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Sustaining Traditional Craft Enterprises Through System Dynamics: An Empirical Study of Poshakmaking in The Mathura–Vrindavan Region

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Abstract
Traditional craft-based enterprises constitute a vital component of cultural economies, yet many remain embedded within informal and structurally vulnerable systems. Poshak making the traditional craft of designing and producing deity clothing in the Mathura-Vrindavan (Braj Bhoomi) region of Uttar Pradesh, India represents a culturally significant but economically unorganized sector. Despite sustained demand driven by temple economies and devotional practices, the sector is characterized by low income levels, absence of formal skill development mechanisms, weak institutional support, and exploitative market structures.This study employs a System Dynamics approach to analyze the structural complexity and long-term behavior of the poshak-making ecosystem. Primary data were collected through unstructured interviews and semi-structured schedules involving artisans and workshop owners. Key variables were systematically categorized into four domains: skill-related, business-related, society-related, and human resource-related factors. Using causal loop analysis, the study identifies reinforcing (virtuous) and balancing (vicious) feedback loops that influence sustainability outcomes.The findings indicate that while strong cultural demand creates inherent growth potential, systemic inefficiencies particularly income instability, lack of standardization, and absence of organized market structures contribute to skill attrition and declining productivity. The study further identifies critical leverage points for intervention and proposes strategic pathways based on **Blue Ocean Strategy**, emphasizing value innovation through heritage branding, experiential integration with religious tourism, and market diversification.By integrating System Dynamics with strategic management perspectives, this study contributes to the limited literature on traditional craft sustainability and offers actionable insights for policymakers, development agencies, and cultural entrepreneurs seeking to formalize and revitalize craft-based economies.

Keywords: *System Dynamics, Traditional Crafts, Poshak Making, Cottage Industry, Sustainability, Vulnerability Analysis*

1. Introduction

One of the oldest traditional crafts and sources of livelihoods of Braj Bhoomi, which includes Mathura and Vrindavan in Uttar Pradesh, India, is poshak making, the making of ritual garments and accessories of Hindu gods. Mathura is worshipped as the home of Lord Krishna, who is at the seat of Hindu mythology and worship. Lord Krishna is venerated both as a child and as an adult and the use of these idols, decorated with elaborate garments and accessories is a vital part of ritual practice.

Hindu families and temples adorn their gods with a myriad of clothing, jewelry, and accessories, such as jeweled jewelry, ornamental flutes, crowns, handmade bedding, and ritual seating. Poshaks are crafted with a variety of materials, including cotton, net, wool, velvet, fur, fake feathers that look like peacock feathers, brocade silk and pure silk. These-garments are decorated with elaborate embroidery styles such as gotti patti, stonework, sequins, mirrors, beads, zardozi, and kundan. It is mostly a manual and skill-based production process that is done at household units and the workshops of the traders where master craftsmen hire several artisans.

Over 2,500 artisans practice this trade (Bharathi, 2016). In Vrindavan, there are about 50 workshops in which close to 1,000 artisans are employed (Vrindavan Today, 2014). This is supported by a robust religious infrastructure: there are almost 5,000 temples in Vrindavan itself (Vrindavan-dham.com, 2016). This produces a naturally high and frequent demand poshaks particularly during festivals like Janmashtami, Radhashtami, and other ritual events. Orders are placed by traders throughout India, as well as in other countries such as the United States, the United Kingdom, and Australia, and even in some African nations.

Poshak making is still an unstructured and unprotected industry despite high demand and cultural importance. Although the Government of Uttar Pradesh officially categorizes the craft as a cottage industry (Vrindavan Today, 2013), the craft does not have formal business operations, institutions, and systems of developing skills,

ensuring the welfare of the worker or expanding the market. Such weaknesses of the system require a dynamic and holistic method of analysis and not a linear method of assessment.

2. Literature Review:

"He who works with his hands is a laborer;
He who works with his hands and his head is a craftsman;
He who works with his hands, his head, and his heart is an artist."
— *Anonymous*

Creative labor, cultural memory and tacit knowledge have made traditional crafts to be alive all over the world. Nevertheless, there are very minimal institutional structures in place to safeguard or encourage those people who continue to practice these crafts. The loss of traditional crafts to modernization, globalization and neglect of policies has been recorded in numerous studies.

