

Digital Inclusion of Women Entrepreneurs in The Unorganized Sector – A Systematic Review

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Abstract

Digital inclusion has emerged as a transformative tool for women entrepreneurs in the unorganized sector, enabling financial access, business sustainability, and economic empowerment. This paper examines the role of digital financial services, mobile banking, and e-commerce in improving opportunities for women entrepreneurs while identifying persistent barriers such as digital illiteracy, socio-cultural constraints, and limited infrastructure. The study highlights the significance of government initiatives like NABARD's Project E-Shakti and fintech-driven solutions in bridging the financial gap. Despite these advancements, challenges such as cybersecurity risks, lack of gender-sensitive policies, and financial exclusion continue to hinder women's participation in the digital economy. Through a comprehensive review of existing literature, this study provides insights into the key challenges, opportunities, and policy recommendations for enhancing digital inclusion among women entrepreneurs in the informal sector. The findings emphasize the need for targeted financial literacy programs, regulatory reforms, and digital infrastructure development to ensure equitable digital participation for women.

Keywords: digital inclusion, women entrepreneurs, unorganized sector, financial inclusion, digital literacy, mobile banking, fintech, government initiatives, policy recommendations, economic empowerment



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INTRODUCTION

Digital inclusion has emerged as a critical factor in enhancing the economic empowerment of women entrepreneurs, particularly in the unorganized sector. Women engaged in informal economic activities often face significant barriers to accessing financial resources, markets, and essential business tools due to structural inequalities and socio-economic constraints (Rathi et al., 2024). The integration of digital financial services, mobile banking, and e-commerce platforms presents a transformative opportunity to bridge these gaps, enabling women to participate more effectively in economic activities. By leveraging digital tools, women entrepreneurs can access credit, manage transactions, and expand their businesses beyond local markets, thereby fostering sustainable economic growth and financial independence (Singh et al., 2023). However, while digital inclusion holds immense potential, its

impact is contingent on addressing the existing disparities in digital literacy, affordability, and access to technology.

One of the key benefits of digital inclusion is its role in expanding financial access for women entrepreneurs. Digital financial services, such as mobile banking and digital wallets, provide women with more accessible, secure, and cost-effective methods of handling financial transactions (Rathi et al., 2024). Programs like the National Bank for Agriculture and Rural Development's (NABARD) Project E-Shakti have demonstrated the effectiveness of linking Self-Help Groups (SHGs) to formal financial institutions, thereby improving women's ability to access credit and savings mechanisms (Sarawagi & Singh, 2024). These initiatives not only enhance women's financial resilience but also empower them to invest in business expansion and skill

development. Moreover, digital platforms facilitate better market access by enabling women to engage in online trade, connect with customers, and promote their products through digital marketing strategies (Singh et al., 2023).

Despite these advantages, digital inclusion also presents significant challenges, particularly for women in the informal sector. One of the major barriers is digital literacy, as many women lack the necessary skills to effectively use digital tools for business operations (Majeed, 2023). Without proper training and support, the potential benefits of digital platforms may remain inaccessible to a significant portion of women entrepreneurs. Additionally, job insecurity remains a pressing concern, as women in the unorganized sector often experience wage discrimination, unstable employment, and limited legal protections (Nair, 2022). While digital inclusion can improve access to financial services, it does not directly address the underlying socio-economic vulnerabilities that women face in the informal labor market.

The economic impact of digital inclusion on women entrepreneurs extends beyond individual businesses to national growth. Studies suggest that increasing women's participation in the workforce through digital inclusion could boost India's Gross Domestic Product (GDP) by up to 27% (Nair, 2022). Furthermore, digital financial access has been linked to greater resilience against economic shocks, as women who have control over their financial resources are better equipped to navigate economic downturns and support their families during crises (Rathi et al., 2024). By integrating women into the digital economy, governments and policymakers can drive inclusive growth and reduce gender disparities in entrepreneurship. The digital inclusion presents significant opportunities for empowering women entrepreneurs in the unorganized sector by enhancing financial access, market participation, and economic resilience. However, the success of digital initiatives depends on addressing critical challenges such as digital literacy, affordability, and employment stability. A comprehensive approach involving digital education, supportive policies, and targeted financial programs is essential to maximize the benefits of digital inclusion and ensure that women entrepreneurs can fully leverage technology for economic empowerment.

Objectives of the study

- a) To study the role of digital financial services in improving access to financial resources for women entrepreneurs in the unorganized sector.
- b) To find the key barriers to digital inclusion, including digital literacy, affordability, and access to technology.
- c) To understand the impact of digital inclusion on the economic empowerment and business sustainability of women entrepreneurs.

- d) To analyse the digital inclusion of women entrepreneurs using SWOT analysis,

