

Technology Acceptance and Smartphone Usage among Women Entrepreneurs in the MSME Sector

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ABSTRACT

As women's empowerment rises in India's micro, small, and medium enterprise (MSME) sector, smartphones have emerged as a gateway to accessible, cost-effective, and flexible business operations, serving as a significant tool for women to leverage enterprise growth in the digital world. The study explored smartphone usage among women entrepreneurs based in Guwahati, the cultural and commercial hub of Northeast India, including its features, social media platforms, business tools, and communication and marketing. Using the Technology Acceptance Model (TAM), the study adopted a descriptive research design and selected a sample of 250 MSME women entrepreneurs through purposive sampling. Primary data were collected using structured questionnaires. With universal smartphone use in business, the findings highlighted that a large majority of women entrepreneurs used features such as voice calls, messages, the camera, and the gallery. Social media platforms such as WhatsApp, Facebook, and Instagram were used by the vast majority of the women, with notable familiarity with WhatsApp Business and Facebook Marketplace. Regarding online payment apps, Google Pay was most preferred among the women. The easy-to-use interface of such platforms contributed to their widespread adoption. In contrast, a very large majority of the women were unaware of business tools such as Evernote, Square Register, Asana, and Wave due to limited training and low digital skills. The extent of smartphone usage was moderate for advertising via calls and messages and promotional infographics and relatively low for email management and video calls. Demographic factors such as age, education, and business types influenced core constructs of TAM-perceived usefulness (PU) and perceived ease of use (PEOU). Women entrepreneurs from younger age groups and higher-education categories showed significant smartphone engagement in entrepreneurial activities. Barriers to smartphone use included physical discomfort; limitations in device features such as small screens; and security concerns, although smartphone use remained highly significant for basic operations such as communication, digital marketing, and online payments. Overall findings of the study emphasized the need to build skills and confidence in using advanced smartphone features, highlighting gaps and opportunities in digital competency among women entrepreneurs. It advocated for targeted toolkits to empower them and prepare them to become skilled digital navigators.

Keywords: Women entrepreneurs, Smartphone usage, Business tools, Digital competency, MSME, Digital entrepreneurship, Assam

INTRODUCTION

The proliferation of smartphone technology has redefined the business landscape across the globe. Information and Communication Technology (ICT), especially smartphones, has become an increasingly significant tool in entrepreneurship, particularly among

women entrepreneurs. In developing countries like India, the digital divide and digital exclusion mean that women have less access to ICTs and digital opportunities, limiting their ability to benefit from ICT (Bose, 2019). However, ICT has helped women solve women-centric problems, specifically time constraints, as women struggle to balance home responsibilities and professional work. The onset

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of the pandemic has made this more difficult, with additional responsibilities such as homeschooling their children and caring for the elderly. The pandemic posed an unexpected challenge for micro, small, and medium enterprises worldwide, prompting businesses to adopt or enhance their internet usage strategies to navigate economic decline (Kusumawardhani *et al.*, 2022).

The COVID-19 pandemic caused unprecedented global disruption, profoundly affecting individuals' lives and livelihoods across economies worldwide. Virtually all major economies were affected, compelling nations, including India, to contend with economic recessions, job losses, and rising healthcare costs. Nevertheless, India has shown remarkable resilience and now ranks among the world's fastest-recovering economies. According to the Economic Survey 2021–2022, the pandemic had negative effects on most economic sectors. In response, the Indian government implemented a series of carefully crafted policies to protect the lives and livelihoods of the most vulnerable populations and small enterprises, including those in the Micro, Small, and Medium Enterprise (MSME) sector. India presently maintains the third-largest startup ecosystem globally, encompassing over 60,000 startups, surpassed only by the United States and China. Notably, 42 unicorns emerged in India during 2021 alone.

