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The Dynamics of Circular Entrepreneurship in Kerala's Craft Sector

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Abstract: ***As the world approaches sustainability, circular entrepreneurship is becoming a game-changing strategy, especially in the craft sector. This study explores the application of circular economy concepts in Kerala's craft industries, renowned for their rich cultural legacy and significant material waste. By investigating waste-to-product innovations among regional craft businesses, the study seeks to address the growing need for sustainable waste management and value creation. The study used a mixed-methods approach, integrating qualitative insights derived from in-depth case studies with quantitative data from surveys of 90 craft business enterprises. Statistical analysis using SPSS substantiates the benefits of adopting circular practices for the economy and environment. Meanwhile, the case studies show effective methods for turning waste into valuable goods. The results also highlight the importance of promoting circular innovation by utilising local resources, promoting community engagement, and implementing supportive legislative measures. This study provides insights into circular business models to established industries that move towards sustainability, with considerations for academics, entrepreneurs, and politicians. It is recommended that future research focus on how scalable these models are and how new technology might improve circularity in the craft industry.***

Keywords: Circular Economy, Entrepreneurship, Waste-to-Product, Craft Industries

1.Introduction

Kerala, a state on India's southwestern coast, boasts an extraordinary wealth of traditional crafts including coir weaving, bamboo artistry, handloom textiles, pottery, and metalwork. These artisanal practices are not merely cultural expressions but integral components of local economies and livelihoods. However, contemporary forces such as globalization, environmental degradation, and shifting market demands have imposed existential challenges on these heritage sectors.

The emerging paradigm of the circular economy (CE) centered on minimizing waste, maximizing resource efficiency, and prolonging product life cycles presents a promising framework for reimagining these traditional sectors. Circular entrepreneurship, rooted in CE principles, promotes sustainable production by integrating resource-conscious design, eco- innovation, and regenerative use of materials. For Kerala's artisans, who have historically practiced sustainability through necessity and tradition, formalizing these practices under a CE model may offer both socio-economic resilience and environmental stewardship.

This paper investigates how circular entrepreneurship is understood, practiced, and experienced in Kerala's craft sector. Using data from 90 artisans across Thrissur, Kannur, Wayanad, Ernakulam, and Thiruvananthapuram, the study explores how these practices contribute to sustainability, what barriers inhibit their adoption, and what policies may support a broader transition. The study contributes to filling a significant knowledge gap concerning circular entrepreneurship in the informal, culturally embedded sectors of developing economies.

2.Literature Review

The concept of the circular economy has been explored extensively in the literature, particularly in the context of sustainable development. Circular entrepreneurship operates at the intersection of sustainable business practices and circular economy principles. While CE has been widely explored in manufacturing, waste management, and technology sectors (Geissdoerfer et al., 2017; Kirchherr et al., 2018), its integration into traditional crafts remains under-researched.

Circular Economy Principles

The circular economy promotes a shift from the linear "take-make-dispose" model to one of continuous reuse, recycling, and regeneration (Ellen MacArthur Foundation, 2013). In entrepreneurial contexts, this implies redesigning products for longevity, engaging in material loops, and aligning value chains with ecological thresholds (Bocken et al., 2016; Lieder & Rashid, 2016).

Traditional Crafts and Sustainability

India's craft sector has long practiced forms of sustainability through community production, low-energy methods, and local materials (UNESCO, 2021). Yet, commercialization and competition from synthetic goods have disrupted this balance (Roy & Singh, 2020). Scholars argue that crafts possess "informal circularity" rooted in tradition but lack institutional recognition (Jain, 2017).

Challenges to Circular Entrepreneurship

Empirical research reveals several challenges in operationalizing CE in the informal and traditional sectors: lack of training (Prendeville et al., 2016), market barriers (Ranta et al., 2021), inadequate policy alignment (NITI Aayog, 2021), and limited consumer awareness (Bocken et al., 2016). Women entrepreneurs often demonstrate higher circular engagement but face exclusion from formal ecosystems (George & Bino, 2022).

Policy and Ecosystem Perspectives

Institutional frameworks in India support CE in theory (NITI Aayog, 2021), but few policy instruments target the craft sector specifically. Kerala's progressive development indicators and literacy levels offer fertile ground for testing decentralized CE transitions (Kannan, 2020). However, sector-specific data remains scant, which this study aims to address.

Objectives

This study is guided by the following research objectives:

1. To assess the awareness and implementation of circular economy principles among craft entrepreneurs in Kerala.
2. To examine the relationship between circular practices and entrepreneurial outcomes.
3. To identify enablers and barriers to circular entrepreneurship in Kerala's craft sector.
4. To propose policy recommendations for enhancing circular entrepreneurship ecosystems.

