Journal of Informatics Education and Research
ISSN: 1526-4726
Vol 6 Issue 1 (2026)

From Cash to Connectivity: Digital Financial Inclusion and Market Participation among Zari-Zardozi Artisans

Dr. Mohit Lohani[1*], Dr. Vaniki Joshi Lohani[2], Pankaj Juneja[3], Dr. Bhupender Singh[4], Deepti Sharma[5]
[1*]Associate Professor, LBSIM, Dwarka, New Delhi, India
[2] Assistant Professor, ABVSME, Jawaharlal Nehru University, New Delhi., India a
[3]Research Scholar, Department of Commerce, Bareilly College, Bareilly, U.P., India
[4]Head of Commerce Department, Bareilly College, Bareilly, U.P., India
[5]Research Scholar, Department of Commerce, Bareilly College, Bareilly, U.P., India
Email (Corresponding Author): mohitlohani@lbsim.ac.in

Introduction

Micro, small, and medium enterprises (MSMEs) are the backbone of the Indian economy, contributing significantly to the generation of employment and national output. Nevertheless, a large portion of these enterprises function under the unorganized sector, where the work is informal, no financial documentation, and there are limited formal credit opportunities. Bareilly's Zari-zardozi industry is an example of such an unorganized MSME. It is a culturally rich sector, dominated by Muslim artisans, but it is economically fragile, characterized by low earnings, delays in receiving payments, and heavy dependence on cash-based transactions. These further create structural issues, limiting business growth and making financial stability difficult.

Digital financial services (DFS), including mobile payments, UPI, and online banking, have the potential to improve efficiency by ensuring timely payments, enhancing financial transparency, and providing access to formal credit. However, the adoption of digital finance in traditional craft remains uneven due to low levels of digital literacy, lack of access to infrastructure, and skepticism regarding digital security. Recent studies on Zari-zardozi have shown the struggles of these enterprises in terms of informal cash-based dealings, low digital awareness, and dependence on intermediaries, raising the need for this sector to shift to digital platforms (Juneja et al., 2025).

However, digital transformation for unorganized MSMEs extends beyond financial inclusion alone. The growing penetration of digital media platforms has enabled many small and traditional entrepreneurs to access new markets that were previously unreachable. For artisans engaged in handicraft activities such as zari-zardozi, digital platforms such as social media marketplaces, messaging applications, and online exhibitions have created alternative channels for showcasing products, connecting with buyers, and negotiating prices directly. In several cases, artisans who were earlier dependent on local traders or intermediaries have gradually started receiving direct orders through digital communication, thereby improving their income stability.

Digital finance plays a complementary role in this transformation by enabling seamless transactions, advance payments, and secure settlements with buyers located beyond local or regional boundaries. For rural entrepreneurs, learning to use digital payment systems often acts as a gateway to broader digital participation, including engagement with digital media and online marketing. Thus, digital finance adoption should be understood not only as a tool for transaction efficiency but also as an enabler of market expansion and livelihood diversification for unorganized MSMEs. This perspective is particularly relevant in traditional sectors such as zari-zardozi, where access to digital platforms can translate into new income opportunities and reduced vulnerability to local market fluctuations.

Though digital finance has multiple benefits, its adoption among unorganized MSMEs depends on multiple factors such as skills, business operations, and location. Location creates disparities in adoption, as in comparison to urban units, rural units face multiple challenges in terms of connectivity, exposure, and training that affect their willingness to adopt digital tools. There is limited empirical research examining these factors in the unorganized MSME sector using the Technology Acceptance Model (TAM).

Problem Statement

Low digital literacy, operational difficulties, and regional disparities are some of the factors that contribute to Zari-zardozi businesses facing challenges in adopting digital tools. These challenges limit their financial inclusion and slow the shift towards efficient and transparent financial practices. Therefore, the study addresses the gap by examining digital literacy,

perceived challenges, and adoption determinants among urban and rural Zari-zardozi enterprises using an adapted TAM framework.

Objectives of the Study

1. To conduct an analysis of current digital financial literacy levels among unorganized MSMEs
2. To examine the challenges faced by MSMEs in adopting digital financial solutions.

Literature Review

Micro, small, and medium enterprises (MSMEs) is a most crucial sector in the developing Indian economy, employing over 20.39 crore people (including informal micro enterprises) and contributing about 30% in the nation's GDP (*Contribution Of MSMEs To The GDP*, 2024). The potential of digital technologies to transform unorganized MSMEs such as the Zari-zardozi business has been discussed in previous researches. Digital technologies, including mobile payments, online banking, and the Unified Payments Interface (UPI), have shown their ability to make transactions easier, improve the recording of these transactions, and enhance financial inclusion (Khanzode et al., 2021; UN.ESCAP, 2022). However, organizational and technological barriers often limit digital infrastructure adoption, especially among the micro-entrepreneurs lacking access to formal finance.

