

Indigenous Technology and Economic Empowerment of Rural Woman

Anjan Niyogi

Assistant Professor, Shree Agrasian College,
annjani.y20@iujharkhand.edu.in

Pallavi Kumari

Associate Professor, ICFAI University, Ranchi
pallavikumari@iujharkhand.edu.in

DOI :

Abstract

The paper systemically examines the role of indigenous technology in rural environment serving economic empowerment. A systematic Literature review of the past decades, reflecting the traditional practice in rural India. In which we see the application of Herbal Medicine, Agro-Processing and Craft Making contributing to Women Entrepreneurship. (Agarwal,2002, Kumar & Singh,2018). Empirical studies have indicated involvement with indigenous practices promotes decision-making capacity. It increases self-confidence. Further it promotes cultural identity. (Chambers & Conway, 2018). But there are certain barriers in this pathway, for example limited market access, inadequate policy support and inadequate infrastructure which restricts the market development. (Shiva, 2016). The study mentions the indigenous knowledge combined with advanced digital technologies. Use of renewable energy application along with hybrid approaches address the existing challenges. It helps to expand market and improve product quality. This lifts the sustainable local enterprises (Resnick et al., 2019; World Bank, 2021). These innovations of social upliftment goes beyond economic benefits, gender equality and social harmony. The findings indicate culturally sensitive policy, technological intervention and capacity-development. This helps in developing sustainable goals and promoting all round growth for rural women (United Nations, 2015). Addressing the research gaps especially in the long-term has impact assessments along with digital intervention. This further improve policies and women empowerment.

Keywords: Indigenous Technology, Women Empowerment, Rural Development, Sustainable Livelihoods, Cultural Preservation

1. Introduction

Agriculture and agriculture-related works have been corner stone of Indian Economy. Both in terms of Employability and Income Generation. Women's groups have been the backbone of rural India. Their contribution is notable but unnoticed. They have worked under the shadow of the male population. In Advanced Economies, Women are undertaking responsible activities in the farm and livestock management (World Bank,2021). Population pressure and gender disparity are obviously a few reasons that make the difference between the developed and developing economies. Although they are taking a key role, their significance is marked with enormous challenges. Access to quality Education, Availability of Finance, and quality health facilities are the key requirements that are missing. These factors significantly deters the promotion women entrepreneurs (UN Women,2020). In order to have a proper economic development, upliftment of women is necessary. Availability of quality education will not only increase literacy rate but would enable them to think, understand and take important decision.

In paper, the role of indigenous or application of Technology importance have been mentioned. The strategic role of it making economic development highlighting both opportunities and challenges faced. It mentions community-centered application utilizing the knowledge as a foundation for gender equality and sustainable development.

2. Literature Review

The potential of indigenous knowledge and technologies works as key factor for sustainable development. Although, it has been highly acclaimed in scholarly circles. It remains hardly used within policy frameworks. Research studies indicate indigenous technologies covers diverse domains. It ranges from traditional agricultural methods, home based industries such as pottery, herbal medicine, food processing and many others. For example, in African countries women involve in indigenous specialized craft. Craftsmanship of the highest quality in bead-making which has been a source of income. Further, an avenue for cultural expression. (Agyemang & Bayang, 2020). In South Asia, women are involved in organic spice grinding or herbal product preparation. Earning livelihoods which environmentally sustainable (Kumar & Singh, 2018).

In the context of environmental sustainability, indigenous knowledge systems play pivotal role in biodiversity. Further, it also helps towards conservation and climate adaptation strategies. For example, indigenous methods of seed-saving techniques. Practices such as sustainable harvesting practices, organic farming

method contribute to ecological balance (Shiva, 2016). Practices of such kind helps reinforcing women's role in the society as custodian of local ecosystems. (Chambers & Conway, 2018).

The existing literature introspects overcoming these barriers. It attempts to deliberate, culturally sensitive strategies respecting indigenous knowledge. Various models does advocate for community ownership, capacity building. Further intellectual property rights protection, capacity-building are also in this same arena. The market access facilitation helping indigenous practices (Leach et al., 2010). Evidence based study effectiveness remains limited. Many studies lack rigorous analysis and are predominately descriptive. There is a recognition of potential of indigenous technology in women's empowerment. This gap helps in understanding, especially in implementation and impact assessment.

3. Absence of Longitudinal and Impact-Focused Studies

Although there is a need for policy interest towards indigenous technology for empowering rural women. There are several critical gaps restricting its potential. These gaps need to be addressed. This would create an environment for the inclusive, sustainable development of women's rural entrepreneurship.

