Chapter 1

Introduction

The digital transformation has emerged as a pivotal force reshaping global business dynamics in the contemporary era. It has eliminated geographical boundaries, enabling facile communication and universality in trade, fostering inclusive economic participation. This transition is distinguished by the swift adoption of digital technologies, facilitated by expanded internet connectivity and proliferation of mobile technologies, which have transformed the landscape of entrepreneurship (Al-haimi et al.,2025). Technologies act as enablers, streamlining business operations, increasing market access, reducing operational costs, and improving customer experience to remain competitive in the increasingly dynamic market (Hair et al.,2012). Hence, entrepreneurs have become more resilient, efficient, and self-sustaining in the digital economy (Savaget et al.,2025).

According to the "India Employment Report 2024 on Youth Employment, Education, and Skills," published by the Institute for Human Development and the International Labour Organization (ILO), a staggering 82 per cent of the workforce is engaged in the informal sector, with nearly 90 per cent being informally employed. Self-employment ranks among the primary forms of employment in the country, constituting 55.8 per cent of jobs, followed by casual labour at 22.7 per cent, with regular employment accounting for only 21.5 per cent of workers.

The entrepreneurial ecosystem in India comprises a spectrum ranging from formal startups to registered MSMEs and pervasive informal enterprises. Unlike formally registered businesses, informal entrepreneurs lack regulatory recognition, access to institutional credit, digital platforms, and government incentives. This highlights critical divide: while formal and MSME-registered ventures benefit from policies, subsidies, and market linkages, the overwhelming majority of informal entrepreneurs remain excluded, which limits their growth and integration into the digital economy (Ahmad & Patra, 2023)

According to ILO (2019), Informal businesses include limited number of individuals as employees; these businesses usually have less than ten people working for them. They are numerically dominant enterprise type in the world economy (Saarela et al., 2018). Recent research affirms this characterization, noting that informal micro enterprises remain

the backbone of many low and middle-income countries, with 92.6 percent employment and struggle with low productivity (OECD, 2024; UN Policy Brief, 2024)

According to the National Commission for Enterprises in the Unorganized Sector (NCEUS), the informal sector includes all unincorporated private enterprises owned by individuals or households engaged in the production and sale of goods and services operated on a proprietary or partnership basis with less than ten total workers, not regulated under legal provisions, and without maintaining regular accounts. Additionally, the workers are not covered under major labour regulations .

The entrepreneurial activities undertaken by informal entrepreneurs are primarily driven by the need to identify and exploit opportunities in constrained environments (Bygrave & Hofer, 1992; Akhtar et al., 2023). They engage in economically productive ventures such as home-based manufacturing, street vending, food processing etc, which is socially accepted and integral to local economies, but do not comply with formal business regulations including operating without business registrations, tax fillings, licenses, formal employment contracts often referred to as "off- the-book transactions (OECD, 2024)

Informal entrepreneurship is grounded in a range of theoretical approaches and theories that explain its origins, motivations, approaches, and frameworks. Here include the prominent ones,

The marginalization/structural approach considers individual and small enterprise involvement in Informal Entrepreneurship as an adjustment/survival strategy as a result of the deregulated world economy, and the demands for flexibility, efficiency and profit maximization driven by the growth of subcontracting (Castells and Portes 1989; Jones et al. 2006; Slavnic 2010; Williams and Nadin 2012).

In contrast, the neo-liberal approach considers informality as a response to dysfunctional institutions and over-regulation. From this perspective, informal entrepreneurship is seen as a voluntary decision to avoid costs, time, and the complexities of formal registration (Williams, 2014).

Building on these perspectives, the institutional theory includes a more nuanced understanding by examining the persistence of informality and differences across the countries due to weak state capacity, corruption or high regulatory burdens (Williams et al., 2016; Akhtar et al., 2023)

Further, Entrepreneurial Bricolage theory captures how informal entrepreneurs succeed in resource-constrained environments, making them do whatever is available in order to solve problems and innovate (Salvi et al., 2023).Similarly, Effectuation Theory provides valuable insight into adaptive strategies in volatile informal markets. This fits the uncertainty and non - linear decision making of informal entrepreneurs (Martin Navaro et al., 2023)

Social Capital Theory deepens the understanding by highlighting the critical role of informal ties for credit, information, and market access, thereby fostering business resilience and continuity (George et al., 2021). While, Necessity vs. Opportunity Entrepreneurship Framework distinguishes entrepreneurs who enter business due to lack of options (necessity driven), and those who identify viable market gaps (Opportunity driven). (William & Nadin, 2020)