Women in Entrepreneurship

The North Eastern Region (NER) has the highest share of women entrepreneurs engaged in income-generating activities. In the first quarter of 2022, 7,880 microenterprises owned by women from the NER were registered with the Ministry of MSMEs, and handicrafts and handloom weaving were the primary employment sectors for female entrepreneurs. Across the NER, women make up 84 per cent of the 18,509 registered weavers and artisans. Comprising Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura, the NER had 1.64 million MSMEs in the mid-2000s, with an additional 138,000 established since 2020. The informal manufacturing sector, dominated by MSMEs, contributes the most to industrial output in the NER, accounting for 62 per cent of the total (Karma, 2024).

Assam has emerged as a prime in entrepreneurial development within the northeastern region, endowed with abundant natural and human resources. Proper and sufficient utilisation of these assets could significantly

accelerate the state's progress. Over recent years, the government has increasingly focused on the region, enabling entrepreneurs to capitalise on these opportunities. However, Assam's start-up ecosystem continues to encounter various challenges. Rather than embracing risks and venturing into innovative business fields, which they perceive as undignified and fear societal judgment, individuals often prefer secure administrative roles that garner social respect. There is a pressing need for awareness initiatives, governmental support, and showcases of successful entrepreneurial ventures to motivate young people, equip them with essential skills, and foster a stronger business culture through dedicated time and effort (Goswami and Dutta 2023).

According to the NSS 73rd Round, 2016-17, Assam has 12.10 lakhs micro enterprises, followed by 0.04 small enterprises. In terms of MSME ownership by gender, India has a total of 1,23,90,523 enterprises owned by women, which is lower than the number of male-owned enterprises, at 4,84,50,722. Assam has 11,28,411 enterprises owned by men and 66,665 enterprises owned by women, as per the NSS 73rd Round, 2016-17 report.

Smartphone Proliferation in Women Entrepreneurship

According to the Comprehensive Modular Survey: Telecom, 2025, published by the Ministry of Statistics and Programme Implementation, Government of India, approximately 79.2 per cent of males and 75.6 per cent of females aged 15 years and above in rural areas own a smartphone among those possessing a mobile phone. In urban settings, these figures stand at around 89.4 per cent for males and 86.2 per cent for females in the same age category. Women in India are 40 per cent less likely to possess a smartphone compared to men. Although women's access to mobile phones increased to 54 per cent in 2024, merely 33 per cent of female smartphone owners have utilised the internet (Reserve Bank Innovation Hub, 2024). The third edition of PyNearby's MSME Digital Index 2025 indicates that 71 per cent of MSMEs rely on smartphones as their primary device for handling routine tasks, establishing them as the go-to tool for business operations. This rate climbs to 84 per cent among female entrepreneurs in rural India, reflecting growing digital proficiency and a preference for mobile-centric business approaches. UPI emerges as the leading transaction method, adopted by 48 per cent of enterprises, followed closely by Aadhaar-enabled banking at 39 per

cent, which is favoured by 42 per cent of women-led businesses for its simplicity and secure biometric authentication (Kumar *et al.*, 2025).

Theoretical Framework: Technology Acceptance Model (TAM)

The current research is based on the Technology Acceptance Model (TAM), introduced by Fred Davis in 1989, which stands as one of the most extensively utilized theoretical models for explaining technology adoption and usage patterns. TAM asserts that acceptance of technology is mainly driven by two central cognitive elements: Perceived Usefulness (PU), described as “the extent to which an individual believes that employing a specific system would improve their work performance,” and Perceived Ease of Use (PEOU), defined as “the extent to which an individual believes that employing a specific system would require minimal effort”. These elements form users’ attitudes toward the technology, which in turn affect their behavioural intentions and eventual system utilisation. The model illustrates that technologies viewed as valuable for meeting business objectives and straightforward to use are more readily adopted and incorporated into routine practices (Davis, 1989). Guided by the TAM framework, the study designed questionnaire items to explore multiple aspects of smartphone usage among women entrepreneurs, such as usage patterns of features, awareness and implementation of business apps, enhancement of technical abilities, and recognised advantages and drawbacks. By aligning the survey tool with TAM’s fundamental concepts, the research provides detailed insights into how women entrepreneurs perceive and interact with smartphone technologies in their business activities. This theoretical basis guarantees that the research methodically examines elements impacting digital proficiency and technology adoption, establishing a solid groundwork for comprehending obstacles and facilitators to smartphone-supported entrepreneurship for women in the MSME field.

