A Comprehensive Study on Smartphone Utilization for Enterprise Management by the Women-led MSMEs of Guwahati City, Assam

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A Comprehensive Study on Smartphone Utilization for Enterprise Management by the Women-led MSMEs of Guwahati City, Assam

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By

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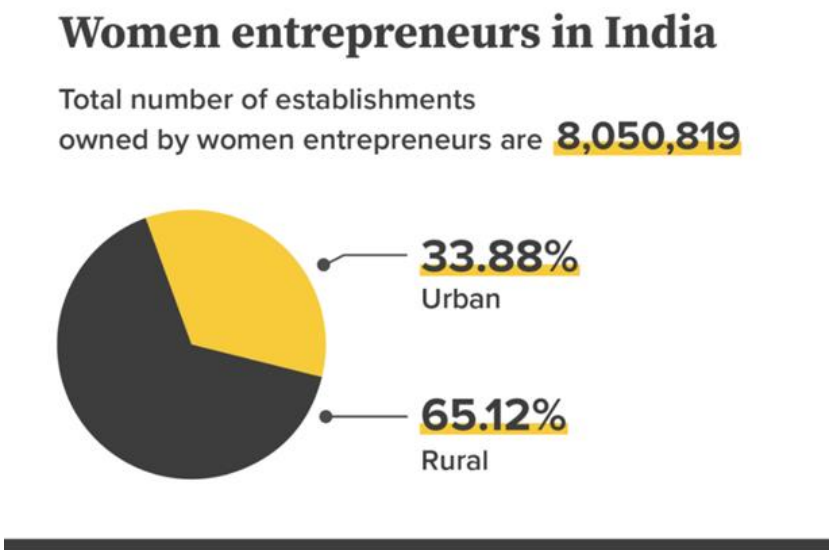
EXECUTIVE SUMMARY

1. Introduction

1.1 Women Entrepreneurship in India

As a renowned driver of development, entrepreneurship has been essential in generating capital and propelling India's economy forward. The number of female entrepreneurs contributing to economic growth is rising as well. Women entrepreneurs are defined as those that engage in business ventures and business creation that empower women economically, establish financial security, and carve out a niche for themselves in the community.



Source: All India Report of Sixth Economic Census 2016

According to an IBEF report, approximately 20.37% of Indian women run MSME businesses and employ more than 23.3% of the labour force. According to a Bain & Co. report, women entrepreneurs directly employ between 22 to 27 million people. Surprisingly, Indian women entrepreneurs have the potential to create an additional 150-170 million employment by 2030. As of November 7, 2022, DPIIT-recognised startups with at least one woman director employed 3,90,000 people. With the worldwide pandemic, India observed a surge in the online businesses, with women-led online businesses at its peak. The IT industry accounts for 30.32% of all women-

led companies registered with The Department for Promotion of Industry and Internal Trade (DPIIT), making it the largest sector. (Startup India, 2025).

According to an IBEF report, approximately 20.37% of Indian women run MSME businesses and employ more than 23.3% of the labour force. According to a Bain & Co. report, women entrepreneurs directly employ between 22 to 27 million people. Surprisingly, Indian women entrepreneurs have the potential to create an additional 150-170 million employment by 2030. As of November 7, 2022, DPIIT-recognised startups with at least one woman director employed 3,90,000 people. With the worldwide pandemic, India observed a surge in the online businesses, with women-led online businesses at its peak. The IT industry accounts for 30.32% of all women-led companies registered with The Department for Promotion of Industry and Internal Trade (DPIIT), making it the largest sector. (Startup India, 2025).

According to Annual Report 2022-23 of Ministry of Micro, Small and Medium Enterprises of India, micro sector with 630.52 lakh estimated enterprises accounts for more than 99% of total estimated number of MSMEs.

In accordance with the provision of Micro, Small & Medium Enterprises Development (MSMED) Act, 2006 the Micro, Small and Medium Enterprises (MSME) are classified as below:

(i) a micro enterprise, where the investment in plant and machinery or equipment does not exceed one crore rupees and turnover does not exceed five crore rupees;

(ii) a small enterprise, where the investment in plant and machinery or equipment does not exceed ten crore rupees and turnover does not exceed fifty crore rupees; and

(iii) a medium enterprise, where the investment in plant and machinery or equipment does not exceed fifty crore rupees and turnover does not exceed two hundred and fifty crore rupees.

According to Annual Report 2022-23 of Ministry of Micro, Small and Medium Enterprises of India, micro sector with 630.52 lakh estimated enterprises accounts for more than 99% of total estimated number of MSMEs.

Out of 633.88 MSMEs, there were 608.41 lakh (95.98%) MSMEs were proprietary concerns. There was dominance of male in ownership of proprietary MSMEs. Thus, for proprietary MSMEs

as a whole, male owned 79.63% of enterprises as compared to 20.37% owned by female. There was no significant deviation in this pattern in urban and rural areas, although the dominance of male owned enterprises was slightly more pronounced in urban areas compared to rural areas (81.58% as compared to 77.76%).

1.2 Micro, Small and Medium Enterprises (MSME) in Assam

According to NSS 73rd Round, 2016-17, Assam has 12.10 lakhs Micro enterprises followed by 0.04 Small enterprises. In terms of MSMEs owner with respect to gender, India has a total of 1,23,90,523 enterprises owned by women which is comparatively less than number of male owners who owns 4,84,50,722 enterprises.

Assam has 11,28,411 enterprises owned by male and on the other hand 66,665 enterprises owned by women as per report of NSS 73rd Round, 2016-17.

As per statistical handbook of Assam 2022, Kamrup Metro district has 8309 Micro enterprises, 957 Small enterprises and 91 Medium enterprises, with a total of 9357 MSMEs.

Generic areas of women entrepreneurship in Assam

Source: https://sheatwork.com/women-entrepreneurs-of-assam/

Women entrepreneurship in Assam play a pivotal role in driving the state's economy, particularly through their local and cultural forte of textiles, handicrafts, and food processing. With approximately 135,000 women-led enterprises, they represent 12.6% of the state's total entrepreneurial landscape, placing Assam 15th among Indian states in terms of women entrepreneurship. (Bora and Rabha, 2025).

1.3 Role of mobile technology in entrepreneurial empowerment

Smartphones have evolved into a vital tool for business owners, fostering involvement in all facets of the industry, from networking and communication to e-commerce, business administration, marketing, financial management, learning, and well-being. In today's digital age, smartphones' accessibility, ease, and adaptability enable business owners to work more productively, continuously innovate, adjust to shifting market conditions, and succeed as entrepreneurs.

Communication and Networking: Smartphone enables instant communication with employees, clients, customers, mentors, peers and investors facilitating quick decision making and problem solving. Using social media platforms like Facebook, WhatsApp, Instagram and many more helps connect business owners with the potential stakeholders expanding networking and business opportunities.

Productivity and organisation: Features and smartphone applications such as clocks, calendar, notes, calculators, customer management apps, and work management apps, facilitates effective task management, organize schedules and productivity. Such applications helps receive timely feedback from customers and support through messaging apps, chatbots, and video calls, improving customer satisfaction and product/service credibility.

E-commerce: Smartphones facilitates digital marketing through various social media platforms, email marketing and mobile advertisements. It enables businesses to sell products and services through apps such as Facebook Marketplace, WhatsApp business, Instagram, Amazon, Flipkart etc. It helps in the flexible management of business tasks irrespective of time and location. The smartphone further helps keep track of sales, inventory and stocks of any products/services. Various editing apps such as Canva, Picsart, Lightroom and photo/video editing software helps

business owners create visually appealing products/services for marketing and branding of their business.

Training and e-learning: Smartphones have changed the landscape by providing various courses, tutorials and online resources that can be accessed anytime and at any location, without being confined to a physical location. Business owners can access multiple resources and training modules based on technical skills and industry-based knowledge that can tailor the needs and requirements of entrepreneurial activities.

Considering the above discussion, the following listed research questions needs to be worked on.

1. To what extent are the women entrepreneurs aware of various mobile applications related to entrepreneurship?
2. What is the usage level of smartphones in business activities among women entrepreneurs?
3. How does the smartphone facilitate the business activities of women entrepreneurs?
4. What challenges are women entrepreneurs facing while using mobile applications?
5. How do smartphone features contribute to tackling business operation challenges?
6. What are the opportunities and limitations associated with women entrepreneurs' use of smartphones for e-commerce activities?
7. What is the role of smartphones and their applications in the economic empowerment of women entrepreneurs and their standard of living?
8. How advantageous is a smartphone for women entrepreneurs regarding 24-hour business operations from home?

1.4 Statement of the Problem

Looking into the research questions, a study titled "A Comprehensive Study on Smartphone Utilization for Enterprise Management by the Women-led MSMEs of Guwahati City, Assam" was designed.

1.5 Rationale of the Study

The growth of women entrepreneurs is an essential beginning in the overall development of human resources. Without including women, who comprise about half of the global population, no development programme could be considered a complete success. It is widely acknowledged that women manage the great bulk of household expenses. When a woman succeeds in business, she

transforms her family and society and encourages other women to follow in her footsteps and become independent. Women are more likely to comprehend the viewpoint of the consumer better. Furthermore, women are frequently reported to be more adept at establishing lasting relationships, which is essential for any business relationship to survive for an extended period. According to a United Nations research, women's empowerment and economic development are closely intertwined. The economies of nations where women have made progress have typically been stable. In contrast, the economy has stagnated in nations where women have faced restrictions (Hujuri, 2018).

