

Digital Payment Systems and Financial Technology Adoption in Rural MSMEs: A Case Study of Telangana

PY. Lalitha Chaitanya,

Lecturer in Commerce

Department of Commerce & Management Studies

Government City College (Autonomous),

Hyderabad – 500002, Telangana, India

Gowlikar Nikitha

Department of Commerce & Management Studies

Government City College (Autonomous),

Hyderabad – 500002, Telangana, India

Madastu manasa

Department of Commerce & Management Studies

Government City College (Autonomous),

Hyderabad – 500002, Telangana, India

Abstract

Telangana, home to an estimated 26 lakh Micro, Small, and Medium Enterprises (MSMEs), represents a unique microcosm of India's digital transformation. While the state boasts high digital literacy rates among rural youth (94.5%), a significant dichotomy persists between the tech-savvy clusters of Hyderabad and the traditional rural industries in districts like Nizamabad and Rajanna Sircilla. The dominance of informal micro-enterprises, which constitute a vast majority of the sector, presents distinct challenges in financial inclusion despite progressive state policies. This research paper aims to: (1) Evaluate the adoption of digital payment systems (UPI, AePS) in Telangana's rural MSME clusters; (2) Analyze the impact of state-specific interventions like the Telangana MSME Policy 2024, WE Hub, and the Yantram Fund; (3) Investigate sector-specific digital adoption patterns, specifically among Sircilla's textile weavers and Nizamabad's turmeric farmers; and (4) Assess the role of institutional incubators in fostering rural women entrepreneurship. The study employs a mixed-method approach, synthesizing secondary data from the Telangana Industries Department, TG-iPASS reports, and WE Hub impact assessments. This is complemented by a review of recent empirical studies on street vendors in Sircilla and turmeric traders in Nizamabad to provide granular insights.

The analysis reveals that Telangana creates a conducive ecosystem through policy, yet "last-mile" usage varies. While 8.9 lakh MSMEs have formalized via Udyam registration, actual digital integration is sector-dependent. In Nizamabad, AI-based quality assaying has revolutionized turmeric trading, boosting incomes. Conversely, handloom weavers in Sircilla show high digital awareness but moderate adoption due to infrastructural gaps. WE Hub has emerged as a critical enabler, supporting women-led startups, though rural outreach remains a work in progress compared to urban centers.

Keywords

Telangana MSMEs, Rural Fintech, WE Hub, Nizamabad Turmeric Cluster, Sircilla Textile Industry, Digital Transformation, Women Entrepreneurship, TG-iPASS.

1. Introduction

Since its formation, Telangana has prioritized industrial growth, with MSMEs forming the backbone of its rural economy. According to National Sample Survey (NSS) estimates, the state hosts approximately 26 lakh MSMEs, employing a vast segment of the rural population. The sector is diverse, ranging from the high-tech precision engineering units in Medak to the traditional **Pochampally Ikat** weavers and **Nizamabad turmeric** processors.

The state's ecosystem is bolstered by the **TG-iPASS** (Telangana State Industrial Project Approval and Self-Certification System), which has streamlined business approvals. Since 2014, annual registrations of new MSME units on the portal have risen by 11-15%, reflecting a trend towards formalization.

1.1 Recent Trends: Policy and Institutional Push

Telangana has distinguished itself through aggressive policy interventions aimed at digitization and formalization:

Telangana MSME Policy 2024: Unveiled to address the "technological obsolescence" of rural units, this policy introduced a **₹100 Crore Yantram Fund** to subsidize the adoption of Industry 4.0 technologies and digital tools for MSMEs.

WE Hub: As India's first state-led incubator for women entrepreneurs, WE Hub has moved beyond urban startups to support rural women through programs like "Project Inclusion" and "WE Reach," focusing on digitizing informal women-led enterprises.

Digital Infrastructure: The state's rural youth (ages 15-29) exhibit a 94.5% capability in performing online banking, significantly higher than the national average, providing a fertile ground for fintech adoption.

1.2 Problem Statement + Significance

Despite these advantages, rural MSMEs in Telangana face the classic "access vs. usage" paradox. While **UPI** adoption is ubiquitous in semi-urban centers, deep rural clusters (e.g., tribal areas in Adilabad) still rely heavily on cash. Furthermore, while the **Nethanna Bima** scheme provides insurance to weavers, the premium payments and claim settlements often face digital friction due to lack of seamless fintech integration. This paper investigates these localized gaps to understand why high digital literacy has not yet translated into universal digital financial inclusion.

2. Review of Literature

2.1 Studies on Rural MSMEs and Street Vendors in Telangana

Recent micro-studies provide a realistic picture of digital adoption at the street level.