According to Prahalad (2007), inclusive growth has to be based on sustainable opportunity creation as opposed to subsidies and there is a need to address the issue of diversity and inclusiveness through arts and cultural industries. Development initiatives are known to fail as a result of underestimating the cultural dimensions, and the World Commission on Culture and Development (1995) recognized that culture is central to human development.

India@75 vision documents recommend the need to preserve local arts, offer vocational training, incorporate arts into mainstream education, and to establish sustainable livelihoods by using MSME and skill-development (Jadhav, 2013). Nonetheless, there are structural issues. Persistent problems that were identified at the Industries Conference of 1947 that faced cottage and handicraft industries included the unavailability of finance, lack of updated technology, flawed marketing, unavailability of raw materials and competition by mechanized goods (Jadhav, 2013).

Craft sustainability and innovation have been discussed by a number of scholars. Liebl and Roy (2001) studied Indian crafts as part of World Bank policy planning and Donkin (2001) studied conservation of intangible cultural heritage. As Kapur and Mittar (2014) showed, dying crafts can be revitalized through collaborative design interventions. Bunnell (2004) postulated the argument that craft-based methodologies should be able to incorporate digital technologies to address the needs of customization in post-industrial economies. Sai (2008) analyzed the issue of intellectual property in safeguarding traditional handicrafts.

Although there is an abundance of documentation, the existing literature is mostly of the static or descriptive orientation. A research gap exists in applying System Dynamics to the study of feedback mechanisms, long-term behavior and leverage points within traditional craft ecosystems.

2.1 Traditional Crafts and Sustainability

Earlier research indicates that traditional crafts are a source of inclusive development but face threats of modernization, globalization and ineffective institutions. The sustainability of craft relies on continuity of skills, access to the market, and innovation in adaptation.

2.2 System Dynamics in Socio-Economic Studies

Complex systems with feedback loops, delays and non-linear interactions that involve supply chains, sustainability transitions and livelihood systems have been studied extensively using System Dynamics. Nevertheless, it has limited use in the case of traditional craft ecosystems.

2.3 Strategic Innovation and Blue Ocean Strategy

Blue Ocean Strategy focuses on value innovation which is the establishment of uncontested market spaces instead of competing on a crowded market. In the case of heritage-based industries, the concept of cultural distinctiveness, narrative, and experience is used.

Table 1: Literature Review Summary:

Author(s) & Year	Study Context	Methodology / Approach	Key Findings	Research Gap / Relevance to Present Study
Forrester (1961)	Industrial systems	System Dynamics modeling	Introduced feedback loops and stock–flow structures in complex systems	Provides theoretical foundation for applying System Dynamics to craft ecosystems
Sterman (2000)	Business & policy systems	Simulation and system thinking	Demonstrated dynamic behavior arising from feedback and delays	Supports analysis of long-term sustainability in poshak making
Meadows (2008)	Sustainability systems	Systems thinking framework	Identified leverage points for systemic intervention	Helps identify intervention areas in traditional crafts
Senge (1990)	Organizational systems	Learning organization model	Emphasized feedback loops and adaptive learning	Relevant for skill development and knowledge transfer

Kaplinsky & Morris (2001)	Value chain analysis	Qualitative value chain approach	Highlighted role of intermediaries in income distribution	Explains exploitation and middlemen dominance in poshak sector
Kim & Mauborgne (2005)	Strategic management	Blue Ocean Strategy	Value innovation creates new market spaces	Supports strategic recommendations for craft sustainability
Liebl & Roy (2001)	Indian handicrafts	Sectoral analysis	Crafts face market and institutional challenges	Provides macro-level context for craft sector issues
Donkin (2001)	Craft conservation	Case-based analysis	Importance of preserving intangible heritage	Supports cultural preservation argument
Bunnell (2004)	Craft & technology	Conceptual study	Integration of craft with digital technology enhances innovation	Suggests modernization pathways for poshak craft
Kapur & Mittar (2014)	Design intervention in crafts	Case-based study	Collaboration enhances innovation and revival	Supports need for design and innovation integration
Sai (2008)	Legal framework	Policy analysis	Weak IP protection for traditional crafts	Highlights institutional gaps
Jena (2010)	Handicraft policies	Policy review	Government schemes exist but implementation gaps persist	Supports policy intervention analysis
Jadhav (2013)	Cottage industries	Secondary analysis	Identified structural issues like finance, marketing, and technology gaps	Reinforces systemic challenges in poshak sector
Rahman & Singh (2020)	Craft livelihoods	Empirical study	Institutional support crucial for sustainability	Validates need for formalization
Singh & Bhardwaj (2019)	Craft industry systems	Systems-based qualitative study	Vulnerability driven by feedback loops	Directly supports System Dynamics application
Geels (2011)	Sustainability transitions	Multi-level framework	Innovation drives systemic transitions	Supports transformation perspective
UNESCO (2013)	Creative economy	Policy report	Cultural industries support economic development	Justifies economic relevance of study
Bharathi (2016)	Vrindavan poshak craft	Descriptive study	Large artisan base dependent on craft	Provides empirical base
Vrindavan Today (2014)	Local craft economy	Report-based	Strong demand and economic potential	Supports demand-side argument

