

Title

A Thematic Analysis of the Barriers and Challenges Confronting Women Entrepreneurs in Digital Technology Adoption in Indian MSMEs

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Abstract

The Micro, Small, and Medium Enterprises (MSME) sector plays a crucial role in India's economic development by driving employment, innovation, and industrial growth. However, women entrepreneurs within this sector continue to face persistent challenges that limit their participation and success. This study investigates the barriers and challenges confronting women entrepreneurs in Indian MSMEs using a qualitative research design. Data were collected from 48 women entrepreneurs through semi-structured interviews employing snowball sampling. Thematic analysis conducted with QSR NVivo 15 software revealed six key themes: limited digital skill acquisition, difficulties in adopting technology, challenges in responding to market dynamics, inadequate policy support, restricted access to networks and mentorship, and enduring gender-based stereotypes and safety concerns. These findings highlight the structural, sociocultural, and institutional constraints that hinder the growth and competitiveness of women-led enterprises. The study underscores the need for targeted interventions such as inclusive digital training programs, gender-sensitive policies, and supportive entrepreneurial ecosystems to enhance women's engagement in the MSME sector and contribute meaningfully to India's economic progress.

Keywords: Women entrepreneurs, MSMEs, Digitalization, gender skills gap, upskilling, reskilling.

Word Count

6114

1. Introduction

In recent years, the rise in technological advancement have necessitate the business environment to reshape and offering new opportunity to the entrepreneurs. Technological advancement provide opportunity to explore and generate new and innovative ideas for scaling the businesses (Cassetta et al., 2020). Rapid globalization and technological breakthroughs have compelled organizations to adopt digital technologies to gain market competitiveness. These changing technologies necessitate the adoption of digitalization in the business operations to ensure quality services, (Gellerstedt and Arvemo, 2019). In today's digitalized world, the success of the business is dependent on innovation. MSMEs generating 120 million jobs and contributing 33 percent to India's GDP due to which it is widely recognised as the primary economic support system of India. MSMEs contributing to 633.9 lakh business in India, with micro- enterprises constituting over 99 percent i.e., 630.5 lakh enterprise. Medium-sized businesses, comprising merely 0.01 percent of all MSMEs, account for 0.05 lakh enterprises, whereas small businesses constitute 0.5 percent, i.e., 3.3 lakh enterprises. There are primarily 324.9 lakh businesses in rural areas, while urban areas include 309 lakh businesses (Forbes, 2024). The Udyam portal listed 2,775,390 women-led MSMEs as of March 2023. This figure has surged to 4,667,278 by January 2024, marking a remarkable 68.17 percent increase. This notable trend highlights the rising number of women entrepreneurs in the MSME sector. As digitalisation is an important element in every aspect, its importance in small business ventures cannot be ignored (Nambisan et al., 2019). Over 71 percent of women engaged in MSMEs retail industry have adopted digital technologies in varying extents (Economic Times, 2023; PayNearby, 2023). This shows the significant importance of digital connectivity for the people and businesses.

Technology provides women entrepreneurs a tool to empower themselves and act as a catalyst. Traditionally women usually engaged in either in farming activities and household chores, due to which their contributions were ignored for several years. However, entrepreneurship enabled women to achieve financial and economic independence (Chhetri, 2023). Digitalisation provide women to work in a conducive environment and continue to pursue their entrepreneurship (Suseno and Abbott, 2021). Some scholars have termed the digitalisations as emancipation (McAdam et al., 2020) because it provides the low entry barriers compared to traditional businesses. By using the technology, they can leverage numerous advantages such as they can do business with flexible work hours while simultaneously taking care of their family (Ughetto et al., 2020). In addition to it, provide them information of the market (Hair et al., 2012), reduce operating expenses and can expand their network by using social media (Nambisan, 2017).

However, women entrepreneurs face challenges when using digital tools and technologies. The digital divide is still an issue, particularly for women residing in rural and semi-urban areas who may lack the required business management and digital skills. Previous research indicates that female entrepreneurs are not as proficient as their male counterparts in adopting and utilizing digital technologies such as marketing, product and brand development, and entrepreneurial digital competencies (Kamberidou, 2020). In addition, women entrepreneurs in developing countries face challenges in digital competency and access due to inadequate social policies (Kamberidou, 2020). These studies argue that despite the evolving digital environment, women entrepreneurs still continue to face many obstacles emphasizing the need for implementing laws that promote women's participation in digital entrepreneurship (Malik, 2017). Khaire (2011) emphasizes the role of government in establishing the benefits of national

communities and highlights the role of statutory policies for empowering women and their entrepreneurial advancements. Despite their efforts women entrepreneurs continue to face challenges in the business environment, especially for the adoption of the technology and usage (Mehta, 2022). According to Marlow and McAdam (2013), it has been a notion that businesses led by women are frequently perceived as underperforming.

Thus, there is a pressing need for comprehensive research into the challenges faced by women-owned MSMEs in utilizing digital technologies. Though previous research has focused on the barriers and challenges faced by women entrepreneurs in general, but limited studies that explores the role of technology played in entrepreneurial journey of women entrepreneurs specially in developing context like India (Shukla and Kushwah, 2025). This study investigates the issue using Human Capital Theory (Becker, 1993), which highlights how a person's skills, knowledge, and learning experiences play a key role in their ability to succeed. In this context, the theory helps us understand why many women entrepreneurs struggle to use digital tools in their businesses. It is not just about lacking access to technology or infrastructure often; the deeper issue is that they have not had enough chances to build the skills or receive the training they need to confidently and effectively use digital platforms. These missed opportunities limit their ability to grow in the digital world.

To explore this issue, the study poses the following research question:

What are the key barriers and challenges faced by women entrepreneurs in Indian MSMEs in adopting and utilizing digital technologies?

To answer this, the research draws on qualitative interviews with women entrepreneurs in Uttar Pradesh, a state selected for its economic diversity and strong MSME presence.

this paper uses a thematic analysis approach to center lived experiences of women. By doing so, it provides deeper insight into the structural and personal hurdles that hinder women's digital inclusion and explores how these can be addressed through targeted support.

To address the issue, this study is structured as follows. The following section includes a literature review that explores the relationship between women entrepreneurship and digitalisation, the role of women in the MSME sector, and the challenges they face in adopting digital technologies. This is followed by the methodology section, which outline the process of designing the questions for conducting the interview and the process of data collection as well. The subsequent sections provide a detailed analysis of the data, followed by the key findings, discussion and Implications along with suggestions for future research and limitation of the study.