Literature review

Ambika and Nair (2022) provide an extensive analysis of digital financial inclusion and its role in empowering women in India's informal economy. Their study highlights that approximately 195 million women are employed in the informal sector, yet their contributions remain largely overlooked. Despite their significant presence, they continue to face severe challenges, including wage discrimination, job insecurity, and limited access to formal financial services. The study draws attention to a Deloitte report, which suggests that increasing women's participation in the workforce could potentially boost India's GDP by 27%, reinforcing the importance of gender inclusion in economic growth. Digital financial inclusion, according to the authors, serves as a powerful tool to bridge the financial gap by providing women with easier access to credit, banking services, and savings mechanisms. Additionally, the study examines the link between financial inclusion and poverty alleviation, arguing that technology can serve as a catalyst for economic development among marginalized groups. However, while the study presents a compelling argument, it primarily relies on secondary data, such as Deloitte reports, which could introduce biases or inaccuracies if the original data is not entirely representative. Furthermore, it does not fully explore the technological barriers women face, such as limited access to digital devices, inadequate internet connectivity, and low levels of digital literacy. The research also focuses exclusively on the Indian context, which limits its applicability to other global settings where socio-economic conditions may differ. Future research should investigate these technological constraints in greater depth and assess the long-term impact of digital financial inclusion on women's financial stability and overall economic participation. Similarly, Rathi, Sidana, and Rathi (2024) explore the role of digital financial inclusion in promoting the sustainable development of women-owned Micro, Small, and Medium Enterprises (MSMEs). Their study emphasizes that financial inclusion enhances women entrepreneurs' resilience by providing accessible banking solutions, improving credit availability, and fostering financial independence. The authors also link financial inclusion to Sustainable Development Goal (SDG) 5, which aims to promote gender equality and women's empowerment, highlighting the broader implications of digitalization in economic development. One of the key findings of the study is that digital financial services are reaching underserved populations more effectively than previously anticipated, thus accelerating financial accessibility for women entrepreneurs. Additionally, the study underscores how digital financial inclusion strengthens women's resilience to economic shocks, enabling them to sustain their businesses during financial crises. However, despite these positive aspects, the research does not fully address disparities in digital

literacy, which could impact the effectiveness of financial inclusion initiatives. Many women, especially in rural areas, lack the necessary skills to navigate digital financial platforms, making it difficult for them to leverage these services effectively. The study also overlooks potential cybersecurity risks, which may discourage women from adopting digital financial solutions due to concerns about fraud and data privacy. Furthermore, the paper focuses predominantly on economic empowerment, without accounting for socio-cultural barriers such as restrictive gender norms that may limit women's entrepreneurial activities. Addressing these gaps in future research could provide a more comprehensive understanding of digital financial inclusion and its potential to drive gender-inclusive economic development.

Digital financial inclusion plays a crucial role in enhancing women's economic participation, job security, and contribution to GDP, particularly in the informal sector. Nair (2022) highlights that digital financial services enable women entrepreneurs to overcome financial barriers by providing access to banking, credit, and savings mechanisms. The study emphasizes that improved financial inclusion can significantly aid in poverty eradication and economic empowerment, allowing women to achieve self-reliance and sustainability in their entrepreneurial ventures. Additionally, the research underscores that increased female workforce participation through digital financial inclusion has the potential to boost a country's GDP, as seen in the case of India, where it is estimated to increase GDP by 27%. However, despite these benefits, Nair (2022) also notes that women in the informal economy continue to face challenges such as wage discrimination, job insecurity, and digital illiteracy, which limit their ability to fully leverage financial technologies. Similarly, Rathi, Sidana, and Rathi (2024) discuss the significance of digital financial inclusion in promoting the sustainable development of women-led Micro, Small, and Medium Enterprises (MSMEs). Their study argues that financial access not only strengthens women's economic resilience but also fosters gender equality, aligning with the objectives of Sustainable Development Goal (SDG) 5. Digital financial services offer women entrepreneurs the opportunity to improve business productivity, expand market reach, and secure financial stability. However, the study highlights concerns regarding digital literacy and cybersecurity risks, which may hinder the widespread adoption of financial technologies among women entrepreneurs. Addressing these barriers through targeted digital literacy programs and improved cybersecurity measures could enhance the overall effectiveness of financial inclusion initiatives.

Majeed and Rashid (2023) provide an alternative perspective by examining the interplay between traditional and modern financial channels in fostering women's economic empowerment. Their study highlights that digital tools enable women to initiate new

business ventures, assert financial independence, and improve socio-economic status through targeted policy interventions. By blending traditional community-based financial models with digital banking, women in the informal sector can benefit from enhanced financial security and business growth opportunities. Meanwhile, Sarawagi and Singh (2024) focus on the impact of E-Shakti, an initiative aimed at digitizing Self-Help Groups (SHGs) to enhance financial inclusion. Their study finds that digital SHGs have led to improved income opportunities, reduced reliance on informal financial sources, and strengthened credit linkage, leading to better loan repayment performance among women entrepreneurs. Similarly, Singh et al. (2023) explore the enablers and benefits of digitalization for women in the informal sector. Their research highlights key factors such as family support, social influence, and a willingness to adopt digital tools as major drivers of digital financial inclusion among women entrepreneurs. Looking beyond India, global studies further support the argument that digital financial inclusion is essential for empowering women entrepreneurs. Omar and Rahim (2015) examine digital inclusion in Malaysia, showing that increased access to digital tools enhances women's ability to take financial risks, innovate, and expand their entrepreneurial ventures. In Kenya, Melubo and Musau (2020) analyze the impact of digital banking on women entrepreneurs, finding that while digital banking improves financial access, limitations such as low literacy rates and restricted internet access continue to pose significant barriers. Likewise, Hamunakwadi, Mbanga, and Moffat (2024) assess financial inclusion in informal settlements in South Africa, emphasizing that digital inclusion provides women entrepreneurs with access to economic opportunities, financial resources, and business networks necessary for sustainable growth. These studies collectively illustrate the transformative potential of digital financial inclusion while also highlighting the need to address structural and technological barriers to ensure that all women entrepreneurs can benefit from digital financial services. Digital financial inclusion has emerged as a transformative force for women entrepreneurs, particularly those in informal sectors or underserved communities. Several studies highlight how digital finance tools, financial literacy, and supportive policies contribute to women's economic participation and empowerment. Fadzlyn and Muhammad (2024) emphasize the importance of financial literacy for non-educated women entrepreneurs in Kelantan, Malaysia, stating that literacy programs, mentorship, and policy interventions are critical for securing loans and making informed financial decisions. Without these initiatives, women entrepreneurs in the region struggle to access digital financial services, thereby limiting their business growth. Similarly, Shah (2017) examines the Digital India Drive, highlighting how it has helped bridge gender gaps in entrepreneurship by equipping women with digital financial tools, increasing their market access, and promoting financial independence. This initiative has

