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Research Article

Digital Transformation and Gender Equity in the Handloom Industry: Supporting Women Weavers through E-Commerce and Technology in Telangana, India

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Abstract: The handloom industry in India is a culturally significant sector, providing livelihoods to millions, particularly women. In Telangana, clusters like Pochampally and Gadwal represent this heritage. However, women weavers face persistent challenges, including low wages, limited market access, and marginalisation. This working paper examines the transformative potential of digital platforms and e-commerce in addressing these issues, focusing on gender equity in the sector. It highlights the barriers women face in adopting digital tools and proposes an inclusive digital transformation framework rooted in feminist economics, aimed at promoting social justice and economic empowerment.

Keywords: Digital Transformation, Gender Equity, Women Weavers, Handloom Industry, E- Commerce, Digital Literacy, Feminist Economics, Informal Labour, Social Justice.

INTRODUCTION

The handloom industry in India, long celebrated for its artisanal craftsmanship and cultural heritage, is now standing at the crossroads of tradition and technology. For decades, this sector has been a source of livelihood for millions, particularly women, despite the persistent challenges of market access, supply chain inefficiencies, and exploitative middlemen. Women weavers, who form the backbone of this industry, have historically worked within invisible frameworks of informal labor, receiving little recognition or remuneration. However, the advent of digital platforms is beginning to change this narrative.

In recent years, e-commerce platforms have emerged as crucial enablers of visibility and economic autonomy. SB Yadav [1] in their paper expounded on how digital marketplaces such as Amazon, Flipkart, and niche platforms like GoCoop allow weavers to reach national and global consumers directly. This disintermediation not only increases the revenue share for women producers but also allows them to engage with markets from within their domestic spaces, which is especially empowering in regions where mobility is socially restricted.

Beyond market reach, digital financial tools have also played a transformative role. According to the study "Shaping Atmanirbhar Bharat (Self-Reliant India) through Atmanirbhar Nari (Self- Reliant Women): A Roadmap for Empowering Women-Led MSMEs through ICT, Financial Access, and Skill Development" by P. Rathi and A. Rathi (2025) [2], the integration of digital payment systems such as UPI and mobile wallets has simplified transactions, reduced dependency on male intermediaries, and fostered financial autonomy among women. These tools not only ensure prompt payments but also contribute to enhancing women's bargaining power within their households, a step forward in shifting gender power dynamics.

The digital shift is not limited to transactions and marketplaces. Social media has become an equally powerful tool for identity, branding, and storytelling. The article "Blended Traditional and Digital Marketing for Empowering Women Artisans: An Empirical Approach" by Anurag and Uma [3] demonstrates how platforms like Instagram, WhatsApp, and Facebook allow women weavers to showcase their products, communicate with buyers, and build micro-brands that resonate with ethical consumerism. Through these narratives, women transition from being anonymous producers to recognised digital entrepreneurs, with control over their labour's narrative and pricing.

Moreover, digital training and literacy programs are laying the groundwork for long-term empowerment. Government-backed initiatives such as the Digital India program and freely available platforms like YouTube offer skill-building opportunities, introducing rural women to design trends, marketing techniques, and digital tools. The Digital India Initiative: Impact on Rural Women Artisans (Government of India, 2023) highlights how tailored, community-based training modules are key to bridging knowledge gaps, especially for women who have limited access to formal education.

Innovative technologies, like blockchain, are also creating new forms of transparency and ac- countability. The article "Weaving Resilience: Gujarat's Textile Traditions as a Blueprint for Sustainable Supply Chain" by Vrajlal. K

(2025) illustrates how blockchain can authenticate the origins of handwoven products, assure ethical sourcing, and ensure fair compensation to weavers most of whom are women subjected to exploitation within opaque value chains. This level of traceability fosters trust among consumers and paves the way for inclusive trade models that recognise the labour behind the product.