2. Literature review

2.1 Women entrepreneurs and Digitalisation

Digitalisation is a foundation for today's competitive environment. The advancement of digital technology has made it necessary to integrate it in every aspect of life. From business to household, technology is everywhere and its usage is unavoidable. In today's world technology is not an option but a necessity. Digitalisation provide an advantage to create, share and disseminate the concerned information at any time and from any part of the word. The increasing technological advancement provide new ways to perform the business activities.

Increasing advancement in digital technologies provide an opportunity for women- led entrepreneurship (Suseno and Abbott, 2021). Women entrepreneurs has been considered as an important pillar for economic development as they create employment not only for them but also for the others (Sharma, 2018). Women entrepreneurs these days are more open to use technologies compared to previously. Due to its pervasive advantages digital platforms become popular mostly in marginalized group of people such as female entrepreneurs (Kapoor and Agarwal, 2017). The digital technologies such as digital platform like business websites, social media platforms etc are widely encouraged to use these days because of its easy usage and economical to use. (Högberg, 2018) and apart from these benefits such as flexible working hours and transportation cost has been reduced (Ughetto et al., 2020). Entrepreneurs have started adapting to new technologies and started incorporating its usage in their daily operation. Digitalisation also provide an opportunity to create the innovative products (Nambisan et al., 2019). Though every business aims to scale their business to larger level. Those business which are adaptive to the changing environment such as adopting to the digital technology are more likely to sustain. Entrepreneurs are adaptive to digital technologies as it helps them in generating new opportunities, helps in showcasing their products by marketing it through social media, and also helps them in maintaining the transactions of the business (Sharafizad, 2016). With the growing body of knowledge in this area few studies have explored the intersection of women entrepreneurship and digital platforms (Pergelova et al., 2019).

Some researchers also highlight how digital technology helps in surpassing the gender bias that women entrepreneurs usually face (Elam et al., 2019). Digital technology provides an opportunity specially to those women entrepreneurs who struggle financially and socially due to traditional cultural norms rooted in the society hinder their progress (McAdam et al., 2019). The importance of technology has been evident at the time of COVID 19 when all the businesses were shut down due to pandemic, but only those business were able to survive those who adopts the technology to operates (Alhothali and Al-Dajani, 2022). The term human capital was introduced from the economic concepts of “capital” means something that provide some output such as income (Becker, 1993). This study relied on the human capital theory defined as the range of set skills and knowledge that has been acquired by an individual either through training, or education or through one’s experiences (Becker,1993), which resulted in increase in firm performance (Coleman, 2007). Thus, Digitalisation provide an edge to the business by leveraging the benefits of using technology in the business.

2.2 Women entrepreneurs in MSMEs

Women entrepreneurs have been recognized as essential catalysts for inclusive economic growth and innovation. Their participation in the MSME sector is crucial for harnessing untapped talent and promoting community-level development. Nevertheless, despite increased attention, women-owned MSMEs continue to face deep-rooted structural, institutional, and socio-cultural obstacles that impede their growth and digital adoption. Nayak et al. (2025) assert that characteristics, including self-confidence, increased motivation, and risk taking, as well as external factors such as financial accessibility and socio-cultural context, substantially impact entrepreneurial success. Their research on Indian women entrepreneurs emphasizes that digital competencies, access to training, and supportive institutional frameworks are essential for the establishment of MSMEs. Digitalization act as an enabler for these women entrepreneurs. Suseno and Abbott (2021) highlight that digital platforms increased women empowerment by providing flexibility, market access, and increase cost effectiveness. Kamberidou (2020) mentioned that a persistent digital divide, especially in rural areas, restricts

women's full participation. A significant number of women entrepreneurs lack the necessary technical skills or digital infrastructure to utilize technology effectively (McAdam et al., 2020; (Shukla and Kushwah, 2025).

Women entrepreneurs are significantly engaged in the micro-enterprise sector within the Indian MSME environment. Although more women are contributing in the MSME sector in Odisha, they still face major hindrances such as low financial awareness, limited access to funding, and cultural barriers (Senapati et al., 2024). Economic empowerment of women entrepreneurs is strengthened by the factors such as employability, decision-making capacity, and having financial control. Similarly, Sanu et al. (2021), in a comparative analysis, mentioned that even though women-owned MSMEs generate more employment, they tend to earn less profit than those run by their male counterparts. This gap is largely due to unequal access to resources, family responsibilities, lack of prior business experience, and weak institutional support. Access to financial services is a vital facilitator of women's business growth. Martín García Moritán (2020) emphasizes that financial inclusion, beyond mere credit access, required financial literacy and the implementation of digital finance to empower women in micro, small, and medium enterprises (MSMEs).

2.3 Barriers and challenges to women entrepreneurs in digitalisation

Digitalisation has opened the new ways for businesses, specially the MSMEs, it has the potential to provide new opportunities for businesses to thrive by enabling it to become competitive and innovative. Though the digital technology provides a wide range of advantages, despite few researches also highlights the challenges associated with it. (Barba-Sanchez et al., 2007) argued that as small businesses associated with small groups, when incorporating digital technologies, they faced the challenges of balancing both things. Women entrepreneurs especially engaged in small businesses often are not very skilled. Several studies have shown that small business owners struggle with the knowledge and skills related to digital technologies (Olsson and Bernhard, 2021). Previous studies also highlight that digital competences of women entrepreneurs are lacking compared to their male counterparts (Kamberidou, 2020). Due to lack of educational and technical skills women have, they are less likely to obtain the benefits from technology (Oggero et al. 2020). Even though women entrepreneurs lack in digital competencies (Panta and Thapa, 2018), some women who adapt the technologies faced online sexual harassment when using technology (Michota, 2013). According to the Alliance for Affordable Internet (2021), women have generally engaged less with digital technology and perform fewer activities compared to men.

3. Methodology

This study was conducted to explore the challenges faced by women in their entrepreneurship journeys within Indian MSMEs in using the technology. For this purpose, an interview questionnaire was developed that helps to guide the interview. Qualitative data was collected from women entrepreneurs using a semi-structured interview. A qualitative approach helps in understanding individual's beliefs, and experiences, and also allows participants to express their views on the subject matter (Shastri et al., 2019). Based on the study variables, an extensive review of relevant literature was undertaken, and after a comprehensive analysis, pertinent questions were prepared to align with the study's problem statement. Following multiple rounds of revisions, the questionnaire was finalized, incorporating both open-ended

and closed-ended questions. The questionnaire comprised of two sections: Section 1 gathers demographic information about respondents, while Section 2 examines the barriers and challenges experienced by women entrepreneurs in using technology. The final questionnaire was reviewed by two subject matter experts in the field.

