

Original Article

Eco Friendly Art for Socioeconomic Empowerment: A Qualitative Study of Women Artisans and Eco-Friendly Micro-Enterprises in Peri-Urban Karnataka

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Abstract - Though they possess extensive traditional craft skills, the cost of transactions to the larger markets is a higher constraint for rural women artisans, and this impacts their income generation and financial security. As digital technologies and online commerce have become increasingly widespread, online marketplaces are seen as a potential way of increasing market scope and enhancing economic outcomes. This study emphasises women artisans of peri-urban areas who are engaged in producing eco-friendly handicrafts like water-hyacinth-based crafts, and how this can be supplemented by digital entrepreneurship as a source of income. While some past work has focused on women's entrepreneurship or digital commerce, few works have looked at the role of digital marketplaces as an empowering tool for rural eco-artisans producing sustainable products. Qualitative phenomenological research was used, drawing on primary and secondary data; semi-structured interviews with rural women artisans were used to collect data. The results show that artisans are highly dependent on the training organisation for marketing and selling their products, and that the absence of digital awareness and agency also hinders them from selling their products themselves. The study underscores the need for training of women artisans and institutional support to improve their digital skills so that they can play an active role in the digital economy. This study contributes to the existing literature on sustainable rural development by demonstrating the positive impact of training on women's economic empowerment and sustainable livelihoods. The findings show that there is room for improvement in supporting rural women entrepreneurs in the long run, through investment in digital literacy programmes, capacity building, and specific policy measures.

Keywords - Artisans, Digital Literacy, Handicraft, Karnataka, Water Hyacinth, Women Empowerment.

1. Introduction

Today, many freshwater ecosystems are facing threats due to various reasons like pollution, eutrophication, global warming and the proliferation of invasive species (Gupta and Yadav 2020). Water hyacinth, originating from the Amazon Basin in South America, is amongst the most damaging invasive aquatic plants in tropical and subtropical freshwater environments because of its ability to proliferate and form thick, impenetrable mats over the surface.

The proliferation of this species of water hyacinth is visible in Kelgeri lake in Dharwad, Lake Naivasha (Mironga et al. 2011) in Kenya, and Durgam Cheruvu in Hyderabad. It is also a sociological problem, as it damages livelihoods as fishermen, farmers and tourism agencies all lose income; it also creates public health risks, especially increasing diseases like dengue and malaria (Honlah et al. 2019). Not only this, but it can also cause conflict due to limited resources.

Although India has emerged as one of the major economies of the world, women, especially those in rural areas, suffer from socioeconomic marginalisation, which in turn makes the rural economy suffer. This may be a result of a lack of innovative thinking related to the generation of new jobs, the disposal of waste products, and the platforms used to sell the products or goods manufactured. Even though this impacts the rural economy majorly, women in these areas face problems as it becomes a challenge for them to sustain their livelihood (Srivastava and Srivastava 2010).

This project delves deeper into how water hyacinth can be reused to create sustainable products that could successfully provide employment to women. An example of a place where the recycling of hyacinth is prevalent is the peri-urban region of Karnataka, home to many women artisans. Formal paid employment remains limited amongst rural women in Karnataka; the share of rural women in the regular workforce remained close to 10% (IWWAGE 2026).



This suggests why women are not very involved in income-generating activities, making them depend on informal or self-employed work. This further makes access to the digital market and media literacy all the more important for these women artisans.

The overall percentage of female labour participation remains much lower than that of men, which could be a reason for economic challenges for women.

This research aligns with an ongoing project, “Aqua Loop,” which explores how women beneficiaries have been able to achieve and capitalise on socioeconomic empowerment through digital entrepreneurship in rural Karnataka. It also highlights that the lack of understanding or access to technology often impacts the ability to expand microbusinesses and explore further opportunities.

The core objectives of this research are to examine how participation in small businesses shapes the sense of economic agency, self-esteem, confidence and social visibility in women artisans within their society, household and communities. It also aims to delve deeper and analyse how varying levels of digital platform awareness and literacy among artisans influence their capacity to engage in independent e-commerce. Not only this, but it also seeks to understand how intermediary private and public skill-training institutions shape market access and income opportunities for women artisans in peri-urban Karnataka.

