that addressing motivational factors, such as user confidence, perceived value, or incentives, may positively influence attitudes

Table 2: ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	73.503	2	43.448	3.128	0.051
Within Groups	1081.211	147	12.704		
Total	1154.714	149			

The F-value of 3.128 indicates some variation in TAM factors across experience levels. The p-value of 0.051 is slightly above the conventional significance threshold of 0.05. While this suggests a marginally non-significant result, it is very close to the critical value, indicating a possible trend toward significant differences. This marginal result indicates that with a slightly larger sample size or improved measurement precision, significant differences may emerge.

Table 3

Value-Based Adoption Model (VAM) Factors according to the level of experience

VAM	N	Mean	Std. Deviation	Std. Error
Perceived Value (PV)	29	12.4154	.50855	0.80514
Perceived Sacrifice (PS)	58	11.9822	.60681	0.43316
Perceived Benefits (PB)	63	11.6247	.58896	0.87765
Total	150	11.1578	.58172	0.36503

Key Observations:

1. Perceived Value (PV): Respondents perceive the technology as highly valuable, with consistent responses across participants. The low standard deviation suggests strong agreement about the perceived value.
2. Perceived Sacrifice (PS): The moderate score suggests that users acknowledge some level of effort, cost, or trade-offs associated with adopting the technology. The variability here is slightly higher than PV, indicating differing perceptions of sacrifices made.
3. Perceived Benefits (PB): Despite recognizing value and some sacrifices, respondents perceive the benefits as comparatively lower. This may imply a gap between user expectations and realized advantages.

The total mean score suggests a moderately positive perception of the technology's overall value proposition, though with some variability across experience levels.

Implications

1. The higher PV score indicates that users generally see the technology as valuable. This positive perception can be leveraged to enhance adoption rates.
2. The relatively lower PB score suggests a need to improve the communication or demonstration of tangible benefits to users.
3. The PS score, being relatively close to the PV score, suggests that while users recognize sacrifices, they may be willing to tolerate them if the perceived value remains high.

Table 4: ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	73.503	2	24.343	2.157	0.059
Within Groups	1081.211	147	10.338		
Total	1154.714	149			

The F-value of 2.157 indicates some variation in VAM factors across experience levels. The p-value of 0.059 is slightly above the conventional threshold of 0.05, indicating that the differences between groups are not statistically significant at the 5% level. However, this p-value is close to 0.05, suggesting a borderline effect — there may be some meaningful differences that warrant further exploration. While the result is not strictly significant, the p-value of 0.059 suggests that experience levels may still have a moderate influence on VAM factors. This marginal result indicates that further investigation with a larger sample size or more refined grouping criteria may reveal significant differences. The table presents the results of an F-test analyzing differences in four key dimensions — Financial Literacy, Digital Infrastructure, Regulatory Support, and Networking — across three age groups: Young, Middle, and Old.

Table: 5
Results of F-test for FinTech Adoption and Financial Inclusion among MSMEs

Dimensions	Age group	N	Mean	SD	F	Sig.
Financial Literacy	Young	36	77.32	0.237	0.721	0.172
	Middle	70	67.71	0.256		
	Old	44	86.41	0.392		
	Total	150		0.255		
Digital Infrastructure	Young	36	72.49	0.424	1.132	0.284
	Middle	70	79.72	0.375		
	Old	44	71.25	0.321		
	Total	150		0.312		
Regulatory Support	Young	36	85.50	0.421	6.415	0.001
	Middle	70	78.78	0.502		

	Old	44	62.10	0.587		
	Total	150		0.533		
Networking	Young	36	77.32	0.441	1.847	0.136
	Middle	70	67.71	0.428		
	Old	44	86.41	0.565		
	Total	150		0.417		

Key Observations

1. Financial Literacy

- **F-value:** 0.721 | **p-value:** 0.172 (Not Significant)
- Despite observable differences in mean scores (Young = **77.32**, Middle = **67.71**, Old = **86.41**), the result is **not statistically significant**.
- **Interpretation:** Age differences do not significantly influence financial literacy levels.

2. Digital Infrastructure

- **F-value:** 1.132 | **p-value:** 0.284 (Not Significant)
- Mean scores vary slightly (Young = **72.49**, Middle = **79.72**, Old = **71.25**), but the differences are **not significant**.
- **Interpretation:** Access to and use of digital infrastructure is relatively uniform across age groups.

3. Regulatory Support

- **F-value:** **6.415** | **p-value:** **0.001** (Highly Significant)
- Significant differences are evident, with mean scores dropping notably from Young (**85.50**) to Middle (**78.78**) and Old (**62.10**).
- **Interpretation:** Age has a **significant impact** on perceptions of regulatory support. Older MSMEs may perceive less effective regulatory support, which could hinder their FinTech adoption.