Methodology

Research Design

A convergent mixed-method design was adopted, integrating quantitative surveys with qualitative interviews to triangulate findings (Lieder & Rashid, 2016).

Sample

The sample consisted of 90 craft entrepreneurs, including women-led and family-based units from five major districts: Thrissur, Kannur, Ernakulam, Wayanad, and Thiruvananthapuram. The sampling employed random sampling methods, ensuring diverse representation across craft types (coir, bamboo, pottery, handloom, natural fibers).

Data Collection and Tools

- Quantitative tool: Structured questionnaire capturing demographics, business models, material use, circular practices, challenges, and impacts.
- Qualitative tool: Semi-structured interviews exploring artisan narratives of innovation, sustainability, and barriers.

3.Analysis and Results

Demographic Overview

Variable	Category	Frequency	Percentage
Gender	Male	36	40.0%
	Female	54	60.0%
Age	Below 30	20	22.2%
	30–50	43	47.8%
	Above 50	27	30.0%
Education	Primary	15	16.7%
	Secondary	40	44.4%

Variable	Category	Frequency	Percentage
	Graduate+	35	38.9%

Adoption of Circular Practices

Circular Practice	Adoption (%)
Use of natural/recycled materials	78%
Waste material reuse	66%
Product upcycling	54%
Biodegradable packaging	52%
Product lifecycle design	60%
Composting/Eco-disposal	28%

Correlation Analysis

A positive correlation ($r = 0.63$, $p < 0.01$) was found between education level and adoption of circular practices. Similarly, higher circular practice scores correlated significantly with higher income and broader market reach ($p < 0.05$).

4.Findings

This study uncovers a dynamic interplay between traditional practices and emerging sustainability paradigms within Kerala's craft sector. The results highlight a latent yet significant alignment with circular economy (CE) principles, driven largely by cultural continuity, gendered leadership, generational innovation, and community-based

resourcefulness. At the same time, several systemic and structural limitations constrain the potential of this alignment from being formally recognized or scaled. The major findings are organized under the following thematic dimensions:

Traditional Foundations of Circular Practices

A dominant finding of the study is that circular practices are not new or externally imposed in Kerala's craft sector. Instead, they are embedded within the very ethos of artisanal traditions. Artisans across diverse craft clusters including handloom, coir, bamboo, and pottery demonstrated practices that closely reflect CE principles such as material reuse, waste reduction, and localized sourcing.

These sustainable behaviors are largely the result of generational knowledge transfer and an ethos of frugality rather than institutional training. For example, handloom weavers often use natural dyes and repurpose excess fabric, while coir producers employ locally sourced coconut husk waste. Such practices highlight the intuitive sustainability ingrained in the sector and suggest that many artisans are already operating within the CE framework, albeit informally and without formal recognition. (Kannan, K. P., 2020)

Women as Catalysts of Circular Innovation

Women entrepreneurs emerged as central agents of sustainability and innovation within the craft sector. Representing approximately 60% of the respondents, women-led enterprises were consistently more likely to adopt and promote circular practices. Their leadership often extended beyond production to include cooperative enterprise management, resource pooling, and skills dissemination within their communities.

These women-driven ventures frequently utilized models of collective procurement, shared production spaces, and peer training. In doing so, they not only reduced operational costs but also strengthened community resilience and social capital core tenets of circular entrepreneurship. Their involvement underscores the importance of incorporating gender- sensitive strategies in CE policy design, as women appear to play a disproportionate role in advancing sustainability objectives in the craft economy.

Generational Divide in Innovation and Digital Adoption

The study also reveals a significant generational divergence in approaches to innovation, particularly in the areas of product design, sustainability awareness, and digital engagement. Younger artisans, especially those under 40, were more inclined to experiment with upcycled materials, eco-conscious branding, and digital marketing techniques. Many reported using social media platforms and e-commerce channels to reach environmentally aware consumers.

Conversely, older artisans tended to maintain conventional production and sales methods, relying heavily on local exhibitions and word-of-mouth referrals. This cohort often lacked exposure to digital tools and formal sustainability frameworks, reflecting a digital and informational divide. The generational gap indicates a critical need for targeted capacity- building programs that merge traditional knowledge with digital literacy and sustainability education.

Absence of Formal Recognition and Certification

Despite their evident alignment with CE principles, most artisans did not identify their businesses as sustainable or circular. There was minimal awareness of eco-certification schemes, sustainability labels, or formal standards that could validate and promote their practices. As a result, these artisans are largely excluded from emerging green markets and financial mechanisms designed to support circular businesses.

This lack of formal recognition creates a barrier to scalability. Without access to sustainability certifications, artisans are unable to command higher prices, differentiate their products in competitive markets, or access institutional incentives such as green finance, tax benefits, or inclusion in eco-trade platforms.