enabled women entrepreneurs to engage in formal financial transactions, increasing their access to credit, investment opportunities, and digital payment solutions. The role of digital space in overcoming patriarchal constraints is explored by Ejaz, Grinevich, and Karatas-Ozkan (2022). Their study reveals that affordability, flexibility, and connectivity within digital platforms enable women entrepreneurs in informal economies to bypass traditional societal barriers, enhancing their financial participation. Additionally, Ashubwe-Jalemba et al. (2024) investigate the potential of digital loans in reducing gender disparities in financial access for female health entrepreneurs in Kenya. Their research highlights that while digital loans provide crucial funding opportunities, low trust in digital lenders remains a significant challenge. Addressing these trust issues through improved financial literacy and regulatory frameworks could enhance women's access to credit and overall financial security. In a similar vein, Qasim (2023) discusses how public-private collaborations play a crucial role in increasing women's access to technology and digital financial services, particularly in unorganized sectors. These collaborations provide customized financial solutions that cater to the specific needs of women entrepreneurs, thereby fostering greater economic inclusion.

Further studies highlight the tangible impacts of digital financial inclusion on poverty alleviation and economic stability. Oladunni, Roseline, and Adeyemi (2024) examine the role of digital financial inclusion in improving the poverty status of women entrepreneurs in Akure, Ondo State, Nigeria. Their findings suggest that digital financial tools not only provide access to financial resources but also enhance income security and economic resilience. Additionally, mobile money services have proven to be instrumental in increasing financial inclusion among rural women. Djaowe and Tiku (2022) study the use of Orange Money in Yagoua, revealing that mobile finance enhances financial education, increases income, and broadens financial service access for women in rural and informal sectors. However, while digital financial inclusion is widely acknowledged as a means to improve women's economic participation, Jain, Kaur, and Mehta (2022) emphasize the need for policy reforms and infrastructure improvements to ensure that digital financial services are accessible to all women, regardless of their socio-economic background. Similarly, Chinelo and Ayodeji (2022) analyze how digital finance supports women agripreneurs in Southern Nigeria, demonstrating that increased access to digital financial tools boosts income and savings. However, their research also identifies challenges such as low awareness and underutilization of micro-insurance services, which hinder women agripreneurs from fully leveraging digital financial inclusion. These studies collectively underscore the need for targeted interventions, enhanced digital literacy programs, and policy measures to maximize the benefits

of digital financial inclusion for women entrepreneurs worldwide.

Digital financial inclusion plays a transformative role in enhancing women's economic opportunities, particularly in the informal sector. Various studies highlight the positive impact of digitalization in improving financial accessibility, reducing gender gaps, and fostering entrepreneurial growth among women. Kulkarni and Ghosh (2021) emphasize how digital technologies, particularly Information and Communication Technology (ICT), have contributed to financial inclusion by providing women entrepreneurs with access to digital banking, mobile payments, and microfinance services. However, they also point out persisting challenges, such as gender disparities in digital literacy, financial awareness, and access to mobile technology, which hinder complete financial inclusion for women. Similarly, Khan and Shahid (2024) investigate the role of mobile payment systems like e-Paisa in supporting micro-entrepreneurs in marginalized communities. Their study finds that mobile financial services enable women entrepreneurs to enhance business transactions, manage savings, and reduce dependency on cash-based economies. They argue that mobile banking fosters social inclusion by increasing women's financial independence. However, they also highlight barriers such as the digital divide, lack of trust in digital financial services, and socio-cultural norms that prevent many women from fully utilizing mobile payment systems. The effectiveness of digital financial inclusion initiatives largely depends on women's digital literacy and their ability to leverage technology for economic growth. Several studies emphasize the importance of digital training programs in improving financial access for women entrepreneurs. Aduragba, Yu, and Cristea (2020) analyze the impact of the TechUPWomen program in Northern England, which retrains women from underrepresented communities in digital and tech-related fields. Their findings suggest that while such programs improve employability and technology adoption, they do not necessarily focus on women entrepreneurs in the unorganized sector, leaving a gap in financial inclusion efforts.

Martinez Demarco (2023) takes a broader approach by examining digital inclusion in the Global South. The study advocates for an "appropriation approach" to digital inclusion, where technology adoption is not merely about access but also about integrating digital tools into women's economic and social activities. The author argues that socio-cultural factors significantly influence how women engage with digital financial services, highlighting the need for gender-sensitive interventions that go beyond infrastructure improvements. Similarly, Bhatt (2023) investigates the impact of digital literacy training for rural women entrepreneurs in Karolia village. His study finds that training programs significantly enhance women's ability to adopt digital platforms for business transactions,

particularly in the post-COVID-19 economic landscape. He emphasizes that digital literacy is a crucial factor in sustaining small businesses and ensuring financial resilience in rural and unorganized sectors.

The role of digital financial inclusion in empowering rural women entrepreneurs is another critical area of research. Several studies have explored how digitalization improves economic participation and financial independence among women in rural areas. Kudiwa (2024) examines the impact of digitalization on rural women in Umguza District, Zimbabwe, finding that access to digital financial services has significantly enhanced women's ability to participate in economic activities. However, he emphasizes that gender-sensitive initiatives and targeted financial policies are essential for ensuring sustainable inclusion. A similar study by Rani (2016) focuses on the socio-economic challenges faced by women vegetable vendors in Tiruchirappalli, India. The study highlights how economic compulsions force women into the informal sector, where they lack access to formal financial institutions. Rani argues that digital financial tools, if made accessible and user-friendly, could play a key role in improving the financial stability of women in unorganized markets.

