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# "Determinants of Digital Financial Inclusion and its Impact on Micro Enterprises" Ease of doing Business, A Comprehensive Review

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***Keywords*— Digital Financial Inclusion, Micro-Enterprises, Ease of Doing Business, Logistic Regression, World Bank Enterprises Survey, India**

***Abstract*—** *This study investigates the determinants of digital financial inclusion (DFI) and its influence on the ease of doing business for micro-enterprises in India. Utilizing data from the World Bank's Enterprises Survey of Micro Firms (ESM) 2022, encompassing 998 micro-enterprises, this research examines variables related to access and usage of digital finance. Two categories of independent variables—digital resource capability and firms' and owners' characteristics—are analyzed as explanatory factors for DFI. Analysis of variance (ANOVA) is employed to assess disparities in perceived business obstacles between micro-enterprises with and without access to digital finance. Additionally, a logistic regression model is constructed to identify the determinants of DFI. The findings indicate that DFI plays a significant role in mitigating business obstacles related to regulation and market externalizes for micro-enterprises. Moreover, results from both the logistic regression model and marginal effects estimation underscore the importance of factors such as internet access, educational attainment, and owner experience in facilitating DFI among micro-enterprises. This study offers insights valuable to diverse stakeholders including government agencies, entrepreneurship promoters, financial institutions, and international organizations involved in promoting digital financial inclusion. A noteworthy contribution of this study lies in its examination of the determinants of DFI specifically among micro-enterprises in India, leveraging extensive and specific data collected by the World Bank. By shedding light on this under explored area, the study contributes to a deeper understanding of the factors influencing digital financial inclusion in the context of India's micro-enterprise sector.*

## I. INTRODUCTION

In the contemporary global economy, digital financial inclusion (DFI) stands as a crucial instrument for fostering economic empowerment and fostering inclusive growth, particularly for micro-enterprises. Micro-enterprises, often operating in resource-constrained environments, play a significant role in driving economic activity, job creation, and innovation. However, they frequently face numerous challenges, including limited access to formal financial services, which can impede their growth and sustainability.

Against this backdrop, understanding the determinants of digital financial inclusion and its impact on micro-enterprises' ease of doing business is of paramount importance, especially in the context of emerging

economies like India. Digital financial inclusion refers to the provision of low-cost digital access to financial services, aiming to reach economically underserved populations and businesses. It encompasses the utilization of digital platforms, such as mobile banking apps, internet banking, and digital wallets, to facilitate financial transactions and access to credit, savings, insurance, and other financial services.

India, with its vast and diverse micro-enterprise sector, presents a compelling case study for examining the dynamics of digital financial inclusion. The country has witnessed significant strides in digital transformation, spurred by government initiatives and technological advancements. Initiatives like the Unified Payments Interface (UPI) and Aadhaar-linked banking have revolutionized the financial landscape, making digital financial services more accessible and inclusive.

Despite these advancements, challenges persist, particularly concerning the effective integration of micro-enterprises into the digital financial ecosystem. Identifying the determinants that influence digital financial inclusion among micro-enterprises and understanding its impact on their ease of doing business is crucial for devising targeted interventions and policy frameworks to address existing barriers and promote inclusive growth.

This study aims to fill this gap by investigating the determinants of digital financial inclusion among micro-enterprises in India and assessing its impact on their ease of doing business. Drawing upon data from the World Bank's Enterprises Survey of Micro Firms, this research will analyze factors such as access to digital finance, digital resource capability, and firm and owner characteristics. Furthermore, it will explore how digital financial inclusion influences micro-enterprises' ability to overcome business obstacles and enhance their operational efficiency.

By providing empirical evidence and insights into the relationship between digital financial inclusion and micro-enterprises' ease of doing business, this study seeks to inform policymakers, financial institutions, and other stakeholders about the importance of fostering an inclusive digital financial ecosystem. Ultimately, the findings of this research can guide the design and implementation of strategies to promote digital financial inclusion, unlock the potential of micro-enterprises, and drive sustainable economic development in India and beyond.