Sircilla Street Vendors: A study on street vendors in Sircilla town found that while the majority adopted digital payments due to "customer influence" and "easy access to bank accounts," they faced significant challenges such as network latency and delayed credit of funds (settlement risk).

Hyderabad vs. Rural Vendors: Comparative studies indicate that while urban vendors in Hyderabad use fintech for business analytics (tracking sales), rural vendors primarily use it only for receiving payments (P2M), missing out on value-added services like digital credit.

2.2 Studies on Women Entrepreneurship and WE Hub

Literature on women's entrepreneurship in the state highlights the pivotal role of **WE Hub**.

Research suggests that WE Hub's "incubation" model helps formalize informal women-led businesses by assisting them with Udyam registration and compliance. However, studies also note a "confidence gap" among rural women, where digital financial literacy (DFL) lags behind general digital literacy.

SHG Digitization: The digitization of Self-Help Groups (SHGs) in Telangana is well-documented, yet the transition of individual SHG members into independent "digital entrepreneurs" remains slow.

2.3 Studies on Sector-Specific Tech Adoption (Agri & Handloom)

Turmeric Cluster (Nizamabad): The introduction of **AI-based quality assaying** in the Nizamabad market yard is a landmark case. Literature notes that this technology reduced testing time from days to seconds, allowing farmers to get immediate, transparent pricing based on curcumin content, thereby bypassing exploitative middlemen.

Handloom Sector: Studies on the handloom industry (Pochampally/Sircilla) highlight that while e-commerce platforms could eliminate intermediaries, weavers struggle with the "digital logistics" of online selling (cataloging, digital payments, shipping).

2.4 Critical Comparison

Most existing studies focus either on the *success* of urban tech hubs like T-Hub or the *distress* of rural sectors. There is a lack of research connecting the two—specifically, how state-led "tech" initiatives (Yantram Fund, WE Hub) are physically impacting the "distress" sectors in rural districts. This paper bridges that gap.

3. Research Gap

District-Level Granularity: While state-level data is available, there is limited evidence comparing the *fintech maturity* of an agricultural cluster (Nizamabad) versus an artisan cluster (Sircilla).

Impact of 'Yantram Fund': As a 2024 initiative, there is virtually no academic assessment of the early impact of the ₹100 Crore Yantram Fund on rural technology adoption.

Tribal Financial Inclusion: Studies often overlook the specific digital payment challenges in Telangana's tribal belts (e.g., Bhadradri Kothagudem, Mulugu), where infrastructure is the primary bottleneck.

4. Objectives of the Study

1. To analyze the penetration and usage patterns of UPI and AePS among rural MSMEs in Telangana
2. To evaluate the effectiveness of the Telangana MSME Policy 2024 and WE Hub
3. To assess the impact of AI and Fintech interventions on income stabilization in specific clusters (Turmeric in Nizamabad and Textiles in Sircilla).

4. To identify infrastructural and behavioral barriers to digital adoption in deep rural Telangana and propose state-specific policy remedies.

5. Research Questions / Hypotheses

RQ1: Does the high rate of digital literacy among Telangana's rural youth translate into increased digital adoption for family-run MSMEs?

H1: Digital literacy serves as a significant moderator for fintech adoption in inter-generational rural family businesses.

RQ2: Has the "WE Hub" initiative successfully bridged the gender gap in financial inclusion for rural women entrepreneurs?

H2: Women entrepreneurs incubated under state initiatives demonstrate significantly higher usage of formal digital credit compared to non-incubated peers.

6. Methodology

6.1 Research Design

This study uses a Descriptive and Diagnostic research design, focusing on specific clusters within Telangana to diagnose the "health" of digital adoption.

6.2 Data Sources

Primary Data (Proxy): Insights drawn from field studies referenced in the literature, specifically covering Sircilla street vendors and Nizamabad farmers.

Secondary Data:

Government Reports: Telangana Socio-Economic Outlook, MSME Policy 2024 documents.

Institutional Data: WE Hub annual impact reports, TG-iPASS registration statistics.

RBI Data: Financial Inclusion Index data specific to the Southern region/Telangana.

6.3 Sample / Clusters of Interest

1. **Nizamabad:** Represents the **Agri-MSME** sector (Turmeric processing and trading).
2. **Rajanna Sircilla:** Represents the **Artisan/Manufacturing MSME** sector (Powerlooms and Handlooms).
3. **Hyderabad Peri-Urban:** Represents the control group of semi-urban MSMEs with better infrastructure.

6.4 Tools / Techniques

- **Cluster Analysis:** Comparing digital maturity across the three identified districts.
- **SWOT Analysis:** Specifically for the implementation of the Telangana MSME Policy 2024.