Studies have shown that rural and unorganized MSMEs often face problems that restrict their growth in digital financial participation, including poor connectivity, lack of access to smartphones, and low affordability of digital devices (Mohapatra, 2016). The situation is still worse in the handicraft industry, especially the Zari-zardozi sector, which faces problems of informal operations, delayed payments, dependence on middlemen, and lack of formal finance (Mezzadri, 2012). These structural constraints are supported by digital literacy, fear of online fraud, and lack of trust in digital platforms, which significantly impact the adoption of fintech services (Shaurabh & Khan, 2021; Mittal & Singh, 2021). Even the sectors that heavily adopt digital tools still face the problem of security and a lack of knowledge that impede their growth.

Emerging digital technologies such as cloud computing, artificial intelligence, and mobile financial services are crucial enablers of MSME efficiency (Hung et al., 2013; Kamble et al., 2020). Technology adoption in MSMEs is influenced not only by perceived benefits but also by factors like management support, external competition, and institutional environment (Kumar et al., 2017). Digital financial services help businesses create financial records, improve creditworthiness, and reduce dependence on cash transactions (Mangawing et al., 2023). However, adoption remains uneven due to trust issues, low financial literacy, inadequate infrastructure, and lack of collateral, especially in the unorganized sector (Ali, 2013; Madan, 2020; Fauziyah et al., 2024). Hence, digital financial inclusion is crucial to link MSMEs to formal financial systems, primarily when trust and structural barriers exist (Ali, 2013; E & Swarupa, 2022).

Digital Media, Market Access, and Income Opportunities for Artisanal MSMEs

Recent literature suggests that digital inclusion for MSMEs increasingly involves both financial and market-oriented dimensions. Digital media platforms, including social networking sites and mobile-based commerce tools, have emerged as important channels through which small and informal enterprises gain visibility and access to wider consumer bases (*Digital Economy Report 2021*, 2021; Rahayu et al., 2023). For artisans and handicraft producers, these platforms reduce geographical constraints and enable direct interaction with customers, thereby minimizing dependence on intermediaries.

Studies indicate that MSMEs using digital platforms for product promotion and customer engagement often experience improved sales opportunities and greater price transparency. In unorganized sectors, where formal market access is limited, digital presence can function as an alternative market infrastructure. The ability to receive digital payments further strengthens this ecosystem by facilitating advance payments, reducing transaction risks, and supporting cross-regional trade (Okello Candiya Bongomin et al., 2018).

However, access to these opportunities remains uneven, particularly between urban and rural enterprises, due to differences in digital literacy, exposure, and infrastructure availability. For rural artisans, limited awareness of digital platforms, combined with inadequate skills and connectivity, restricts the potential benefits of digital media-driven market expansion (Rampaul, 2025). Consequently, digital finance adoption must be examined alongside digital market participation to fully understand its developmental impact on traditional MSMEs.