2. Literature Review

The retrieved literature reveals an overall tendency that cottage industries can be used as an empowerment instrument by women; however, the way in which the empowerment process is implemented at various places differs. One of the main concepts all these studies evoke is that income generation through small-scale production will boost the economic activity of the woman, which may, in turn, lead to increased autonomy. Gonde, Nkiwane and Ncube (2021) argue that the textile cottage industry in rural Zimbabwe limits women’s empowerment due to poor Information and Communication Technologies (ICTs), manual production, and electricity.

Women who embrace digital technologies in the form of e-commerce websites, accounting software, stock-tracking systems, etc., have higher productivity and reach a larger market, which, in turn, enhances revenue and makes women more influential in the household and community in general. In contrast, Sharma (2011), who researched microcredit in India and other places in the Global South, believes the problem is that, despite the inability of small loans to get cottage industries going, women are always confronted with low empowerment due to the fact that most of the businesses are low-profit and survival-oriented, and in some cases, because a man exists who takes the loan. Income, therefore,

is not sufficient on its own to change gender power relations except when complemented with the training of skills and enhanced market connections.

In favour of the theory of income empowerment, in their article on rural women involved in bindi-making and embroidery in Diamond Harbour, Purkait and Mandal (2015) show that even small-scale home-based industries alleviate poverty, enhance nutrition and educational performance, decrease early marriages, and raise the level of self-esteem and involvement in household decision-making. These studies combined suggest that cottage industries enable women to be empowered, primarily through engagement in economic pursuits, yet the generalisability of empowerment rests on enabling structures like access to digital tools in Zimbabwe, finances and patriarchy in Sharma’s analysis, and community-level socioeconomic benefits — empowerment is not a single term but a multi-dimensional one.

A consistent body of literature has recognised that increased adoption of digital platforms and e-commerce has the potential to transform the socioeconomic environment of small-scale businesses through improved connectivity, visibility, and interaction with customers. As Salkynbayeva and Yesturliyeva (2023) argue, mobile commerce and social media transform the nature of business networks, as they allow direct communication with customers, enhance supply-chain coordination, and expand market linkages that subsequently strengthen trust, revenue, and social acknowledgment.

Their empirical study also suggests that increased presence on the internet enhances the confidence and status of the entrepreneur within their communities. As evidenced by Luz (2025), digital technologies such as e-commerce websites, social networks, and search engine optimisation can alleviate geographic isolation in rural America, as well as help small businesses access external markets, build long-term customer relationships, and contribute to the economic stability of a specific area.

However, both articles concur that these long-run benefits are restricted by financial constraints, high cost of technologies, and a low level of digital competencies. These limitations are also supported by Omotosho (2018), who notes that despite most Nigerian craft workers being aware of the commercial benefits of social media, fluctuating internet connectivity, cyber-fraud, and a lack of technical skills prevent them from engaging in commercial activities consistently, which is why many entrepreneurs tend to engage in personal activities rather than professional ones.

Despite naming the potential of social media in relation to visibility and market penetration, Omotosho points out that effective social influence necessitates digital literacy, safe online spaces, and facilitating policy. Collectively, these

studies imply that online platforms may support social engagement and integration, though this relies on institutional support, infrastructure development, and a long-term capacity-building process.

Sustainable livelihood creation studies have highlighted the importance of diversification, human capital development, and community-based enterprises in promoting long-term economic resilience. Tao and Wall (2009) looked at a Taiwanese Indigenous community and revealed that sustainable livelihoods result from tourism being integrated with pre-existing livelihoods like agriculture and fisheries, whereby tourism allows households to earn income from multiple sources and reduces vulnerability to economic shocks. Their people-centred approach focuses on the unity of indigenous knowledge, cultural practices and natural resources in risk management and the strengthening of social cohesion.

Likewise, Kunjuraman (2022) reveals that community-based ecotourism in developing nations empowers livelihood diversification through homestays and local hospitality businesses, provided it is backed by capacity-building measures, ICT training, government oversight, and strong social networks with tourism agencies. Sharif (c. 2000), by contrast, deals with poor female youth in Sub-Saharan countries and states that sustainable livelihoods cannot be obtained through short-term income or microcredit; rather, Sharif emphasises education, skill acquisition, delayed fertility, and legal empowerment, especially land rights, in overcoming structural inequalities and enhancing intergenerational mobility.