Absence of Longitudinal and Impact-Focused Studies

Existing research studies on indigenous technologies and women's empowerment focus on cross-sectional study. This provides limited access to long-term socio-economic impacts. There is lack of longitudinal studies. Studies on women's income levels, decision-making capacity, and their social standing over extended periods are scarce. Data is required for understanding indigenous enterprises. This is required for understanding sustained empowerment over time (Leimona et al., 2018). Designing policies and programs without conducting a longitudinal study remains a challenge.

Insufficient Focus on Vulnerable and Marginalized Subgroups

Studies highlights the benefits of indigenous practices. They overlook the unique challenges faced for example women with disabilities, may be belonging to lower socio-economic group. They encounter stiff barriers like-social discrimination, cultural restriction in participation (O'Hara & Ali, 2021). Research data related to socio-economic status, caste, ethnicity, disability are important for targeted intervention which promote inclusivity.

Limited Exploration of Technological Integration

The indigenous knowledge with modern digital innovations is an under-explored frontier. Opportunities leading to more access to mobile phones, digital marketplaces,

and financial technology. Development of market access towards traditional crafts having immense potential. Online platforms promote women crafts to reach wider audiences. Digital payment systems facilitate transactions in remote areas (World Bank, 2021). Empirical studies into effective models, barriers, practices for digital integration in indigenous practices is rare.

Policy Frameworks and Institutional Support

A significant gap remains in understanding policy structures. It effectively supports the recognition, protection of indigenous technologies. There is a need for comprehensive policy frameworks. Need to address intellectual property rights and market development appropriately. (Kumar & Shankar, 2020). Understanding successful policy models, replicability in various contexts remains important for useful recommendations.

Impact of Indigenous Enterprises on Socio- Community Dynamics

Few studies have valued the broader social fabrication of indigenous entrepreneurial commitment. The practices promoting gender equity, and family relationships overtime. The social dimensions are crucial. It empowers outcome holistic and leads to sustainable community resilience.

Scalability and Replicability of Best Practices

Few community-based projects demonstrate success in some specific contexts. The transformation of models to other regions remains uncertain. Clear indication in the context of adaptation, sustainability are lacking. It restricts the policymakers' and practitioners' capacity.

The paper provides a thorough review of literature as to role of indigenous technology and its role in the society. The research gaps identified through the literature review stresses the importance of more specific impact-oriented investigation. In order to have a sustainable development the gaps needs to be addressed. This will useful for economic development in the coming years.

4. Research Objectives

The scope of this review paper, primary aim is to integrate existing literature to clarify the role of local technology in economic empowerment of rural women. The objectives guiding this are as follows:

To fundamentally understand the existing research on native technology. Its practical utilization contributing to income generation and livelihood (Agrawal, 2002). To study diverse case study reports for understanding the nature of native remote practices among women in different Socio- Culture.

To Understand the socio-economic impacts on technology utilization. Its impact on rural women's empowerment including aspects of income, community participation and social recognition (Chambers & Conway, 2018). This objective aims to find previous research which link traditional practice.

To identify the barriers enabling factors which influence the adoption and sustainability of technology. It is based one valuations and reviews (Leach et al., 2010). This relates to literature on Socio-Cultural, economic challenges and facilitators.

To identify the potential for integrating practices with modern technological innovations. This includes the application of digital platforms, renewable energy, and market linkage tools (World Bank, 2021). This objective relates to existing discussions combined tradition with innovation.

To develop policy implications on comprehensive research on developing sustainable and culture. The sensitive strategies empowering rural women with technology (Kabeer, 2015). The goal is data-based study for creation of policy for successful models and identified gaps.

5. Research Hypotheses

This is a review paper without original data collection. The following hypotheses are created to guide the critical analysis of the reviewed literature:

H1: Local technological practices are associated with increased income levels and livelihood sustainability.

Rationale: Multiple case studies suggest that traditional practices like craft-making, herbal medicine, and agro-processing contribute positively to women's economic independence (Agyemang & Bayang, 2020; Kumar & Singh, 2018). This hypothesis seeks to find the relationship based on existing evidence.

H2: Involvement with local technology improves women's empowerment, which includes decision-making and community participation (Chambers & Conway, 2018).

Rationale: The literature study mentions the participation in local business helping social status, although findings may vary.

H3: Barriers like limited market access, cultural stigmas and lack of institutional support negatively impact the extent of local technology adoption among rural women (Leach et al., 2010; Shiva, 2016).

Rationale: Existing reviews indicate persistent problems of impending sustainability.

H4: Integration of local practices and modern technologies. Applications of digital platforms and renewable energy solutions are improving the sustainability of enterprises (World Bank, 2021).

Rationale: The potential of various approaches of traditional knowledge in the modern markets is discussed.

H5: Supportive policy environments and frameworks that improve the preservation of technologies benefiting rural women (Kabeer, 2015).

Rationale: The importance of policy in safeguarding local knowledge developing economic outcomes based on study.