3.1 Process of Data Collection

Uttar Pradesh has been chosen for collecting the data, as this state ranks as fifth largest state contributing to women entrepreneurs in MSMEs (Ministry of Micro, Small and Medium Enterprises, 2024). Apart from this state has wide socio- economic diversity, and traditional gender norms, and different range of business as cultural heritage, making it as an ideal setting to investigate challenges and barriers faced by women entrepreneurs in adopting the technologies within MSMEs sector. The first phase of interview was conducted from August 1 to August 12, 2024, and the second from October 3 to October 14, 2024. Women entrepreneurs who manage or own MSMEs in India and are actively involved in their business operations were selected as participants. The study encompassed all segments of MSMEs—Micro, Small, and Medium. To gather contact information for potential participants, institutions such as District Industries Centres (DIC), NABARD, and IIIT Lucknow were approached. These organizations provided lists of women entrepreneurs, and snowball sampling was then used to gain additional referrals from the women entrepreneurs. Out of 86 women entrepreneurs initially approached, 48 agreed to participate: 17 via DIC, 12 through NABARD, 6 from IIIT Lucknow, and 13 through referrals. Table 1 presents a brief demographic background of the respondents. Ritchie et al. (2003) and Sandelowski (1995), suggest that qualitative sample sizes for large studies typically fall below 50, the sample size was deemed appropriate. Participants were contacted by phone before the study, informed of its purpose, and offered a choice to be interviewed either at their office or home based on their convenience. Consent was obtained prior to the start of the study. To ensure confidentiality, each respondent was assigned a code (e.g., W1, W2). Interviews, lasting approximately 40 to 50 minutes, and were conducted in the participants' preferred language (Hindi or English) and recorded with their permission.

Table 1. Demographic profiles of entrepreneurs

Respondents	Age	MSMEs	Sector	Educational qualifications
W1	21	Micro	Edtech	B. Tech. Final Year student
W2	22	Micro	Food Industry	Graduate
W3	26	Micro	Technology	BBA
W4	34	Small	Healthcare and wellness	Masters in law
W5	31	Micro	Healthcare	M.Sc.
W6	62	Medium	Hotel Industry	M.COM, Ph.D.
W7	51	Small	Manufacturing	BBA Honours
W8	25	Micro	Handicraft	BA
W9	28	Micro	Handicraft	10th class
W10	39	Small	Textile	Masters

W11	42	Micro	Retail	MSc
W12	25	Micro	Handicraft	12 th class
W13	21	Micro	Fashion boutique	10 th class
W14	58	Small	Manufacturing	B. ED & MA in literature
W15	69	Medium	Handicraft	MBA
W16	55	Small	Handicraft	MA Economics
W17	29	Micro	Salon	12th
W18	33	Micro	boutique	Graduate
W19	54	Small	Textile	Post Graduate in Mass Communication
W20	66	Micro	Wooden Handicraft	2 nd class
W21	24	Micro	Tailoring	Graduate
W22	27	Micro	Retail store	BA
W23	31	Micro	Food processing	Bachelors in fine Arts
W24	42	Small	Handicraft	PhD scholar
W25	36	Small	Handicraft	None
W26	22	Micro	Salon	11 th class
W27	49	Small	Women and child health care manufacturer	5 th class
W28	55	Micro	Handicraft	Graduate
W29	27	Micro	Handicraft	B. Com
W30	29	Micro	Handicraft	ITI
W31	32	Small	Handicraft	11 th
W32	54	Small	Dairy and Agriculture farming	Fashion Designing, MA in sociology and MBA
W33	47	Micro	Photo studio	None
W34	33	Micro	Courier service	Graduate
W35	29	Micro	Textile	Graduate, PGDCA
W36	52	Micro	Manufacturing	8 th class
W37	27	Micro	Handicraft	MA sociology
W38	64	Medium	Handicraft	Graduate
W39	51	Micro	Handicraft	B.SC
W40	23	Micro	Hotel	Graduate
W42	60	Micro	Parlour	7 th class
W43	25	Micro	tailoring	Graduate
W44	28	Micro	Cosmetic shop	12 th class
W45	51	Small	Manufacturing	M.Phil.
W46	55	Small	Textile	Post graduate
W47	47	Micro	Handicraft	9 th class
W48	29	Micro	Handicraft	BA

3.2 Data Analysis

The study conducted thematic analysis of the data with interviews transcribed verbatim and analysed using NVivo 15 software. NVivo software helps in organizing, analysing, interpreting, and visualizing the data. The data analysis followed Braun and Clarke's (2006) six-step method:

- (1) Understanding the data: The Initial step is to become familiar with the data, by reading and re- reading the interview transcripts. By doing so, it helps in understanding the entire data, and helps in writing down the important key points from the data.
- (2) Generating initial codes - Key points were identified, and similar information was organized under specific codes. After thoroughly reviewing the dataset, the transcripts interview was grouped into distinct codes.
- (3) Identifying relevant themes - The codes were grouped into possible themes, with all related information collected under each theme. The transcripts interview has been reviewed to identify these themes.
- (4) Analysing the themes- The themes were reviewed to ensure that each one accurately matched its relevant codes.
- (5) Defining and naming the themes- Transcripts have been continuously analysed to refine and clearly define each theme, reviewing categories and subcategories to ensure clarity and connection.
- (6) Producing the results- In the final analysis, clear extracts were selected to connect findings to the research question and existing literature. Themes, categories, and sub-categories were finalized, with data organized under each to ensure consistency and interconnections. Themes and codes were compared with transcripts to identify any missing data, and coding was refined in an iterative process until consistency was achieved (Miles and Huberman, 1994).

Figure 1 below presents a detailed flowchart illustrating the proposed research methodology, encompassing each step undertaken from the initial design and development of the research instrument through to the comprehensive data analysis procedures. This diagram provides a structured overview of the methodological approach, offering insight into the sequential stages of instrument formulation, data collection, and subsequent analytical techniques employed to ensure the rigor and validity of the study's findings. The emerged themes from the analysis are presented in Figure 2. Figure 3 presents the word cloud generated through analysis conducted using NVivo 15 software. The word cloud highlights the most frequently occurring terms within the interview transcripts, with prominent words including "technology," "lack," "access," "digital technology," and "training." These terms reflect key areas of concern and discussion among the participants. The thematic framework developed from the qualitative data analysis in NVivo 15 is illustrated in the Figure 4. This framework includes the primary themes, sub-themes, and their interrelationships, offering a comprehensive representation of the patterns and concepts that emerged during the analysis. The interconnectedness of these themes underscores the complexity and depth of the participants' experiences and perceptions.