Comparatively, Tao and Wall (2009) and Kunjuraman (2022) focus more on community-level diversification and institutional support, while Sharif focuses on the individual level of human capital and gender equity. Collectively, the studies imply that sustainable livelihoods are developed using integrated approaches that incorporate economic diversification, capacity building, cultural capital, and social empowerment.

Although very useful, the reviewed articles have numerous missing links, such as limited work on the intersection of digital platforms, market access, and empowerment in women-led cottage industries, and a lack of research on eco-friendly micro-enterprises in peri-urban settings, which are the focus of the current study. To start with, while Gonde et al. (2021) and Salkynbayeva and Yesturliyeva (2023) emphasise the importance of digital technologies, and Sharma (2011) and Sharif (c. 2000) concentrate on financial and human capital, a limited number of works investigate the intersection of digital platforms, market access, and empowerment in women-led cottage industries. Second, Omotosho (2018) and Luz (2025) recognise infrastructural and skill-based challenges but do

not adequately address them. Third, the majority of studies focus on short- and medium-term outcomes, with little attention paid to long-term social mobility and income stability. Moreover, there is a lack of research on eco-friendly and socially motivated micro-enterprises in peri-urban settings. To address these gaps, this study examines the impact of digital platforms, e.g. WhatsApp Business, Instagram, and general e-commerce web pages, on market access, income prospects, economic agency, and social visibility of women artisans engaged in sustainable goods production in peri-urban Karnataka.

More specifically, it examines and seeks to understand the possible impacts of digital media on cottage industries and the artisans running them. In attempting to incorporate technological, economic and social aspects, this study seeks to present a more comprehensive picture of how digital entrepreneurship can serve as an example of sustainable livelihood formation based on social impact rather than profit maximisation *per se*.

Recent Indian research indicates that women artisans' access to digital platforms can improve their access to markets; however, market access is not synonymous with the economic empowerment of women artisans. Interviews with 50 online handicraft business owners by Yadav et al. (2023) identified key opportunities and constraints associated with digital selling: opportunities include marketing and accessing new customers, access to supply chains, and business survival during the pandemic, while constraints include unreliable internet access and a lack of digital skills. A study of 60 women engaged in Madhubani painting in Bihar by Singh et al. (2024) concluded similarly — social media has enabled artisans to promote their work and attract customers outside their local markets, though some experienced difficulty maintaining their online presence and needed support with digital promotion and customer engagement. Based on a study conducted in Rajasthan, India, Ibrahim and Ojha (2025) concluded that digital training of women artisans, alongside on-site support to create content and market products through Instagram, Facebook, and WhatsApp, could help increase their awareness and market reach. Recent work by Thounaojam and Ojha (2026) identified financial insecurity and the generation gap as persistent issues among Kashida artisans in the Thar desert, relating to financial security and digital literacy. Together, these studies show that e-markets can help overcome geographical barriers and reduce reliance on conventional marketing channels, but this requires continuous training, affordable internet access, financial support and logistics, and ongoing online marketing support.

3. Methodology

This is qualitative research grounded in phenomenological philosophy. It examines lived experience to understand how women artisans perceive (and achieve)

empowerment, visibility and agency through digital platforms. The term phenomenology is often used in a loose and superficial way, even by social scientists — namely, as a mere description of the ‘appearances’ or ‘experiences’ of something; phenomenology, however, is also a philosophy that claims to be a ‘rigorous science’ with an ‘autonomous philosophical method’ (Flick 2014). The research site is the peri-urban district of Karnataka — Aneundi — and artisan clusters linked to the AquaLoop initiative, chosen as it is home to an abundance of water hyacinth and women artisans.

The primary participants of this research are nine women artisans producing water-hyacinth eco-friendly crafts, engaged in micro-enterprise activity and digital selling. Participants are adult women between 25 and 45 years old, from lower- to lower-middle-income households in peri-urban communities in Karnataka.

The sampling strategy used is purposive sampling, a non-random strategy in which researchers deliberately select groups, settings, or individuals where the phenomenon or process under investigation is most likely to occur (Denzin and Lincoln 2011). This was used to recruit artisans with experience selling before and after adopting digital platforms, accessed through the already established community network.

The primary method for data collection is the semi-structured interview, defined as “an interview with the purpose of obtaining descriptions of the life world of the interviewee in order to interpret the meaning of the described phenomena” (Brinkmann and Kvale 2015). These interviews used an interview guide as the primary tool, with audio recording and brief field notes. Data collection and analysis took place over a span of 3–4 weeks.