6. Methodology

This paper employs a methodology to clarify the existing research. Studies on native technology and economic empowerment of rural women. The primary objective is to evaluate the depth and quality of available literature that connects patterns, gaps, and emerging trends. The methodology further stresses and emphasises the dynamic relationship. The traditional practices, the application of indigenous technology and rural women empowerment are very closely linked.

6.1 Research Design and Approach

The research has been designed using a qualitative interpretative approach (Jesson et al., 2011). Analysis has been conducted to understand the indigenous technology working as a catalyst for socioeconomic development. A deep study has been conducted on various reports, peer-reviewed articles and case studies of past years. Efforts have been undertaken to understand the unique indigenous models, the policy environment and its overall outcome.

6.2 Literature Search Strategy

A multi-database search was conducted. Platforms such as Google Scholar, JSTOR, Science Direct, Springer-Link, and Scopus was used. The search used specific keywords, including: “indigenous technology,” “rural women,” “economic empowerment,” “craftsmanship,” “women entrepreneurship,” and “sustainable development.” The search was from publications 2000 onwards to ensure a contemporary relevance.

6.3 Inclusion and Exclusion Criteria

Inclusion Criteria:

Peer-reviewed articles, case studies explicitly focused on local practices and women’s livelihoods. Studies analysing socio-economic impacts, barriers, facilitators, policy implications related to indigenous technology use.

Exclusion Criteria:

Articles without qualitative/quantitative analysis. Publications focused on urban contexts. Non-scholarly opinion articles without methodology

From the selected literature, data was extracted. Regarding the type of indigenous practices studied, geographic regions, methodological approaches. The key findings related to economic outcomes, empowerment, barriers, or enablers. A thematic approach (Thomas & Harden, 2008) was employed for recurring contradictions, and gaps.

6.4 Quality Assessment

In this study tools like Critical Appraisal Skill Programme (CASP), Checklist for validity and reliability (CASP,2018). Further, it needs to be noted that relevance of the research questions and its applicability was done critically to understand the significance.

6.5 Analysis and Interpretation of the Literature

After undertaking a thorough study of the literature, it was identified that local indigenous technology does play an important role in economic development. Entrepreneurship in women is markedly influenced by the application. Though there are high amount of scope for utilisation.

6.5.1 The Role of Indigenous Practices in Income Generation

Case studies have indicated of the fact places such as West Africa, South Asia, and South America, rural women have taken textile, weaving, and agro-processing as a source of income. Further, they are earning quite a significant amount. (Agyemang & Bayang, 2020; Kumar & Singh, 2018). The work they have undertaken is done for the age. It is deeply rooted in the tradition, custom and style. In our country, India, women involved in herbal medicine plantation and production have seen a significant increase in income. The literature report suggests that income has increased by around 40% level. This has affected their economic position and increased their significance in the household.

6.5.2 Impacts on women's empowerment in the socioeconomic environment

Women's entrepreneurship has long standing role in women empowerment. There skill, craftsmanship with indigenous technology helps to improve their social capital. Further, it provides them recognition and puts them in leadership roles (Chambers & Conway,2018). This development makes the possibility of gender equality. Further, the age-old class discrimination and gender bias in also challenged.

6.5.3 Challenges and Barriers to further development

There are inherent quite a few challenges which restricts the development. These problems are chronic such as limited access to markets, lack of fund, age old thought process and many others. These problems are vicious in nature. They crumble the very foundation of development. (Shiva,2016). Further, availability proper infrastructure, lack of digital adaptation. It becomes difficult to expand market beyond certain area due to lack digital marketing. Support facilities in the form of capacity building and policy support are meagre.

6.5.4 Potential for Innovation and Integration

Case studies of African nation Kenya suggest have enabled women entrepreneurs to reach broader audiences with the use of mobile technology. This has provided a solution of restricted market. Further, it has shown was to increase income (World Bank,2021). The blend of indigenous technology and entrepreneurship have yielded good results specially were renewable sources such as Solar, Wind energy have been used to power generation. This led to lower cost, higher yield and revenue upliftment. These innovations using tradition with technology address existing barriers of market access and technological constraints.

6.5.5 Policy and Institutional Frameworks

The literature indices the importance of government policies and institutional support. Developing local practices among rural women. Models often involve policies for intellectual property rights, capacity-building programs which targeted specifically at women-oriented local enterprises. For instance, India's Geographical Indications (GI) registrations are for traditional crafts. It has helped to authenticate and market women's products globally. (Kumar & Shankar, 2020). Lack of policy coherence and insufficient institutional backing. It continues to hamper the growth of industry sectors, emphasizing the need for more, culturally sensitive policy interventions.