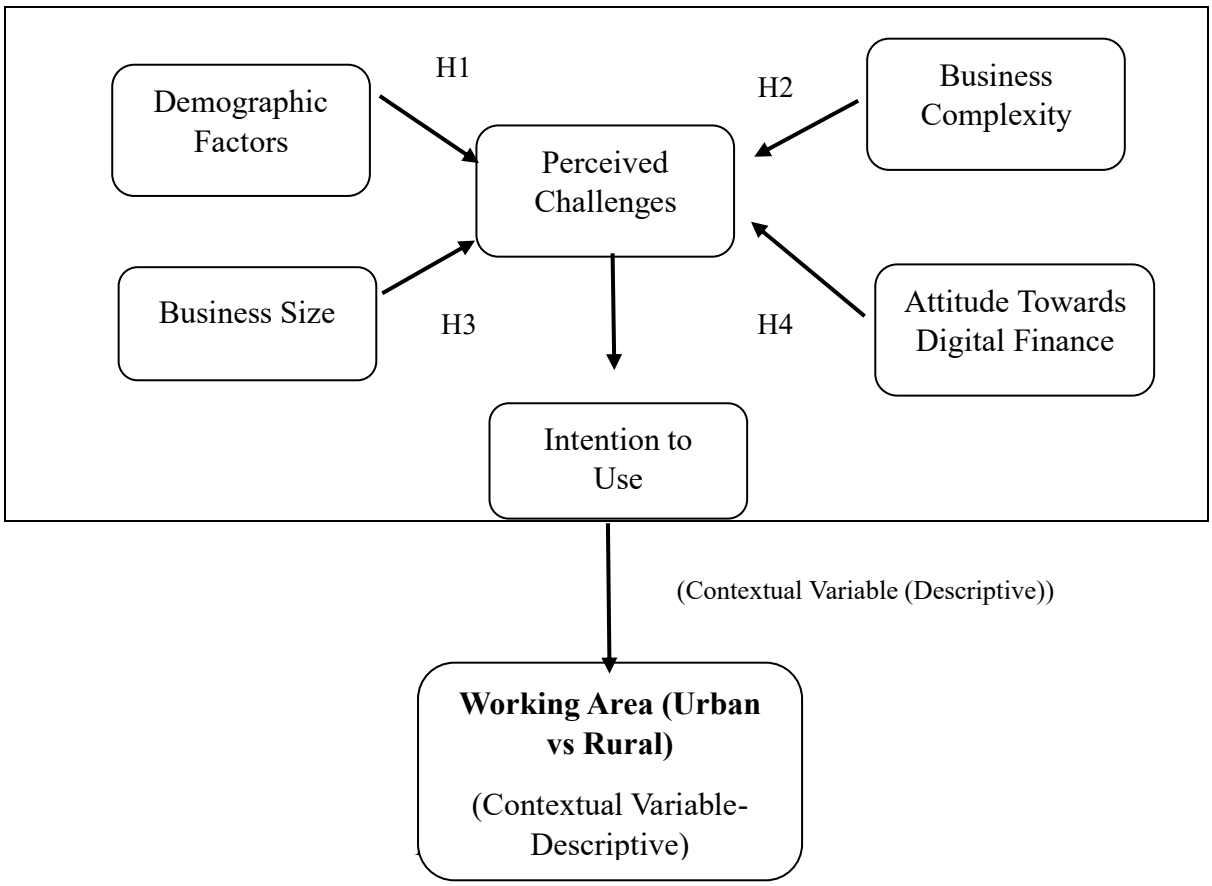
Technology Acceptance Model (TAM) in Digital Finance

The TAM model is widely used to explain how users perceive and adopt new and emerging technologies. It accounts for perceived usefulness and perceived ease of use, leading to attitude formation and intention to use. Past studies have adopted TAM for digital finance adoption, which links attitudes, perceived challenges, and trust to behavioural intention to adopt fintech services among MSMEs (Rahayu et al., 2023; Thathsarani & Jianguo, 2022; Verma & Shome, 2025). In the context of handicraft entrepreneurs, TAM explains how perceived risk, literacy, and operational complexity influence the willingness to adopt digital tools (Ullah et al., 2022).

Research Gap

There are many studies that highlight the importance of digital literacy and barriers to digital finance adoption. There are very few studies that focus on MSMEs, particularly on unorganized artisans, especially Zari-zardozi enterprises. Also, a few studies apply TAM to digital finance adoption in the small, unorganized handicraft industry, and even fewer have analyzed their urban-rural differences in the digital ecosystem. Therefore, this study is necessary to analyse the existing gaps in unorganized MSMEs using the TAM framework and a descriptive understanding of the working area divide.

Conceptual Framework and Model Specification



Hypothesis

H1: The perceived challenges in adopting digital financial solutions among zari-zardozi businesses are influenced by demographic factors.

H2: The perceived challenges in adopting digital financial solutions among zari-zardozi businesses are influenced by the size of the business.

H3: The perceived challenges in adopting digital financial solutions among zari-zardozi businesses are influenced by business complexity.

H4: The perceived challenges in adopting digital financial solutions among zari-zardozi businesses are influenced by

attitudes towards digital finance.

Research Methodology

The study employs a structured methodology to examine the factors influencing the adoption of digital finance among unorganized MSMEs in the Zari-zardozi businesses of Bareilly, Uttar Pradesh. The study incorporates the Technology Acceptance Model (TAM) to investigate how perceived challenges, attitudes, business characteristics, and demographic factors shape the Zari-zardozi owners' intention to use digital financial services. Additionally, the study adopts working area (urban vs rural) as a contextual descriptive variable to identify the gap between adoption patterns of urban and rural areas; however, it is not tested statistically as a moderating factor.

Research Design and Sampling

A cross-sectional survey design was adopted, targeting Zari-zardozi businesses in the urban and rural areas of Bareilly district. For this, data from 110 Zari-zardozi businesses were collected using purposive and convenience sampling, representing the urban and rural embroidery hubs. To examine the differences on the basis of working area, the sample was balanced, taking 55 businesses from the urban area and 55 from the rural area.