Objectives of the study

1. To examine the smartphone usage pattern based on its features and applications, and technical proficiency, among women entrepreneurs of Guwahati, Assam.
2. To study the perceived benefits and challenges of smartphone usage in business among the

women entrepreneurs.

3. To study the influence of demographic factors and technical proficiency of the women entrepreneurs over their smartphone usage.

Review of literature

The integration of smartphones into entrepreneurial activities has been increasingly recognised as a catalyst for women’s economic empowerment, particularly in developing regions, where Information and Communication Technology (ICT), including smartphones, addresses time constraints for women entrepreneurs in India by enabling flexible business operations amidst household responsibilities, though digital divides persist, limiting access and benefits for many (Bose, 2019). Complementing this, the pandemic’s impact on Micro, Small, and Medium Enterprises (MSMEs) revealed that enhanced internet and smartphone strategies helped mitigate economic declines, with women-led businesses in Indonesia showing resilience through digital adaptation, a pattern potentially applicable to Indian contexts (Kusumawardhani *et al.*, 2022). In the Northeast Region (NER) of India, women dominate MSME sectors like handicrafts and handlooms, comprising 84% of registered weavers, underscoring the potential for smartphone-mediated growth in areas with high female entrepreneurial participation (Karma, 2024), while Assam’s entrepreneurial landscape emphasizes government support and awareness campaigns to overcome societal barriers, where women own significantly fewer enterprises than men (66,665 vs. 1,128,411 as per NSS 73rd Round, 2016-17), yet show promise in sectors like handlooms and food processing (Goswami and Dutta, 2023). Building on theoretical foundations, the Technology Acceptance Model (TAM) provides a framework for understanding smartphone adoption, positing that perceived usefulness (PU) and perceived ease of use (PEOU) drive technology integration, which is evident in studies of women entrepreneurs’ digital behaviors (Davis, 1989). For instance, smartphone usage among Nigerian women entrepreneurs shows high reliance on basic features like calls and social media for marketing, but low awareness of advanced tools, mirroring challenges in digital competency (Etebu and Otiri, 2020). Additionally, 71% of MSMEs use smartphones for daily operations, rising to 84% among rural female entrepreneurs, with UPI as a preferred transaction method, indicating growing digital confidence (Kumar *et al.*, 2025). Further research

underscores barriers and opportunities, as women in India are 40% less likely to own smartphones than men, yet post-2024 access has risen to 54%, suggesting targeted interventions could enhance competency (Reserve Bank Innovation Hub, 2024). Smartphone training improves women's business promotion via social media, leading to increased sales and empowerment in Pakistan (Ashfaq and Farhan, 2025), while rural women entrepreneurs' adoption of mobile apps in India reveals that platforms like WhatsApp and Facebook Marketplace boost market reach, though education levels significantly influence proficiency (Chatterjee *et al.*, 2020). In Assam-specific contexts, over 92% of weaver households are women-led, with digital tools like online platforms expanding sales beyond local markets (Fourth All India Handloom Census, 2019-20), and India's resilient response to COVID-19 supported MSMEs through policies promoting digital tools, resulting in 60,000+ startups, including women-led ventures leveraging smartphones for flexible operations (Economic Survey, 2021-2022).

METHODOLOGY

The present study primarily aimed at understanding the usage of smartphone technology by women entrepreneurs in their entrepreneurial activities. A quantitative research approach was utilised to obtain precise and objective information. A sample of 250 women entrepreneurs from micro and small enterprises based in Guwahati city, Assam, was selected for the study using purposive and convenience sampling techniques. Data were collected using structured questionnaires and were analysed using the survey method. The collected data were then analysed using statistical measures, *i.e.*, frequency-percentage, mean, Kruskal-Wallis Chi-square test, and Mann-Whitney tests.

Ethical considerations

Prior permission from the institutional ethics committee was obtained to conduct the research. Regarding data collection, ethical norms were upheld by obtaining participants' consent, ensuring the anonymity and confidentiality of their identities and the data they provided.