Several scholars have also investigated the role of entrepreneurship education and financial training in fostering digital financial inclusion for women. Orser, Riding, and Li (2019) highlight the gender barriers in ICT adoption and advocate for gender-inclusive entrepreneurship education and training (EET) programs. Their research suggests that women entrepreneurs face unique challenges in adopting digital technologies, including socio-cultural norms, lack of mentorship, and limited financial literacy. They recommend tailored EET programs to address these barriers and ensure that women can actively participate in the digital economy. Kasparian, Súnico, and Grases (2023) further explore how different digital work platforms impact low-income women. They compare corporate platforms like Zolvers with cooperative platforms like Up & Go, finding that cooperative models provide women with better working conditions, greater financial stability, and more control over their earnings. Their study underscores the importance of platform design in ensuring financial inclusion and economic empowerment for women in digital economies.

The digital financial inclusion is a powerful tool for empowering women entrepreneurs, especially in informal and rural sectors. However, persistent challenges, including digital literacy gaps, socio-cultural barriers, and trust issues in digital financial services, must be addressed to ensure sustainable inclusion. The findings suggest that a multi-pronged approach—combining financial literacy programs, gender-sensitive digital policies, and targeted entrepreneurship training—can significantly enhance women's economic participation. Future research should explore innovative

strategies to integrate digital financial services into women's everyday economic activities while ensuring equitable access to technological advancements. Women's digital economic participation during the COVID-19 pandemic has been a crucial area of research, as digital accessibility, literacy, and socio-cultural constraints significantly impact their inclusion, particularly in the unorganised sector. The pandemic exacerbated existing structural inequalities, making it even more challenging for women to adopt digital tools for economic empowerment. Miranti, Sulistyaningrum, and Mulyaningsih (2022) highlight that gendered family roles, limited digital literacy, and lack of access to technology have hindered women's full participation in the digital economy. Their research underscores the need for targeted interventions to address these barriers and enhance digital inclusion for women in informal sectors. Similarly, home-based women workers in Delhi face multiple socio-economic challenges that impact their financial security and work stability. While digital inclusion is not the primary focus, Dadheech and Sharma (2023) examine factors influencing women's work choices in the informal sector, such as job insecurity, low wages, and the absence of digital resources. Their findings suggest that improving digital access and financial literacy could significantly enhance the economic resilience of home-based women workers. The role of digital financial inclusion in enhancing women's economic participation has been widely studied. Kofman and Payne (2021) explore how digital financial services, such as mobile banking and online transactions, improve financial access for women entrepreneurs in the informal sector. They emphasize, however, that challenges such as financial scams, lack of trust in digital services, and inappropriate financial products pose significant risks. The study advocates for regulatory policies and educational initiatives to ensure ethical financial inclusion. Similarly, Mabrouk, Bousrih, and Elhaj (2023) compare digital financial services before and after COVID-19, highlighting how these services have become critical for women's financial independence. Their study underscores the need for continued support and awareness programs to enable women entrepreneurs to leverage digital financial services effectively.

Financial literacy plays a crucial role in empowering women entrepreneurs in the informal sector, yet many still struggle with basic financial knowledge. Jiyane and Zawada (2013) discuss how financial literacy programs improve business performance and economic sustainability for women entrepreneurs. While their study does not focus on digital aspects, it highlights key challenges such as limited mathematical literacy, lack of awareness of business services, and difficulty in money management. They suggest that integrating digital financial training into existing literacy programs could further enhance women's ability to manage finances effectively. The human rights perspective of women workers in the unorganised sector has also been explored concerning economic and social security. Patro, Panda,

and Das (2024) examine how women in informal employment face significant hurdles due to the absence of social security benefits, healthcare access, and financial stability. Their research, while not directly addressing digital inclusion, highlights the economic contributions of women in informal sectors and suggests that digital financial tools could offer solutions to improve their socio-economic conditions. Likewise, Parveen (2014) studies the socio-economic vulnerabilities of female laborers in Aligarh's informal service sector. Her research highlights exploitative working conditions, long hours, and minimal wages, reinforcing the argument that digital financial inclusion could provide financial independence and improve work conditions for women in informal employment.

The digital inclusion of women across different socio-economic contexts has been a key research area in multiple global studies. Thompson and Paul (2020) compare digital inclusion factors among women in India, Chile, and Australia, identifying common barriers such as affordability, digital skills gaps, and socio-cultural constraints. Their study suggests that while digital access has improved in many regions, deep-rooted gender disparities continue to limit women's participation in digital economies. In a similar vein, Ronchi (2019) advocates for e-Inclusion for all, particularly women entrepreneurs in the informal sector, emphasizing that the digital divide must be addressed to ensure equal ICT opportunities. He argues that the exclusion of women from digital transformation processes can lead to greater economic disparities, making inclusive digital policies essential. Gender disparities in digital financial services have also been examined in the context of India. Kulkarni and Ghosh (2021) explore how digitalization can enhance financial inclusion for women entrepreneurs by reducing barriers related to cost, distance, and traditional banking limitations. However, they highlight persistent challenges such as lower levels of digital literacy, gendered financial norms, and socio-cultural resistance to women's financial independence. Their study calls for gender-sensitive financial policies and training programs to maximize the benefits of digital financial services for women entrepreneurs. The digital financial inclusion and literacy play critical roles in empowering women, particularly in the unorganised sector. However, structural barriers such as limited digital access, socio-cultural norms, and financial insecurity continue to hinder women's full participation in digital economies. Future research should focus on developing inclusive policies and educational programs that bridge these gaps and ensure equitable access to digital financial tools for all women.