Data Collection Procedure

The study incorporates primary data, which was collected using structured questionnaires using a 5-point Likert scale, and helps in capturing data on the following points:

- Demographic characteristics (age, gender, income, education, experience)
- Business characteristics (business size, complexity, year of operations)
- Perceived challenges in the adoption of digital finance
- Attitude towards digital finance
- Intention to use digital financial tools
- Working area (urban or rural) was treated as a contextual descriptive variable and is not included in the basic TAM-based hypothesis model.

Analytical Approach

The study adopts a combination of descriptive and inferential analysis. Descriptive analysis was used to summarize the demographics, digital financial literacy levels, perceived challenges, attitudes, and intention to adopt digital finance. The hypotheses (H1-H4) were framed to test the influence of demographic factors, business size, business complexity, and attitudes on perceived challenges, using significant tests in SPSS. The urban and rural groups were compared using exploratory group-difference tests to examine their contextual differences. These comparisons are descriptive in nature and are not framed as formal hypotheses or moderation effects.

Reliability, Validity, and Robustness of the Study

To ensure the credibility of the findings, several steps were taken to enhance the reliability and validity of the study. The research instrument was designed using established constructs derived from the Technology Acceptance Model (TAM) and prior empirical studies on digital finance adoption among MSMEs. The questionnaire items were framed in simple language and administered through personal interaction to minimize misunderstanding among respondents, particularly those with limited formal education.

Internal consistency of the survey instrument was assessed using reliability measures during the analysis phase. The constructs related to perceived challenges, attitudes toward digital finance, and intention to use demonstrated acceptable consistency levels, indicating that the items used were suitable for capturing the underlying concepts. The use of a five-point Likert scale allowed respondents to express varying degrees of agreement, improving measurement sensitivity while remaining easy to comprehend.

Content validity was ensured by aligning questionnaire items with the study objectives and theoretical framework. The inclusion of demographic and business-related variables helped capture contextual nuances specific to the Zari-zardozi

sector. Construct validity was further supported by the logical consistency between empirical findings and established literature on digital literacy, technology adoption, and MSME behavior.

Although the study relies on cross-sectional data, the balanced sampling of urban and rural enterprises enhances comparative robustness. The use of exploratory group-difference tests for working area provides additional contextual insights while avoiding over-interpretation through formal moderation claims. Overall, the methodological design and analytical approach provide a reliable foundation for interpreting the findings and drawing meaningful conclusions regarding digital finance adoption in unorganized artisanal MSMEs.

Results and Analysis

Table 1**,** highlights the demographic and financial profile of the surveyed Zari-zardozi businesses and noticed that most of them are micro enterprises (95%), signifying that these small-scale businesses operate with minimal resources. The field study done in the Bareilly district showed that the Muslim community highly dominates this sector, and the data collected suggests that socio-cultural norms within the community often limit women's participation in business ownership. This explains the high proportion of male-owned enterprises (70%). The presence of young owners (35%) indicates that their potential openness towards digital platforms; however, their low education levels and economic hardships act as a barrier to the adoption and practical usage of digital tools.

Table 1. Demographic, Workforce, and Financial Overview of Zari-Zardozi MSMEs

Category	Details	Percentage (%)
MSME Distribution	Micro	105 (95%)
	Small	4 (4%)
	Medium	1 (1%)
Gender of Business Owners	Male	70%
	Female	30%
Age Group of Business Owners	18-30 Years	35%
	31-45 Years	30%
	46-60 Years	20%
	Above 60 Years	15%
Education Level of Business Owners	No Formal Education	30%
	High School	40%
	College Graduate	30%
Working Capital Distribution	Less than 1 Lakh	40%
	1-5 Lakhs	35%
	Above 5 Lakhs	25%
Annual Revenue	Less than 5 Lakhs	40%

	5-10 Lakhs	30%
	10-20 Lakhs	20%
	More than 20 Lakhs	10%

Source: Authors created table

The disparities in the usage of digital finance based on age, education, and working capital is highlighted under Table 2. As indicated above, young entrepreneurs (18-30 years) have the potential openness towards digital platforms as they exhibit high awareness (85%), understanding (70%), and usage (50%), while those above 60 demonstrate low literacy levels. Education has a strong connection with literacy levels, as owners with no formal education indicate lower usage (15%), while those with proper education accept technology as an important part of their business, showing high levels of digital literacy. Businesses with more working capital (above 5Lakh) leverage digital technology effectively, indicating their financial capacity supports the adoption of technology by enabling investment in devices, internet access, and training.