The intersection of informal entrepreneurship and digital transformation has given rise to a new wave of emerging theoretical insights focused on how technology reshapes business practices in unregulated environments. The Digital Inclusion as a Formalisation Enabler shows how digital technology adoption enhances the performance of micro enterprises and facilitates their transition towards formalisation (Bakshi & Mukherjee, 2024)

Digital Platform and Legitimacy Theory suggests that platform based entrepreneurs in informal markets build legitimacy across user, market, and regulatory levels (Prasetyo, 2022). The latest is the AI-Enabled Individual Entrepreneurship Theory suggests that AI tools give more power and opportunity to small, informal entrepreneurs who are left out of formal systems, can now compete, expand , make smarter decisions and succeed on their own (Ganuthula, 2025).

Despite rising theoretical interest in digital revolution and entrepreneurship, the digital divide is an unrelenting, universal, and national challenge. Approximately, 2.8 billion remain offline in low-income and rural regions, restraining their participation within digital economy (ITU, 2024). Beyond access to digital technologies, digital skill gaps persist to be critical. Over 60 percent of the global workforce lack in basic ICT skills, hampering their entrepreneurial potential (OECD, 2024).

Oxfam's India Inequality Report (2022) reveals that in India, although over 800 million people have internet access, stark disparities persist, especially among rural users, women, and marginalized communities. Further, it was reported that only 31percent of women owned mobile phones in 2021 compared to 61percent of men, and the internet usage was 33percent lower among women than men. It also impacts access to education, healthcare, and financial services for marginalised communities.

The digital divide has implications for informal entrepreneurs who contribute nearly 90percent of the businesses in developing countries and about 60% in developed and transition economies (GEM, 2023).

Within this context, informal women entrepreneurs represent a vital segment in developing economies, where their businesses contribute substantially to household income and local markets. (ILO, 2019; Bhattacharya, 2019). In India,88 percent of women are in the informal sector (National Sample Survey, 2019) and about 50 percent of the national product are accounted with women contributing through micro-entrepreneurial activities.

Despite the vital contribution of women entrepreneurs in the informal sector, they frequently confront challenges in securing essential resources, including finance, training, and technology, which impede their growth and productivity. Further pandemic and economic shocks have exacerbated these barriers, underscoring the need to adopt technologies for business operations. In some contexts, social norms and cultural factors can create additional obstacles for women entrepreneurs seeking to engage with technology. This can range from limited access to education and training opportunities to societal expectations that discourage women from pursuing technological fields.

Technology gives women entrepreneurs in the informal sector, the ability to interact with their customers through e-mail, blogs, business apps, social networks, and online forums. The connectivity allows entrepreneurs to gather real-time feedback and meet customer preferences swiftly (Crupi et al., 2020). Moreover, the democratization of technologies, including mobile applications, digital platforms, digital payment systems, and cloud services into business functional operations is the key to enhancing access to broader markets, optimizing operations, and improving customer engagement, which will increase resilience and business sustainability in the dynamic business environment (Olurinola et al., 2021).

The impact of digital technologies on informal entrepreneurship can be examined from various perspectives. Firstly, the digital transformation of the economy has reduced the barriers to entry for new businesses, allowing individuals to more easily identify and capitalize on untapped business opportunities (Akhter et al., 2022). This is particularly relevant in sectors that have traditionally been shielded from competition, where the introduction of digital technologies has disrupted the status quo and opened up new avenues for enterprising individuals to establish and grow their ventures.

Secondly, digital technologies have enabled entrepreneurs to streamline their business operations, reducing overhead costs and enhancing their ability to reach a wider customer base. The ease of access to digital tools and platforms has empowered entrepreneurs to engage with their target audience more effectively, fostering stronger customer relationships and facilitating the expansion of their businesses.

Consequently, acquiring and utilising digital competencies has become a pivotal skill for business sustainability in the informal sector. Thus, Digital competency training enables women in the informal sector to overcome barriers and unlock the transformative potential of technology in business operations.