The digital inclusion of women, particularly in the unorganised sector, has been a critical area of research, highlighting the various challenges and opportunities that arise with the increasing reliance on technology. Several studies have explored the impact of digital inclusion on low-income women, particularly in rural

areas, by examining how mobile technology and digital literacy programs contribute to entrepreneurial initiatives and access to job opportunities. Research by González Ramos and Arroyo Prieto (2014) emphasizes the role of internet accessibility in improving life conditions for these women. Similarly, efforts to integrate gender inclusion in digital jobs and youth employment programs have been discussed in reports by Datta and Robinson (2020), which propose strategies for enhancing employment outcomes for young women in the digital economy. The financial inclusion of women entrepreneurs in the unorganised sector has also received significant attention. Studies such as those by Nghargbu and Jumare (2024) highlight the barriers to digital financial inclusion faced by women in Africa, including limited access to digital financial services. Digital financial inclusion plays a transformative role in promoting women's empowerment, yet obstacles such as low financial literacy, social norms, and digital illiteracy persist, as examined by Arnold and Gammage (2019). Another important aspect of digital inclusion relates to its impact on women's health and well-being, particularly in rural communities. Wagg, Cooke, and Simeonova (2017) provide an overview of the gender digital divide and how disparities in digital access affect healthcare outcomes for women in these settings. Their research underscores the necessity of targeted policies to ensure equitable access to digital health resources.

Women's morale and job satisfaction in the unorganised sector have been analyzed by Anitha, Neelamegam, and Kanagaraju (2017), who examine the factors influencing retention and job stability. Issues such as seasonal employment, lack of social security, and poor working conditions are central themes in studies on domestic workers and other vulnerable groups in the informal economy. Kumar (2015) provides a case study of maid servants in Ghaziabad, highlighting their struggles with low wages and job insecurity. The role of digital technology in supporting rural women entrepreneurs has also been explored, with studies emphasizing the importance of training and financial support. Patgaonkar and Barhat (2012) discuss the challenges faced by women in informal entrepreneurship and how targeted initiatives can enhance their success. Similarly, Sánchez-Oro and Fernández Sánchez (2017) explore the barriers faced by rural women in using digital technology for business activities, emphasizing the influence of family and social structures on their entrepreneurial endeavors. The broader gender digital divide remains a pressing issue, with several scholars examining the strategies necessary to promote e-inclusion. Vázquez and Castaño (2011) discuss digital exclusion and the importance of designing policies that specifically address the needs of women. Faulkner and Lie (2007) explore gender inclusion in the information society and propose measures to support women's participation in digital spaces. The challenges of digital inclusion in Spain's strategic policies are examined by Rodríguez-Díaz and Jiménez-Cortés (2020), who call for increased visibility

and support for women in digital initiatives. Similar discussions on the digital gender divide and its implications for entrepreneurship are found in research by Balagopal (2020), who emphasizes the need to reduce internet costs and enhance information access for women. The impact of digital inclusion on women's time use and gender relations is another area of research that has received attention. Arroyo (2020) investigates how digitalization influences women's daily routines and lifelong learning opportunities, highlighting gaps in empirical research on time allocation. Additionally, the role of digital financial inclusion in the context of the Fourth Industrial Revolution is explored by Ojo (2022), who discusses the barriers faced by women in Africa in achieving digital financial inclusion and the potential benefits of overcoming these challenges for sustainable development. Research on digital skills and labor market inclusion by Jevtić, Vučković, and Tasić (2023) further underscores the significance of digital knowledge in enhancing employment opportunities for women, particularly in emerging economies.

As the digital economy continues to expand, it is crucial to address the structural barriers that hinder women's full participation in digital financial services, employment, and entrepreneurship. The studies referenced here contribute to the growing discourse on gender digital inclusion, highlighting both the existing challenges and the potential solutions that can lead to greater economic empowerment for women in the unorganised sector. The digitalisation of various sectors has significantly impacted women, particularly those in the unorganised sector. Gender and digitalisation in artificial intelligence (AI) have been examined by Kelan (2025), who discusses the importance of inclusion strategies to address algorithmic bias and improve women's visibility in AI-driven processes, particularly in entrepreneurship. Similarly, Saravanan and Dash (2017) highlight how digital inclusion can empower women in the unorganised sector by enhancing their skills, improving economic opportunities, and addressing gender inequality. The impact of digitalisation on rural women in India has been explored by Doddahanumaiah (2023), who emphasises how technology improves financial independence and skill capacity, which is crucial for entrepreneurs in the unorganised sector. Inadequacies in formal and non-formal education systems have been identified as barriers to women's employment in the informal sector, as noted by Leach (1996), who argues that current educational structures fail to prepare women for such work.