Technology is the fundamental construct that makes human lives to function easily and assure the flow of life in all domains. Technology is essential to entrepreneurship in many fields, including production, services, information, and communication, transportation, marketing, and advertising. This significant facet of women's entrepreneurship must be considered to ensure profitability. Although digital intervention in entrepreneurship has offered significant advantages to the women entrepreneurs, their still remains many challenges faced by the women, particularly the lack of digital literacy, limited access to digital trainings, and their difficulty in adapting and keeping up with ever changing digital trends.

Technology, like smartphones provides an incredible platform to the women, especially in developing countries like India, which helps women to break economic and traditional barriers and participate in the global market, promoting gender equality and inclusivity. There has been numerous studies conducted to access the role of technology, or ICT in particular among the women entrepreneurship, however, a gap was found in exploring how smartphone efficiency acts as a transforming vehicle that supports economic and societal inclusion, improves business performance, and aids in the female entrepreneurs' general growth and empowerment. Therefore, this research would essentially study the role of smartphone in the prime entrepreneurial domains of communication, finance, social media and marketing, while analysing the influence of their socio-demographic factors.

1.6 Objectives of the Study

1. To study the demographic profile of women entrepreneurs, their enterprise in Guwahati city, Assam.

2. To explore the basic details of smartphone among the women entrepreneurs of Guwahati city, Assam.
3. To study the perceived benefits and disadvantages in entrepreneurship of smartphone among the women entrepreneurs of Guwahati city, Assam.
4. To study the usage level of smartphone in entrepreneurship among the women entrepreneurs of Guwahati city, Assam in terms of:
    a. Communication and Networking
    b. Marketing and Promotion
    c. Financial management
    d. Social Media management
5. To study the differences in usage level of smartphone in entrepreneurship among the women entrepreneurs of Guwahati city, Assam, in relation to the following variables:
    a. Age
    b. Educational qualification
    c. Family income
    d. Nature of business
    e. Entrepreneurial experience
    f. Technological skills
    g. Access to tech-friendly resources
    h. Privacy and security concerns
    i. Problems related to smartphone usage
6. To study the difference in usage level of smartphone regarding communication and networking in entrepreneurship among the women entrepreneurs of Guwahati city, Assam, in relation to the following variables:
    a. Age
    b. Educational qualification
    c. Family income
    d. Nature of business
    e. Entrepreneurial experience
    f. Technological skills
    g. Access to tech-friendly resources

h. Privacy and security concerns
i. Problems related to smartphone usage

7. To study the difference in usage level of smartphone regarding marketing and promotion in entrepreneurship among the women entrepreneurs of Guwahati city, Assam, in relation to the following variables:
    a. Age
    b. Educational qualification
    c. Family income
    d. Nature of business
    e. Entrepreneurial experience
    f. Technological skills
    g. Access to tech-friendly resources
    h. Privacy and security concerns
    i. Problems related to smartphone usage
8. To study the difference in usage level of smartphone regarding financial management in entrepreneurship among the women entrepreneurs of Guwahati city, Assam, in relation to the following variables:
    a. Age
    b. Educational qualification
    c. Family income
    d. Nature of business
    e. Entrepreneurial experience
    f. Technological skills
    g. Access to tech-friendly resources
    h. Privacy and security concerns
    i. Problems related to smartphone usage
9. To study the difference in usage level of smartphone regarding social media management in entrepreneurship among the women entrepreneurs of Guwahati city, Assam, in relation to the following variables:
    a. Age
    b. Educational qualification

c. Family income
d. Nature of business
e. Entrepreneurial experience
f. Technological skills
g. Access to tech-friendly resources
h. Privacy and security concerns
i. Problems related to smartphone usage

10. To study the challenges related to smartphone usage in entrepreneurship among the women entrepreneurs of Guwahati city, Assam.
11. To develop an e-module on entrepreneurship aiming to build awareness, enhance technological skills customized as per the needs and situations of the women entrepreneurs of Guwahati city, Assam.

1.7 Null Hypotheses of the Study

1. There will be no significant difference in usage level of smartphone in entrepreneurship among the women entrepreneurs of Guwahati city, Assam, in relation to the following variables:
    a. Age
    b. Educational qualification
    c. Family income
    d. Nature of business
    e. Entrepreneurial experience
    f. Technological skills
    g. Access to tech-friendly resources
    h. Privacy and security concerns
    i. Problems related to smartphone usage
2. There will be no significant difference in usage level of smartphone regarding communication and networking in entrepreneurship among the women entrepreneurs of Guwahati city, Assam, in relation to the following variables:
    a. Age
    b. Educational qualification
    c. Family income

d. Nature of business
e. Entrepreneurial experience
f. Technological skills
g. Access to tech-friendly resources
h. Privacy and security concerns
i. Problems related to smartphone usage

3. There will be no significant difference in usage level of smartphone regarding marketing and promotion in entrepreneurship among the women entrepreneurs of Guwahati city, Assam, in relation to the following variables:
    a. Age
    b. Educational qualification
    c. Family income
    d. Nature of business
    e. Entrepreneurial experience
    f. Technological skills
    g. Access to tech-friendly resources
    h. Privacy and security concerns
    i. Problems related to smartphone usage
4. There will be no significant difference in usage level of smartphone regarding financial management in entrepreneurship among the women entrepreneurs of Guwahati city, Assam, in relation to the following variables:
    a. Age
    b. Educational qualification
    c. Family income
    d. Nature of business
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5. There will be no significant difference in usage level of smartphone regarding social media management in entrepreneurship among the women entrepreneurs of Guwahati city, Assam, in relation to the following variables:
    a. Age
    b. Educational qualification
    c. Family income
    d. Nature of business
    e. Entrepreneurial experience
    f. Technological skills
    g. Access to tech-friendly resources
    h. Privacy and security concerns
    i. Problems related to smartphone usage

1.8 Delimitations of the Study

1. The study is delimited to the selected women entrepreneurs of Guwahati city, Assam using smartphones.
2. The study is delimited to the usage level of ICT among the selected women entrepreneurs of Guwahati city, Assam.

1.9 Assumptions of the Study

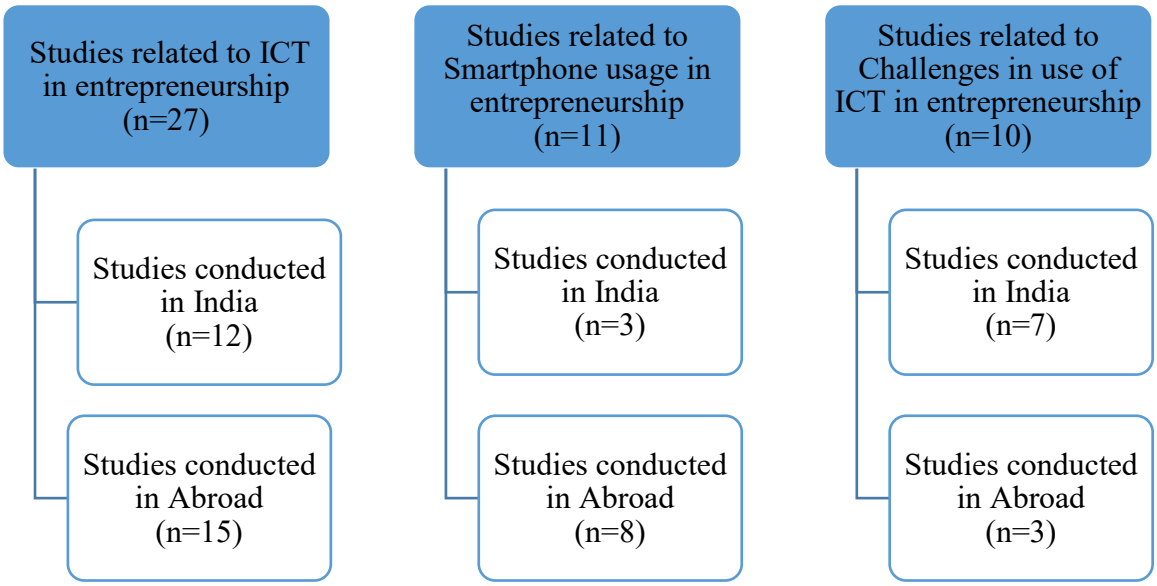
1. The selected women entrepreneurs from Guwahati city, Assam use smartphones.
2. The selected women entrepreneurs from Guwahati city, Assam will have varying extents of smartphone usage.
3. There are specific challenges faced by the selected women entrepreneurs from Guwahati city, Assam.

2. Review of Literature

The present study is undertaken to assess the usage level of smartphone in entrepreneurial activities among the women entrepreneurs in Guwahati city, Assam. The study further investigates the engagement of smartphone in terms of communication, marketing, social media and security concerns, along with the challenges faced while adopting smartphone for business. Considering the purpose of the study, various related literatures have been reviewed and sourced from from

Smt. Hansa Mehta Library of Maharaja Sayajirao University of Baroda and various e-resources such as Academia.edu, Research Gate, Shodhganga, Google Scholar, Scopus, NASSDOC, ProQuest, Springer and so on. In addition to the traditional databases and e-resources, AI-powered tools, namely Scispace and Litmaps, were also utilised to identify and synthesize relevant literatures for the study.

The literatures reviewed for the present study has been divided into the following categories:



2.1 Trend Analysis

The reviewed literature from 2017 to 2025 highlights the increasing importance of Information Communication Technology (ICT) and smartphones in women's entrepreneurship across both Indian and global contexts. A total of forty seven studies have been reviewed. In Indian context, the studies spans regions such as Assam, West Bengal, Maharashtra, Delhi, Telangana, Gujarat, Pune, Andhra Pradesh, Uttar Pradesh, Bihar, Haryana, Odisha, Madhya Pradesh, Tamil Nadu, and, Kerala. In the international context, studies were from diverse countries like Indonesia, Turkey, Tanzania, Egypt, Nigeria, Bangladesh, Saudi Arabia, Malaysia, China, Iraq, Afghanistan, Colombia, and, Pakistan.