## II. LITERATURE REVIEW

Access to financing has been linked to business performance, according to a number of earlier studies (Rokhim et al. 2021; Osano and Languitone, 2016). Anthanasius Fomum and Opperman (2023) assert that financial inclusion raises the likelihood that microenterprises will be categorized as emerging and developed businesses. According to Yang and Zhang (2020), the macroeconomy as well as small and micro businesses can benefit from the restructuring of the financial sector and the promotion of digital financial inclusion. According to Yang and Zhang (2020), the macroeconomy as well as small and micro businesses can benefit from the restructuring of the financial sector and the promotion of digital financial inclusion.

According to Singh et al. (2014), digital financial inclusion is thought to be a workable way to alleviate the barriers that the impoverished have in obtaining financial services. They state that the adoption of digital financial inclusion facilitated the flow of capital, encouraged entrepreneurship, and removed barriers encountered by enterprises. The main cause of the scarcity of profitable opportunities is inadequate financial accessibility, or the inability to quickly obtain capital. Most previous studies have examined how DFI affects the degree of income inequality (Neaime and Gaysset, 2018; Zhang et al., 2020). According to Yang et al. (2022), women are empowered by digital financial inclusion because it encourages entrepreneurship among underprivileged women, especially those with lower levels of education or financial independence.

Digital financial inclusion does not increase listed companies' total factor productivity (TFP), according to Chen et al. (2022b). However, digital financial inclusion can significantly increase the productivity of listed companies in large cities with concentrated financial resources. SMEs believe that the biggest barrier to their expansion is getting access to financing (Wang, 2016). In China, digital finance has expanded quickly, promoting inclusive finance but also posing operational, policy, default, and fraud issues (Song and Dong, 2020). With different incentives for businesses with different property rights and geographic locations, digital finance lowers financing constraints and boosts SME innovation (Yao and Yang, 2022).

According to Beck (2013), financial deepening facilitates company entry into the market, encourages entrepreneurship, and lowers funding barriers for SMEs. It also enhances resource allocation. DFI has improved equity and efficiency by expanding financial inclusion, which has positive externalities and benefits the economy and society. It improves the efficiency and accessibility of financial services. Massive amounts of e-commerce data can be leveraged by digital finance institutions to lower the cost of financial transactions, enhance financial inclusion (Frost et al. 2019), and stimulate economic growth and

entrepreneurship (Xie et al. 2018). Oz-Yalaman (2019) came to the conclusion that business regulation and financial inclusion boost tax receipts. According to Bai et al. (2021), MSEs are using digital finance for business transactions like purchasing and paying bills and taxes.

Nonetheless, there is more research done on the subject of how digital financial inclusion affects business accessibility. The literature mentioned above has led to the formulation of the following research hypotheses:
H1: The micro firms with and without access to digital finance perceive the same business obstacles.
H2: The perceived business barriers by microfirms using and not using digital finance are the same.

**Digital financial inclusion and the ability to use digital resources**

Scholarly discussions have focused on the impact of information and communication technologies (ICT) (Aziz and Naima, 2021; Karakara and Osabuohien, 2020; Niebel, 2018; Hong, 2017). According to existing research, ICT, particularly mobile phones and the internet, have become important innovations in the financial sector (Suryono et al. 2020; Pradhan et al. 2017). Diniz et al. (2012) state that the use of ICT has made it easier for banking services to be widely distributed and for banks to operate close to one another. The introduction of information technology into the banking sector has fundamentally changed how financial services are provided to clients around the globe (Chavan, 2013).

Technology innovations like automated teller machines (ATMs), internet banking, mobile banking, digital banking kiosks, and the Unified Payments Interface (UPI) have revolutionized the banking industry, according to Gupta and Arya (2019) and Sarkar (2016). These developments have brought about new mechanisms that have the potential to greatly improve banks' capacity to provide more effective and efficient customer service. The current third technological revolution, which is centered on the internet, is having a major impact on the fairness and efficiency of banking, according to Liu et al. (2020). China has benefited greatly from the internet revolution since it has made it easier for the nation's digital economy and digital finance to flourish.

Over the past ten years, China's digital economy—particularly in the field of digital finance—has grown significantly as a result of the country's adoption of cutting-edge technologies like big data and cloud computing (Yin et al. 2019; Gabor and Brooks, 2017). More than 80 countries offer digital banking services that can be accessed through mobile phones, according to the World Bank (The World Bank, 2020; Chu, 2018). Many people use mobile phones and other digital tools, such as artificial intelligence (AI), which increases the number of people who can access banking services (Salampasis and Mention, 2018). People can obtain financial services at a cost and in a manner that suits them best with digital financial inclusion (Gomber et al. 2017).