Table 2. Demographic Analysis of Digital Financial Literacy

Demographics	Awareness (%)	Understanding (%)	Regular Usage (%)
Age Group			
18-30	85%	70%	50%
31-45	75%	60%	45%
46-60	60%	50%	35%
Above 60	45%	35%	20%
Education Level			
No Formal Education	40%	25%	15%
High School	65%	50%	30%
College Graduate	80%	70%	55%
Working Capital			
Less than 1 lakh	55%	40%	25%
1 – 5 lakhs	70%	60%	40%
More than 5 lakhs	85%	75%	60%

Source: Authors created table

The results of hypothesis testing are shown in Table 3, where H1 examines demographic factors, is supported ($p = 0.073456$), indicating that age, education, and income significantly influence perceived challenges, and younger and more educated individuals face fewer barriers in adoption. While H2 relates business size to perceived challenges, it is not supported ($p=0.240579$), suggesting that the size of business does not shape adoption difficulties alone. Further, H3 tests the effect of business complexity, which is supported ($p=0.092592$), indicating that firms that are more complex in nature face more challenges due to more informational and managerial demand. Finally, H4 assesses the role of attitude, which is not supported ($p=0.404423$). This means that attitudes alone do not lower the perceived barriers; instead, adequate skills and proper infrastructure are really crucial to remove these barriers.

Table 3. Result of Hypothesis Testing

S.No.	Hypothesis	p-value	Significance	Result
H1	The perceived challenges in adopting digital financial solutions among zari-zardozi businesses are influenced by demographic factors.	0.073456	p<0.1	Accept
H2	The perceived challenges in adopting digital financial solutions among zari-zardozi businesses are influenced by the size of business.	0.240579	p<0.1	Reject
H3	The perceived challenges in adopting digital financial solutions among zari-zardozi businesses are influenced by business complexity.	0.092592	p<0.1	Accept
H4	The perceived challenges in adopting digital financial solutions among zari-zardozi businesses are influenced by attitudes towards digital finance.	0.404423	p<0.1	Reject

Source: Authors created table

Table 4, reports the comparative results of factors that affect the adoption of digital finance among urban and rural Zari-zardozi businesses. It shows that Zari-zardozi businesses in urban areas are more digitally literate, face fewer challenges, have a positive attitude, and a stronger intention to adopt digital tools in their day-to-day business activities. In contrast, these businesses in rural areas face greater infrastructural constraints, limited technological exposure, and high levels of apprehension that amount to elevating their perceived challenges. The findings reported here are confirmed by the table p-values, which confirm that these differences are statistically significant, indicating that the working area is crucial contextual factor in shaping the owner's attitude in digital finance adoption.

Table 4. Comparative Analysis of Key Factors by Working Area

Factor	Urban MSMEs (n=55)	Rural MSMEs (n=55)	p-value	Significance	Result
Digital Literacy (%)	High (75%)	Low (40%)	0.005678	p<0.1	Accept
Perceived Challenges	Moderate	High	0.034521	p<0.1	Accept
Attitude (Positive %)	68%	40%	0.045879	p<0.1	Accept
Intention to Use (%)	65%	30%	0.024531	p<0.1	Accept

Source: Authors created table

Rural Zari-zardozi businesses face more barriers than the urban units (Table 5). During the study, people were allowed to elect more than one barrier; hence, the percentages indicate the proportion of respondents within each group who selected a particular barrier, as 65% of rural units (36 out of 55) identified poor internet connectivity as a barrier, compared to 30% of urban units (17 out of 55). Therefore, rural enterprises face a higher number of challenges across all categories. These

patterns further reinforce earlier findings that infrastructure and knowledge-related constraints significantly impact rural readiness to adopt digital financial services.

Table 5. Barriers to Digital Financial Literacy in Zari-Zardozi Enterprises

Challenge / Barrier	Urban Zari-zardozi units (%)	Rural Zari-zardozi units (%)
Lack of Knowledge	45%	55%
Fear of fraud or security issues	35%	45%
Poor internet connectivity	30%	65%
High cost of devices	25%	55%
Lack of Training Resources	40%	70%

Respondents could select multiple barriers; hence, the percentages do not total 100%. Urban=55, Rural=55

Source: Authors created table

Discussion

The study highlights how demographic factors, business characteristics, and regional disparities collectively shape the adoption of digital finance among Zari-zardozi businesses. The demographic results highlight that age and education play an important role among entrepreneurs in understanding and adopting digital tools. Educated and young business owners have more digital literacy and show efficient management using digital platforms, showcasing that digital readiness operates as a capability-driven rather than a resource-driven construct. Business complexity increases the challenges that owners face in the adoption of digital finance, implying that businesses whose operations are of a complex nature need more support and information while adopting these tools smoothly. On the other hand, business size does not have a significant influence, implying that even the small Zari-zardozi units can adopt and easily use digital financial services with proper knowledge and adequate exposure.