Despite these advancements, the journey toward full digital integration is uneven and fraught with obstacles. The digital divide, as analysed in the article "Bridging the Digital Divide: A Study on the Growth of Digitalization through Digital Transformation in the Indian Economy" by Jaya Prem (2024) [4], continues to marginalize women who lack access to smartphones, internet connectivity, and basic digital literacy. Structural inequalities, particularly those linked to caste, class, and gender, compound these issues. For digital empowerment to be truly inclusive, policy interventions must go beyond hardware provision and address deep-rooted socio-economic dis- parities. Together, these developments reveal a complex but promising landscape. As digital tools continue to disrupt traditional value chains, they must be accompanied by economic frameworks that foreground women's lived experiences and labour realities. The shift from margins to markets is not automatic it must be made intentional, equitable, and justice-driven.

LITERATURE REVIEW

Existing research highlights the potential of digital platforms to democratize market access and empower marginalised workers. However, the gendered dimensions of these transformations, particularly in traditional industries like handloom weaving, remain underexplored. This study builds on the feminist economics framework, emphasising social justice and equity, to analyse the intersection of digital inclusion and gender in the handloom sector.

The paper "Empowering women through ICT-based business initiatives: An overview of best practices in e-commerce/e-retailing projects"; by Sylvia Maier, Usha Reichert [5] explains that information and communication technologies (ICTs) are crucial for empowering women, particularly in the Global South, by providing them with opportunities for economic participation through e-commerce initiatives. It highlights the necessity of addressing structural barriers that women face, emphasising the importance of government and institutional support to create an enabling environment for success. Additionally, the paper stresses the need for comprehensive training programs that equip women with both technical and managerial skills, fostering their confidence and capabilities in navigating the digital landscape. Community and societal involvement are also identified as critical factors, as projects that engage local stakeholders tend to be more success- ful. The study outlines best practices for implementing effective e-commerce projects, including the expansion of market access and the adoption of managerial best practices, ultimately aiming to inform effective program development and policy design to enhance women's empowerment through ICT.

The paper "Leveraging ICT Technologies in Closing the Gender Gap" by Marie Sicat, Ankai Xu, Ermira Mehetaj, Michael J. Ferrantino, Vicky Chemutai [6] discusses that digital technologies can significantly empower women by creating new employment and entrepreneurial opportunities, thereby reducing gender disparities in trade. It highlights that e-commerce lowers barriers for micro, small, and medium-sized enterprises, which is particularly beneficial for women facing mobility constraints and discrimination. However, the paper stresses that technology alone is insufficient to close the gender gap, as women's access to ICTs often lags behind men's; thus, targeted policies are essential to ensure equitable benefits. Additionally, it points out that structural challenges, such as cultural norms, must be addressed to fully leverage ICT for women's empowerment. The introduction of new frameworks for analysing the gender dimensions of e-commerce further aids in developing effective strategies to bridge these gaps.

The paper "Digital India and Women: Bridging the Digital Gender Divide" by Manjit Nath and Pallabi Barah [7] investigates the potential of digital technologies to mitigate gender inequality in Indian society. It critiques the prevailing discourse on digitalisation, which often focuses solely on access, and proposes a three-tier framework to assess the impact of digital technologies on women's empowerment. Using the Digital India programme as a case study, the authors explore how this initiative can serve as a solution to traditional methodologies aimed at achieving gender equality. Through primary data analysis of selected Digital India products and services, the paper highlights the transformative role of technology in empowering women and bridging the existing gender gap. It emphasises that while the digital divide remains a significant issue, the Digital India initiative has the potential to enhance women's access to digital resources, thereby improving their socio-economic conditions and fostering empowerment.