4. Networking

- **F-value:** 1.847 | **p-value:** 0.136 (Not Significant)
- Although the mean scores vary (Young = **77.32**, Middle = **67.71**, Old = **86.41**), the differences are **not significant**.
- **Interpretation:** Networking opportunities appear consistent across age groups.

Discussion:

- **Regulatory Support** is the **only dimension with statistically significant differences** across age groups (**p = 0.001**), indicating that older MSMEs may feel underserved or less informed regarding regulatory frameworks.
- **Financial Literacy, Digital Infrastructure, and Networking** show **no significant differences** across age groups, suggesting these dimensions are relatively stable regardless of age.

Summary of Findings:

The results revealed distinct patterns across the analyzed dimensions:

1. Financial Literacy:

- The analysis showed no statistically significant difference across the age groups (**F = 0.721; p = 0.172**). Although the mean scores suggest that older MSMEs (Mean = **86.41**) demonstrated higher financial literacy levels compared to younger (Mean = **77.32**) and middle-aged groups (Mean = **67.71**), these differences were not significant.
- While financial literacy remains important, age is not a defining factor in MSMEs' financial knowledge levels. This suggests that MSMEs across different age groups may require similar types of financial literacy interventions to improve their understanding and adoption of FinTech services.

2. Digital Infrastructure:

- No significant differences were found between age groups regarding digital infrastructure (**F = 1.132; p = 0.284**). While middle-aged MSMEs scored slightly

higher (Mean = **79.72**) than both younger (Mean = **72.49**) and older groups (Mean = **71.25**), the variation was not statistically significant.

- Digital infrastructure access and usage appear consistently across age groups, suggesting that improvements in this area should focus on enhancing system usability, reliability, and cost-efficiency rather than targeting specific age groups.

3. **Regulatory Support:**

- Significant differences emerged in perceptions of regulatory support (**F = 6.415; p = 0.001**). Younger MSMEs reported the highest confidence in regulatory support (Mean = **85.50**), followed by middle-aged MSMEs (Mean = **78.78**) and older MSMEs (Mean = **62.10**).
- The significant disparity suggests that older MSMEs perceive regulatory frameworks as less supportive or accessible. This highlights the need for targeted interventions that improve regulatory awareness and guidance among older business owners to enhance their trust in FinTech solutions.

4. **Networking:**

- Networking scores varied across groups but did not show statistically significant differences (**F = 1.847; p = 0.136**). Mean scores were highest among older MSMEs (Mean = **86.41**) and lowest among middle-aged groups (Mean = **67.71**).
- Networking opportunities appear to be evenly accessible across age groups. However, reinforcing MSME networks through mentorship programs, industry events, and collaborative platforms may further improve FinTech adoption.

Implications for Practice

• **For Regulatory Support:**

- Policymakers should enhance outreach programs and communication strategies tailored to older MSMEs to improve their understanding and access to regulatory support.

• **For Financial Literacy and Digital Infrastructure:**

- While no significant differences emerged, targeted education and digital training programs could further support FinTech adoption across all age groups.
- **For Networking:**
 - MSMEs may benefit from improved peer-to-peer networks, mentorship programs, or industry-specific events to foster collaboration and knowledge sharing.

Conclusion

The research examined FinTech adoption patterns together with financial inclusion approaches of MSMEs in Bengaluru Urban by using Technology Acceptance Model (TAM) and Value-Based Adoption Model (VAM). The assessment incorporated Financial Literacy and Digital Infrastructure adoption determinants but added Regulatory Support and Networking to the analysis framework. The assessment included observations regarding various age group interactions with the identified dimensions. This study produces vital insights about adoption processes which offer helpful guidelines to financial institutions alongside MSME stakeholders and policy-making entities. The research shows Regulatory Support functions as strong criteria that drives FinTech adoption within mature businesses of the MSME sector. The combination of Financial Literacy along with Digital Infrastructure and Networking functions as prime promoters of FinTech adoption and financial inclusion yet produced no statistically significant results. The enforcement of proper regulatory instruments directed at older MSMEs should be bolstered by policymakers to boost digital financial participation by these businesses. Financial organizations must develop customized assistance systems to teach customers advanced digital skills and teach them about digital financial benefits and fight modern financial reluctance. Fintech solution providers can establish partnering network environments to build trust with MSMEs, which creates confidence to adopt FinTech solutions. Stakeholders should focus on the obtained insights to improve financial inclusion in Bengaluru Urban so that businesses of any age group can access digital economy resources.

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