Structural and Systemic Barriers

While the sector exhibits a strong intuitive foundation for circular entrepreneurship, several structural challenges hinder its full realization. These include:

Limited Access to Sustainable Raw Materials

Although Kerala is rich in natural resources, many artisans reported difficulties in sourcing processed or certified eco-friendly materials at scale. The absence of accessible supply chains for sustainable inputs often forces entrepreneurs to opt for synthetic substitutes, undermining their sustainability goals.

Knowledge and Awareness Gaps

There exists a significant gap between practice and formal knowledge. While many artisans instinctively follow sustainable methods, few have been exposed to structured training on CE principles, sustainable design, or market trends related to green consumption. This hinders both product development and market alignment.

Digital and Technological Exclusion

A substantial number of artisans, particularly from rural or older demographics, lack the digital skills needed to promote their products in broader markets. Their limited engagement with e- commerce and online platforms restricts visibility and commercial reach, especially among sustainability-conscious consumers.

Policy and Institutional Voids

Currently, there is no comprehensive state or national policy specifically supporting circular entrepreneurship in

the craft sector. Government schemes largely prioritize productivity and exports without integrating environmental performance criteria or sustainability targets. This policy vacuum results in missed opportunities for sectoral transformation.

Financial Barriers and Credit Inaccessibility

Most artisans operate as informal or micro-enterprises and face significant challenges in securing finance. The lack of tailored financial products such as green loans, grants for sustainable innovation, or subsidies for eco-packaging limits their ability to invest in circular upgrades or scale their operations.

Fragmentation of the Sector

The craft economy in Kerala is highly decentralized and lacks unified governance. This fragmentation prevents collective procurement, weakens advocacy efforts, and diminishes the potential for coordinated sectoral shifts towards circularity.

Market Pressures and Consumer Behavior

Artisans face stiff competition from mass-produced and mechanized products, which are often priced lower. While there is growing awareness of sustainability, it does not consistently translate into consumer willingness to pay a premium for eco-friendly crafts. This price sensitivity discourages investment in sustainable production processes.

5.Discussion

This study offers a critical lens into Kerala's craft sector, positioning it as a compelling case of "informal circularity" a term that aptly captures the organic alignment between traditional artisanal practices and the principles of the circular economy (CE). Artisans in this sector have long employed resource-efficient methods, including material reuse, waste minimization, and reliance on local inputs, (NITI Aayog, 2021). These practices, though not framed in contemporary CE terminology, demonstrate a cultural and ecological orientation that mirrors the objectives of circular entrepreneurship. However, despite this intrinsic alignment, the sector continues to operate on the margins of formal recognition and lacks the institutional scaffolding necessary for scaling and sustainability.

Cultural Embeddedness of Circular Practices

The persistence of sustainable production methods within Kerala's craft traditions underscores the significance of culture as a driver of circularity. These practices have been preserved and transmitted across generations, often in the absence of formal education or policy incentives, (Jain, S., 2017). This finding aligns with scholarship that emphasizes the role of indigenous knowledge systems and informal economies in advancing sustainability transitions, particularly in the Global South. The implication is clear: circularity is not solely the domain of technological innovation or industrial redesign it also emerges from community values, heritage knowledge, and lived practice.

Gender as a Lever for Sustainability

A salient feature of the sector is the prominent role of women entrepreneurs, who accounted for a majority of the respondents. These women not only implement environmentally responsible practices but also take on leadership roles in cooperative production, shared resource management, and skill dissemination. Their enterprises are often embedded within local networks that facilitate collective resilience and inclusive growth. This reinforces the findings of George and Bino (2022), who argue that gender-inclusive models are essential to sustainable entrepreneurship. Yet, these contributions remain under-recognized in both policy and institutional frameworks. A gender-responsive approach to circular entrepreneurship is therefore imperative, not only to empower women but to leverage their pivotal role in ecological stewardship.

Generational Disparities in Innovation and Engagement

The study also reveals a notable generational divide in the adoption of circular innovations and digital tools. Younger artisans demonstrate greater openness to experimentation, particularly in upcycled product design and sustainable branding. They are also more likely to engage with e-commerce platforms and social media to expand market reach. In contrast, older artisans tend to operate within traditional production and sales frameworks, with limited exposure to digital technologies or formal sustainability concepts, (Roy, P., & Singh, A., 2020). This divergence highlights the need for targeted interventions that facilitate knowledge transfer across generations while equipping older entrepreneurs with the tools and training needed to participate in emerging market dynamics.

Policy Incoherence and Institutional Gaps

While Kerala is widely recognized for its progressive social policies and high human development indicators, the state's craft sector remains conspicuously absent from formal circular economy strategies. Existing policy frameworks prioritize production efficiency and export performance, offering little support for sustainability-oriented initiatives. The absence of a dedicated institutional architecture encompassing regulatory guidelines, capacity-building mechanisms, and financial instruments represents a significant barrier to mainstreaming circular entrepreneurship in this domain.