Table 2 presents illustrative quotations that illustrate each theme, which are explored in greater detail in the subsequent sections.

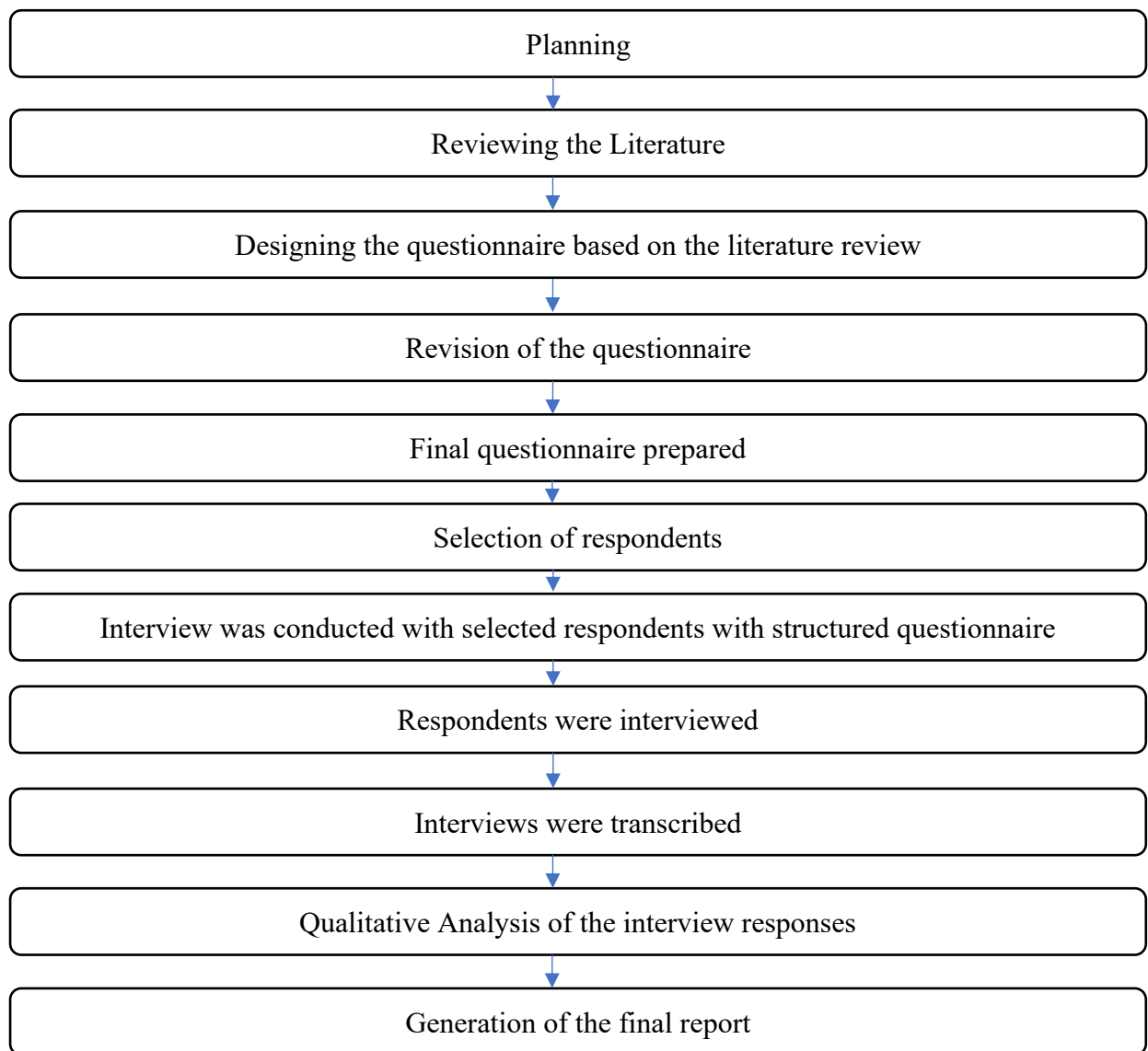


Figure 1: Flowchart of the steps involved in the methodology of the study

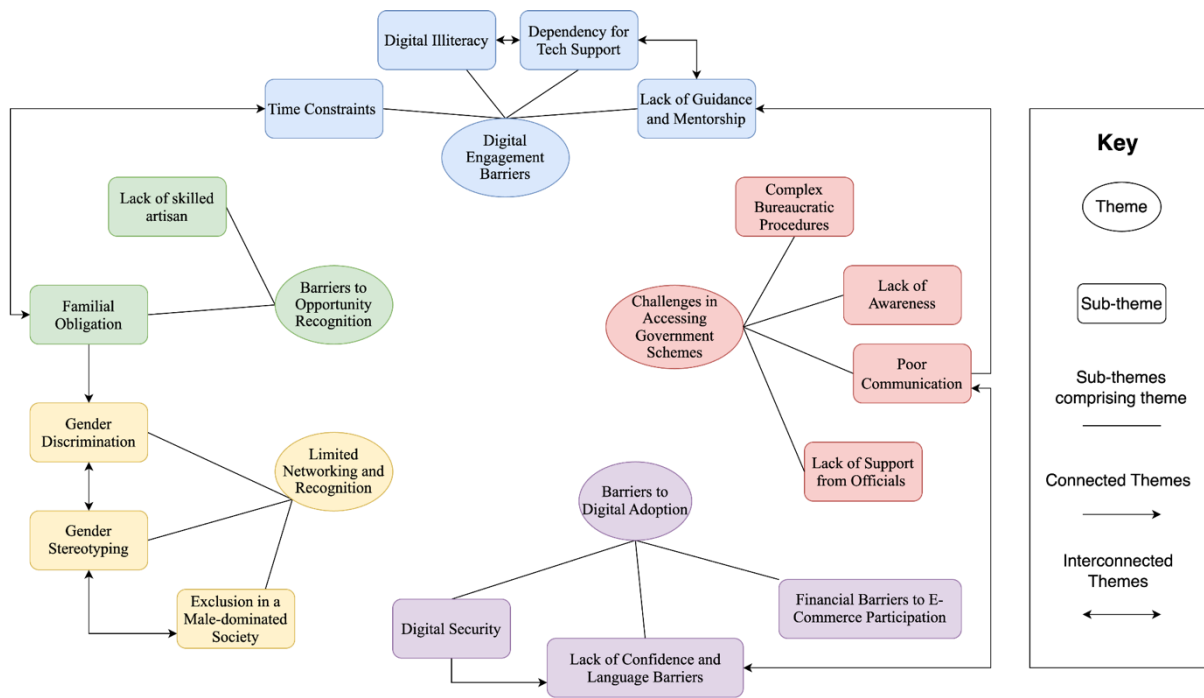


Figure 4. Visual Representation of Generated Themes and Sub-themes with Mapping

Table 2. Data, categories and aggregate themes

First order codes	Second order codes	Broader themes
<i>"I don't know how to use technology for my business, running an online business is a challenging task for me because I don't have much knowledge of online channels, such as using social media for my business, and I face challenges in registering my business on the e-commerce platform, and due to financial constraints, I cannot afford to make my own business website."</i> <i>"In our time, technology was not prevalent, and that's why I don't have digital literacy, I am on social media platforms, but my children handle this, and I don't know much about it."</i> <i>"Due to a lack of time and guidance, I struggle with using digital apps and doing business on social media platforms."</i>	Digital illiteracy Dependency for tech support Time constraints and poor guidance and mentorship	Digital Engagement Barriers
<i>"I am not very aware of new business opportunities because I have very few connections, and also, I have small kids, being a woman, the responsibility to take care of my family lies on me, and due to this, I don't have much time to connect with business networks."</i> <i>"In the handmade chikankari field, skill is crucial because it involves detailed embroidery. One of the main challenges is</i>	Familial obligation Lack of skilled artisan	Barriers to Opportunity Recognition

<i>finding skilled workers, as even a small mistake can ruin a design and affect the quality of our products."</i>		
<i>"My experience with accessing government schemes has been very bad. The officials are very rude and provide no help with funding or training. They don't give any information and treat me unfairly."</i> <i>"Government schemes are very diplomatic and much more documented. The process is full of red-tapeism, it needs to be more organized and should be with fewer terms and conditions."</i> <i>"We don't have information about government schemes and programs, which is why we are unable to avail the benefits. And we miss the chances."</i>	Lack of Support from Officials and poor communication Complex Bureaucratic Procedures Lack of awareness of government schemes	Challenges in accessing government schemes
<i>"Being a business woman, I often face challenges while networking because of gender prejudices and underrepresentation of women in business."</i> <i>"I struggle a lot with the prejudice, people make of me, they underestimate my capabilities, and they perceive me as less capable than them. I work in a dairy and agriculture business, where I used to go to cattle sheds and in village fields for my work, where I interact with the farmers for business purpose, and they make prejudice statements,</i>	Experiencing gender discrimination Gender stereotyping and undermining women's skills	Limited Networking and Recognition

<i>and sometimes do not take me seriously as a women entrepreneur."</i> <i>"Yes, I am in manufacturing field and I feel excluded in networking in my field, where the ratio of women is quite less."</i>	Exclusion in a male-dominated society	
<i>"I experienced a cybersecurity incident when I lost my 50,000 Rs last year, they scammed me, and I lost my money. I am terrified by the incident. Since then, I have been in shock and have stopped using the online payment apps."</i> <i>"I face challenges with technological skills and lack knowledge in using online platforms. I am not confident in using the internet, and most of the digital content is in English, which is a major challenge for me."</i> <i>"I tried to make my product listed on the e-commerce platform, but they demanded extra charges to showcase my products on the website, which is a significant challenge."</i>	Fear of data security issue Lack of confidence and Language Barriers Financial Barriers to E-Commerce Participation	Barriers to Digital Adoption

4. Findings and Discussion