Thematic analysis — a data reduction and analysis strategy by which data is segmented, categorised, summarised, and reconstructed in a way that captures the important concepts within a data set (Flick 2014) — was used to analyse the data sets. Interviews were analysed using thematic analysis, in which the author coded for patterns such as agency, confidence, visibility, dependency, negotiation, and aspiration; this was done manually.

The participants can be viewed as potentially vulnerable due to economic constraints, gendered employment, informal work arrangements, and the potential for online harassment or reputational damage arising from online visibility. The research does not gather excess information on sensitive matters and treats business and platform information as confidential. Ethical practices followed during data collection include informed consent, voluntary participation, the right to withdraw, and a clear explanation at the start of the interview of how the interview and digital data would be used. Organisational relations were not used as a means to

obtain participation; access via community gatekeepers, where necessary, was not obligatory. To ensure confidentiality, pseudonyms were used, and identifying information such as names and exact locations was removed to preserve anonymity.

3.1. Selection Criteria

Purposive sampling was used to select participants. The minimum criteria were: (1) adult women living in or around Aneundi; (2) currently engaged in income-generating activity related to the production of water hyacinth or any other aspect of its associated craft activity under the Kishkinda Trust/AquaLoop network; (3) at least 6 months of continuous paid craft experience; and (4) at least 3 months of exposure to organised digital promotion or sales through the Handmade in Hampi website, social-media promotion, or online orders received by the organisation.

Personal ownership or independent operation of an e-commerce account was not necessary, as this was managed by the organisation rather than by individual artisans. These criteria were applied to the final sample, all of whom met the criteria.

3.2. Recruitment Process

The Kishkinda Trust and AquaLoop community network staff served as community gatekeepers, providing access to participants. Eligible artisans were initially informed about the study by staff and introduced to the researcher through those who responded to the staff’s announcement.

A clear explanation of the study was provided in a language each woman could understand, and she was told that participation was voluntary, that she could withdraw at any time, and that this would have no impact on her employment or relationship with the organisation. Interviews were conducted only with participants who independently agreed and gave informed consent.

3.3. Interview Guide

See Appendix 1.

3.4. Interview Protocol

Semi-structured interviews were conducted, using a guide of 13 core questions and follow-on probes regarding training, production hours, use of income, family support, knowledge of digital platforms, self-employment, and employment goals. Interviews lasted approximately 20–30 minutes and were held individually. Interviews were conducted mostly in Kannada, the preferred language of most participants; Hindi or English was used only where participants were more comfortable. During preparation of the interview notes and transcripts, Kannada responses were translated into English while maintaining, as closely as possible, the meaning intended by the participants.

4. Analysis

Table 1. Participant Demographics and Craft Profile

#	Initial	Age	Location	Language	Years in Craft	Products Made	Work Hours	Monthly Income	Family Support
1	G	35	Anegundi	Kannada	10 years	All water hyacinth products (mats, table runners, baskets); segregate stems by thickness	6 hrs/day, year-round	₹4–4.5k	Yes
2	S	28	Anegundi	Kannada	6 years	Water hyacinth products, sometimes banana fiber	6 hrs/day, year-round	₹4k	Yes
3	M	35	Anegundi	Kannada	10 years	All water hyacinth products; assists with training; collects banana fiber/water hyacinth	6 hrs/day, year-round	₹3.5–4k	Yes
4	T	32	Anegundi	Kannada	8 years	All water hyacinth products, sometimes banana fiber	6 hrs/day, year-round	₹4k	Sole earner
5	A	31	Anegundi	Kannada	6 years	All water hyacinth products	6 hrs/day, year-round	₹4k	Yes
6	V (Head)	62	Anegundi	Kannada, Telugu, Hindi, English	Since 1997	Trains new joiners; facilitates govt. training; leads artisans	6 hrs/day, year-round	Not specified	Unmarried
7	N	30	Anegundi	Kannada	6 years	All water hyacinth products (mats, bags, etc.)	6 hrs/day, year-round	₹4k	Yes
8	P	36	Anegundi	Kannada	10 years	All water hyacinth products; sorts stems; cushions, mats, baskets	6 hrs/day, year-round	₹4k	Yes
9	Su	29	Anegundi	Kannada	6 years	All water hyacinth products	6 hrs/day, year-round	₹4k	Yes

The interview data were analysed manually through a mixed inductive-deductive coding technique. Initial codes were formulated after drawing on the research question and literature review, and other patterns were inductively formulated through multiple readings of the interview transcripts. The coding process took place three times: the first to familiarise with the responses, the second to assign codes to each response and compare across participants, and the third to further develop existing codes and consolidate them into larger codes or themes. The analysis was done by one researcher only, with no second coder; after some time, the transcripts were re-read and checked against the final coding framework, and the themes were confirmed.