In majority of the reviewed studies, survey method was commonly used as a method of quantitative data collection, followed by structured and semi-structured interviews, and, focus group

discussions were used as method of qualitative data collection. The sample size of the studies ranged from minimum of 3 to maximum of 1555 women entrepreneurs. Regarding sampling technique, majority of the researches employed purposive sampling, with few of them employed convenient and snowball sampling techniques. The variables taken for analysis in most of the reviewed studies included age of the respondents, their marital status, education, type of business, socio-economic status, entrepreneurial experience and, digital competency.

The studies consistently highlighted the significance of ICT adoption and smartphone usage in performance of the women entrepreneurs in terms of communication, marketing, and productivity. Most of the studies demonstrated the role active role of social media, especially with the active use of WhatsApp, Facebook and Instagram, by the women entrepreneurs for their entrepreneurial activities, particularly in networking, customer engagement, and marketing. Many studies also reported the positive impact of digital technologies in empowering women entrepreneurs regarding financial independence, skill development, and the advantage of flexible works, enabling them to balance professional and household responsibilities. Moreover, it was also seen that almost all of the studies recommended about targeted interventions aiming towards exercising digital literacy and technical skills among women. Indian studies showed usage of ICT limited to social media usage, and digital payments, while international studies also focused on active usage of women in e-commerce, mobile money, and diverse digital platforms, along with the support from government and institutional frameworks. In terms of policy landscape, both Indian and the global studies focused on developed digital inclusion, with interventions and programmes supported by government and institutions, however, a strong need of regional language digital literacy was observed among most of the Indian studies.

2.2 Research Gaps

- Limited functional studies
- Lack of studies regarding security concerns
- Lack of studies regarding interventions
- Limited focus on challenges
- Limited regional studies

2.3 Conclusion

The above reviewed literatures gives a clear picture of adoption and use of ICT adoption, and its effect on the entrepreneurial section among the women entrepreneurs, irrespective of age, marital status, educational level, socio-economic status, entrepreneurial background, digital competency, and geographical location. Although majority of the women entrepreneurs in the reviewed studies have benefitted from ICT, and smartphone in particular, there was a lack of studies related to specific features and functions of smartphone, and its utility in entrepreneurship. Furthermore, majority of the researches focused on widespread use of social media platforms, Facebook, WhatsApp and Instagram, and none of the researches focused on how the women actively engage with various business tools, and its impact on their businesses. With only three researches focussing on safety concerns in digital entrepreneurship, the studies lacked in comprehensive research on the privacy, security concerns, cyberbullying, trolling, misuse of data, and technical and personal challenges faced by women using ICT in entrepreneurship.

Considering the trend and gaps of the reviewed literatures, the present study is a deliberate attempt to understand and analyse the meticulous use of smartphone by the women entrepreneurs from micro, small and medium entrepreneurial background based in Guwahati city, Assam. This study will underscore the detailed usage of smartphone among the women particularly focusing on communication, social media, marketing, finance, and safety and security concerns in entrepreneurship. It will also furthermore present a detailed account of various challenges encountered by women in smartphone usage in businesses.

3. Methodology

The present research was undertaken with an aim to explore the smartphone usage among women entrepreneurs of Guwahati city, Assam, for the entrepreneurial activities. The key purpose of the study was to delve into the smartphone usage pattern in terms of communication, finance, marketing and social media platforms. Furthermore, the study also look into the challenges while using smartphone in entrepreneurship. The methods and techniques used in the research are summarized below.

5.3.1 Feasibility Study

5.3.2 Population of the Study

5.3.3 Sample of the Study

5.3.4 Construction of Research Tool

5.3.5 Validity of the Research Tool

5.3.6 Reliability of the Research Tool

5.3.7 Data Collection

5.3.8 Ethical Consideration

5.3.9 Scoring and Categorization of Data

5.3.10 Plan of Statistical Analysis

3.1 Feasibility study

Feasibility of the study was carried out to find out the possible practicability of the intended research. The level of ICT usage by women entrepreneurs of Guwahati city, Assam for their business was studied during the period of December 2023- January 2024.

3.1.1 Objectives of the study

- To study the demographic profile of women entrepreneurs of Guwahati city, Assam.
- To find out the level of ICT usage by the women entrepreneurs for their ventures.
- To explore the problems related to ICT adoption among the women entrepreneurs.

3.1.2 Population of the study

The population of the study included the women entrepreneurs hailing from Guwahati city, Assam, and were using ICT tools for their businesses.

3.1.3 Sample of the study

The sample of the study consisted of thirty three women entrepreneurs selected using snowball and purposive sampling techniques.

3.1.4 Tool for data collection

A structured questionnaire was prepared comprising of the following sections:

- Background Information of respondents
- Information regarding entrepreneurship
- ICT engagement level
- Problems related to ICT adoption in entrepreneurship

3.1.5 Procedure of data collection

The data of the study was collected using both survey and online method, i.e. Google forms were administered among the respondents. The data was then analysed using frequency-percentages.

3.1.6 Major findings of the study

3.1.6.1 Background information of the respondents

- Age group
  - 25-35 years (52%)
  - 36-52 years (48%)
- Educational Qualification
  - Graduation (43%)
  - Post-graduation (30%)
  - Secondary school (27%)
- Marital status
  - Married (80 %)
  - Unmarried (17 %)
  - Separated (3 %)
- Family type

- Nuclear (79%)
- Joint (15%)
- Extended (6%)

➢ Monthly Income of the Family

- Less than Rs 50,000 (33.3%)
- Rs 50,000-80,000 (33.3%)
- Rs 80,000-1,00,000 (21.2%)
- More than Rs 1,00,000 (12.1%)

3.1.6.2 Information regarding entrepreneurship

➢ Areas of entrepreneurship

- Traditional wear (39.39%)
- Traditional jewellery (15.15%)
- Handicraft (15.15%)
- Food (6.06%)
- Beauty and wellbeing (6.06%)
- Retail stores (6.06%)
- Tailoring (6.06%)
- Bell Metal (3.03%)
- Nursery (3.03%)

➢ Apart from their enterprises, almost about ten percent (9.09%) of the respondents were working in service sector.

➢ Majority (81.8%) of the enterprises were registered, whereas only about twenty percent (18.2%) were not registered.

- Majority (87.9%) of the respondents' enterprises were of sole proprietorship, and only twelve percent of them had partnership.
- Very high majority of the respondents (93.9%) had their area of marketing within the district, whereas only twelve percent of them had area of marketing at national and international level.
- Little more than fifty percent (54.5%) of the respondents had entrepreneurial experience of 1to 5 years, followed by 21 % having 6 to 10 years, and 18.2 % having more than 10 years of experience.
- High majority, i.e. almost ninety percent (87.9%) of the respondents were the sole proprietor of their enterprises.
- High majority, i.e. more than eighty percent (84.4) of the respondents started the enterprises as own initiative.
- Little less than fifty percent (45%) of the respondents had monthly income of less than Rs 30,000 followed by 33.3% of the respondents had between Rs 30,000 to Rs 50,000, and 21.2% of the respondents had more than Rs 50,000 of monthly income from their enterprises.

3.1.6.3 ICT engagement level

- All of the women entrepreneurs were using smartphones, followed by almost twenty percent (18.8%) owned Laptop, twelve percent owned desktop, and only three percent owned tablet.
- Very high majority (90%) of the respondents used Assamese language in ICT tools, followed by majority of them (72.7%) used English, and thirty percent of them used Hindi.
- Regarding various purposes of using smartphone, almost eighty percent (78.8%) used smartphone for voice calling, followed by almost seventy percent i.e. 66.7% used it for messaging, majority of the women entrepreneurs (60%) used for e-banking and only thirty percent used smartphone for promotion of business.
- In terms of duration of smartphone usage, little more than fifty percent (51%) of the respondents used smartphone for four hours, little more than forty percent (42%) used it for two to four hours, and only six percent of then used smartphone for less than two hours.

- Majority of the respondents (81.3%) learned using ICT applications before COVID-19, whereas only about twenty percent (18.8%) learned during or after COVID-19.
- Majority (81.81%) of the respondents used WhatsApp to a great extent, almost sixty percent (57.57%) used Facebook to a great extent, followed by almost forty percent (39%) of the respondents used Instagram to a great extent.
- Few percent (33% and 30%) of the respondents were able to compare information from various sources and find authentic sources to a great extent.
- Similar percentage, i.e. (33% and 30%) of respondents were able to private data to a great extent followed by almost forty percent (39%) of the respondents had responsible online behaviour.
- Little more than forty percent of the respondents (42%) used cloud storage to a less extent.
- Little more than fifty percent (51.51%) of the respondents were using Reels/Shorts for business promotion to a less extent.
- Almost fifty percent of the respondents (48%) wished to take technical training in terms of use of internet for business purpose. little more than forty percent (42%) of them wished training support for digital marketing, followed by little less than one-fourth of the respondents (21%) wanted training on website development and little more than ten percent (12%) wanted training on e-banking.