The experiences shared by women entrepreneurs in this study highlight how personal responsibilities, social expectations, and institutional challenges all come together to shape their ability to use digital technologies in their businesses. As we analyzed the interviews, a number of key issues became clear. These challenges relate to the Human Capital Theory, which suggests that people's success in work or business depends on the skills, knowledge, and experiences they gain over time (Becker, 1993). For many women running MSMEs, opportunities to build these skills are often missing due to wider structural issues. The next sections examine these limits in further detail as they relate to their daily endeavor to adopt and use digital tools.

4.1 Digital Engagement Barriers

4.1.1 Digital illiteracy

Many women in the study shared that they struggle with basic digital tasks like using social media or signing up on e-commerce platforms. These are not just individual issues; rather, they indicate a wider gap in access to digital training and education, particularly in rural and semi-urban regions. Human Capital states that while it is clear that basic digital skills are crucial in today's business environment, still many people lack them. Many women entrepreneurs' states that,

"I have been running my business offline because I struggle with digital technology. I have faced many challenges trying to learn it, and despite several attempts, I often find it overwhelming and complex. It is been frustrating, which is why I have stuck to running my business offline." (W5, W27, W46).

A 36-year-old women entrepreneurs states that,

"Due to my limited technical skill set, such as navigating social media platforms, digital marketing, and using online software for business operations, I have struggled to scale my business. These skill gaps have made it challenging to reach a broader audience and take full advantage of digital opportunities." (W25).

4.1.2 Lack of access to digital Infrastructure

Inadequate access to internet services and devices such as smartphones or laptops emerged as another critical barrier. Many women entrepreneurs rely on basic keypad mobile phones and experience poor network connectivity. This lack of access strengthens their exclusion from digital learning and online business environments. These infrastructural challenges limit opportunities to gain digital exposure and practical experience which are the key components in building human capital.

Few women entrepreneurs' states that,

"I come from a rural area where I only have access to a basic keypad mobile phone, and the network coverage is poor. This lack of digital resources and connectivity has kept me distanced from the digital world, limiting my ability to access online opportunities." (W22, W41, W36).

4.1.3 Fear in using technology

Fear of making mistakes or losing money online was frequently cited by participants. This problem frequently results from a lack of experience and confidence when utilizing digital platforms, which is caused by a lack of educational opportunities. According to human capital theory, individuals find it difficult to gain confidence when applying new skills if they don't have any experience. Therefore, fear is a reflection of lost opportunities to become digitally fluent.

A 47-year-old women entrepreneurs states that,

"I run a small parlour, and I have noticed that many other businesswomen in my field are embracing digital technology for their business. However, I am held back by a fear of making mistakes. I worry that if I make a costly error, I won't be able to recover from it." (W 33)

4.1.4 Dependency for tech support

Many women shared that they rely on children, spouses, or hired help to manage digital tasks. This dependency reflects a gap in informal learning and peer-driven knowledge sharing. Human Capital is not only built in formal settings it is also acquired through mentorship, observation, and practice, all of which are lacking in these cases.

A 42- year-old women entrepreneurs shared her experiences,

"I rely heavily on my staff and family for technology-related tasks because I'm not comfortable handling it myself. They manage everything from updating the website to dealing with social media, as I'm not familiar with the digital tools."(W11)

4.2 Barriers to Opportunity Recognition

Balancing household responsibilities with pursuing business restricts time and energy that could otherwise be invested in learning digital tools or exploring new business strategies. This restricts the development of human capital's experience and cognitive components.