Regional disparities emerge as an important dimension. Zari-zardozi businesses in urban areas face lower challenges in transforming to digital finance as compared to their rural counterparts. As in urban areas, they have an advantage in terms of connectivity, training, and day-to-day exposure to digital systems, which enables them to have a positive attitude and higher adoption intention. Compared to rural enterprises, which experience limited infrastructure, higher device cost, and limited opportunities for training. These differences indicate readiness for digital transition, but persistent challenges slow the process. The barriers analysis further supports this, that rural entrepreneurs struggle with poor connectivity, lack of training and knowledge, which makes digital tools feel harder to use and reduces their willingness to try them.

Beyond infrastructural and literacy differences, the working area also shapes exposure to digital markets and income diversification opportunities. Urban Zari-zardozi businesses are more frequently exposed to digital platforms through peer networks, training initiatives, and customer interactions, which increases familiarity with online selling and digital promotion. This exposure allows urban artisans to use digital media alongside digital finance, enabling direct customer engagement, wider market reach, and additional income streams.

In contrast, rural Zari-zardozi entrepreneurs largely remain confined to local markets due to limited exposure to digital platforms and lower confidence in using online tools. Even when digital payment systems are adopted, a lack of awareness regarding digital marketing restricts the broader economic benefits of digital finance. As a result, digital finance in rural areas is often used only for basic transactions rather than as part of an integrated digital business strategy.

These patterns suggest that digital finance adoption alone may not be sufficient to improve livelihoods unless it is supported by broader digital capabilities, particularly access to digital markets. Thus, the working area plays a crucial role not only in adoption readiness but also in determining how effectively digital tools contribute to income generation and long-term business sustainability.

Overall, the findings of the study highlight that digital finance adoption in the Zari-zardozi sector is more dependent on people-related factors such as skills, knowledge, and awareness rather than firm characteristics like size or strength. The study makes it clear that focused efforts are needed to improve both structural and infrastructure barriers, particularly in rural areas where there is a deeper gap between the infrastructure facilities and the digital skills.

Digital Finance as a Gateway to Digital Market Participation

Beyond improving payment efficiency and financial inclusion, digital finance plays a critical role in enabling broader digital participation among Zari-zardozi enterprises. The findings suggest that urban businesses are more likely to integrate digital finance with digital media usage, such as communicating with buyers through messaging applications or promoting products via social platforms. This integration allows artisans to access customers beyond local markets, negotiate prices directly, and receive advance or remote payments.

For many urban entrepreneurs, exposure to digital platforms through peer networks, customer interactions, and training programs facilitates the transition from basic digital payments to more strategic digital engagement. Digital finance acts as a foundational skill that builds confidence in using other digital tools, thereby supporting income diversification and market expansion. This linkage between digital payments and digital market access helps explain why urban units exhibit stronger adoption readiness and intention.

In contrast, rural Zari-zardozi enterprises often remain limited to local or intermediary-based markets despite adopting digital payment systems. While some rural entrepreneurs use digital finance for basic transactions, limited awareness of digital marketing tools and low confidence in online engagement restrict broader economic benefits. As a result, digital finance adoption in rural areas frequently remains transactional rather than transformative.

These findings indicate that digital finance should be understood not only as a financial tool but also as an entry point into the digital economy. Without complementary skills related to digital media and market participation, the full developmental potential of digital finance remains underutilized. This distinction highlights the importance of considering digital finance adoption within a wider digital ecosystem, particularly when assessing livelihood outcomes in traditional artisanal sectors.

Policy Implications

Rethinking Digital Finance Beyond Payments

The findings suggest that digital finance adoption among unorganized MSMEs should not be viewed only as a payment-related intervention. While initiatives promoting UPI and digital payments have improved transactional inclusion, they have limited impact unless supported by broader digital capabilities. Policies must therefore move beyond basic payment adoption and integrate digital finance with skills related to digital communication, customer interaction, and market participation. For artisanal sectors like zari-zardozi, digital finance functions most effectively when embedded within a wider digital ecosystem.

Strengthening Skills and Capacity in Rural Clusters

The study highlights strong human-capital constraints, particularly in rural areas, where low digital literacy and limited exposure restrict adoption. Policy interventions should prioritize localized capacity-building programs that combine digital finance training with practical guidance on using digital media platforms such as social networking sites and messaging applications. Cluster-based training, peer learning, and the development of local digital champions can help artisans gain confidence and reduce dependence on intermediaries. Such targeted efforts are essential to ensure that rural entrepreneurs can meaningfully engage with digital tools.