Digital skills are envisioned as traits that enable firms to exploit opportunities provided by information and communications technologies (ICTs), thereby ensuring more efficient performance and exploring innovative ways to conduct business operations (Sholak et al., 2019). Digital transformation uses new technologies to facilitate business improvements and enhance customer experience (Jaifer et al.,2022). Moreover, this needs to evolve according to the ability to take advantage of technologies and adjust according to the market’s circumstances (Stan and alex,2022).

Digital competencies are regarded as the ability to understand and express the transformation of information into knowledge, operations, and services by making analytical, productive, and creative use of ICTs and social software (Robert et al.,2022).According to the European Commission's DigComp 2.2 framework (2022), Digital Competency involves the 'confident, critical and responsible use of, and engagement with, digital technologies for learning, in the workplace, and participation in the society. It involves the combination of knowledge, skills, and intention.

The Digital Capability framework facilitates the adoption of ICTs, highlighted in the technology adoption literature. The application and beneficial exploitation of ICTs require

specific knowledge and skills that firms can primarily obtain through education and training (Shankar et al., 2022). However, the dearth of studies on business apps training payoffs for small firms, particularly in the informal sector, exposes a rhetoric versus reality argument of whether relevant training is critical to firms' strategies and payoffs. The limited studies have found that internet skills training, such as training on the latest audio and visual computer equipment, business apps, and basic Web design skills, can raise awareness of ICTs among small and medium firms, helping break down the barriers toward technology. Internet skills training can act as a catalyst to convince small and medium firms to adopt ICTs and promote the general level of digital skills among trainees. Indeed, trainees reported being inspired, prompted, and encouraged by training to go digital.

The training on digital transformation in small and medium firms, aiming to enhance decision-making capabilities at both a strategic and tactical level, can bring favourable evaluations among trainees about the concepts, principles, methodologies, and tools taught during training (Jacinto and Jardin,2022)

The present study analyses the factors influencing technology usage among women entrepreneurs in the informal sector. Drawing on the existing literature, it investigates the determinants of actual technology usage, focusing on technology acceptance variables including Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions, and their impact on behavioural intention to adopt technology and the actual usage of technology. Additionally, the study elucidates the role of digital competency in shaping behavioural intention through performance expectancy and effort expectancy, on the actual usage of technology, and the direct effect of digital competency on actual Usage.

1.1 Statement of the Problem

Although women in informal sectors often possess basic digital devices, including mobile phones and an internet connection, they frequently lack the digital competency needed to effectively leverage technology for crucial business activities such as marketing, digital payments, and accessing e-commerce platforms.

This leads to the underutilization of technologies. Consequently, digital competency has become indispensable for the survival and growth of their businesses in the digital economy. This digital competency gap is further exacerbated by the scarcity of targeted

training programs designed to equip entrepreneurs with the practical skills necessary to apply digital technologies in their business operations.

Disdaining the potential benefits of integrating technology into their business operations, women entrepreneurs in the informal sector confront formidable barriers to adopting and effectively utilizing these technologies. A critical challenge lies not in accessing digital resources like devices and internet connectivity, but in developing the ability to leverage these technologies effectively. This inability stems from a lack of digital competency, which creates technophobia and digital distrust, ultimately contributing to the underutilization of technology.

Bridging this digital divide is essential for fostering inclusive economic growth and empowering women entrepreneurs to succeed in the modern business landscape. This requires a multi-faceted approach involving investments in infrastructure, digital skills training, and addressing social and cultural barriers that limit women's participation in the digital economy.

While the significance of digital skills is widely recognized, women entrepreneurs in the informal sector face limited access to comprehensive digital competency training, which hinders their ability to adapt and integrate technologies into their operational functions. This study aims to uncover the barriers to acquiring essential digital skills and develop customized digital competency training programs that include business applications, platforms, and digital tools that are affordable and user-friendly for their business operations. This enhances the ability of women entrepreneurs in the informal sector to leverage technology for the growth and sustainability of their businesses.

1.2 Research Questions

Based on the above discussion, the following research questions have emerged:

- Do entrepreneurs possess the ability to use digital technology in business operations?
- What are the technological resources available for entrepreneurs?
- What are the barriers to technology adoption among women entrepreneurs in the informal sector?
- How does digital competency training effect ICT-Proficiency, Information, Data, and Media Literacy, Digital Communication, Collaboration, Participation, Digital

Learning, Digital Creation and Problem-solving, Digital Identity, and Well-being of informal women entrepreneurs?

- Have the beneficiaries learned the skill of integrating technology in business operations?

1.3 Objectives of the study

To find the answer to the above-stated questions, the following objectives were framed.