4.2.1 Familial obligations

"I am a small manufacturer and retailer of chikankari apparel, and my slower shift to online sales has put me at a disadvantage. I missed valuable opportunities to reach customers who prefer the convenience of shopping online, and my familial obligations further delayed my transition, making it even more challenging to adapt to the digital market."(W12)

4.2.2 Lack of skilled workers/ artisans

Numerous women operating product-oriented MSMEs reported challenges in sourcing trained workers. It affects overall productivity and innovative capabilities, constraining growth potential. A shortage of skilled people signifies problems in overall human capital in regional entrepreneurial ecosystems.

"In the handmade chikankari field, skill is crucial because it involves detailed embroidery. One of the main challenges is finding skilled workers, as even a small mistake can ruin a design and affect the quality of our products." (W47)

4.3 Challenges in accessing government programs

Women entrepreneurs are continuously encouraged by the government (Liñán et al., 2020). However, they encounter numerous challenges in accessing these schemes and policies, Bardasi et al. (2011) emphasised that women entrepreneur faced challenges such as unsupportive official and lack of effective institutional framework. Similar challenges faced by the women entrepreneurs in the study as given below

4.3.1. Lack of awareness of govt schemes and policies

Many respondents reported they were unaware of digital training or financial support schemes provided by the government. This gap in access to institutional knowledge directly affects the ability to develop relevant entrepreneurial skills.

"I currently have little knowledge about the government-funded schemes, policies, and training programs available to support my business." (W17, W44).

"A few years ago, I considered applying for government schemes, but the process seemed too tedious and involved a lot of paperwork, which made me decide to skip it altogether." (W22, W43, W9).

"Officials are often unhelpful, providing little information about government schemes or stalls, and often expect bribes when asked about the stalls and exhibitions process." (W38).

4.3.2. Complex training programs

Women reported that the training curriculum was either very advanced or not aligned with their basic understanding. The absence of adaptive training hinders significant skill advancement.

"A few months ago, I attended a government training session on social media. However, without basic computer knowledge, I found the content too challenging and technical to understand." (W21)

4.4 Limited Networking and Recognition

Social and professional networks provide access knowledge, mentorship, and business opportunities. The women entrepreneurs in this study experienced difficulty creating such networks due to gender bias and exclusion from male-dominated settings. Human Capital Theory promotes formal and informal learning, therefore limiting networking lowers experiential and peer-based knowledge gain.

"I am the first in my family to start a business, so I don't have the established connections or networks that others might rely on to grow their businesses. This makes it harder for me to find support and opportunities." (W39)

Other entrepreneurs also faced the challenges related to it, and reported

"I have a lot of connections, but people these days are hesitant to share information. There is a fear that if they help, I might get ahead of them, and this mindset often holds them back from sharing useful insights or opportunities." (W35).

Women entrepreneurs often face biases and stereotyping because of the cultural and societal norms. They often are viewed that women's main responsibility is childcare and household

responsibility. Marlow and McAdam (2013) highlight that women entrepreneurs are often face stereotyping, because the entrepreneurship is often associated with the male (Figuerola-Domecq et al., 2020).

One such incident is shared by a women entrepreneur, who owns a dairy and agriculture farm, stating,

"I run a dairy and agricultural farm, so I often go to the fields related to work with the farmers. However, many of them don't take me seriously because they think, coming from a privileged family, I am not as capable of handling fieldwork as they are."

4.5 Barriers to Digital Adoption

4.5.1 Safety and security concern

Incidents of cyber fraud or lack of confidence in online security systems caused several women to withdraw from using digital platforms. Human Capital Theory would suggest that these experiences erode digital confidence and discourage skill application. Building digital trust through education is critical for long-term adoption.

The owner of chikankari store, shared her experience, quoted that,

"I have been afraid of using digital technology ever since an incident where my bank account was hacked, and Rs. 50,000 was withdrawn. From that day on, I stopped using UPI and digital banking apps entirely, out of fear" (W28).

4.5.2 Lack of confidence and Language Barriers

Since many platforms only offer material in English, language is still a big barrier. This limits the digital learning options available to non-native English speakers. Women cannot develop relevant human capital if there are no materials available in their native tongues.

"I face challenges with technological skills and lack knowledge in using online platforms. I am not confident in using the internet, and most of the digital content is in English, which is a major challenge for me." (W37)

4.5.3 Financial Barriers to E-Commerce Participation

Women entrepreneurs are unable to expand online due to low financial capital and high digital platform registration charges. This limits their hands-on learning. This shows that not only skill gap but also financial burden limits their technology adoption. To succeed in the digital economy, women in MSMEs need targeted and inclusive methods to overcome challenges.

"I tried to make my product listed on the e-commerce platform, but they demanded extra charges to showcase my products on the website, which is a significant challenge." (W43)

The current study aims to explore the challenges and barriers faced by women entrepreneurs in the MSME sector. The women in the study highlight various obstacles in their entrepreneurial journeys, including a significant digital technology skills gap. Many struggle to use smartphones for business-related tasks, despite the growing necessity to adopt digital

tools in today's era (Noonan et al., 2017). They emphasize the need for government-led training programs to help them develop the required technological skills. Additionally, challenges such as difficulty in capturing markets, limited networking capabilities, institutional barriers, insecurity of using technology, and gender stereotyping were frequently reported. Addressing these challenges through taking necessary actions will create a more supportive environment and encourage more women to pursue entrepreneurship.

5. Implications

5.1 Theoretical Implications

This study contributes to human capital theory by demonstrating that challenges and barriers to digital technology adoption faced by female entrepreneurs are rooted in unequal access to knowledge, skill development, and learning opportunities not just only infrastructure-related. This theory extends the understanding into the field of gendered digital entrepreneurship among MSMEs in India, this study employs qualitative analysis of lived experiences. The findings indicates that many women entrepreneurs struggle to adopt technology because of inadequate training, low levels of computer literacy, and inadequate engagement with technology. This highlights the significance to build their skills and knowledge to help them succeed. The study supports earlier research by showing that structured training programs can play a key role in helping women overcome these challenges and succeeded in business.

5.2 Practical Implications

To support women entrepreneurs in MSMEs, there is a need for basic digital training programs that start from the imparting knowledge from basic especially for those who are new to using technology. These programs should be designed to keep in mind the challenges faced by these women entrepreneurs. It is essential that government initiatives and opportunities are disseminated in a manner accessible to anyone. In addition to training, enhancing internet access, delivering digital tools, and providing individualized support can empower women to acquire the confidence and abilities necessary. The objective should be to assist them in not only utilizing digital tools but also in developing self-efficacy in using technology.