The article "ICT Strategies for Gender Empowerment: Actionable Approaches and Recommendations"; by Claudia Morrell and Revi Sterling [8] discusses the critical role of Information and Communications Technologies (ICT) in promoting gender equality, particularly in developing regions. It highlights the risk of reinforcing existing gender inequalities if ICT initiatives do not specifically address the needs of women and girls. The authors emphasize the importance of recognising the gendered digital divide and advocate for equal access to ICT programs for women. They outline the need for culturally appropriate initiatives that consider local power dynamics and grassroots activities. The paper identifies gaps in current research, such as the long-term impacts of ICT on women's lives and the design of technology that meets their needs. It calls for collaboration among stakeholders to develop effective strategies for data collection and program assessment, ensuring that ICT efforts benefit women equitably. The authors also stress the necessity of legislative and policy changes to support

women's access to ICT, alongside ongoing research to identify successful practices and programs. Overall, the article serves as a call to action for integrating gender considerations into ICT development to foster positive social change for women and girls.

OBJECTIVES

- To study how digital tools and e-commerce platforms can enhance the livelihoods and economic participation of women weavers in the handloom sector.
- Identify the structural, cultural, and infrastructural challenges that hinder digital adoption in rural weaving communities
- Suggest actionable, community-centred strategies to support equitable and sustainable digital transformation within the handloom industry.

METHODOLOGY

A field-based primary study was conducted in Telangana's Pochampally and Gadwal weaving clusters. Data was collected directly from 120 women weavers. Snowball sampling technique where research respondents are asked to assist in identifying other potential respondents was used to conduct the study which helped in identifying similar or identical sample for the study. Focus Group Discussions was conducted to uncover collective challenges and shared experiences. In- depth Interviews was conducted to explore individual barriers and aspirations regarding digital platforms.

DIGITAL ADOPTION AMONG WOMEN WEAVERS FROM FIELD WORK

Fieldwork conducted across the weaving clusters of Pochampally and Gadwal in Telangana offers critical insights into the lived experiences of women weavers navigating the promise and pitfalls of digital transformation. As a researcher engaging directly with 120 women weavers through interviews and focus group discussions, it became evident that the popular narrative of digital inclusion overlooks significant structural and cultural barriers that inhibit meaningful engagement with technology. While digital tools are increasingly positioned as vehicles of empowerment for marginalized groups, particularly women, my findings highlight a complex interplay between access, literacy, time, and social context that often renders this empowerment aspirational rather than real.

One of the most prominent findings was the widespread presence of smartphones among women below the age of 50. However, ownership or access to a digital device does not automatically trans- late into digital empowerment. Most women reported using smartphones only for basic communication purposes. WhatsApp and YouTube emerged as the most commonly used applications, with WhatsApp serving primarily as a means of staying connected with children or relatives through video calls, and YouTube as a source of passive entertainment. Engagement with digital market- places, e-commerce platforms, or even informational content related to their weaving practice was practically nonexistent. This disjuncture between access and meaningful use confirms what Nath and Barah (2017) argue in "Digital India and Women: Bridging the Digital Gender Divide" that access is a necessary but insufficient condition for digital empowerment.

Moreover, lack of digital literacy remains a critical barrier. A majority of the women interviewed expressed apprehension toward using mobile applications or the internet due to a fear of digital scams. This fear was particularly prevalent among older women and was often reinforced by stories circulating within their communities. This phenomenon resonates with Morrell and Sterling's (2006) caution in "ICT Strategies for Gender Empowerment", where they argue that digital exclusion is not merely a function of hardware availability but also of trust, cultural perception, and social support for digital engagement.

Perhaps most revealing was the issue of time poverty, a term often overlooked in digital inclusion discourse. Many women, even when in possession of digital tools, simply did not have the time to explore them. The act of weaving itself is labor-intensive and time consuming, with women spending an average of 9 to 10 hours daily on production activities confirmed by data collected in both Gadwal and Pochampally. As Folbre (1994) [9] points out in "Who Pays for the Kids?", the economic value of unpaid or underpaid labor particularly when performed in domestic spaces is systematically overlooked. In the context of these weavers, the intensity of their manual labor leaves little room for self-learning or experimentation with technology. An intergenerational divide was also clearly observable. In households where younger family members are engaged in weaving, there is a visible shift toward digital engagement for economic purposes. Some younger weavers and their families have begun to explore platforms like Whats App and Instagram to promote their products, creating small-scale visibility and bypassing traditional intermediaries. These cases, though few, signal the transformative potential of digital tools when accompanied by a minimum threshold of literacy, support, and motivation. As Sicat et al. (2020) suggest in "Leveraging ICT Technologies in Closing the Gender Gap", e-commerce can offer new entrepreneurial pathways to women, but only if the structural enablers such as education, safety, and affordability are in place.