3.1.6.4 Problems related to ICT adoption in entrepreneurship

- In terms of problems regarding ICT usage, almost seventy percent (69.69%) of the respondents felt they lacked understanding of Information and Communication Technology (ICT) and various technologies to some extent.
- Almost sixty percent (57%) of the respondents felt they lacked understanding regarding computer and mobile operations, and benefits of social media in business to some extent.
- Less than fifty percent of the respondents (42%) felt that they had difficulty keeping up with rapid change in technology to some extent.

- Almost forty percent (39%) of the respondents had physical and mental tiredness and indifference in operating ICT tools to a great extent.
- Similar percentage of respondents i.e. 39% lacked familiarity with the trends in digital media skills such as making shorts and Instagram reels, and attractive videos for their products and services.

3.1.6.5 Discussion and Conclusion

The findings revealed that women entrepreneurs use various ICT tools for their business purposes, with smartphones being used the most. Smartphone being the most compatible, affordable and convenient device have become an integral to their daily lives and for their business operations. Voice calling, messaging and e-banking had the highest usage among the women entrepreneurs for their business purposes, which further explains how smartphone usage have practically helped the women entrepreneurs to perform their daily tasks of communication and financial transactions necessary for their business ventures. Again, regarding social media usage, WhatsApp and Facebook was in its peak usage among the women entrepreneurs. The apparent reason for this was the simple features in these applications that were comprehensible and easy-to-use especially in terms of communication and promotion of their business. The findings related to various digital skills among women entrepreneurs showed limited responsible online behaviour when it comes to security and privacy concerns, determining authentic information sources, other skills such as use of cloud storage and keeping data private. These determined the need of all-inclusive awareness and literacy in terms of ICT in entrepreneurship. The various problems faced by the women entrepreneurs such as lack of understanding of ICT, especially smartphone computer skills, awareness related to benefits of smartphone in business, their difficulty in keeping up with the rapid changes in technology determines sincere need of exposure in advantages of technology in entrepreneurship among the women entrepreneurs, especially starting from the need and usage of smartphone. With internet and smartphone being recognized as indispensable tools in their daily lives, the study "**A Comprehensive Study On Smartphone Utilization For Enterprise Management By The Women-led MSMEs of Guwahati City, Assam**" was undertaken.

3.2 Population of the study

Women entrepreneurs from Guwahati city, Assam, who owned the micro, small and medium enterprises in the city formed the core population of the study. The community of women entrepreneurs represents a vital role in the socio-economic landscape of the city.

3.3 Sample of the study

Small, medium and micro women entrepreneurs residing in Guwahati city, Assam, who had established businesses operating in the city, was selected as the sample of the study. The inclusive criteria for selecting the sample were as follows:

- They should own and/or use a smartphone
- They should be an internet user

To achieve the relevant data, a comprehensive list of registered women entrepreneurs was obtained from the District Industries and Commerce Centre, Kamrup Metro district, Assam. A total of 9358 women entrepreneurs were registered, out of which the required sample size of 369 women entrepreneurs was calculated using the formula given below.

$$n = \frac{N.Z^2.p.(1-p)}{e^2.(N-1) + Z^2.p.(1-p)}$$

(Source: https://www.cuemath.com/sample-size-formula/)

Where,

n= required sample size

N= population size

Z= Z score

p= population proportion

e= margin of error

The period of data collection was from June 2024 to October 2024. While the study initially intended to select the sample using random sampling technique sampling, due to various practical constraints, non-probability sampling, i.e. purposive sampling technique was employed. The

constraints included resource limitations, alongwith adverse weather conditions during the data collection period, imposing logistical challenges. Furthermore, access and unavailability, and decline to participate posed significant challenges. In numerous cases, businesses registered under women entrepreneurs were primarily managed by their husbands, and not all of the women entrepreneurs used smartphones. This made it challenging to obtain relevant and accurate information directly from the intended respondents. Due to such unanticipated challenges, out of 369, data was ultimately collected from two hundred fifty women entrepreneurs, based on their availability and willingness to participate.

Quantitative data was collected for this study using survey method.

3.4 Construction of research tool

Research tool is the standard procedure for collecting data in a research. Considering it as the cornerstone of any research, a questionnaire was constructed aiming the gather information addressing the research objectives and research questions. The research employed a structured questionnaire for valid and reliable data, ensuring easy comparison and analysis of the data.

The questions were prepared and incorporated, taking into account the numerous literatures reviewed and relevance of research objectives. Relevant research literatures, i.e. theses, journals, e-resources etc. on smartphone adoption and utilization in entrepreneurship were referred from–

- Smt. Hansa Mehta Library, The Maharaja Sayajirao University of Baroda
- Library of Department of Extension and Communication, FFCSc., The Maharaja Sayajirao University of Baroda
- Shodhganga, Inflibnet, NASSDOC
- Online websites

Moreover, the findings of the feasibility study helped in refining and tailoring the content of the research tool, ensuring its relevance and alignment with the research objectives. For easy understanding and convenience of the respondents, the tool was prepared in English and then translated to their regional language, i.e. Assamese.

3.4.1 Description of Research Tool

To achieve a set expected result, the structured questionnaire was formulated with five sections including subsections. These segments were bifurcated as per the objectives of the studies having background information of the respondents, business details, basic details of smartphone, perceived benefits and limitations of smartphone usage, usage of smartphone in business, challenges faced while using smartphone, and information about module requirement.

Table: Description of Research Tool

Section	Content	Total no. of questions	Response system
I (a)	Background Information	16	Open and close ended
I (b)	Information regarding business venture	11	Open ended and checklist
I (c)	Basic details of smartphone	9	Checklist and 4-point rating scale
II	Perceived benefits of smartphone usage	10	5-point Likert scale
	Perceived limitations of smartphone usage	10	
III	Information regarding usage of smartphone for business	9	Checklist and 4-point rating scale
IV	Challenges related to smartphone usage in business	23	4-point rating scale

V	Information regarding requirements for module construction	3	Checklist

Section I (a): Background Information

Section I (a) of the questionnaire was prepared to collect data regarding profile of the respondents. The questions included respondents'

- Name
- Age
- Contact details
- Educational qualification
- Family type
- Religion
- Monthly income of Family and Business
- Details of enterprise such as its name and address
- MSME registration number
- Social Media platform name of business
- Breadwinner of family

Section I (b): Information Regarding Business Venture

Section I (b) of the questionnaire was prepared to collect detailed information about respondents' business that included questions related to

- Number of owned enterprises
- Nature of business

- Area of business
- Years of entrepreneurial experience
- Type of ownership
- Market reach in terms of area
- Market reach in terms of online platforms
- Participation in entrepreneurial training/course

Section I (c): Basic Details of Smartphone

This section was prepared to get basic smartphone details of the respondents'. The questions included were based on

- Number of smartphones owned
- Network connectivity
- Operating system
- Sim connection
- Language used in smartphone
- Other users of smartphone
- Source of motivation to use smartphone
- Technological skills developed- Four point rating scale was prepared to obtain the responses. A total of ten statements were listed to obtain accurate data related to the technological skills the respondents have gained using smartphone in business. The respondents has to select the frequency level of the statement as per the skills mentioned.

Section II: Perceived benefits and limitations of smartphone usage for business

This section of the questionnaire dealt in obtaining information about the observed and supposed advantages and disadvantages of using smartphone in entrepreneurial activities by the women

entrepreneurs. Five-point Likert scale with options ranging from “Strong Agree” to “Strongly Disagree” was used to obtain relevant responses. A total of twenty statements, with ten statements each related to perceived benefits and perceived limitations were evenly included, which were to be selected by the respondents according to their understanding of experience in using smartphone.

Section III: Information regarding usage of smartphone for business

Information regarding smartphone usage for business was the predominant section of the questionnaire. The questions were prepared to get a detailed and extensive range of usage pattern regarding smartphone for entrepreneurial activities by the women entrepreneurs. The questions were based on

- Hours spent smartphone for business
- Usage frequency of smartphone features
- Usage frequency of social media apps
- Usage frequency of online banking apps
- Awareness of business related applications

Furthermore, the section was also extended to explore the extent of usage level of smartphone in business in terms of following aspects

- **Communication and networking**
- **Marketing Management**
- **Financial management**
- **Social media management**.
- **Fears and security concerns**

Section IV: Challenges related to smartphone usage in entrepreneurship

This section of the questionnaire include questions related to various problems faced by the women entrepreneurs while using smartphone for business purpose. A total of twenty three statements were included in this section, distributed across four categories- technical, network and connectivity, security concerns, and personal challenges. The statements were designed to explore the challenges faced in using smartphone in terms of its malfunctions, frequent updates, complexities, lack of technical skills, unreliable network connections, fear of privacy risks, difficulty in adaption latest trends in technology etc. The responses were prepared to obtain data from respondents having to rate it from "great extent to never" as per their level of usage.

Section V: Information regarding requirements for module construction

Under this section, a checklist was prepared for the respondents to tick the necessary skills related to smartphone operations they feel that needs to be learnt. A total of sixteen statements was included and divided into two categories –basic smartphone skills and advanced smartphone skills. The responses gathered through this checklist will guide the development of the educational module, ensuring it aligns with the specific learning requirements identified by the respondents.

3.5 Validation of Research Tool

Content validity of the research tool was conducted to identify any flaws and for ensuring the credibility and quality of the content of the research tool. The developed tool was given to experts from various fields, and were further asked to offer their valuable suggestions and comments in terms of –

- Authenticity
- Accuracy
- Appropriateness of response system
- Language clarity

The experts approached were from the following teaching faculties-

- Associate Professor, Department of Extension and Communication, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara.
- Two Assistant Professors, Department of Extension and Communication, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara.
- Assistant Professor, School of Journalism and Mass Communication, AURO University, Surat.
- Post Graduate Teacher, Department of Statistics, Swadeshi Academy, Guwahati, Assam
- Post Graduate Teacher, Department of English, Beltola Mahavidyalaya Senior Secondary School, Guwahati, Assam
- Lecturer, Department of Assamese, Beltola Mahavidyalaya Senior Secondary School, Guwahati, Assam.