7. Results and Discussion

7.1 Digital Infrastructure and Adoption in Telangana

Telangana has achieved significant milestones in digital readiness. The state has registered nearly **8.9 lakh MSMEs** on the Udyam portal since 2020.

Youth as Catalysts: The high digital capability of rural youth (94.5%) acts as a catalyst. In many rural MSME households, the younger generation ("Gen Z") manages the digital payment interfaces (QR codes/Wallets) while the older generation manages core operations. This "collaborative adoption" model is unique to the family-business structure of rural Telangana.

7.2 The 'Golden' Transformation in Nizamabad

Nizamabad district, famous for its turmeric, provides a compelling case of how "Deep Tech" helps rural MSMEs.

The Spices Board and private agritech players introduced AI-based quality assaying machines at the Nizamabad market yard. Previously, visual inspection of turmeric took days and was subjective. The AI machine now assesses curcumin content in 60 seconds. This instant quality assurance allows for immediate digital price settlement. Farmers and small traders receive payments directly into bank accounts based on scientific quality metrics, eliminating delays and opaque deductions. This has encouraged more farmers to adopt digital receiving methods.

7.3 Digital Weaving in Sircilla

In Sircilla, the textile hub, adoption is driven by both market push and government welfare.

A study of 150 street vendors and small merchants in Sircilla revealed that "Customer Influence" was the primary driver for adopting QR codes. As consumers increasingly moved to UPI, weavers and local merchants were forced to adapt to avoid losing business. The **Nethanna Bima** scheme (life insurance for weavers) relies on digital databases. While this has formalized the identity of weavers, the study notes that awareness of the *digital claim process* remains low (40% had moderate awareness). Network connectivity ("server down" issues) and the fear of transaction failure are cited as major stressors for small merchants who operate on thin margins.

7.4 The WE Hub Effect on Women Entrepreneurship

WE Hub has been instrumental in addressing the gender gap.

Formalization: Through programs like "Project Inclusion," WE Hub assists informal rural businesses in obtaining Udyam registration and opening current accounts.

Credit Access: By acting as an aggregator, WE Hub facilitates linkages with formal credit (Mudra, Stree Nidhi). However, data suggests that rural women still heavily rely on SHG inter-loaning rather than direct bank credit due to the complexity of banking documentation.

Digital Sakhis: The "Digital Sakhi" model, where trained women assist others in digital transactions, has been effective but needs scaling beyond the pilot districts.

7.5 Policy Impact: MSME Policy 2024

The newly launched **Telangana MSME Policy 2024** shows promise but faces implementation hurdles.

Yantram Fund: The ₹100 Crore fund for technology adoption is a step in the right direction. However, for a micro-enterprise in a rural village, "technology adoption" means a smartphone and a soundbox, not expensive machinery. The policy needs to clarify if "digital tools" (accounting software, PoS devices) are covered under this fund.

Land and Infrastructure: The policy addresses land access, but for digital MSMEs, *digital land* (connectivity) is more critical. T-Fiber's last-mile connectivity to industrial parks is crucial for the "Industry 4.0" vision to materialize in rural areas.

8. Findings

1. **High Awareness, Moderate Usage:** In Telangana, awareness of digital payments is near-universal among MSMEs, but usage is often limited to receiving payments (Passive) rather than making vendor payments (Active).
2. **Sectoral Variance:** Agri-MSMEs (Nizamabad) are adopting "Deep Tech" (AI Quality checks) faster due to immediate revenue realization, whereas Artisan MSMEs (Sircilla) adopt "Surface Tech" (Payments) primarily due to peer/customer pressure.
3. **Institutional Trust:** State institutions like **WE Hub** and **T-Hub** command high trust. Rural entrepreneurs are more likely to adopt a technology if it is endorsed or subsidized by these state bodies.
4. **The "Soundbox" Revolution:** Audio-confirmation devices (Soundboxes) have been the single most effective tool in building trust for rural merchants in Telangana, bridging the literacy gap by verifying transactions vocally in Telugu.

9. Conclusion

Telangana stands at the forefront of the digital revolution in India, with a robust policy framework and a digitally literate youth population. The state's MSME sector is transitioning from a "survivalist" mode to a "growth-oriented" mode, aided by DPI and state-specific interventions like WE Hub.

However, the "digital divide" in Telangana is no longer about *access* to hardware, but about the *capability* to use it for business growth. The success of the Nizamabad turmeric cluster proves that when technology solves a core business problem (quality transparency), adoption is rapid. The challenge lies in replicating this value proposition for the weaver in Pochampally or the petty shop owner in Adilabad. By aligning the Yantram Fund and WE Hub initiatives with the hyper-local needs of these clusters, Telangana can truly unlock the potential of its 26 lakh MSMEs, making them the engines of a \$1 trillion state economy.

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