5.3 Societal Implications

This study highlights the influence of social and cultural factors on women's access to digital tools and business opportunity. Many women continue to faced familial obligations and societal norms that restrict their ability to engage completely in the digital technology. The struggles shared by participants show that digital barriers are not just about technology they are deeply connected to long-standing inequalities in how women are treated and supported. Solving this goes beyond offering tools or training; it also means changing how society sees and supports women in business. Families, communities, and local networks need to encourage and normalize women using digital platforms for their work. When women are supported at all levels whether at home, at societal level, and through inclusive policies they are more likely to grow, lead, and contribute to a fairer and stronger business environment.

6. Limitations

This study has few limitations. First, the research is based only on women entrepreneurs from Uttar Pradesh. Although this region reflects a wide range of social and economic backgrounds, the findings may not apply to women in other states or countries with different contexts. The study also used small sample and used snowball sampling. In terms of theory, the study uses Human Capital Theory to explain the findings, however various other theory can be applied in this context that might give a more complete picture of the challenges. Lastly, the research focuses mainly on the challenges women face in adopting digital technologies Future studies could explore women entrepreneurs with heterogeneous socio demographic characteristics.

7. Future Research Directions

Future studies can be undertaken, first, To compare women entrepreneurs from different parts of India or explore how their experiences differ between urban and rural areas. This would help uncover regional differences in the challenges and support they receive when it comes to using digital tools. Secondly, researchers should examine women entrepreneurs to assess the growth of their enterprises, particularly following receiving training. Employing a combination of methods can provide a more comprehensive understanding of their experience. It is essential to critically examine the effectiveness of government programs, digital training, and NGO initiatives, rather than presuming their effectiveness. Another aspect to investigate is the intersection of gender with variables such as caste, income, education, or age in relation to digital technology. Ultimately, subsequent research could employ various theories to analyse how women's social networks, community support, and cultural expectations affect their success in the digital business.

References

- Alhothali, G.T. and Al-Dajani, H., 2022. Emotions and resilience in Saudi women's digital entrepreneurship during the COVID-19 pandemic. *Sustainability*, 14(14), p.8794.
- Alliance for Affordable Internet 2021. *The affordability report 2021*. Web Foundation.
- Barba-Sánchez, V. and Jiménez-Zarco, A.I., 2007. Drivers, Benefits and Challenges of ICT adoption by small and medium sized enterprises (SMEs): A Literature Review. *Problems and Perspectives in Management*, 5(1), pp.103-114.
- Bardasi, E., Sabarwal, S. and Terrell, K., 2011. How do female entrepreneurs perform? Evidence from three developing regions. *Small Business Economics*, 37, pp.417-441.
- Becker, G.S., 1993. Nobel lecture: The economic way of looking at behavior. *Journal of political economy*, 101(3), pp.385-409.
- Braun, V. and Clarke, V., 2006. Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), pp.77-101.
- Berardino, D., 2020. The relationship between digital technologies and internationalisation. Evidence from Italian SMEs. *Industry and Innovation*, 27(4), pp.311-339.
- Chhetri (2023) 'Leveraging technology to maximise the potential of women-led MSMEs in India'. *SME Futures*. Available at: <https://smefutures.com/leveraging-technology-to-maximise-the-potential-of-women-led-msmes-in-india/>.
- Danish, A.Y. and Smith, H.L., 2012. Female entrepreneurship in Saudi Arabia: opportunities and challenges. *International journal of gender and entrepreneurship*, 4(3), pp.216-235.
- Dy, A.M., Marlow, S. and Martin, L., 2017. A Web of opportunity or the same old story? Women digital entrepreneurs and intersectionality theory. *Human relations*, 70(3), pp.286-311.
- Elam, A.B., Brush, C.G., Greene, P.G., Baumer, B., Dean, M., Heavlow, R. and Global Entrepreneurship Research Association, 2019. Women's entrepreneurship report 2018/2019.
- Figueroa-Domecq, C., De Jong, A. and Williams, A.M., 2020. Gender, tourism & entrepreneurship: A critical review. *Annals of tourism research*, 84, p.102980.
- García Moritán, M., 2020. Financial inclusion for MSMEs and women's economic empowerment. *Journal of the International Council for Small Business*, 1(1), pp.7-9.
- Gellerstedt, M. and Arvemo, T., 2019. The impact of word of mouth when booking a hotel: could a good friend's opinion outweigh the online majority? *Information Technology & Tourism*, 21(3), pp.289-311.
- Giotopoulos, I., Kontolaimou, A., Korra, E. and Tsakanikas, A., 2017. What drives ICT adoption by SMEs? Evidence from a large-scale survey in Greece. *Journal of Business Research*, 81, pp.60-69.

Hair, N., Wetsch, L.R., Hull, C.E., Perotti, V. and Hung, Y.T.C., 2012. Market orientation in digital entrepreneurship: Advantages and challenges in a web 2.0 networked world. *International Journal of Innovation and Technology Management*, 9(06), p.1250045.

Högberg, K., 2018. *Persistent Digital Service Encounters: Challenges of organizational use of social media in a hotel chain* (Doctoral dissertation, University West).

Jadhav, R., 2024. '50 per cent of women-owned MSMEs in five States', *BusinessLine*, 29 February. Available at: <https://www.thehindubusinessline.com/data-stories/data-focus/50-per-cent-of-women-owned-msmes-in-five-states/article67899183.ece>

Jung, L., Clark, U., Patterson, L. and Pence, T., 2017. Closing the Gender Gap in the Technology Major. *Information Systems Education Journal*, 15(1), pp.26-41.

Kain, P. and Sharma, M., 2013. Women entrepreneurship education need for today. *Journal of Management Sciences and Technology*, 1(1), pp.43-53.

Kamberidou, I., 2020. "Distinguished" women entrepreneurs in the digital economy and the multitasking whirlpool. *Journal of Innovation and Entrepreneurship*, 9(1), p.3.

Kapoor, R. and Agarwal, S., 2017. Sustaining superior performance in business ecosystems: Evidence from application software developers in the iOS and Android smartphone ecosystems. *Organization science*, 28(3), pp.531-551.

Katepa-Kalala, P., 1999, November. Assessment report on women and poverty and the economic empowerment of women. In *Economic commission for Africa sixth African regional conference on women* (pp. 22-26).