Based on the experts' feedback, modifications made to improve the clarity and comprehensibility of the questions. The experts suggested simplifying the language and adjusting the question types to ensure that respondents could easily understand and provide accurate data. These modifications aimed to enhance the overall quality of the responses and ensure that the data collected was precise and reliable.

3.6 Pretesting and Reliability of Research Tool

Pretesting of the tool was conducted with twenty respondents to ensure its effectiveness and identify any potential issues. The primary purpose of this pretest was to evaluate how well the tool performed and to discover any problems respondents might face while filling out the questionnaire. The entire process took approximately fifteen to twenty minutes for each respondent. The suggestions gathered from the respondents were carefully considered, and necessary changes were made to improve the tool's clarity and usability, with an aim to obtain quality data for further data collection.

A test-retest method was applied for measuring the reliability of the research tool. Keeping a gap of fifteen days, the tool was administered to twenty respondents. The reliability was determined

by calculating the correlation coefficient, which resulted in a value of 0.97, indicating an exceptionally high level of agreement or consistency among the responses.

$$r = \frac{MS_B - MS_W}{MS_B + (k-1).MS_W}$$

(Source: https://www.uvm.edu/~statdhtx/StatPages/icc/icc-overall.html)

where,

MS_B is the mean square between subjects

MS_W is the mean square within subjects

k is the number of raters or measurements

3.7 Procedure for Data Collection

Adhering to the ethical norms for data collection, data was collected from a total of two hundred and fifty women entrepreneurs hailing from Guwahati city, Assam, during the period of June 2024 to October 2024. The respondents were identified from the list obtained from the District Industries and Commerce Centre, Kamrup Metro district, Assam. Key market areas within Guwahati city were targeted, and respondents from these areas were contacted accordingly. Appointments were scheduled in advance to address challenges related to accessibility, participant unavailability, reluctance to participate, time constraints, and logistical issues due to adverse weather conditions. The survey method was employed for data collection, and help was offered to respondents who faced any difficulty filling up the questionnaire, particularly in terms of language clarity.

Nearly five hundred forms were distributed to the eligible sample for data collection. However, only two hundred and fifty questionnaires were selected for data generation. The reason for exclusion of the remaining forms were-

- Lack of interest in participation
- Length of the questionnaire

- Unavailability of the participants despite repeated visits
- Incomplete responses
- Loss of the questionnaires
- Busy schedule of the respondents

This careful approach towards data collection helped in obtaining a more reliable and accurate data, forming a strong base for the research.

3.8 Ethical Consideration

The study was conducted following the necessary ethical considerations to ensure integrity of the research. The ethical approval for conducting the study was obtained from The Institutional Ethics Committee for Human Research (IECHR), Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara, with ethical approval number IECHR/FCSc/Ph.D./04/2024/03. The approval process by the ethical committee involved a thorough review of the study, which included assessing of research objectives, methodology, data collection method, research tool, and consent form.

With prior permission, list of registered women entrepreneurs in Kamrup Metro district, Assam was obtained from the District Industries and Commerce Centre, Kamrup Metro district, Assam. This ensured that the study adhered to ethical norms by engaging participants who were registered and officially recognised by the government. Furthermore, informed consent from the participants were obtained prior to data collection, along with providing the option to withdraw at any time. Confidentiality and anonymity of the data was strictly maintained during the period of data collection.

3.9 Scoring and Categorization

The data collected on smartphone utilization among women entrepreneurs for their entrepreneurial management was scored and categorized as follows-

3.9.1 Categorization of variables of the study

Table: Categorization of Independent Variables

Independent variables	Basis	Categories
Age	24-34	Younger adults
	35-45	Adults
	46-56	Older adults
Educational Qualification	Primary school	Lower level of education
	Middle school	
	Secondary school	
	Intermediate/Diploma	
	Graduation	Higher level of education
	Post-graduation	
	Doctoral degree	
Monthly income of the family	Less than Rs 50,000	Low income family
	More than Rs 50,000	High income family
Years of Entrepreneurial experience	Less than a year	Lesser experience
	1-5 years	
	6-10 years	Higher experience
	More than 10 years	
Access to tech-friendly resources	Below mean 5-8	Less access
	Mean and above 9-14	More access
Technological skills	Below mean 3-19	Low technological skills
	Mean and above 20-30	High technological skills
Privacy and security concerns	Below mean 0-15	Less concerned
	Mean and above 16-24	More concerned
Challenges	Below mean 8-29	Less challenges
	Mean and above 30-62	More challenges

Table: Categorization of Dependent Variable

Dependent variable	Basis	Categories
Usage level of smartphone	13-98	Less usage
	99-160	Moderate usage
	161-248	High usage

3.9.2 Scoring of variables of the study

3.9.2.1 Scoring of Usage level of Smartphone for entrepreneurship

Total no. of items	Range	Minimum score	Maximum score
9	13-248	13	248

3.9.2.2 Aspect wise scoring of Usage level of Smartphone for entrepreneurship

To study the usage level of smartphone for entrepreneurship, various aspects, namely, communication and networking, marketing management, financial management, and social media management were identified and studied. The categories of the same are as follows-

Aspect	Total no. of items	Range	Minimum score	Maximum score
Communication and Networking	5	0-15	0	15
Marketing management	5	0-145	0	15
Financial management	5	0-15	0	15
Social media management	8	0-24	0	24

Table: Score Provided For Different Responses of Aspect Wise Usage Level of Smartphone in Entrepreneurship

Response	Score
Great Extent	3
Some Extent	2
Less Extent	1
Never	0

Table: Categorization of Item wise Intensity Indices of Usage level of Smartphone in Entrepreneurship

Range of Intensity Indices	Categories
2.0-2.6	Great Extent
1.3-1.9	Some Extent
0.6-1.2	Less Extent/Never

5.3.9.2 Scoring of technological skills in smartphone for business

Various technological skills were listed in a four-point rating scale. The scoring and categorization has been shown below.

Total no. of items	Range	Minimum score	Maximum score
10	3-30	3	30

Table 6: Score Provided For Different Responses of Technological Skills in Smartphone for Business

Response	Score
Great Extent	3
Some Extent	2
Less Extent	1
Never	0

Table 7: Categorization of Item wise Intensity Indices of Technological Skills in Smartphone for Business

Range of Intensity Indices	Categories
1.7-1.4	Great Extent
1.3-1.0	Some Extent
0.9-0.7	Less Extent/Never

5.3.9.3 Scoring of access to tech-friendly resources

Total no. of items	Range	Minimum score	Maximum score
4	5-14	5	14

5.3.9.4 Scoring of Perceived Benefits and Limitations of smartphone usage

Perceived benefits and limitations of smartphone usage was listed in a Five-point Likert scale, ranging from Strongly Agree to Strongly Disagree. The scoring and categorization has been shown below.

Table: Score Provided For Different Responses of Perceived Benefits and Limitations of Smartphone Usage

Response	Score
Strongly Agree	5
Agree	4
Neutral	3
Disagree	2
Strongly Disagree	1

Table: Categorization of Item wise Intensity Indices of Perceived Benefits of Smartphone Usage

Range of Intensity Indices	Categories
4.51-5.00	Strongly Agree
3.51-4.50	Agree
2.51-3.50	Neutral
1.51-2.50	Disagree
1.0-1.50	Strongly Disagree

Table: Categorization of Item wise Intensity Indices of Perceived Limitations of Smartphone Usage

Range of Intensity Indices	Categories
4.51-5.00	Strongly Agree
3.51-4.50	Agree
2.51-3.50	Neutral
1.51-2.50	Disagree
1.0-1.50	Strongly Disagree

5.3.9.5 Scoring of Privacy and Security Concerns in Smartphone Usage in Entrepreneurship

Total no. of items	Range	Minimum score	Maximum score
8	0	24	0-24

Table: Score Provided For Different Responses of Privacy and Security Concerns in Smartphone Usage in Entrepreneurship

Response	Score
Great Extent	3
Some Extent	2
Less Extent	1
Never	0

5.3.9.6 Scoring of Challenges related to smartphone usage in entrepreneurship

Various challenges related to smartphone usage in entrepreneurship were listed in a four-point rating scale. The scoring and categorization has been shown below.