RESULTS AND DISCUSSION

Table 1 shows the demographic profile of the women entrepreneurs, where almost an equal percentage

of women belonged to the age group of younger adults (42.4%), and adults (41.6%), followed by less than twenty per cent (16%) of them belonged to the older adults age group. Nearly sixty per cent (56%) of the women had an education level below graduation, and just over forty per cent (44%) were graduates and above. Regarding marital status, nearly eighty per cent (78%) of them were married, and a little more than twenty per cent (21%) were unmarried. In terms of monthly family income, a similar percentage of women entrepreneurs reported belonging to the high- and low-income categories. A little more than fifty per cent (51%) of the women had high monthly family income, and almost fifty per cent (49%) had low monthly family income.

Table 1: Demographic Data (n=250)		
Characteristics	Basis	Percentage
Age group	Younger adults	42.4
	Adults	41.6
	Older adults	16
Education	Below graduate	56
	Graduate and above	44
Marital Status	Married	78
	Unmarried	21
	Separated	0.4
Monthly Family Income	High Income	51
	Low Income	49

Table 2 shows information on businesses owned by women entrepreneurs, with a large majority (93%) owning a single enterprise. By business sector, the manufacturing sector was dominant (44%), followed by the service sector (33%) and the trade sector (23%). A significant majority of the women entrepreneurs owned micro enterprises (97%), and a very small percentage owned small enterprises (3%).

Table 2 : Percentage distribution of Respondents According to Their Business Profile (n=250)		
Characteristics	Categories	Percentage
Number of Enterprises	One	93
	More than one	7
Sector of Business	Manufacturing	44
	Service	33
	Trade	23
Type of Enterprise	Micro	97
	Small	3

Table 3 shows the usage patterns of smartphone functions and features among women entrepreneurs. A large majority (91%) of women frequently used the basic

functions of a smartphone, *i.e.*, calls and messages. Similarly, the use of social media platforms among women was observed at a higher rate (88%). WhatsApp, Facebook, and Instagram were used frequently for their business, with WhatsApp being used the most. About eighty per cent (79%) of the women used digital payment apps to a greater extent, where Google Pay was mostly preferred and used for financial transactions. Regarding email management, the features were used by little more than thirty per cent (31%) frequently on their smartphones, about thirty per cent (28%) occasionally, and more than forty per cent (41%) seldom for business purposes. Surprisingly, the majority of the women entrepreneurs (81%) have rarely used business-related apps on their smartphones. A very minimal percentage of women (8%) have utilised business apps for their business operations.

Table 3 : Percentage Distribution of Respondents According to the Features and Functions of Smartphone Used (n=250)

Features/Functions	Frequent Use (%)	Occasional (%)	Seldom/Never (%)
Calls and Messages	91	9	0
Social Media Platforms	88	11	1
Digital Payments	79	18	3
Email Management	31	28	41
Business Apps	8	11	81

Table 4 shows the awareness level of various significant business-related apps among the women entrepreneurs. The findings reported that a very high majority of women were aware of WhatsApp Business (96%) and Facebook Marketplace (93%). An equal

Table 4 : Percentage Distribution of Respondents According to their Awareness Regarding Business-related Apps (n=250)

Business-related apps	Aware (%)	Unaware (%)
WhatsApp Business	96	4.0
Facebook marketplace	93	6.4
Google Workspace	50	20
Evernote	4	98.4
Asana	6	97.6
Zoho CRM	3.2	96.8
Canva	7.2	92.8
Vyapar	10.4	89.6
Khatabook	19.6	80.6
IndiaMART	22.8	77.2

percentage of women were both aware and unaware of Google Workspace. Regarding business apps, a high majority of the women were not aware of Zoho CRM (96.8%) and Canva (92.8%). Furthermore, the majority of them were also unaware of Vyapar (89.6%), Khatabook (80.6%), and IndiaMART (77.2%).