Khaire, R.J., 2011. Literature review of the women entrepreneurs and statutory policies. *International Journal of Multidisciplinary Research*, 1(7), pp.345-355.

Khoo, C., Yang, E.C.L., Tan, R.Y.Y., Alonso-Vazquez, M., Ricaurte-Quijano, C., Pécot, M. and Barahona-Canales, D., 2024. Opportunities and challenges of digital competencies for women tourism entrepreneurs in Latin America: a gendered perspective. *Journal of Sustainable Tourism*, 32(3), pp.519-539.

Liñán, F., Jaén, I. and Martín, D., 2022. Does entrepreneurship fit her? Women entrepreneurs, gender-role orientation, and entrepreneurial culture. *Small Business Economics*, 58(2), pp.1051-1071.

Malik, P., 2017. *Gendering digital entrepreneurship: from research to practice using a tensional lens* (Doctoral dissertation, Purdue University).

Marlow, S. and McAdam, M., 2013. Gender and entrepreneurship: Advancing debate and challenging myths; exploring the mystery of the under-performing female entrepreneur. *International Journal of Entrepreneurial Behavior & Research*, 19(1), pp.114-124.

McAdam, M., Crawley, C. and Harrison, R., 2019. Digital girl: cyberfeminism and the emancipatory potential of digital entrepreneurship in emerging economies. *Small Business Economics*, 55(1179).

McAdam, M., Crowley, C. and Harrison, R.T., 2019. "To boldly go where no [man] has gone before"-institutional voids and the development of women's digital entrepreneurship. *Technological Forecasting and Social Change*, 146, pp.912-922.

Mehta, M. and Sinha, R., 2022. Women entrepreneurs and information communication technology: the journey from intention to usage. *Journal of Entrepreneurship and Innovation in Emerging Economies*, 8(2), pp.228-243.

Michota, A., 2013. Digital security concerns and threats facing women entrepreneurs. *Journal of Innovation and Entrepreneurship*, 2, pp.1-11.

Miles, M.B., 1994. Qualitative data analysis: An expanded sourcebook. *Thousand Oaks*.

Ministry of Micro, Small and Medium Enterprises, 2024. *MSME Annual Report 2023–24*. New Delhi: Government of India. Available at: <https://msme.gov.in/sites/default/files/FINALMSMEANNUALREPORT2023-24ENGLISH.pdf>

MSME Digital Index (2023) 'MSME Digital Index', released by *PayNearby*. Available at: <https://paynearby.in/media/55of-msmes-use-mobile-hotspots-to-connect-to-the-internet-for-day-to-day-business-operations-paynearby-study/23ENGLISH.pdf>

MSMEs skyrocket use of digital for businesses, smartphone remains popular category. *Economic Times*. Available at: <https://bfsi.economictimes.indiatimes.com/news/nbfc/msmes-skyrocket-use-of-digital-for-businesses-smartphone-remains-popular-category/100183935>.

MSME Statistics and Trends (2024). *Forbes*. Available at: <https://www.forbes.com/advisor/in/business/msme-statistics/>.

Nambisan, S., 2017. Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. *Entrepreneurship theory and practice*, 41(6), pp.1029-1055.

Nambisan, S., Wright, M. and Feldman, M., 2019. The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. *Research policy*, 48(8), p.103773.

Nayak, M., Nayak, P.M. and Joshi, H.G., 2025. Determinants influencing the entrepreneurial success of MSMEs in emerging economies: a study of Indian women entrepreneurs. *Cogent Economics & Finance*, 13(1), p.2472585.

Noonan, M., Richter, G., Durham, L. and Pierce, E., 2017. Learning and the digital workplace: What? So what? Now what? *Strategic HR Review*, 16(6), pp.267-273.

Oggero, N., Rossi, M.C. and Ughetto, E., 2020. Entrepreneurial spirits in women and men. The role of financial literacy and digital skills. *Small Business Economics*, 55, pp.313-327.

Olsson, A.K. and Bernhard, I., 2021. Keeping up the pace of digitalization in small businesses—Women entrepreneurs' knowledge and use of social media. *International Journal of Entrepreneurial Behavior & Research*, 27(2), pp.378-396.

Panta, S.K. and Thapa, B., 2018. Entrepreneurship and women's empowerment in gateway communities of Bardia National Park, Nepal. *Journal of Ecotourism*, 17(1), pp.20-42.

Pergelova, A., Manolova, T., Simeonova-Ganeva, R. and Yordanova, D., 2019. Democratizing entrepreneurship? Digital technologies and the internationalization of female-led SMEs. *Journal of Small Business Management*, 57(1), pp.14-39.

Ritchie, J., Lewis, J., Elam, G., Tennant, R. and Rahim, N., 2003. Designing and selecting samples. *Qualitative research practice: A guide for social science students and researchers*, 2, pp.111-145.

Senapati, A.K., Sahoo, G. and Parida, D., 2024. Need for Financing and Empowering Women Entrepreneurs in the MSME Sector: Evidence from Odisha, India. *Journal of Development Policy and Practice*, p.24551333241293875.

Sandelowski, M., 1995. Qualitative analysis: What it is and how to begin. *Research in nursing & health*, 18(4), pp.371-375.

Sanu, M.S., Ahmad, M.F. and Anjum, S., 2020. A comparative analysis of women and men-owned MSMEs with special emphasis on women entrepreneurship: A case study of Cachar district, Assam. *SEDME (Small Enterprises Development, Management & Extension Journal)*, 47(4), pp.314-328.

Sharafizad, J., 2016. Women business owners' adoption of information and communication technology. *Journal of Systems and Information Technology*, 18(4), pp.331-345.

Sharma, S., 2018. Emerging dimensions of women entrepreneurship: Developments & obstructions. *Economic Affairs*, 63(2), pp.337-346.

Shastri, S., Shastri, S. and Pareek, A., 2019. Motivations and challenges of women entrepreneurs: Experiences of small businesses in Jaipur city of Rajasthan. *International Journal of Sociology and Social Policy*, 39(5/6), pp.338-355.

Shukla, A., Kushwah, P., Jain, E. and Sharma, S.K., 2021. Role of ICT in emancipation of digital entrepreneurship among new generation women. *Journal of Enterprising Communities: People and Places in the Global Economy*, 15(1), pp.137-154.

Suseno, Y. and Abbott, L., 2021. Women entrepreneurs' digital social innovation: Linking gender, entrepreneurship, social innovation and information systems. *Information Systems Journal*, 31(5), pp.717-744.

Ughetto, E., Rossi, M., Audretsch, D. and Lehmann, E.E., 2020. Female entrepreneurship in the digital era. *Small Business Economics*, 55, pp.305-312.