Indian citizens' standard of living has increased as a result of the use of digital technologies in financial transactions (Malladi et al. 2021). The research hypothesis on digital resources and financial inclusion is as follows, based on the literature mentioned above:
H3: The digital financial inclusion of microfirms is not considerably impacted by digital resource capability.

**Features of businesses, owners, and digital financial inclusion**

The way a firm responds to financial challenges is likely to depend on its characteristics (Tuffour et al., 2022; Wakaisuka-Isingoma et al., 2016; Yildirim et al., 2013). According to Nguli and Odunga's (2019) empirical research, the size and age of a firm have a positive and negative impact on financial inclusion. Several scholarly investigations have determined that a person's socioeconomic status is a crucial determinant of their ability to obtain financial services (Barcellos and Zamarro, 2021; Kulkarni and Ghosh, 2021; Nandru et al. 2015; Izquierdo and Tuesta, 2015). According to research by Frempong (2009) and Izquierdo and Tuesta (2015), education is a key factor in promoting financial inclusion in businesses. According to Smallbone and Wyer (2000), education enhances exploration, communication, and foresight and inspires entrepreneurs.

According to Miao et al. (2017), seasoned business owners apply their knowledge and skills to help others complete challenging assignments. Dittmar and Duchin (2016) pointed out that seasoned managers make good use of financial resources. The financial affairs of the company are significantly impacted by the experience of the CEO (Matemilola et al. 2018). Experience in business enhances the links between the acquisition of intellectual capital and resources and improves resource acquisition. The effectiveness of financial literacy can also be influenced by individual characteristics, such as the age, education, and experience of managers (Barcellos and Zamarro, 2021; Garg and Singh, 2018). This has important implications for financial inclusion (Goyal and Kumar, 2021; Schuetz and Venkatesh, 2020). One of the main reasons women don't launch or formalize their businesses is a lack of access to capital and information networks (Xheneti et al. 2019).

One of the main reasons women don't launch or formalize their businesses is a lack of access to capital and information networks (Xheneti et al. 2019). According to certain studies (Brixiová and Kangoye, 2016; Demirgüç-Kunt et al., 2013;

and Brush and Cooper, 2012), women have difficulty obtaining loans from outside sources. The literature reviewed above has led to the formulation of the following research hypothesis:

H4: The digital financial inclusion of micro firms is not significantly impacted by the characteristics of the firms or the owners.

## III. RESEARCH METHODOLOGY

**Source of data and survey instrument**

The World Bank's Enterprises Survey of Micro Firms (ESM) 2022 served as the study's foundation. Between December 2021 and March 2022, data was gathered. Nielsen (India) Pvt. Ltd. conducted a survey on behalf of the World Bank to examine the microenterprise business environment and demographics. In accordance with the Factory Act and the Shop and Establishment Act, information was gathered from businesses with fewer than five employees who were registered with a government agency. The universe table of micro-enterprises was derived from the sixth economic census of India. The Enterprises Survey of Micro Firms (ESM) 2022 covers the following major sectors: manufacturing, construction, retail and wholesale trade, transportation and storage, lodging, and food services. Data from the survey were gathered through stratified random sampling, with 998 micro-enterprises participating in the survey. Two steps were involved in the data collection process. First, to establish eligibility and arrange interviews, phone calls were placed to the micro-enterprises. The owners, managers, and directors of the companies were then interviewed in person. See the Enterprise Survey, Micro, India 2022 implementation report (ESM, 2022) for more details. A structured questionnaire has been used for data collection. The questionnaire covers a wide range of factors related to the firm's business operations, perceived business barriers, and demographic profile.

The regression model contains two sets of explanatory variables: firms' and owners' characteristics and digital resource capability. The characteristics of firms and owners have been gathered in relation to the age of the firm, the owner's gender, the size of the household, and the level of education. The ability to access the internet and use computers or tablets is considered a capability of digital resources. Table 1 provides a thorough explanation of the variables, measurement scales, and descriptive statistics.