Table: Score Provided For Different Responses of Challenges Related to Smartphone Usage in Entrepreneurship

Response	Score
Great Extent	3
Some Extent	2
Less Extent	1
Never	0

Table: Categorization of Item wise Intensity Indices of Challenges Related to Smartphone Usage in Entrepreneurship

Range of Intensity Indices	Categories
1.5-2.0	Great Extent
1.0-1.4	Some Extent
0.4-0.9	Less Extent/Never

5.3.10 Plan of Statistical Analysis

The gathered data was analysed using various statistical measures. The data was coded and then analysed using few statistical software namely MS-Excel and SPSS. The following statistical measures were used to analyse the following-

Content	Statistical Measures
Background Information	Frequency-percentage
Information regarding business venture	Frequency-percentage, Mean
Basic details of smartphone	Frequency-percentage, Mean, Intensity Indices
Perceived benefits of smartphone usage	Frequency-percentage, Intensity Indices
Perceived limitations of smartphone usage	
Usage level of smartphone in entrepreneurship	Frequency-percentage, Mean, Intensity Indices, Mann-Whitney U-Test and Kruskal-Wallis Test
Challenges related to smartphone usage in business	Frequency-percentage, Mean, Intensity Indices, Mann-Whitney U-Test

Formulae used for Test

Mann-Whitney U-test

$$U = n_1 n_2 + \frac{n_2(n_2+1)}{2} - \sum_{i=n_2+1}^{n_2} R_i$$

(Source: https://www.socscistatistics.com/tests/mannwhitney/)

Where,

U = Mann-Whitney U test

n_1 = Sample size one

n_2 = Sample size two

R_i= Rank of the sample size

Kruska-Wallis Test

$$H = \frac{12}{n_r(n_r+1)} \sum_{i=1}^{k} \frac{R_i^2}{n_i} - 3(n_r+1)$$

(Source: https://real-statistics.com/one-way-analysis-of-variance-anova/kruskal-wallis-test/)

Where,

K = the number of populations

n_r = the number of observations in sample i

$nr = \sum_{i=1}^{k} n_i$= the total number of observations in all samples R_i = = the sum

of the ranks for the sample i

Intensity Indices:

$$\frac{Total\ score\ of\ an\ item}{Total\ Number\ of\ respondents}$$

4. Major Findings of the Study

4.1 Demographic profile of the respondents

- Little more than forty percent (42.4%) of the women entrepreneurs were younger adults, with similar percentage of the women entrepreneurs were adults (41.6%), and less than twenty percent (16%) of the women entrepreneurs were older adults.
- About sixty percent (56%) of the women entrepreneurs had lower level of education, whereas little more than forty percent had higher level of education.
- Majority of the women entrepreneurs (78%) were married, little more than twenty percent (21%) were unmarried, and very little percent of the women entrepreneurs were separated (0.4%).
- Very high majority of the women entrepreneurs (96%) had nuclear family, followed by joint (2.8%) and extended family (1.2%).
- Regarding monthly income of the family, almost equal percentage of the women entrepreneurs belonged to the lower income family (48.8%) and higher income family (51.2%). However, majority of the women entrepreneurs (60.8%) had low business income, and almost forty percent of them (39.2%) had higher income in the business.

4.2 Information regarding business venture

- Very high majority (93.5%) owned only one enterprise, followed by very small proportion owning two enterprises (5.3%) while a very minimal percentage (1.2%) owned four number of enterprises.
- Little more than forty percent (44.8%) women entrepreneurs were engaged in manufacturing businesses, followed by almost one third of them (31.6%) were engaged in service businesses, and about one fourth of them (23.6%) were involved in trade related businesses.
- Little more than forty percent (42.8%) of women entrepreneurs were engaged in manufacturing and production, which included the manufacturing of handloom products, handicraft items, boutiques and agricultural products production.
- Forty percent (40.8%) of them were engaged in food and hospitality, which included services like beauty parlours, household cleaning, tailoring, legal services, consultations,

real estate agencies, restaurants and catering, bakeries, pickle making, travel agencies, PGs and other accommodation, and rental car services.

- In terms of area of retail and wholesale business, very few percent of women entrepreneurs (10.8%) were engaged in it, which included the shops dealing in stationary, garment, grocery, textile, water supply, hardware, and brass metal. Very few percent (4.8%) of the women entrepreneurs were engaged in the area of technology and education, which dealt in dance, skill education, schools, coaching centre, and ICT. Very minimal percentage (0.8%) of the women entrepreneurs were engaged in the area of healthcare and pharmaceuticals.
- Very few percent (0.8%) of them had entrepreneurial experience of less than a year. Little more than fifty percent of the women entrepreneurs (52.4%) had their entrepreneurial experience of 1-5 years, followed by little less than one fourth of them (24.4%) had 6-10 years of entrepreneurial experiences, little more than twenty percent (22.4%) of them had more than 10 years of experiences.
- A high majority of the women entrepreneurs (89.2%) started their business through their own initiative, indicating a strong sense of independence and self-motivation. Just about ten percent (9.2%) of the women entrepreneurs inherited their family-owned business, while very few percent (1.6%) of them bought the business as an already running operation.
- Very high majority (97.2%) of women entrepreneurs were running the business as sole proprietorship, indicating a strong preference for individual ownership. Very few percent of them (2.8% and 0.5%) runs their business in partnership and cooperative venture.
- Very high majority of the women entrepreneurs owned micro enterprises, followed by very little percent (1.6%) of them owned small and medium enterprises.
- Very high majority of the women entrepreneurs (99.6%) operate within their district, and few percentage of the women entrepreneurs (16% and 14.4%) operates within the district and the state, whereas very few percent of them (7.6% and 1.2%) handles their market reach in national and international boundaries.
- WhatsApp (10%) and Facebook (9.6%) were commonly used for selling products and services online by the women entrepreneurs, followed by Instagram (6.4%). On the other hand very limited percent of women entrepreneurs used Amazon (1.2%), Flipkart (0.4%), Meesho (0.4%) and Ajio (0.4%) to sell their products online.

- Almost sixty percent (57.6%) of the women entrepreneurs have business operation with small workforce of 1-3 employees. About twenty percent (19.6%) of the women entrepreneurs had a workforce of 4-6 employees, whereas few percent (6.8%) of them had more than 7 employees.
- Very high majority (93.6%) of women entrepreneurs have not participated in any training programs related to entrepreneurship, whereas only a small proportion (6.4%) have undergone training.

4.3 Basic details of smartphone

- Almost seventy percent (69.6%) rely on single smartphone for both personal and professional use, whereas little more than one fourth (30%) of them own two smartphones. Very high majority (98%) of the women entrepreneurs had Android as their smartphone's operating system, compared to the minimal percent of them (11.2%) having iOS.
- Prepaid sim connection was preferred by very high majority of the women entrepreneurs (96.7%), whereas very few percent (5.7%) preferred postpaid connection. In terms of network connectivity, majority of the women entrepreneurs (76.4%) used 5G network connection, while one third of them (33.6%) used 4G connection.
- Significant percentage of the women entrepreneurs (79.7%) allow **employees** to use smartphones. Half of the women entrepreneurs (50.6%) showed smartphone usage by the family. However, very few percentage of women entrepreneurs' smartphones was used by friends (8.1%), hired technical experts (2.3%) and hired marketing experts (1.2%).
- A high majority (84%) of the women entrepreneurs used English language in their smartphones, little more than one-third of the women entrepreneurs (35.2%) used their regional language, Assamese, and only a small proportion (11.2%) of them used Hindi language.
- Very high majority, i.e. 93% of the women entrepreneurs were self-motivated to use smartphone. On the other hand very minimal percent of women entrepreneurs were motivated by family (5.2%), friends (3.3%), business partners (1.4%), business events/workshops (0.9%), and industry peers/colleagues (0.5%).

- A very high majority (92.0%) of the women acquired their smartphone skills before COVID-19, whereas a small proportion (8.0%) developed their skills during or after COVID-19.
- A high majority of the women entrepreneurs were comfortable in making and receiving calls over smartphone to a great extent (2.8). Majority of them were able to download various apps from Playstore (2.3) and were skilled to capture photos and videos to some extent (2.3). Similarly, women entrepreneurs were able to understand how to share files via Bluetooth, email, messaging apps. (WhatsApp, Facebook messenger, Instagram) to some extent (2.0). Women entrepreneurs were lacking in smartphone skills that were slightly advanced such as managing emails (1.7), scheduling tasks (1.7), troubleshooting basic issues (1.6), adopting new features (1.6), using cloud storages (1.5), and creating documents in Word, Excel and PDF (1.4), having these skills to a less extent.

4.4 Perceived benefits and limitations of smartphone usage in entrepreneurship

- Women entrepreneurs strongly agree on the benefits of smartphone in entrepreneurship in terms of communication with clients from any place through calls, video conferences, and messages (4.2). They further strongly agree about the role of social media in boosting promotion of business (4.1), and how mobile banking apps such as Google Pay, Phonepe, aids smooth transaction (4.1). Women entrepreneurs further agreed on the perception of smartphone creating appealing photos/videos to some extent (4.0). Similarly, they also agreed on how smartphone helps to perform business operations in a flexible manner (4.0). Furthermore, women entrepreneurs agreed on the perceived benefits regarding role of smartphone in staying updated with emerging trends and innovations (3.9), in helping to innovate in business for a competitive edge (3.7) and to balance personal and professional life (3.7). However, perceived benefits regarding role of smartphone in helping to access business related online resources such as market trends/ Stocks/ innovations was neutral by the women entrepreneurs (3.4). They also had neutral perception on the perceived benefit of smartphone regarding usage of cloud storages in effectively managing business related files (3.2).
- Women entrepreneurs agreed on the perceived limitations regarding difficulty of working in small screen of smartphone (4.1). They also agreed that frequent smartphone use causes

physical discomfort (e.g. posture problem, neck & eye strain, head ache) (4.1). They further agreed about how using smartphone limits face-to-face communication. (3.9). Furthermore perceived limitation regarding distractions from business tasks caused due to excessive social media usage was also agreed by the women entrepreneurs (3.8). Similarly, they further agreed that constant connectivity creates pressure to always be available for customers. (3.7). The women entrepreneurs also agreed about smartphones exposing security risks like data breaches and unauthorized access (3.6), followed by influx of information and notifications gets distracting (3.6). However they were neutral about perceived limitation regarding heavy reliance on smartphone causes technical limits (3.6). Women entrepreneurs further agreed on the limitations of difficulty operating advanced features of smartphone (3.4).