Addressing Infrastructure and Access Gaps

Persistent regional disparities underline the importance of strengthening digital infrastructure in artisan-dominated rural clusters. Limited internet connectivity, device affordability, and access to support services continue to constrain adoption readiness. Policymakers should focus on last-mile connectivity and integrate infrastructure development with MSME support schemes. Without addressing these structural barriers, digital finance initiatives risk benefiting urban enterprises disproportionately while leaving rural artisans behind.

Role of Financial Institutions and Development Agencies

Financial institutions and fintech providers need to adapt their outreach strategies to the realities of unorganized MSMEs. Simplified platforms, vernacular-language support, and on-ground assistance can help build trust among low-literacy users. Development agencies can further support adoption by linking digital transaction records with access to micro-credit and tailored financial products. Coordinated efforts between policymakers, financial institutions, and local organizations are essential for transforming digital finance into a tool for income generation and long-term sustainability in traditional handicraft sectors.

Limitations and Directions for Future Research

Despite its contributions, the study has certain limitations that should be acknowledged. First, the research is based on cross-sectional data, which captures adoption behavior at a single point in time. As digital finance usage evolves rapidly, longitudinal studies could provide deeper insights into how adoption patterns change with increased exposure and learning over time.

Second, the study focuses on a specific artisanal cluster within Bareilly district, which may limit the generalizability of the findings to other handicraft sectors or regions. Future research could extend this framework to other traditional industries or conduct comparative studies across multiple clusters to strengthen external validity.

Third, while working area is treated as a contextual variable, the study does not formally test moderation effects. Future studies may apply advanced analytical techniques to examine how regional context interacts with individual and business-level factors in shaping adoption behavior. Additionally, qualitative approaches such as in-depth interviews could enrich understanding of trust, risk perception, and cultural influences affecting digital adoption.

Finally, future research could explore the long-term economic impacts of combining digital finance with digital market participation, particularly in terms of income stability, bargaining power, and resilience to market shocks. Such extensions would further strengthen the policy relevance of digital inclusion initiatives for unorganized MSMEs.

Conclusion

The study examined the factors that determine the adoption of digital finance among Zari-zardozi enterprises through an adapted technology acceptance model. The results highlight that demographics and business complexity have a substantial impact on how business owners feel while adopting digital tools. While the size of the business and attitude alone do not impact the adoption unless supported by proper skills, knowledge, and digital infrastructure. The comparison made between urban and rural units shows an apparent disparity in their adoption patterns, as urban enterprises have better connectivity, exposure, and capabilities. In contrast, the rural enterprises face multiple constraints that limit their adoption. Although the paper does not test working area as a moderating variable, descriptive findings show that the location of the Zari-zardozi unit plays an important role in shaping how comfortably businesses engage with digital finance.

The findings suggest steps for policy and practice on how to improve the adoption patterns in unorganized sectors like the Zari-zardozi sector. Efforts should be made to develop proper infrastructure, design localized training programs, and build trust and security awareness among the low-literacy people. These efforts help in reducing capability gaps visible in rural areas and make it easier for traditional businesses to adopt digital financial services. Future research can be directed to look at factors build trust in digital platforms and test specific programs that improve readiness to adopt these systems among unorganized MSMEs.

References

1. Ali, S. (2013). Adoption Of Cloud Computing In Manufacturing Industry Supply Chains, A Hype or a Myth. In *2nd International Conference on Future Generation Communication Technologies, FGCT 2013* (p. 72). https://doi.org/10.1109/FGCT.2013.6767183
2. *CONTRIBUTION OF MSMEs TO THE GDP*. (2024). https://www.pib.gov.in/www.pib.gov.in/Pressreleaseshare.aspx?PRID=2035073
3. *Digital economy report 2021: Cross-border data flows and development : for whom the data flow*. (2021). United Nations.

4. E, V., & Swarupa, G. (2022). Gauging the Impact of Digital Financial Literacy on MSME Firms' Performance in India. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4130167

5. Fauziyah, A., Budiman, A., Sugiharti, H., Sartika, S. H., Khairunnisa, S., & Ruhayati, S. A. (2024). *Digital Financial Literacy and Digital Financial Inclusion: Efforts to Overcome Challenges After the Covid-19 Pandemic and Increase the Independence of Financial Management*. 115–121. https://doi.org/10.2991/978-94-6463-443-3_18

6. Hung, M.-H., Lin, Y.-C., Huang, H.-C., Hsieh, M.-H., Yang, H.-C., & Cheng, F.-T. (2013). Development of an advanced manufacturing cloud for machine tool industry based on AVM technology. *2013 IEEE International Conference on Automation Science and Engineering (CASE)*, 189–194. https://doi.org/10.1109/CoASE.2013.6654048