This policy disconnect underscores a broader challenge: the misalignment between macro-level CE narratives and the micro-level realities of informal and traditional sectors. Without a coherent policy framework tailored to the needs and characteristics of the craft economy, artisans are excluded from accessing green finance, eco-certifications, and sustainability-linked incentives. Bridging this gap is essential for ensuring that circular transitions are inclusive, equitable, and contextually relevant.

Untapped Potential of Digital Ecosystems

Digital technologies offer significant potential to transform Kerala's craft sector into a more visible and competitive participant in the global green economy. Platforms for e-commerce, digital storytelling, and virtual exhibitions could help artisans differentiate their products based on sustainability credentials and cultural value. However, this potential remains largely untapped due to infrastructural barriers, digital illiteracy, and limited institutional support for digital integration.

Younger artisans are beginning to leverage these tools, but broader digital inclusion will require systemic efforts, including training programs, platform partnerships, and localized technology infrastructure. Such initiatives could also enhance market transparency, enable better consumer education on sustainability, and facilitate access to premium segments that value ethical and environmentally responsible production.

Strategic Implications and Future Pathways

Overall, the findings position Kerala's craft sector as a promising yet underutilized avenue for advancing circular entrepreneurship in a manner that is culturally grounded, socially inclusive, and economically viable. Realizing this potential will require a multi-dimensional policy response, including:

- Policy integration: Developing craft-specific circular economy strategies at the state and national levels.
- Financial inclusion: Creating tailored financial products that support eco-innovation, including green microcredit and sustainability-linked grants.
- Skills development: Establishing training programs in eco-design, CE principles, and digital marketing tailored to artisans of diverse age groups and literacy levels.
- Digital enablement: Investing in digital infrastructure and capacity-building to enhance online visibility and market access.
- Gender-sensitive interventions: Designing support mechanisms that recognize and amplify the contributions of women entrepreneurs to sustainable development.

By aligning Kerala's rich artisanal heritage with contemporary sustainability imperatives, policymakers and stakeholders can foster a circular economy model that is not only efficient and resilient but also deeply rooted in local knowledge and community wellbeing.

6.Conclusion

This study has examined the dynamics of circular entrepreneurship in Kerala's craft sector, revealing a complex and contextually rich ecosystem where sustainability is both a cultural inheritance and an emerging entrepreneurial strategy. The quantitative results affirm that higher engagement in circular practices is associated with increased economic performance. This aligns with findings by Bocken et al. (2016), who argue that circularity can enhance value creation. However, the qualitative data also point to critical gaps particularly in training, institutional support, and market integration that inhibit scalability.

The findings highlight that artisans across the state particularly women and younger entrepreneurs are actively engaging in practices that align with the principles of the circular economy, albeit informally and often without formal recognition or institutional support.

The research underscores that Kerala's craft sector exemplifies a form of "informal circularity", where resource-efficient production, material reuse, and local sourcing are embedded in generational knowledge systems. These practices contribute significantly to environmental sustainability, community resilience, and economic self-reliance. However, their transformative potential remains constrained by systemic challenges, including limited access to eco-materials, lack of awareness and certification, technological gaps, and policy fragmentation (Roy, P., & Singh, A, 2020).

Women entrepreneurs emerged as key agents of circular innovation, leveraging collective strategies and community-based models to sustain environmentally and socially embedded enterprises. At the same time, the generational divide in digital and sustainability engagement points to the need for inclusive capacity-building initiatives that bridge traditional wisdom with contemporary market demands (Ellen MacArthur Foundation, 2013).

Despite Kerala's progressive development indicators, the absence of a coherent policy framework for circular entrepreneurship in the craft sector represents a critical oversight. The lack of targeted financial instruments, institutional support, and digital infrastructure has prevented the sector from scaling its sustainability efforts and participating fully in green markets.

To harness the latent potential of Kerala's craft economy, a multi-pronged strategy is essential. This includes the development of sector-specific CE policies, gender-sensitive interventions, tailored financial tools, formal recognition mechanisms, and digital enablement programs. Such measures would not only enhance the competitiveness and resilience of craft enterprises but also position Kerala as a model for culturally grounded and socially inclusive circular economy transitions.

In conclusion, this research contributes to the broader discourse on sustainable entrepreneurship by foregrounding the role of traditional knowledge, local innovation, and gender dynamics in shaping circular economies in the Global South. By situating circularity within the lived realities of craft communities, the study offers valuable insights for policymakers, practitioners, and scholars seeking to promote sustainability that is both effective and equitable.

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