6.5.6 Key Gaps and Future Directions

The literature advocates for positive effect of indigenous technology. The existing studies have shown the work reflected short term projects for a very small window time. This makes quite difficult to assess the sustainability and feasibility. Limited use of Digital technology innovations have been a bottleneck for fast growth and access to bigger market. Studies lack specific projections meant for rural enterprise development.

6.5.7 Emerging Trends and Good Practices

There have been some positivity areas as well. Cooperative movement, Government involvement in the form of subsidy, digital literacy and training have made positive inroads. This has led to Women Empowerment, Increasing the understanding of Legal nit grittiness, knowledge of favourable market. Ultimately improving the economic position and social status (Leach et al., 2010).

7. Major Findings

The review of literature have pointed some critical areas. The indigenous technology plays a key role in economic empowerment of rural women across geographic and social strata.

7.1 Indigenous technology leading to income generation

Technology plays a key role in income generation. In Western Africa, women are involved beads weaving. Through this process they drive income. Rural craftsmanship in form of agro-processing, herbal medicine, farming using skill and technology. This practices helps to preserve social cultural identities (Agyemang & Bayang, 2020). In our country application of indigenous technology can see in organic spice processing, herbal medicine production. This practices have significantly helped in household earnings and economic development (Gill et.al, 2020).

7.2 Enhancement of Socio-economic Empowerment

Women's socio-economic empowerment—improves their decision-making power. This helps in building social recognition. Further, works a long way in building social equality. The skill helps them to generate income on one hand as well as compete with the male counterparts on the other-side. Their voices gets importance in the household discussion (Chambers & Conway, 2018).

7.3 Barriers Impeding Growth and Sustainability

There are certain key barriers which have been detrimental cause in development. Challenges such as access to market, inadequate infrastructure, lack of digital empowerment are key hurdles. Further, the family stigma societal norms of age-old binding of restricting women in household activities (Shiva,2016).In South Asian countries, women have shown there skill in embroidery. But due lack of digital literacy they are unable to explore new markets and move beyond certain workspace.

7.4 Application of modern technology

Studies have shown integrating local practices with the advancement in technology. It's a dynamic process; it needs a time-to-time upgradation. Revolution in Mobile technology and application of renewable energy sources have helped to increase productivity and quality of work (Resnick et al., 2019). This helped to have more financial inclusivity. Adopting hybrid approaches have helped to strengthen infrastructural barriers.

7.5 Policy Framework and Institutional Support

Policy framework and institutional support is required to survival and growth. Policies and regulations in the form of capacity building programs, Digital empowerment are crucial. It is important for safeguarding the local technology. In India Geographical Indication (GI) is used for registering traditional crafts. This helps from the legal challenges and duplicate. (Kumar & Shankar,2020)

8. Suggestions

Based on the exhaustive review of literature and gaps in this paper. The suggestions for developing the role of indigenous technology in empowering rural women:

8.1 Strengthen Policy Frameworks and Legal Protections

The government's role is very important in overall improvement of women leading to economic empowerment. Policy such as intellectual property rights and GI Certification can help to protect the indigenous technology. This will preserve the technology and ensure fair remuneration (Kabeer,2015).

8.2 Promote Capacity Building and Digital Literacy

To promote women entrepreneurship capacity building measured shown be prioritized. Digital empowerment through training, data availability at cheap prices and network development is important in digital infrastructure build up. Hand-holding programs and booth level workshop are required for micro level familiarization and incorporation (World Bank,2021).

8.3 Infrastructural development and Market expansion

Public private partnership can provide necessary investment. Infrastructure development in areas such as ICT Connectivity, transportation are important. Women cooperatives needs to be facilitated with digital platform access for competing in the national market and if possible, in the international market. This would provide the opportunity of higher earning and sustainability (Resnick et al., 2019).

8.4 Facilitate Financial Inclusion

Developing customized financial products such as micro credit, savings schemes for women entrepreneurs. This would reduce their financial challenges. Further, introduction of banking in the form of online banking in remote areas is important. This would be more applicable in areas where traditional banking footprints are not there (Shiva, 2016).

9. Conclusion

Women entrepreneurship is full of challenges. Application of indigenous technology goes a long way in economic empowerment. The combination of culture and ecological knowledge helps to have a sustainable livelihood. This creates the atmosphere for financial independence and stability. This process of women empowerment required a multi-level application. This process considers the intrinsic practices and integrates with modern innovations. Policies and rules in the field of digital accessibility guarding the indigenous knowledge helps in the development. It promotes Digital Literacy, Financial sustainability and improvement of Infrastructure. The role of private and public partnership can help to develop this movement.

The inherent challenges such as limited access of market, inadequate infrastructure are the common bottleneck in development process. More in-depth studies in the future considering longitudinal framework to understand the indigenous technology in women empowerment is required to decisive conclusion. Application of digital tools would enhance the market and provide the opportunity to access new avenues.

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