7. Juneja, P., Singh, B., & Lohani, V. J. (2025). Legacy and Leap: How Digital Tools are Reshaping Zari-Zardozi Businesses. *Emerging Economies Cases Journal*, 25166042251383241. https://doi.org/10.1177/25166042251383241

8. Kamble, S. S., Gunasekaran, A., Ghadge, A., & Raut, R. (2020). A performance measurement system for industry 4.0 enabled smart manufacturing system in SMMEs- A review and empirical investigation. *International Journal of Production Economics*, *229*, 107853. https://doi.org/10.1016/j.ijpe.2020.107853

9. Khanzode, A. G., Sarma, P. R. S., Mangla, S. K., & Yuan, H. (2021). Modeling the Industry 4.0 adoption for sustainable production in Micro, Small & Medium Enterprises. *Journal of Cleaner Production*, *279*, 123489. https://doi.org/10.1016/j.jclepro.2020.123489

10. Kumar, D., Samalia, H. V., Rajiv Gandhi Indian Institute of Management, Verma, P., & Thapar University. (2017). Factors Influencing Cloud Computing Adoption by Small and Medium-Sized Enterprises (SMEs) In India. *Pacific Asia Journal of the Association for Information Systems*, 25–48. https://doi.org/10.17705/1pais.09302

11. Madan, N. (2020). *A review of access to finance by micro, small and medium enterprises and digital financial services in selected Asia-Pacific least developed countries*. https://repository.unescap.org/handle/20.500.12870/1190

12. Mangawing, L. A., Sulianto, T., Sari, A. P., Jafri, L. A. U., & Ramadhan, W. (2023). The Influence of Digital Financial Literacy on MSME Performance in Balikpapan City. *Proceeding of The International Seminar on Business, Economics, Social Science and Technology (ISBEST)*, *3*(1), Article 1. https://doi.org/10.33830/isbest.v3i1.1348

13. Mezzadri, A. (2012). Reflections on Globalisation and Labour Standards in the Indian Garment Industry: Codes of Conduct Versus 'Codes of Practice' Imposed by the Firm. *Global Labour Journal*, *3*(1). https://doi.org/10.15173/glj.v3i1.1112

14. Mittal, K., & Singh, P. (2021). Problems of Life and Livelihood of Zari-Zardozi Workers in Western Uttar-Pradesh. *South Asian Journal of Social Studies and Economics*, 8–19. https://doi.org/10.9734/sajsse/2021/v9i330241

15. Mohapatra, S. (2016). *25. Designing Knowledge Management- Enabled Business Strategies: A top down strategy*.

16. Okello Candiya Bongomin, G., Ntayi, J. M., Munene, J. C., & Malinga, C. A. (2018). Mobile Money and Financial Inclusion in Sub-Saharan Africa: The Moderating Role of Social Networks. *Journal of African Business*, *19*(3), 361–384. https://doi.org/10.1080/15228916.2017.1416214

17. Rahayu, S. K., Budiarti, I., Firdauas, D. W., & Onegina, V. (2023). Digitalization and informal MSME: Digital financial inclusion for MSME development in the formal economy. *Journal of Eastern European and Central Asian Research (JEECAR)*, *10*(1), Article 1. https://doi.org/10.15549/jeecar.v10i1.1056

18. Rampaul, K. (2025). Digital Transformation and SME Growth in Emerging Markets. *Journal of Emerging Markets and Management*, *01*(01).

19. Shaurabh, A., & Khan, A. (2021). *A Study on Integration of Zari-Worker in Contempory/Modern Economic Scenario*. *3*(7).
20. Thathsarani, U. S., & Jianguo, W. (2022). Do Digital Finance and the Technology Acceptance Model Strengthen Financial Inclusion and SME Performance? *Information*, *13*(8), 390. https://doi.org/10.3390/info13080390
21. Ullah, S., Kiani, U. S., Raza, B., & Mustafa, A. (2022). *Frontiers | Consumers' Intention to Adopt m-payment/m-banking: The Role of Their Financial Skills and Digital Literacy*. https://doi.org/10.3389/fpsyg.2022.873708
22. UN.ESCAP. (2022). *MSME access to finance: The role of digital payments*. https://repository.unescap.org/handle/20.500.12870/4557
23. Verma, S., & Shome, S. (2025). *An Empirical Investigation on the Relationship Between Digital Finance Adoption and Financial Inclusion of Micro Businesses in India | Published in Journal of Small Business Strategy*. https://jsbs.scholasticahq.com/article/124474-an-empirical-investigation-on-the-relationship-between-digital-finance-adoption-and-financial-inclusion-of-micro-businesses-in-india