Involvement was voluntary, and informed consent was obtained prior to each interview. Participants were told the aim of the study, their right to refuse to answer any question, and their right to withdraw from the study without any consequences for their job or their connection with the Kishkinda Trust or AquaLoop network. Identifying information was removed from all names to provide participant labels during analysis and to exclude identifying information from reported results. A formal institutional ethics board review was not conducted, but ethical approval was obtained from an external mentor, a doctoral researcher from Sweden with over ten years' experience conducting qualitative research across various geocultural and demographic groups in India. The mentor guided the

informed consent process, respectful interviewing, confidentiality, voluntary participation, and attentiveness to participants' responses.

The economic agency and independence of most of these women comes from extremely high levels of labour directly associated with the water hyacinth craft cycle; of the 9 women, 6 reported labouring on water hyacinth nearly all year round (around 6 hours a day). Labour intensity was the most common code within this theme, reflecting the physically intensive nature of the work and the fact that water hyacinth is available as a raw material throughout the year. Participant G said she worked "6 hours each day, whole year round", and Participant S said "6hr per day, 365 days." Participant M also stated she works "6hr per day, whole year," and Participant V gave a similar response regarding sustained daily labour. These results indicate that the weaving of water hyacinth is not seasonal or occasional work but continuous work that can be carried out throughout the year, since water hyacinth, unlike many natural-fibre plants, grows in large quantities and can be harvested at any time; alongside this continuity of labour, income is also generated steadily.

However, despite the labour-intensive nature of the occupation, participation in weaving using water hyacinth stems contributes significantly to women's financial agency and independence. Several participants explained that their

earnings are directly used for household welfare and their children's futures. Participant G stated that she "spends my money on her children's education and household miscellaneous expenses," while Participant P said she "spends my money, mostly on her children's education, household expenses."

In other words, women are not only complementary workers but also key participants in household survival, education mobility, and family decision-making processes, as evidenced by their answers.

Financial independence was also significant when a participant had no other means of survival. For Participant T, whose husband passed away, leaving her the main provider for her family, she has to "take care of herself and her daughter." Similarly, Participant V stated that "as she is unmarried, she is dependent on the job."

These results show the importance of weaving as a source of economic self-sufficiency for women with no other financial means. Financial independence provides women with freedom of decision-making regarding their lives, without needing to seek validation, such as for career choices, healthcare choices, and more.

Another factor significant in the context of self-esteem and social visibility was work satisfaction. Participant S said, "the more the products, the happier she is, and Participant A said, "the more the orders, the happier I am." The responses indicate a positive relationship between greater productivity and income generation, as well as professional satisfaction, confidence, and sense of usefulness. Work is therefore a form of economic and psychological empowerment for the artisans.

Family encouragement was also a motivator to weave. Participant G said that her family was "very supportive" and "encouraged me to go to work." This indicates that family social support is a factor in women's confidence and continued participation in income-generating activities. For low-income households, extra income has a significant impact on household finances, allowing more spending on essentials like education and healthcare, which enhances the living environment and offers additional support.

Safety was also identified as an enabling factor for women's participation. Participant M said that because her workplace was deemed "safe for ladies," her family did not place limitations on her working. This highlights the role of perceived safety and social acceptability in women's mobility and engagement in employment in peri-urban communities.

There was also a positive impact on women's economic status and social role through long-term involvement.

Participant G had been in the occupation for the "past 10 years," strengthening the economy, her craft knowledge, and the community's recognition of the occupation.

Overall, participants' digital awareness was expressed more in terms of social use and passive digital presence (not necessarily functional or commercial use), particularly on platforms like WhatsApp and Instagram.