Regarding proficiency in technical skills among women entrepreneurs, Fig. 1 provides a clear picture of the various smartphone-related technical skills possessed by the women. A majority of the women (83%) reported being comfortable in making and receiving calls on their smartphones. A little more than forty per cent of them (44%) were able to download required apps from the Play Store. A little more than thirty per cent of the women (32%) were able to capture quality photos and videos, meant for promotion of their businesses. A little more than one-fourth (27%) of the women were able to work with the email management system. Nearly equal percentages of women entrepreneurs are proficient in using cloud storage (19%) and document editing (21%) on their smartphones.

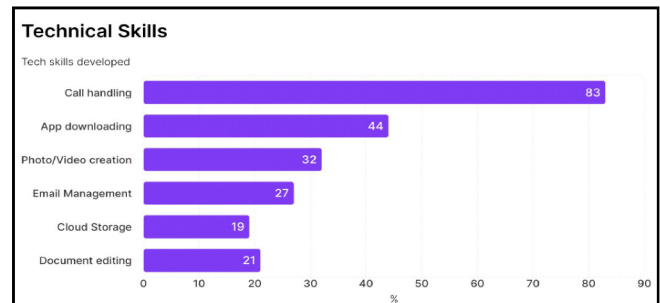


Fig. 1 : Percentage Distribution of Respondents According to the Technical Skills Developed

Table 5 shows several perceived benefits of smartphone usage in business reported by the women entrepreneurs. The intensity indices ranged from 4.2 to 4.0. The women agreed that using smartphones to maintain client communication at any time is an advantage (4.2); smartphones also help boost business promotion via social media platforms (4.1), thereby reaching new markets and fostering business growth. The women further agreed that smartphones are advantageous for seamless digital transactions (4.1), enabling efficient financial activities for small businesses. The women also reported that smartphones help them perform business functions flexibly (4.0), regardless of time or place. Although very few women were proficient in creating photos and videos (Fig. 1), regarding the perceived

benefits of smartphones, the majority of women reported that smartphones allow them to capture appealing photos and videos (4.0) and to share directly from their smartphones, contributing to the effective marketing of their businesses in competitive environments.

Table 5: intensity Indices of Respondents According to Perceived Benefits of Smartphone Usage in Business (n=250)

Benefit Statement	Intensity Index
Enables client communication anytime	4.2
Social media boosts business promotion	4.1
Facilitates smooth digital payment	4.1
Offers flexible business operations	4.0
Helps to create appealing photos/videos	4.0

Table 6 shows the challenges and limitations perceived in smartphone usage by the women entrepreneurs. The intensity indices ranged from 4.1 to 3.6. Most of the women found it difficult to work on small screens (4.1), especially while working with documents, bills and receipts. Working with smartphones for prolonged periods may cause physical discomfort (4.0), such as eye strain, neck pain, or repetitive strain. Being available for customer communication and product promotion on social media might also cause distractions (3.8) in women's personal lives and in their offline business operations. Moreover, The women might also face continuous pressure (3.7) to stay connected with clients

Table 6 : Intensity Indices of Respondents According to Perceived Limitations of Smartphone Usage in Business (n=250)

Limitations Statement	Intensity Index
Difficulty working on small screens	4.1
Physical discomfort	4.0
Social media distractions	3.8
Pressure of constant connectivity	3.7
Security concerns	3.6

for their responses, feedback, and customer support. Security concerns such as data breaches, financial fraud, and cyber threats (3.6) might pose risks to women entrepreneurs, potentially affecting their efficiency in using smartphones for business purposes.

Table 7 presents statistical highlights on how several demographic variables influence smartphone usage among women in business. Non-parametric tests, namely the Kruskal-Wallis and Mann-Whitney tests, were utilised for the analysis. The findings revealed significant differences in smartphone usage among women entrepreneurs across age, sector of business, education, and technical skills.

Younger adults (mean rank 145.41) show significantly higher smartphone usage than middle-aged adults (110.76) and older adults (111.06), with a Kruskal-Wallis chi-square value of 13.954 and a p-value of 0.001, indicating strong statistical significance. Graduates and above (mean rank 150.25) are substantially more engaged in smartphone use than those with less education (106.06), as reflected by a Mann-Whitney U value of 4978 and a highly significant p-value (0). Those in the service sector (mean rank 138.04) use smartphones more for business than those in manufacturing (126.66) or trade (103.59). The test statistic is 7.514 with a p-value of 0.023, showing statistical significance. Women with higher technical skills (mean rank 151.10) utilise smartphones to a much greater extent than those with lower skills (mean rank 102.62), as confirmed by a significant Mann-Whitney U test ($U = 4767.50, p = 0$).