The financial inclusion of women in Africa remains a challenge despite its potential benefits. Leach, Biswas, Jijina, and Niraula (2024) examine how digital financial services can enhance women's labour force participation, but they also note significant obstacles such as high mobile service costs. The exploitation and potential liberation of women workers in India's unorganised sector have been studied by Desai (2020), who focuses on the economic hub of Surat and the ways in which

digital access could transform labour conditions. Evaluating gender digital inclusion programs is crucial for understanding their effectiveness. Pawluczuk, Lee, and Gamundani (2021) stress the need for rigorous assessments to meet the learning needs of women entrepreneurs. The broader gender-based digital divide has been examined by Hendricks and Olawale (2022), who argue that digital transformation can empower women entrepreneurs by providing more opportunities and promoting gender equality. Enhancing digital inclusion for women entrepreneurs in Cambodia has been explored by Chea (2022), who developed the Khmum eShop, an all-in-one eCommerce platform aimed at overcoming barriers such as digital literacy and access to finance. Williams and Gurtoo (2011) contrast structuralist and neoliberal explanations for women's participation in the informal sector, challenging traditional views on entrepreneurship. The systemic inequalities affecting women's inclusion in ICT have been studied by Gillard and Mitev (2006), who highlight the tensions that persist despite efforts for digital empowerment. Providing digital skills education to elder women has been identified as a crucial strategy for digital inclusion. Şimşek and Erdener (2012) discuss the benefits of digital visual skills training for older women, which can enhance their community engagement. The role of digitalisation in supporting rural women-owned micro and small enterprises (MSEs) has been explored by Donga and Chimucheka (2024), who emphasise how digital technology can boost competitiveness, recovery, and growth, particularly in the post-COVID-19 era.

Structural inequalities have limited women's access to digital technology, exacerbated by the COVID-19 pandemic. Franconi and Naumowicz (2021) highlight how these inequalities have reinforced traditional gender roles and restricted women's participation in the digital economy. Within the EU, Damiani and Rodríguez-Modroño (2024) analyse key indicators of digital inclusion, including the number of women in STEM fields and gender pay gaps. The transformation of the workforce due to digitalisation, and its impact on women in the unorganised sector, has been discussed by Rani, Kelia, Satija, and others (2022), who argue that limited access to digital tools and low literacy levels continue to create barriers. The working and living conditions of women in India's informal sector have been analysed by Omvedt (1992), who focuses on the persistent exploitation of women and their social status within these labour structures. Despite the rapid advancements in digital technology, women in the unorganised sector continue to face significant barriers that hinder their ability to fully participate in the digital economy. The role of digitalisation in promoting financial inclusion and economic empowerment for women has been widely studied. In Nigeria, Ozili (2024) analyses women's digital financial inclusion trends and their positive relationship with economic growth, highlighting mobile money account ownership and internet usage as key factors. Similarly, Disanayaka (2024) explores how

digital financial inclusion influences banking sector stability, considering macroeconomic variables and financial tools such as ATMs and mobile banking.

In the healthcare sector, workplace inclusivity remains a challenge amid digital innovations. Burrell, Barrett, and Lewis (2021) discuss the need for organisational changes to create inclusive environments for women in health organisations engaging with the digital economy. Likewise, Bhatt (2024) examines how e-commerce has empowered women entrepreneurs in India, especially during the pandemic, by enhancing their economic and social independence. The digital skills of women in social networks have been a subject of study by Rebollo Catalán, Mayor Buzón, and García Pérez (2017), who find that employed women and entrepreneurs possess more advanced digital competencies compared to unemployed women. Digital inclusion in rural banking has also been explored by Dam (2022), who assesses how digital banking services can support financial inclusion for unprivileged groups in Tripura, India. Women entrepreneurs in the informal sector face unique challenges and opportunities. Williams and Gurtoo (2011) evaluate the motivations, work-life balance, and perspectives of women in India's informal economy. Similarly, Arango Valencia, Pérez Arias, and Barrientos Gómez (2024) investigate the technological capabilities of women in vulnerable communities in Colombia, identifying barriers to their digital inclusion. In Nigeria, the use of digital technologies to enhance female-owned small and medium-sized enterprises (SMEs) has been highlighted by Etim (2021), who discusses how social media and digital platforms contribute to business growth in the unorganised sector. The challenges faced by elderly women in the unorganised workforce are discussed by Mary and Muthu (2022), who examine wage discrimination and exploitation in informal employment settings.

Urbanization plays a crucial role in enhancing digital inclusion for women entrepreneurs in the informal sector by improving access to digital infrastructure, financial services, and business networks. Ghani et al. (2013) emphasize that urbanization facilitates enterprise creation through agglomeration benefits, which include improved connectivity, access to resources, and knowledge-sharing opportunities. In urban settings, women entrepreneurs can leverage better internet and mobile networks to adopt digital tools such as e-commerce platforms, social media marketing, and digital payment systems. These technologies enable them to expand their customer base beyond local markets, increase business efficiency, and access information that enhances decision-making. However, disparities in digital literacy and access to affordable digital services remain a challenge, particularly for women transitioning from rural to urban areas.

Another critical aspect of urbanization's impact on digital inclusion is the availability of financial services

tailored to women entrepreneurs. Digital financial inclusion, facilitated by mobile banking, fintech innovations, and digital payment solutions, has allowed women in urban areas to participate more actively in the economy (Ozili, 2024). Unlike their rural counterparts, women entrepreneurs in urban settings benefit from greater access to formal banking systems, microfinance institutions, and government-led financial inclusion initiatives. This access not only empowers them economically but also reduces gender disparities in business ownership. However, as Ghani et al. (2013) note, the "urbanization gradient" affects female and male entrepreneurs differently, with women often facing additional barriers such as limited collateral for loans and socio-cultural constraints that restrict financial independence. Furthermore, urban environments offer increased opportunities for skill development, networking, and mentorship programs, which are essential for fostering women's digital inclusion in the informal sector. Training programs on digital literacy, business management, and financial planning are more prevalent in urban areas, equipping women with the necessary skills to integrate digital tools into their businesses (Rebollo Catalán et al., 2017). Additionally, urbanization promotes the formation of women-led entrepreneurial networks, which serve as support systems for knowledge exchange and collaboration. However, despite these benefits, policies must focus on addressing systemic gender inequalities in digital adoption, ensuring that urbanization does not merely reinforce existing disparities but actively contributes to equitable digital inclusion for women entrepreneurs in the informal sector.