- ❖ To assess the digital infrastructural facilities and business applications used in business operations by select Women Entrepreneurs in the Informal Sector
- ❖ To analyze the challenges faced in using digital technology in business operations by select Women Entrepreneurs
- ❖ To assess the impact of Digital Competency training intervention on select Women Entrepreneurs
- ❖ To assess the performance expectancy, effort expectancy, social influence and facilitating conditions, and Behaviour intention to adopt technology by select Women Entrepreneurs and
- ❖ To examine the effect of digital competency and technology acceptance on actual usage of technology among select Women Entrepreneurs.

1.4 Research Hypotheses

In alignment with the objectives of the study, the following hypotheses were formulated related to

i) Effectiveness of Digital Competency Training

Ho_1: There is no significant mean difference between the digital competency of select Women Entrepreneurs in the Informal Sector before and after training

Ha_1: There is a significant mean difference between the digital competency of select Women Entrepreneurs in the Informal Sector before and after training

ii) Adoption of Digital Competencies

Ho_2: There is no significant mean difference between components of digital competency across the socio-demographic profile of Informal women entrepreneurs

Ha_2: There is a significant mean difference between components of digital competency across the socio-demographic profile of Informal women entrepreneurs

Ho_3: There is no significant mean difference between components of digital competency across the Business profile of Informal women entrepreneurs

Ha_3: There is a significant mean difference between components of digital competency across the Business profile of Informal women entrepreneurs

iii) Testing of the model framed

H_4: Digital Competency positively influences the Performance Expectancy of select Women Entrepreneurs in the Informal Sector towards technology adoption

H_5: Digital Competency positively influences Effort Expectancy of select Women Entrepreneurs in Informal Sector toward technology adoption

H_6: Performance Expectancy positively influences Behaviour Intention of select Women Entrepreneurs in Informal Sector toward technology adoption

H_7: Effort Expectancy positively influences Behaviour Intention of select Women Entrepreneurs in Informal Sector toward technology adoption

H_8:Social Influence positively influences Behaviour Intention of select Women Entrepreneurs in Informal Sector toward technology adoption

H_9: Facilitating Conditions positively influence the Behaviour Intention of select Women Entrepreneurs in the Informal Sector toward technology adoption

H_{10}: Behaviour intention positively influences the Actual use Behaviour of Informal Women Entrepreneurs towards technology adoption

H_{11}: Digital Competency positively influences the Actual Usage of select Women Entrepreneurs in the Informal Sector towards technology adoption

1.5 Significance of the study

Digital competency acquisition equips women entrepreneurs with essential digital skills to leverage technology, enhancing their ability to manage and grow their businesses effectively. It promotes financial independence, particularly for women in the informal sector, who often face systemic barriers in accessing resources and opportunities. Further, the adoption of digital tools ensures long-term business sustainability, even in volatile markets. Training enables women entrepreneurs to use tools like e-commerce platforms, digital marketing, and mobile banking, improving efficiency and expanding market reach.

The adoption of digital solutions allows informal businesses to compete with formal entities, fostering economic integration. The study provides valuable insights into the effectiveness of training programs, helping policymakers and organizations design tailored initiatives that address specific challenges in digital adoption.

To Academia:

The study contributes significantly to the academic discourse on women's access to technology within the Informal sector. The key contribution lies in integrating digital competency with the well-established Unified Theory of Acceptance and Use of Technology (UTAUT) model, offering nuanced insights into how digital skills are perceived, adopted, and applied by women in informal business. By aligning theoretical constructs with practical training outcomes, the study bridges the gap between conceptual models and ground-level realities, providing empirical evidence on digital competency and actual use of technology across the socio-demographic and business profiles of women entrepreneurs in the informal sector. It further advances interdisciplinary research across developmental and gender studies, and digital transformation in emerging economies.

Further, the academic values of this study include the design, development, and validation of a structured digital skills training module tailored to the needs of women entrepreneurs in the informal sector. The study demonstrates how digital competency can be assessed, enhanced through targeted interventions, and linked to technology adoption behaviour.

To Training and Skills Development Institutions

The study holds practical relevance for training institutes, non-governmental organisations (NGOs) engaged in the skill development of women entrepreneurs. The structured training module developed through the research incorporates key dimensions of digital competency alongside business application training, tailored support for day-to-day business operations that can serve as a replicable model for similar interventions in comparable socio–economic contexts.