4.5 Usage Level of Smartphone in entrepreneurship

- A significant majority (60.4%) of the women entrepreneurs had less usage of smartphone regarding entrepreneurial activities. Whereas little more than thirty percent (32%) had moderate usage of smartphone, followed by only few percent (7.6%) of them had high usage.
- Majority of them (63.2%) spent two to four hours per day on their smartphones. Little less than one fourth (24%) of the women entrepreneurs spent more than four hours per day on their smartphones for business. However very few percent of the women entrepreneurs (11.2%) and (1.6%) spent one to two hours per day, and less than one hours respectively.
- Very high majority of the women entrepreneurs (90%) used voice call for their business operations for most of the times. Nearly eighty percent (75%) of them used video call sometimes for their business. Furthermore, majority of the women used camera (72%) and calculator (81.2%) sometimes in their businesses. Surprisingly, almost fifty percent (48.4%) used facelock/fingerprint/lock pin most of the times in their smartphones. Similarly, little more than half of the women (55.2%) used Internet in their smartphones for business purpose most of the times. Surprisingly, majority of the women (80.4%) never used Google assistant/Siri in their smartphones. Similarly, almost sixty percent (59.6%) of them never used voice based search feature in their smartphone.

- All of the women entrepreneurs were current member of YouTube. Very high majority of the respondents, i.e. (97.6% and 92.8%) were current members of WhatsApp and Facebook. Majority of the women entrepreneurs (64.4% and 60.4%) were current members of Instagram and Facebook Messenger. Google Pay was used by majority (74%) of them most of the times in their smartphones for business operations.
- Nearly forty percent (36.9%) of the women entrepreneurs used Phonepe sometimes. Similar percentage i.e. almost forty percent of them (38.2%) never used the app in their smartphone. Little less than one fourth (20.6%) of the respondents used Paytm most of the time in their smartphones.
- Very high majority of them (96%) were aware about WhatsApp Business app, followed by very high majority (93%) of them were aware about Facebook Marketplace. Equal percentage of the women entrepreneurs (50%) were both aware and unaware about Google Workplace. Almost all of the respondents were unaware of Evernote (98.4%), Square Register (97.6%), Asana (97.6%), Wave (97.2%), Hootsuite (97.2%), Lio (97.2%).
- In terms of age, the findings shows that nearly half of the younger women entrepreneurs (47.1%) used smartphone to a less extent, about forty percent (39.6%) demonstrated moderate usage, and very few percent (13.2%) of the younger women had higher usage of smartphone. In contrast, significant majority (71.1%) of the middle-aged women entrepreneurs had less usage of smartphone, and about seventy percent (67.5%) of the older women showed less usage.
- Regarding education, majority of women entrepreneurs (70.7%) having educational qualification below graduation, showed less usage of smartphone. Little less than one fourth (23.5%) indicated moderate usage, and very few percent (5.7%) showed high usage. In contrast little more than forty percent (42.7%) had moderate usage, nearly fifty percent (47.2%) had less usage of smartphone, and very few percent of them (10%) had high usage.
- Nearly sixty percent (57.1%) women entrepreneurs with businesses of manufacturing nature had less usage, followed by very few percent of them (10%) had moderate usage of smartphone in business. Similarly, almost sixty percent (59.5%) of the women entrepreneurs form service sector had less usage of smartphone, while very few percent of them (8.3%) had high usage. Interestingly, in trade, significant majority (68.5%) of women

entrepreneurs had less usage of smartphone, and very little percent (1.8%) of them reported high usage.

- Majority of the women entrepreneurs (66.6%) with monthly family income less than Rs. 50,000 had less smartphone usage, whereas very few percent (10%) had high usage. Almost sixty percent (59.5%) of the women entrepreneurs with monthly family income higher than Rs. 50,000 had less usage of smartphone.
- Majority of the women entrepreneurs (61.6%) with less entrepreneurial experience had less smartphone usage, while more than one fourth of them (30.2%) had moderate usage, and very few of them (8.2%) reported high usage of smartphone in business. Similarly, about sixty percent (58.9%) women entrepreneurs having high entrepreneurial experience had less smartphone usage, little more than thirty percent (34.1%) had moderate usage, and very few of them (6.8%) had high usage.
- In terms of technological skills, majority of the women (72.7%) with low technological skills had less usage of smartphone. Only one fourth of them (25.1%) were moderate users, and very less percent (1.5%) were high users of smartphone. In contrast, almost about fifty percent of the women entrepreneurs (46.6%) with high technological skills had less usage of smartphone, about forty percent (38.9%) had moderate usage, and about fifteen percent (14.4%) had high usage of smartphone.
- Among the women entrepreneurs with less access to tech friendly resources, majority of them (61.8%) had less smartphone usage. Little more than thirty percent (32.5%) had moderate usage, and only small fraction of them (5.5%) had high usage of smartphone in entrepreneurial activities.
- Regarding fears and security concerns, a high majority (84.1%) women entrepreneurs who were less concerned had less usage of smartphone. Few of them (15.8%) reported moderate usage, and interestingly, none of them had high usage of smartphone. However, about sixty percent (59.8%) of the women entrepreneurs who were more concerned about fears and security concerns, had moderate usage of smartphone, followed by about twenty percent (19.6%) had less usage, and almost similar percent (20.6%) had high usage.
- In terms of challenges faced by the women entrepreneurs, among the women who faced less challenges, a significant majority of them (75.4%) had less usage of smartphone, whereas very few of them (4.54%) reported high usage. In contrast, among the women

entrepreneurs who faced more challenges, little more than thirty percent (31.1%) of them had less usage of smartphone, followed by forty percent of them had moderate usage, and little more than ten percent (11.6%) had high usage of smartphone in their business operations.

4.6 Kruskal-Wallis Test for Differences in Usage of Smartphone in Entrepreneurship

There was significant differences in usage of smartphone in entrepreneurship by the women entrepreneurs in relation to their age and nature of business. Hence, the null hypothesis stating that there is no significant differences in usage of smartphone among the women entrepreneurs in relation to age and nature of business is not accepted.

4.7 Mann-Whitney Test for Differences in Usage of Smartphone in Entrepreneurship

There was significant differences in usage of smartphone among the women entrepreneurs in relation to education, technological skills, privacy and security concerns, and challenges, and hence, the null hypothesis stating that there are no significant differences in usage of smartphone in entrepreneurship in relation to education, technological skills, privacy and security concerns, and challenges in not accepted.

4.8 Usage of Smartphone in Relation to the Communication and networking

With higher extent of usage level (2.3) and collectively majority of the women entrepreneurs used smartphone for communication and networking to an average extent. Usage level of smartphone among women was to some extent (1.6) regarding advertising of products via calls and messages. Usage of smartphone by the women entrepreneurs (1.5) was observed in terms of business email management by sending/receiving/organising emails with the clients, employees and partners. The findings further suggested that the women conducted video calls with clients and colleagues irrespective of time/location to some extent (1.4). Less extent of usage of smartphone (0.8) was seen among the women regarding their participation in any industry or entrepreneurship related webinars or online conferences.

4.8.1 Kruskal-Wallis Test for Differences in Usage of Smartphone in Entrepreneurship in terms of Communication and Networking

There was a significant difference in smartphone usage for communication and networking among the women entrepreneurs in relation to their age. Therefore, the null hypothesis stating that there will be no significant difference in the usage level of smartphones regarding communication and networking in relation to age is not accepted.

4.8.2 Mann-Whitney Test for Differences in Usage of Smartphone in Entrepreneurship in terms of Communication and Networking

Significant differences was found in usage of smartphone for regarding communication and networking among the women entrepreneurs in relation to education, technological skills, access to tech friendly resources, privacy and security concerns, and challenges faced while using smartphone, and hence, the null hypothesis stating there is no significant difference in usage of smartphone for regarding communication and networking in entrepreneurship among the women entrepreneurs in relation to education, technological skills, access to tech friendly resources, privacy and security concerns, and challenges is not accepted.

4.9 Usage of Smartphone in Relation to the Marketing Management

Almost seventy percent (66.8%) of the women entrepreneurs used smartphone to create visually appealing infographics using editing apps to promote enterprise to some extent (1.9). Little more than thirty percent (35.2%) of the women would update their social media pages and websites with offers regarding their products and services to some extent (1.4). Similar percentage of women used smartphone to monitor customer reviews and feedback to some extent (1.3). Little more than forty percent of the women (44.4%) never used smartphone to keep track of products, orders and inventories (1.0).

4.9.1 Kruskal-Wallis Test for Differences in Usage of Smartphone in Entrepreneurship in terms of Marketing and Promotion

There was no significant differences in usage of smartphone in entrepreneurship by the women entrepreneurs in terms of marketing and promotion, in relation to their age and nature of business.

Hence, the null hypothesis stating that there is no significant differences in usage of smartphone in terms of marketing and promotion in entrepreneurship among the women entrepreneurs in relation to age and nature of business is accepted.

4.9.2 Mann-Whitney Test for Differences in Usage of Smartphone in Entrepreneurship in terms of Marketing and Promotion

There was significant differences in usage of smartphone for marketing and promotion among the women entrepreneurs in relation to education, monthly family income, technological skills, privacy and security concerns, and challenges, and hence, the null hypothesis stating that there is no significant differences in usage of smartphone in entrepreneurship in terms of marketing and promotion, in relation to education, monthly family income, technological skills, privacy and security concerns, and challenges in not accepted.