*Table 1*

| **Variables** | **Definition** | **Measurement scale** | ***N*** | **Min** | **Max** | **Mean** | **S.D** |
|---|---|---|---|---|---|---|---|
| Access to digital financial system | Uses Digital Payments | Yes = 1, No = 0 | 934 | 0 | 1 | 0.66 | 0.48 |
| Usage of digital financial system | Uses Digital Payments To Pay Utiility Bills | Yes = 1, No = 0 | 614 | 0 | 1 | 0.85 | 0.36 |
| Explanatory Variables | | | | | | | |
| Computers or Tablet | Establishment Presently Uses: Computers or Tablet | Yes = 1, No = 0 | 935 | 0 | 1 | 0.43 | 0.50 |
| Internet | Establishment Presently Uses: Internet | Yes = 1, No = 0 | 936 | 0 | 1 | 0.75 | 0.43 |
| Firms Age | Age of the firms | Years in numbers | 898 | 2 | 68 | 14.11 | 9.66 |
| Gender of the owner | Amongst The Owners of The Firm, Are | Yes = 1, No = 0 | 934 | 0 | 1 | 0.09 | 0.28 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | There Any Females? | | | | | | |
| Education level of Owner | Owner Highest Level of Completed Education | | | | | | |
| Primary school or less | Primary school or less | | 922 | 0 | 1 | 0.18 | 0.38 |
| Secondary | Secondary | Yes = 1, otherwise = 0 | 922 | 0 | 1 | 0.33 | 0.47 |
| Diploma | Diploma | Yes = 1, otherwise = 0 | 922 | 0 | 1 | 0.34 | 0.48 |
| Bachelors or above | Bachelors or above | Yes = 1, otherwise = 0 | 922 | 0 | 1 | 0.14 | 0.35 |
| Households Size | Num. of Household Members of The Owner | Number | 864 | 0 | 32 | 4.91 | 1.92 |
| Managers Experience | How Many Years of Experience Working In This Sector Does The Top Manager Have? | Years in numbers | 896 | 1 | 50 | 12.34 | 9.23 |

**Analytical Approach**

SPSS 22 has been used to digitize the ESM 2022 data. The data have been analyzed using basic statistical methods like logistic regression, chi-square testing, and descriptive statistics. To comprehend the nature of the variables extracted for the study, descriptive statistics are utilized. The difference between perceived business barriers by microenterprises with and without access to digital finance, as well as between users and non-users of digital finance, has been measured using analysis of variance (ANOVA). To investigate the factors influencing microenterprises' adoption of digital finance, a binary logistic regression model has been employed. Since the dependent variables are measured on a binary scale, a binary logistic regression model has been applied. Two dependent variables were used in this study: (1) the use of digital payments to gauge how accessible digital finance is. (2) Due to the apparent benefits of digital finance, utilizes digital payments to settle utility bills. where 0 denotes the absence of digital financial inclusion and 1 denotes digital financial inclusion.

## IV. RESULTS AND DISCUSSIONS

**Profile of sample micro enterprises**

Of the total number of micro-enterprises, 66% have reported having access to digital financial systems; of the 998 enterprises, only 614 have reported using these systems, and 85% of micro-enterprises make payments via digital platforms. Seventy-five percent of micro enterprises have internet access, and forty-three percent of micro firms own computers or tablets. Firms have an average age of 14.11 years. Most of the companies are led by men. A diploma and a bachelor's degree or above are held by 14% and 34% of the owners, respectively. Managers in microenterprises have an average of 12.34 percent experience.

**Digital financial inclusion and perceived business obstacles**

The business environment in any economy is reflected by a number of factors, including market externalities, resource accessibility, and business regulation (Singh et al. 2023b; Khan et al. 2023; Boateng and Poku, 2019; Njiraini et al. 2018; and Ali, 2016). The ease of doing business by micro-enterprises has been measured in the current study using