Research gap

Despite the significant progress in digital financial inclusion, there remain substantial gaps in ensuring equitable access for women entrepreneurs in the unorganized sector. Many studies emphasize the benefits of digital financial services, such as improved financial security, enhanced business operations, and economic resilience. However, limited digital literacy, financial illiteracy, and lack of trust in digital platforms continue to hinder women's full participation. Studies have highlighted that while mobile financial services provide access to credit and banking, many women in rural and unorganized sectors struggle with navigating digital financial tools effectively. Furthermore, the exclusion of women from formal education in digital and financial literacy programs further exacerbates their inability to fully leverage digital financial services.

Another critical gap in the existing research is the socio-cultural and structural barriers preventing women from fully integrating into the digital economy. While urbanization and policy reforms have improved digital access for women entrepreneurs, gender norms and socio-economic disparities continue to create challenges. Many women entrepreneurs in rural and semi-urban areas remain excluded from formal banking services due

to the lack of gender-sensitive financial policies. Additionally, the persistent wage gap and economic vulnerability of women in informal sectors further limit their ability to invest in digital technology or financial tools. The gender digital divide, which disproportionately affects women, remains a key concern as research suggests that without targeted interventions, these disparities will continue to persist.

Moreover, cybersecurity concerns and fraud risks associated with digital financial services pose significant challenges for women entrepreneurs in the informal sector. While digital transactions provide efficiency and convenience, many women express concerns about financial fraud, data breaches, and exploitation in digital markets. Current research does not adequately address the impact of cybersecurity threats on women's confidence in digital financial tools. Future studies should focus on strengthening digital security, ensuring regulatory frameworks, and improving consumer protection measures for women entrepreneurs. Additionally, more empirical research is needed to evaluate the long-term impact of digital financial inclusion on women's economic empowerment, particularly in underrepresented and marginalized communities.

Research Agenda

Based on the identified research gaps in digital inclusion for women entrepreneurs in the unorganized sector, the following five research agenda points can guide future studies:

1. Enhancing Digital and Financial Literacy for Women Entrepreneurs

Future research should explore effective models for digital and financial literacy programs tailored specifically for women in the unorganized sector. Studies should examine the impact of training interventions on women's ability to access and utilize digital financial services effectively.

2. Addressing Socio-Cultural and Structural Barriers to Digital Inclusion

There is a need to investigate how gender norms, socio-economic disparities, and household responsibilities affect women's ability to adopt digital tools for entrepreneurship. Research should focus on developing policy recommendations to bridge the gender digital divide.

3. Assessing the Role of Government and Institutional Initiatives

Further studies should analyze the effectiveness of existing government schemes, such as NABARD's Project E-Shakti, and assess how financial policies can be improved to support women entrepreneurs in the informal sector.

4. Strengthening Digital Security and Trust in Financial Technologies

Cybersecurity risks and financial fraud discourage many women entrepreneurs from adopting digital financial services. Research should focus on developing secure and women-friendly digital financial platforms to build trust and confidence in digital transactions.

5. Evaluating the Long-Term Impact of Digital Inclusion on Economic Growth

More empirical studies are required to assess how digital inclusion contributes to women's long-term financial stability, business sustainability, and national economic growth. Research should also explore sector-wise variations in the impact of digital financial inclusion.

SWOT Analysis

Strengths

- a) **Increased Access to Financial Services** – Digital financial inclusion provides women entrepreneurs with access to banking, mobile payments, and credit facilities, reducing reliance on informal money lenders.
- b) **Government and Institutional Support** – Initiatives like NABARD's Project E-Shakti and financial literacy programs are driving greater digital adoption among women in the unorganized sector.
- c) **Lower Transaction Costs and Greater Efficiency** – Digital payments and online transactions reduce operational costs, enabling businesses to scale more efficiently.
- d) **Growing Smartphone and Internet Penetration** – The rapid adoption of mobile technology and internet services in India and other developing economies facilitates digital business expansion.
- e) **Empowerment and Economic Independence** – Digital inclusion fosters greater economic independence, enabling women to engage in formal financial systems and expand their businesses.

Weaknesses

- a) **Low Digital and Financial Literacy** – Many women in the unorganized sector lack the skills to effectively use digital financial tools.
- b) **Limited Infrastructure and Internet Connectivity** – Rural areas still suffer from weak digital infrastructure, affecting the accessibility of online business solutions.
- c) **Gender-Based Socio-Cultural Barriers** – Many women face resistance from family and societal norms, limiting their access to technology and financial independence.
- d) **Trust Deficit in Digital Financial Services** – Cybersecurity concerns, digital fraud, and lack of awareness about financial safety discourage women from using digital payment systems.
- e) **Lack of Tailored Financial Products** – Many financial services are not designed with women's

needs in mind, making it difficult for them to access business loans and credit facilities.

Opportunities

- a) **Rising Digital Economy and Fintech Innovations** – The expansion of fintech solutions such as digital wallets, UPI, and AI-based financial advisory services offers new opportunities for women entrepreneurs.
- b) **Government Policy Reforms** – Increased focus on women-led entrepreneurship and financial inclusion in government policies can drive greater participation.
- c) **Public-Private Partnerships for Digital Literacy** – Collaboration between the government, NGOs, and private fintech companies can boost digital education initiatives for women.
- d) **E-commerce Growth and Market Expansion** – Platforms like Amazon Saheli and Flipkart Samarth provide women entrepreneurs with access to broader markets.
- e) **Microfinance and Low-Interest Loan Programs** – Specialized financial products can be designed to help women entrepreneurs scale their businesses.