4.10 Usage of Smartphone in Relation to the Social Media Management

Little more than forty percent of the women (44%) used smartphone to some extent (1.6) to constantly showcase their products/services using visually appealing photos and videos. Similarly, almost forty percent of the women entrepreneurs (39.6%) used smartphone to some extent for promotion of products/service on social media irrespective of time/location (1.6). Women entrepreneurs used smartphone to some extent in terms of building strong customer interaction via comments, messages, and mentions on social media posts (1.5) and networking with clients/industry peers through social media groups and communities (1.4). Less extent of smartphone usage among the women entrepreneurs was seen regarding connecting with clients/stakeholders/peers/partners over social media across the globe (1.2), updating self with the trends and market research (1.1), repost and reshare customers feedbacks as a proof of authenticity and credibility (1.0), and collaboration with influencers for partnership and promotions (0.9).

4.10.1 Kruskal-Wallis Test for Differences in Usage of Smartphone in Entrepreneurship terms of Social Media Management

Significant differences was found in usage of smartphone in entrepreneurship by the women entrepreneurs in terms of social media management, in relation to their age. Hence, the null hypothesis stating that there is no significant differences in usage of smartphone in terms of social media management in entrepreneurship among the women entrepreneurs in relation to age is not accepted.

significant differences in usage of smartphone for social media management among the women entrepreneurs in relation to education, technological skills, privacy and security concerns, and challenges, and hence, the null hypothesis stating that there are no significant differences in usage of smartphone in entrepreneurship in terms of social media management, in relation to education, technological skills, privacy and security concerns, and challenges in not accepted.

4.10.2 Mann-Whitney Test for Differences in Usage of Smartphone in Entrepreneurship terms of Social Media Management

There was significant differences in usage of smartphone for social media management among the women entrepreneurs in relation to education, technological skills, privacy and security concerns, and challenges, and hence, the null hypothesis stating that there are no significant differences in usage of smartphone in entrepreneurship in terms of social media management, in relation to education, technological skills, privacy and security concerns, and challenges in not accepted.

4.11 Usage of Smartphone in Relation to the Financial Management

Majority of the women (65.6%) check account balance, fund transfers, pay bills via mobile banking apps to some extent (1.9). The findings also suggested the usage of smartphone to a less extent among the women entrepreneurs in terms of record keeping of business expenses (1.1), schedule payments to vendors/suppliers for goods and services (0.8), accurate pricing, margin, and profitability financial transactions need the use of calculators and conversion tools. (0.7), and research on investors, credits, loans, and other financing opportunities. (0.6).

4.11.1 Kruskal-Wallis Test for Differences in Usage of Smartphone in Entrepreneurship in terms of Financial Management

There was significant differences in usage of smartphone in entrepreneurship by the women entrepreneurs in terms of financial management, in relation to their age. Hence, the null hypothesis stating that there is no significant differences in usage of smartphone in terms of financial management in entrepreneurship among the women entrepreneurs in relation to age is not accepted.

4.11.2 Mann-Whitney Test for Differences in Usage of Smartphone in Entrepreneurship in terms of Financial Management

Significant differences was found in usage of smartphone for financial management among the women entrepreneurs in relation to education, technological skills, privacy and security concerns, and challenges, and hence, the null hypothesis stating that there is no significant differences in usage of smartphone in entrepreneurship in terms of financial management, in relation to education, technological skills, privacy and security concerns, and challenges in not accepted.

4.12 Fears and Privacy Concerns regarding Smartphone Usage

Majority of the women entrepreneurs (73.6%) used smartphone to some extent in terms of setting up biometric authentication features such as fingerprint or facial recognition to prevent unauthorized access (2.0). Almost similar percentage of women (70.6%) wear mindful of using banking apps to some extent (2.0). Again, majority of them (63.6%) would keep their phones updated with latest softwares to some extent (2.0). Half of the women showed concern about protecting customer data in their smartphones to some extent (2.0). Women were also mindful of privacy settings of downloaded apps to some extent (1.5), and were hesitant to use mobile banking apps to some extent (1.4).

4.13 Challenges Related to Smartphone Usage in Entrepreneurship

- While using smartphone, women faced challenges regarding their smartphone having poor battery life to some extent (1.1) and the issue of overheating to some extent (1.0).

Furthermore, the women faced challenges to a less extent regarding poor camera quality (0.8), slow phone performance (0.8), apps crash (0.7), and damaged screen (0.4).

- The women entrepreneurs faced challenges to a great extent while using smartphone in terms of unstable network connection (1.5). They faced problem regarding slow network speed in their smartphones to some extent (1.4). The women faced problems to a less extent in terms of limited access to websites and apps (0.7), poor Wi-Fi connection (0.6), and unstable Bluetooth connection (0.5).
- The women faced the challenges to a great extent in terms of fear of virus/malware attacks in smartphone (1.8). They faced challenges to a great extent regarding the anxiety for unauthorized access to personal/business data (1.6) financial fraud (1.6), fear of device/data loss (1.6), and poor device security (1.5).
- The women faced challenges to a great extent in terms of lack of technical knowledge (2.0). The women entrepreneurs also faced difficulty to keep up with the budget-based tech resources (2.0). They further faced issues to a great extent in terms of various health concerns such as insomnia, fatigue, poor posture, headache, eye and neck strain etc. (1.8). The women also faced problems in trusting softwares and apps to a great extent (1.8). Information overload (1.4), difficulty maintaining work-life balance (1.3) and smartphone addiction (1.0) were other challenges faced by the women to some extent in their smartphone usage.

5. Conclusion

In the digital era, smartphones have become a boon for the women entrepreneurs, offering efficiency, connectivity, and convenience. For them, smartphones are beyond communication devices, and has proved to be a medium of empowerment, access and business growth. As smartphones has become increasingly embedded in the day to day lives of the people, the present study reveals the efficacy of its usage among the women entrepreneurs, especially in an urban setup, considering various demographics, and how they have integrated the technology in the entrepreneurial ecosystem.

The findings of the study revealed that although all the respondents own a smartphone, the results show that there are significant differences in the extent and intensity of use. The majority of female

entrepreneurs are sole proprietors running micro enterprises, predominantly in the manufacturing sector. Even while smartphones are being used for important commercial tasks, such as communication (voice calls and messaging), product photography, social media marketing (via Facebook and WhatsApp), and digital payments (primarily through Google Pay), their use were still mostly limited to the most fundamental operations. Complex smartphone functions such as managing emails, cloud storage, business tools, content creation (editing photos/videos, using reels, shorts etc.), scheduling tasks were rarely used by majority of the women entrepreneurs. Although the basic functions such as communication via calls, messages, and social media were mostly found common among the women entrepreneurs, however their shift to a functional and productivity oriented usage was limited. Majority of the women were mostly unaware or lacked the confidence of using professional apps such as Canva, Zoho CRM, Google Workspace, or Trello, indicating a distinct gap regarding lack of exposure and technological skills.

Furthermore, the study also found that the usage of smartphone among the women entrepreneurs was critically influenced by the education level and technological skills. Women with higher educational qualification and greater technological skills showed significant usage of smartphone for a different business tasks. However, even among this group, high usage level of smartphone was not prevalent, implying without access to structured learning or encouragement, education cannot solely ensure the women into delving deeper into the digital domain of entrepreneurship. This further draws the attention to the findings that majority of the women were self-motivated to use smartphone for business, but most of them never attended any digital or business training programmes, highlighting a serious lack of formal support and institutional exposure**.** Additionally, compared to their middle-aged and older adults, younger female entrepreneurs comparatively used smartphones more frequently, and those who had greater access to contemporary digital infrastructure—like 5G connectivity or more updated smartphones—also showed higher levels of engagement.

Additionally, the study found statistically significant differences in smartphone usage by age group and nature of business, suggesting that business and demographic characteristics are important in determining patterns of digital engagement among the women entrepreneurs. Smartphone usage was found relatively greater among entrepreneurs in the service sector and younger age groups, but it was lower among those in the manufacturing and trade sectors.

Although women entrepreneurs acknowledged the advantages of smartphone use in entrepreneurial sphere, such as enhanced flexibility, better customer communication, simpler digital payments, and inexpensive advertising, they however also faced multiple challenges while using the smartphone technology, including physical discomfort (eye strain, bad posture), social media distractions, trouble using small screens for complex tasks, and security concerns. Significantly, people who used smartphones more often also reported more digital issues, indicating that high levels of engagement are associated with higher demands for technical expertise and digital management skills.

Smartphone technology were highly valued and acknowledged in the entrepreneurial domain by the women entrepreneurs in the present study. However, its full potential as medium of business growth remains underutilised. Addressing the gaps and challenges among the entrepreneurs would make them confident and skilled in shifting their usage of smartphone from basic communication tools into advanced and strategic set of endowment for making their business flourish in terms of professional growth, innovation and sustainability. Focusing on strengthening the technological field among the women-led businesses, starting from smartphone, would become a vital factor in contributing in the economic growth and gender-equitable progress.

6. Recommendation for further studies

1. A comparative study may be carried out to study the smartphone usage pattern among the rural and urban women entrepreneurs.
2. A study may be carried out to assess the gender-based differences in smartphone usage pattern among male and female entrepreneurs.
3. A similar as well as comparative study may be carried out in other demographic or geographical regions.
4. A target oriented project may be taken up to design and implement skill development oriented trainings among women entrepreneurs to focusing on the integration of advanced smartphone features, and business tools.
5. Variables such as psychological factors, cultural factors, government/policy awareness, legal and regulatory awareness may be included for further research studies.

6. An action research project can be taken up in collaboration with women entrepreneurs to develop apps catering the local business needs. Organisations such as NEDFi, Indian Institute of Entrepreneurship, NEWEA etc. can be approached.
7. A study on usage of government apps and schemes can be conducted to assess how effective they are for smartphone owned women entrepreneurs.

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