Some artisans had a degree of access to digital communication platforms: Participant G reported using "whatsapp yes" and "instagram yes"; Participant S reported using "whatsapp yes" and "instagram sometimes"; Participant P reported using "whatsapp yes" and "instagram yes." However, this access did not extend to business use of the platforms; participants had not been exposed to how these platforms could be used for business and had little familiarity with capabilities such as business profiles, product listings, or digital payment options — they were much more familiar with apps for personal communication than for earning money. Consequently, participants did not take much advantage of these platforms for e-commerce or direct individual income generation.

A major barrier that emerged was a lack of information and understanding regarding e-commerce systems. Several participants displayed uncertainty while discussing online selling and organisational websites. Participant G stated, "Yes, maybe, they have started a website called HIH, but maybe yes," while Participant M repeated a similar response. These hesitant and incomplete responses indicate partial awareness without a full understanding of how digital commerce operates or how such platforms could be independently used by the artisans themselves.

However, there was still a high level of awareness regarding many organisational digital initiatives. Respondents cited the HIH website (multiple respondents); Participant V, in particular, gave a link to the HIH website.

Specifically, she said that "orders have gone up with their new website HIH." This indicates that artisans are aware of the advantages of being visible online, although not necessarily the ones managing online transactions. Participant S also shared that "sales will increase" as a result of online visibility, and Participant P said that online "recognition" would increase.

These results suggest that women are aware of the positive consequences of digital exposure and online business and their relationship to rising orders and market visibility. Digital exclusion was also a major impediment to digital commerce participation that emerged at the same time: some women do not have access to smartphones and digital technology, as Participant T said, "Whatsapp no, Instagram no, Facebook no — she has a small phone." This

illustrates the ongoing infrastructural and technological disparities in digital participation in peri-urban areas.

Digital literacy also proved to be an important issue affecting confidence in e-commerce participation. Even though many artisans recognise the value of online platforms, as stated by Participant N: “if we understand how to use the same.” Overall, the results suggest that awareness of digital systems is gaining ground slowly, but artisans remain extremely reliant on organisational mediation to achieve greater visibility, communication, and market access online.

As mentioned in the previous theme, reliance on the parent organisation emerged as one of the most prevalent findings affecting artisans’ market access. Almost all participants said commercial transactions, customer contacts, and order allocation are handled directly by the organisation, especially via Kishkinda Trust. Participant G explained that “all orders are sent to the organisation from where each order is allocated to the artisans,” and Participant S similarly said that all orders are distributed through Kishkinda Trust. Participant M gave a very similar answer, describing a highly centralised organisation that facilitates access to markets and customers.

This dependence on the parent organisation, while enabling women artisans to pursue economic independence, also ties them to the organisation and hinders independent dealing, marketing, or individual promotion of their handicraft products.

There was virtually no independent selling among participants. Several respondents explicitly said they would “never” sell products independently, as all products are sold through the organisation. Participant G said, “Never, orders always go to the organisation,” and Participants P and N said the same. The results show that artisans have low entrepreneurial autonomy despite actively producing the products themselves; the organisation also limits direct contact with customers and individual ordering. Participant S explained a particular reason artisans are unable to take orders personally. This indicates that while the organisation offers employment, training, and market access on a commercial basis, it simultaneously restricts independent commercial activity and direct ownership of customer relationships. Income variability was also a strong feature of this theme: monthly income varied with production levels and orders received. Participant G stated she made ₹4–4.5k monthly depending on the number of products made, and Participant M said she earned around ₹3.5–4k monthly based on the number of products made. Participant S described earnings of “4k based on products made monthly.” These responses illustrate that artisans’ incomes are volatile and significantly reliant on the organisation-managed system of order allocation.

Intermediary institutions also played a significant role in skill development and the continuity of artisanal knowledge. Participant V said that she “promises to train new joiners, and helps the government train.” This indicates that the organisation acts not only as a business intermediary but also as a support mechanism for women’s skills development, capacity building, and continuity in the craft sector. Overall, the results suggest that intermediary institutions both empower artisans and restrict their market independence.