The findings of the study highlight the use of smartphones in entrepreneurship among women entrepreneurs through their digital competency, and further highlight persistent gaps in the adoption of advanced technology. The findings underscore the integration of smartphone technology into their day-to-

Table 7 : Differences in Usage of Smartphone in Business With respect to Variables (n=250)

Variable	Category	N	Mean rank	Test Statistics	Sig.
Age	Younger adults	106	145.41	Kruska Wallis	0.001*
	Middle age adults	104	110.76	Chi -square	
	Older adults	40	111.06	13.954	
Sector of business	Manufacturing	112	126.66	Kruska Wallis	0.023*
	Service	84	138.04	Chi -square	
	Trade	54	103.59	7.514	
Education	Below Graduate	140	106.06	Mann Whitney U	0*
	Graduate and above	110	150.25	4978	
Technical Skill	Low technological skill	132	102.62	Mann Whitney U	0*
	High technological skill	118	151.10	4767.50	

day lives, particularly for communication and marketing, through basic functions such as calls, messages, and social media platforms, especially WhatsApp and Facebook. This aligns with prior research in Nigeria, which indicated that social media facilitates market expansion and promotional activities among MSMEs owned by women entrepreneurs (Etebu and Otiri, 2025). The shift towards digital payments, particularly through Google Pay, among the majority of women entrepreneurs further aligns with national trends, with 48% of MSME women opting for UPI payment methods (Kumar *et al.*, 2025) due to the provision of seamless, cashless transactions.

However, the digital skill deficit was observed in terms of business apps awareness and usage, such as Asana and Evernote, among a high majority of the women entrepreneurs (80%), which might be due to their low engagement with smartphones for business and a lack of entrepreneurial and digital skill training. This contradicts a study in Pakistan, where digital skills significantly impacted the performance of the women entrepreneurs. Furthermore, the findings highlighted key advantages of smartphones, such as flexible scheduling and constant client connectivity, and enhanced promotional activities (with intensity scores ranging from 4.0 to 4.2), which aid in managing household responsibilities alongside business tasks—particularly in Assam's handloom industry, where women head 92% of weaver households (Fourth All India Handloom Census, 2019–20). However, limitations, including eye fatigue, small screens, and concerns about data security (intensity scores of 3.6–4.1), hinder full adoption, aligning with India's broader gender-based digital divide, where women are 40% less likely than men to own smartphones (Reserve Bank Innovation Hub, 2024).

The statistical findings show that demographic variables significantly influence smartphone adoption and usage among women entrepreneurs, with women in the younger age group and those with a graduate education or higher demonstrating high smartphone utilisation. This supports the Technology Acceptance Model (TAM), in which perceived usefulness (PU) and perceived ease of use (PEOU) are amplified by age and education, thereby contributing to greater technology integration (Davis, 1989).

Conclusion and Implications

The study reveals that smartphones have served as an indispensable medium of technological empowerment for women entrepreneurs, enabling them to perform

business communications via calls, messages, marketing and promotions via social media platforms, especially WhatsApp and Facebook, and digital payments through Google Pay, thereby fostering flexible operations and economic empowerment in the MSME sector. However, persistent gaps were observed in advanced technical skills, such as high-quality photo/video creation, email management, and document editing. A lack of awareness was also reported regarding business tools in entrepreneurship. These findings underscore the transformative potential of bridging the digital gender divide, particularly in women-dominated domains, emphasising the need for targeted digital skills training to enhance competency and sustainability in the market. Policymakers and organisations are advised to implement digital training programmes and integrate smartphone education for women entrepreneurs, with a particular focus on smartphone advanced features, business tools, and applications. Future research should explore rural-urban comparisons, evaluate intervention impacts, and examine gendered perspectives and other geographical locations.

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