Threats

- a) **Cybersecurity Risks and Digital Fraud** – The unorganized sector is highly vulnerable to online scams and financial fraud.
- b) **Economic Instability and Inflation** – High inflation and economic downturns can limit investment in digital infrastructure, affecting financial inclusion efforts.
- c) **Resistance to Technological Change** – Many small businesses remain hesitant to shift from traditional cash-based transactions to digital payments.
- d) **Inconsistent Policy Implementation** – A lack of effective monitoring and execution of financial inclusion programs can limit their impact.
- e) **Increased Competition from Established Businesses** – Large corporations and organized sector businesses dominate digital marketplaces, making it harder for informal women entrepreneurs to compete.

Further Research Proposal

Title: Enhancing Digital Inclusion for Women Entrepreneurs in the Unorganized Sector: Challenges, Opportunities, and Policy Interventions

Objective:

This research aims to explore the effectiveness of digital financial inclusion initiatives, identify persistent barriers faced by women entrepreneurs in the unorganized sector, and propose actionable policy recommendations for improving digital access, literacy, and financial stability.

Proposed Research Questions:

1. What are the key factors influencing the adoption of digital financial services among women entrepreneurs in the unorganized sector?
2. How do socio-cultural, economic, and infrastructural barriers limit women's participation in digital entrepreneurship?
3. What role do government policies and financial institutions play in promoting digital inclusion for women entrepreneurs?
4. How does digital literacy impact the sustainability and growth of women-led businesses in the informal economy?
5. What strategies can be implemented to strengthen cybersecurity and trust in digital financial services among women entrepreneurs?

Methodology:

- **Qualitative Approach:** Conduct interviews and focus group discussions with women entrepreneurs to understand their experiences with digital financial services.
- **Quantitative Analysis:** Use surveys to collect data on the adoption rate of digital tools, financial inclusion levels, and challenges faced by women in the unorganized sector.
- **Comparative Study:** Analyze best practices from other developing countries that have successfully implemented digital inclusion programs.

Suggestions to Carry Out Further Research

1. **Longitudinal Study on Digital Literacy and Business Sustainability:** Future research should examine the long-term impact of digital literacy training programs on women entrepreneurs, assessing whether they lead to sustained business growth and financial independence.
2. **Exploring Regional Variations in Digital Inclusion:** Research should analyze differences in digital adoption between urban, semi-urban, and rural women entrepreneurs to identify location-specific challenges and solutions.
3. **Impact Assessment of Government and Private Sector Initiatives:** A detailed evaluation of existing programs such as NABARD's Project E-Shakti and fintech-driven financial inclusion initiatives should be conducted to assess their effectiveness and scalability.
4. **Cybersecurity Awareness and Digital Trust Building:** Future studies should investigate the role of cybersecurity education and fraud prevention strategies in enhancing women's confidence in digital financial transactions.
5. **Tech-Based Innovations for Women Entrepreneurs:** Research should focus on the role of artificial intelligence (AI), blockchain, and mobile apps in improving financial access and business efficiency for women entrepreneurs in the informal sector.

Limitations of the Proposal

1. **Limited Data Availability:** Given the informal nature of women's entrepreneurship in the unorganized sector, reliable data on digital adoption and financial transactions may be difficult to obtain.
2. **Challenges in Measuring Digital Literacy Impact:** Assessing the long-term effects of digital literacy training may require extensive follow-ups, which can be resource-intensive and time-consuming.
3. **Regional and Socio-Cultural Constraints:** The study's findings may not be universally applicable, as regional disparities and cultural differences significantly impact digital adoption and financial inclusion.
4. **Rapid Technological Changes:** Digital financial technologies evolve rapidly, and research findings may become outdated if new innovations emerge before policy recommendations are implemented.
5. **Potential Respondent Bias:** Self-reported data from women entrepreneurs may be influenced by personal perceptions, social desirability, or lack of familiarity with digital tools, affecting research accuracy.

CONCLUSION

This study provides valuable insights into the factors Digital inclusion has the potential to transform the landscape of women's entrepreneurship in the unorganized sector by providing access to financial services, expanding market opportunities, and fostering economic empowerment. This study highlights the role of digital financial services, fintech solutions, and government initiatives in bridging the financial gap for women entrepreneurs. However, despite these advancements, significant barriers such as digital illiteracy, socio-cultural restrictions, cybersecurity risks, and inadequate infrastructure continue to hinder equitable participation in the digital economy. Addressing these challenges requires a multi-faceted approach that includes targeted financial literacy programs, improved access to digital tools, gender-sensitive policy interventions, and robust cybersecurity measures.

The findings underscore the need for collaborative efforts between the government, private sector, and non-governmental organizations (NGOs) to create an inclusive digital ecosystem that empowers women entrepreneurs. Programs such as NABARD's Project E-Shakti demonstrate the importance of institutional support in driving digital financial inclusion, yet further policy refinements are needed to ensure sustainable growth for women-led enterprises. Moreover, promoting digital literacy and enhancing trust in financial technologies will be crucial in overcoming systemic barriers and encouraging wider adoption of digital solutions.

Future research should focus on evaluating the long-term impact of digital inclusion initiatives, assessing regional disparities in adoption, and exploring the role of

emerging technologies such as artificial intelligence and blockchain in financial empowerment. By addressing existing limitations and implementing effective policy reforms, digital inclusion can serve as a powerful tool for enhancing women's entrepreneurship, fostering inclusive economic growth, and reducing gender disparities in the unorganized sector.

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