The results corroborate and extend patterns seen in previous studies. The artisans’ complete reliance on the Kishkinda Trust and AquaLoop network for product promotion, customer access, and sales resembles the constraint noted by Gonde et al. (2021) in Zimbabwe, where limited access to information and communication technologies constrained the empowerment potential of cottage industries. However, the constraint in Karnataka differs: artisans are not excluded from the market due to limited access to technology, but are brought into the market through an institution-based approach in which the institution manages most commercial processes. This opens up market access directly but may reduce independent digital and entrepreneurial capability. The results also corroborate Omotosho’s (2018) study on Nigerian craft workers’ awareness of social media benefits alongside limited digital literacy and connectivity, which did not necessarily translate into commercialisation; in this study, several artisans knew WhatsApp and Instagram and used them to connect socially, but not to showcase products, interact with customers, or sell products independently. This study thus extends Omotosho’s finding to rural Karnataka and introduces a sustainability perspective by incorporating the production of eco-crafts from invasive water hyacinth, which was not addressed in the studies reviewed here.

5. Conclusion

5.1. Limitations

Despite the earnest attempts of this research to better understand the relationship between digital entrepreneurship and rural women artisans’ income sufficiency, some limitations must be recognised. First, the sample size was small due to time, resource, and scope constraints. Participants were women artisans from one village in a peri-urban region of Karnataka, and their views cannot be generalised to the entire state or region; results could vary elsewhere due to differences in education, access to digital technology, infrastructure, and local economies.

A further drawback is that primary data were collected via self-report, gathered through surveys and interviews, which may have been subject to unintentional social desirability bias. Recall bias is also likely, as experiences and income changes may be difficult to recall accurately. Some women artisans in the peri-urban areas might also have been reluctant to express financial difficulties, limited digital

knowledge, or dissatisfaction with available support, for fear of being judged within their communities — some responses may therefore have been less complete or candid as a result.

It is also important to note that this study is only a snapshot and does not address change over time. The development of digital entrepreneurship takes time, so the research could not determine whether any lasting benefit in income, business growth, or financial independence emerged. Moreover, many artisans keep little or no accounting records, making it difficult to substantiate reported increases or decreases in sales or income.

Lastly, the secondary data used in this study were drawn from sources of varying methods, locations, and publication dates. Given the fast-changing nature of digital platforms, consumer habits, and technology, some published findings may not fully reflect current conditions. These limitations should be taken into account when interpreting the results and drawing generalisations.

5.2. Future Research

While this research has contributed to understanding how cottage industries and women-led handicraft enterprises support women's empowerment and financial independence, it was limited in scope and could not delve deeper into the nuances of digital entrepreneurship and independent economic pursuits. An important way forward would be longitudinal studies of the same artisans over a longer period, to establish whether the introduction of online marketplaces results in long-term improvements in income, business expansion, financial independence, and quality of life.

Future studies could also expand the sample: a larger, geographically diverse sample analysing rural communities across different states or countries would enhance the generalisability of these conclusions and enable comparison across regions with differing levels of digital infrastructure, educational attainment, and government support. Researchers could also compare the performance of various online platforms — Instagram, WhatsApp Business, dedicated handicraft marketplaces, and large e-commerce websites — to determine which offers the greatest economic benefit to rural artisans.

Another useful area is testing the efficacy of government or non-governmental organisation initiatives, entrepreneurial training, and digital literacy programmes using experimental or quasi-experimental research techniques. Researchers can

track changes in revenue, digital confidence, business success, and consumer reach before and after training programmes. The influence of digital marketing strategies on sales, customer purchasing patterns, and demand for sustainable handcrafted goods could also be investigated further. To expand market access and support more sustainable livelihoods for rural women artisans, future research might also investigate other developments such as Artificial Intelligence (AI), multilingual e-commerce platforms, and modern digital payment mechanisms.

Author Contribution Statement

M.R. conceived and designed the research, conducted the semi-structured interviews with the women artisans, performed the thematic analysis of the primary and secondary data, and wrote the manuscript in its entirety. The author read and approved the final manuscript.

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this paper.

Appendix 1

Interview guide —

1. Which district, city or village do you originally hail from?
2. Since when have you been involved in the artisans' project?
3. What kind of artwork or products do you make with water hyacinth residue?
4. Has your family been supportive of your work? In which ways?
5. Do consumers reach you directly to buy your products, or do you provide them to an individual/organisation who sells them on your behalf?
6. Do you use WhatsApp or Facebook?
7. Have you ever sold your product through WhatsApp or Facebook? Has anyone ever contacted you directly on these platforms inquiring about your work?
8. What do you mainly do with the income you earn from selling your products?
9. What is one thing you have been extremely proud of investing your own earned money in?
10. Do you think knowing how to use digital platforms can help you earn more and sell your products better?

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