perceived business obstacles related to access to resources (land, electricity, and other resources for the establishment's operations), market externalities (competitors' informal sector practices, corruption, theft, and disorder), and business regulation (tax rates, tax administrations, business licensing and permits, and labor regulations). The study examined the perceived barriers to business for microenterprises that have access to digital finance and those that do not. The difference in perceived business barriers with and without access to and use of digital finance has been measured using analysis of variance. Table 2 presents the findings. The results of the analysis of variance show that microenterprises with and without access to digital finance differ significantly in the way taxes are administered (F = 4.349, P = 0.037). The means indicate that the administration of taxes is a comparatively larger barrier for businesses without access to digital financing. Similarly, when it comes to business licenses and permits as a barrier, F-statistics show a difference between micro-enterprises with and without access to digital finance (F = 13.153, P = 0.000). Small businesses using digital finance reported fewer difficulties obtaining business licenses and permits. It suggests that obtaining business licenses and permits is facilitated by digital financial inclusion. It might be because, in comparison to other ways, paying fees online is now simpler. An analysis of variance (ANOVA) reveals that businesses with digital finance access perceive a significant reduction in labor regulation barriers (F = 10.303, P = 0.001). The analysis of variance reveals an intriguing result regarding the practice of competitors as an obstacle: micro-enterprises that have access to digital finance perceived it as a significantly greater obstacle (F = 4.393, P = 0.036) in comparison to firms that do not have access to digital finance. The F-test indicates a significant difference in perceptions of crime, theft, and disorder between firms with and without access to digital finance (F = 16.368, P = 0.000). This suggests that microenterprises with access to digital finance see significantly fewer obstacles in relation to crime, theft, and disorder than do firms without such access. By lowering the danger of carrying cash, digital finance lowers the possibility of money-related crimes. One significant finding that has been documented is that the accessibility of digital finance is impeded by land access. Microbusinesses with digital finance access see a lot more barriers to land access (F = 3.056, P = 0.081). As a result, part of hypothesis H1 is rejected. When compared to micro enterprises without access to digital finance, those with access to it reported facing fewer business challenges. Ease of doing business has also been investigated among and without users of digital finance. Analysis of variance conducted under business regulations reveals that there are significantly fewer barriers for micro users of digital finance when it comes to tax rate (F = 3.091, P = 0.079), tax administration (F = 4.902, P = 0.027), and business licensing and permits (F = 11.573, P = 0.001). Additionally, there are no issues with tax administration. Since the entire tax system is now online, microbusinesses that use digital finance ANOVA does not show statistically significant differences between digital finance users and non-users under the market externalities category. Digital finance users perceived significantly more barriers to land access for business purposes when it came to resource groups. The above result indicates a partial rejection of hypothesis H2.

*Table 2*

| | **Access to digital finance** | | | | **Usage of digital finance** | | | |
|---|---|---|---|---|---|---|---|---|
| | **Yes** | **No** | ***F*** | **Sig.** | **Yes** | **No** | ***F*** | **Sig.** |
| **Access to resources** | | | | | | | | |
| Access to land | 2.04 | 1.91 | 3.056*** | 0.081 | 2.07 | 1.85 | 3.023*** | 0.083 |
| Access to electricity | 2.05 | 2.06 | 0.025 | 0.876 | 2.02 | 2.2 | 2.661 | 0.103 |
| **Business regulation** | | | | | | | | |
| Tax rates | 2.3 | 2.24 | 0.451 | 0.502 | 2.26 | 2.51 | 3.091*** | 0.079 |
| Tax administrations | 1.99 | 2.16 | 4.349** | 0.037 | 1.95 | 2.24 | 4.902** | 0.027 |
| Business licensing and permits | 1.92 | 2.19 | 13.153* | 0.000 | 1.86 | 2.27 | 11.573* | 0.001 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Labor regulations | 1.8 | 2.02 | 10.303* | 0.001 | 1.79 | 1.84 | 0.231 | 0.631 |
| **Market externalities** | | | | | | | | |
| Practices of Competitors | 2.21 | 2.06 | 4.393** | 0.036 | 2.21 | 2.21 | 0.001 | 0.979 |
| Corruption | 2.09 | 2.17 | 0.952 | 0.329 | 2.09 | 2.09 | 0.003 | 0.957 |
| Crime, theft and disorder | 1.75 | 2.03 | 16.368* | 0.000 | 1.73 | 1.87 | 1.696 | 0.193 |