To Policy making

Insights from the study offer support for designing and refining policies aimed at bridging the digital divide among informal workers. The critical barriers in technology adoption, including insufficient digital skills, limited access to digital infrastructure facilities, low levels of digital confidence, and lack of continuous support, were identified. Addressing these challenges require formulation of more inclusive and targeted

interventions to promote technology-driven entrepreneurship among women in the informal sector.

Informal Entrepreneurs

The acquisition of digital competencies yields long-term benefits for women entrepreneurs by equipping them with the skills to adapt to technological advancements and integrating digital tools in business operations. The training intervention enhances their ability to effectively utilise digital tools and platforms thereby improving their operational efficiency and access to broader market. The approach fosters self-reliance and empowers women to make informed decisions in managing and expanding their businesses. Additionally, awareness on the e-Shram portal equips participants to access from government welfare schemes, social security benefits, and related support services.

To NGO and Development Practitioners

The study offers a replicable model for community-based digital literacy initiatives tailored for women in the informal sector. Development practitioners can leverage the findings to enhance program design and ensure more effective outcomes. The digital skills interventions lead to long-term behavioural change by emphasising ongoing support, peer-to-peer learning, and practical application, ensuring sustained impact.

1.6 Scope of the study

This study on the "Acquisition and Adoption of Digital Competency Among Women Entrepreneurs in the Informal Sector" provides a comprehensive exploration of how informal women entrepreneurs acquire, adopt, and leverage digital competencies, integrating these skills within the framework of the UTAUT technology adoption model.

The study provides empirical evidence on the relationship between digital competency and actual usage, examining the socio-demographic and business profiles of these entrepreneurs. By increasing awareness of platforms like the e-Shram portal, the research highlights how such tools enable access to social security, government schemes, and welfare programs, benefiting women entrepreneurs. The study emphasizes the long-term benefits of acquiring digital competencies, including the ability to adapt to technological advancements and incorporate digital tools into business operations. The findings offer valuable insights for Jan Shikshan Samsthan to refine and improve the digital training programs, ensuring they effectively support informal women entrepreneurs. This

will improve the decision-making roles, and contributing to the Skill India program by promoting digital skill development for women. By fostering equitable access to resources, the study aims to reduce inequalities in technology adoption and economic opportunities. Additionally, the research aligns with SDG 8 and SDG 9, advancing the broader goals of inclusive economic development and technological empowerment for women in the informal sector.

1.7 Limitations of the study

Firstly, it focuses on a specific geographical region and a limited sample of respondents, which restricts the generalizability of the findings to the broader population of informal women entrepreneurs. The study does not account for external factors, such as economic fluctuations, government policies, or global events, which could influence the adoption and utilization of digital technologies. Due to constraints in time and finances, the research does not explore the long-term effects of digital competency on business growth. Additionally, the reliance on self-reported data collected through questionnaires introduces the potential for biases, such as social desirability and recall bias, potentially impact the accuracy and reliability of the findings.

1.8 Outline of Thesis

The thesis is presented in the following five chapters

Chapter I – Introduction contains introduction of the study, statement of the problem, research questions, objectives of the study, research hypotheses, significance of the study, limitations of the study, and outline of thesis.

Chapter II Review of Literature deals with the theoretical background and empirical reviews of the study on digital competency, performance expectancy, effort expectancy, social influence, facilitating condition, behavioural intention, actual use of technology, and research gap emerging from literature reviews

Chapter III Research Methodology outlines research design which includes population, research methods, sample framework, sampling technique, sources of data collection, tools for data collection, common method bias, validating content, Ethical consideration, data collection period, pre-test and pilot study, normality testing and reliability. Development of conceptual framework, hypotheses development, framework analysis and operational definition of the key concepts and constructs used in the study.

Chapter IV Results and Discussions, presents the results and discussion of the study. It includes the socio-economic profile and business profile of Women Entrepreneurs in the informal sector. Impact of the intervention of Digital Competency Training, SEM Model to assess the determinants of behavioural intention towards technology adoption and actual usage of technology.

Digital competency across the socio-demographic profile of women entrepreneurs in the Informal sector, digital competency across the business profile of women entrepreneurs in the Informal sector, and Antecedents of technology adoption among women in the Informal sector.

Chapter V - Summary and Conclusion, includes major findings, implications of the study, conclusion and scope for future research.