Beyond literacy and infrastructure, social norms and economic dependencies continue to limit women's participation in the digital economy. In many cases, male family members control house- hold technology and financial decisions, including how mobile devices are used. Women reported that even if they wished to explore selling products online, they lacked the autonomy to do so. Intermediaries predominantly male still control market access, pricing, and customer relations. These findings align with Diane Elson's (1999) [10] framework that views labor markets as gendered institutions, shaped by unequal power relations that transcend formal employment contracts and permeate informal sectors like handloom.

The preliminary findings from this study illustrate that the digital divide in handloom weaving is multidimensional encompassing not just access, but time, trust, knowledge, and gendered autonomy. The few examples of successful digital engagement within families where the next generation has entered the craft underscore what is possible when structural barriers are addressed. However, these instances remain exceptions rather than the norm.

FINDINGS

Findings include lack of digital literacy, most of the women weavers are unfamiliar with e- commerce platforms and digital tools, Infrastructure Deficits there is inadequate access to digital devices and stable internet is a significant barrier. Gender Norms where cultural constraints on mobility and autonomy limit opportunities for training and participation. Economic Dependency women continue to rely on intermediaries for market access, reducing their earnings.

The findings highlight the pressing need for interventions tailored to the unique challenges faced by women in the handloom industry. Digital platforms hold immense potential to transform market access, but structural barriers must be addressed to ensure equitable participation.

CONCLUSIONS

Empowerment through Digital Literacy and Capacity Building

Customized Training Programs to develop digital literacy initiatives tailored to women weavers' skill levels and schedules. These should include basics of using smartphones, computers, and the internet, training on navigating e-commerce platforms and social media for business, Peer-to-Peer learning which will create mentorship networks where digitally proficient weavers train others, fostering solidarity and collective empowerment.

Accessible and Affordable Digital Infrastructure

Community Digital Hubs can be established to share access centers equipped with internet connectivity, devices, and technical support in weaving clusters, Subsidized devices and Services like low-cost smartphones, data plans, and tech tools to be provided to women weavers through government or private sector programs, adapt platforms and training materials into local languages and culturally sensitive formats to enhance inclusivity.

Gender Inclusive Policies and Norms

Market Access without Middlemen which enable direct market access by connecting women to buyers through e-commerce, reducing dependency on intermediaries, Flexible Work Environments which advocate for policies that consider women's dual roles in productive and reproductive work, ensuring their ability to engage in digital economies. Awareness Campaigns which can challenge gender norms by promoting stories of successful women entrepreneurs in handloom, inspiring broader community support for their participation.

Monitoring, Evaluation, and Feedback Mechanisms

Involve women weavers in assessing the effectiveness of digital initiatives, ensuring their voices guide improvements, Develop gender-sensitive metrics to evaluate outcomes, such as income growth, reduction in dependency on middlemen, and increased digital participation. Regularly gather input from participants to refine digital tools, training, and infrastructure in alignment with their evolving needs.

Social Justice through Intersectional Approaches

Recognize the unique challenges faced by women based on caste, class, and geography, and create interventions that reflect these realities, Foster solidarity by involving male family members and community leaders in discussions about the importance of women's economic participation, En- sure equitable pay, safe working conditions, and respect for women's traditional knowledge and skills in the digital economy.

This paper underscores the transformative potential of digital platforms in empowering women weavers in Telangana. By addressing systemic barriers and promoting inclusive practices, the handloom industry can not only preserve its cultural heritage but also ensure gender equity and economic sustainability.

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