**Factors influencing digital financial inclusion in Indian microbusinesses**

A logistic regression model and the marginal effect, which was determined using Stata software, have been used to calculate the factors that influence digital financial inclusion in terms of access and utilization. Table 3 provides estimates for the pseudo-R square, level of log-likelihood, marginal effect, regression coefficient, and significant level. As dependent variables, two aspects of digital financial inclusion—access to and usage of digital finance—have been identified. As a result, two regression models have been created to determine the factors that influence microenterprises' adoption of digital finance. Digital financial inclusion has been the subject of numerous studies conducted under various conditions (Lu et al., 2022; Tay et al., 2022; Yang and Zhang, 2020). Logistic regression estimates indicate that six variables—computers or tablets, internet, age of the firm, owner gender, owner education level, and household size—significantly influence access to digital finance out of a total of seven explanatory variables. Access to computers is less likely to affect access to digital finance, according to an unexpected finding indicated by the regression coefficient of computers or tablets, which is negative and significant ($\beta = -0.404$, $P = 0.029$). This could be because smartphones are typically used to access digital banking. Access to digital finance is positively and significantly impacted by the estimated regression coefficient of internet accessibility ($\beta = -1.539$, $P = 0.000$); this effect may be attributed to the requirement for digital resource capability in order to access the digital finance interface. It is not feasible to use and complete the digital payment process without internet access. As a result, part of the hypothesis H3 is rejected. It can be observed from the results that older firms are more likely to adopt digital financial inclusion, with a positive regression coefficient and marginal effects of a firm's age on access to digital finance ($\beta = 0.032$, $P = 0.004$). It might be because more established businesses have better infrastructure and resource capacities to manage the digital platform.

Gender significantly influences access to digital finance, according to the estimated regression coefficient ($\beta = -0.756$, $P = 0.066$); the value of marginal effects indicates that female-headed micro-enterprises are 14.8 percent more likely to access digital finance than male-headed micro-enterprises. Regarding the education categories, the results of the logistic regression analysis showed that education has a positive and significant impact on digital financial inclusion for both secondary education ($\beta = -0.551$, $P = 0.026$) and bachelor's degree or above ($\beta = -0.916$, $P = 0.005$). This indicates that micro-entrepreneurs' access to digital financial services is significantly influenced by their level of education. It might be as a result of education's ability to empower people and inform them of current developments. Thus, more access to digital finance is revealed by educated micro-entrepreneurs. Even though using or making payments online has gotten too easy, less educated people still don't trust digital transactions. Micro-entrepreneurs' access to digital finance was significantly and inversely impacted by the size of their household ($\beta = -0.129$, $P = 0.008$). According to the model summary, the regression model fits the data fairly well. The regression model's explanatory variables collectively and individually significantly explain the determinants of digital financial inclusion, as indicated by the chi-square value of 93.540. A good fit for a regression model is indicated by the negative value and the high log-likelihood value (−473.306).

## V. CONCLUSIONS

The study delves into the determinants of digital financial inclusion (DFI) among micro-enterprises in India and its impact on ease of doing business, leveraging the comprehensive dataset from the World Bank's Enterprises Survey of Micro-Firms. Through analysis of variance, it is revealed that micro-enterprises equipped with digital finance experience fewer business obstacles compared to those without such access. Logistic regression analysis further elucidates that factors such as internet accessibility, firm age, owner gender and education level, and household

size significantly influence DFI. These findings underscore the importance of digital resource capability, owner characteristics, and internet accessibility in driving digital financial inclusion among micro-enterprises.

The study holds theoretical and managerial implications for various stakeholders, including promoters of micro-entrepreneurship, the banking industry, industrial economists, and the government. It emphasizes the necessity of encouraging micro-enterprises to adopt digital financial inclusion to overcome business barriers. Recommendations include promoting the benefits of digital finance through live demonstrations, implementing comprehensive policies for digital financial inclusion, and providing subsidized digital resources to micro-enterprises. Furthermore, the study underscores the importance of financial literacy programs, affordable digital financial services, regulatory measures, and integration with supply chains to enhance accessibility and transparency for micro-enterprises.

While the study offers valuable insights, it acknowledges limitations inherent in secondary data analysis and suggests avenues for future research. Future studies could incorporate theoretical models, utilize appropriate indicators, and explore behavioral aspects of micro-enterprise owners to enrich understanding of DFI determinants. Additionally, integrating in-depth interviews to explore characteristic variables of respondents could further enhance the comprehensiveness of research models. Overall, the study provides critical insights for creating an enabling environment for digital financial inclusion among micro-enterprises in India and beyond.

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