Significance of the Study

The poshak-making industry in Vrindavan was estimated to add to the total economic value of about INR 2 crore a decade ago and probably more so now (Vrindavan Today, 2014). Nonetheless, artists still have to endure a precarious working environment. The salaries are between INR 200-500 and the employment is seasonal and not salaried.

Embroidery and sitting positions cause occupational health problems like eye strain and musculoskeletal problems among craftsmen. The industry does not have unionized labor, social security, or welfare programs. Although there is high demand and production cycles, economic activity does not result in better livelihoods among artisans.

ResearchGap:

The literature available does not offer a combined study of System Dynamics and strategic innovation to examine and rejuvenate the traditional craft based enterprises.

3. Research Objectives

The paper will analyze the poshak-making traditional craft through a System Dynamics approach with the following goals:

1. To determine the crucial variables that affect poshak-making craft and business system.
2. To group these variables as key factors of influence.
3. To engineer a stock-flow model that is a description of system behaviour.
4. To determine reinforcing (good) and balancing (bad) feedback loops.
5. To detect areas of vulnerability and capacity building.

4. Research Hypotheses

According to the system perspective, the following hypotheses are developed:

H1: The positive and reinforcing effect of skill retention among poshak artisans on products quality and demand is positive.

H2: Instability in income is a strong predictor of skill loss and ultimate decreasing production capacity.

H3: The unorganized market structures have a negative moderating effect on the demand growth and artisan income.

H4: Value innovation of strategic differentiation has a positive impact on the sustainability of traditional craft enterprises.

5. Conceptual Framework (System Dynamics Based)

Framework Description

The models of conceptual framework represent poshak making as a dynamic system which consists of interrelated stocks, flows and feedback loops.

Key Stocks

- Skilled Artisan Base
- Traditional Knowledge Capital
- Production Capacity
- Market Demand
- Income Level

Key Flows

- Skill acquisition and training
- Skill attrition
- Production rate
- Revenue inflow
- Investment in innovation

Feedback Loops

Reinforcing Loop (R1 – Virtuous Cycle): Skill Level → Product Quality → Market Demand → Income → Skill Retention

Balancing Loop (B1 – Vicious Cycle): Low Income → Skill Attrition → Reduced Quality → Declining Demand → Lower Income

Strategic Loop (R2 – Innovation Loop): Value Innovation → Market Differentiation → New Demand → Income Stability →

Reinvestment

This framework highlights leverage points where strategic interventions can reverse decline and promote sustainability.

System Dynamics Approach

System Dynamics is an extension of systems theory, which offers a platform to the study of complex systems in terms of feedback loop, delays and non-linear relationships (Sterman, 2000). It helps researchers to know how the internal structures produce behavior as it is observed with time.

The present study uses the System Dynamics to examine the interaction of the skill development, market demand, income stability, social conditions, and institutional support. Variables could be classified into four broad areas:

1. **Skill-related factors**
2. **Business-related factors**
3. **Society-related factors**
4. **Human resource-related factors**

6. Qualitative Findings and Factor Analysis

6.1 Skill-Related Factors

The training of skills is informal and observational. Learning is through imitation and is not through any form of training as expressed by the artisans and owners of workshops. No official system of innovation, or curriculum-based education or certification of skills. There is little creative experimentation and the knowledge transfer is weak.

6.2 Business-Related Factors

Business environment is totally disorganized. Access to formal credit is limited, recovery of payments is delayed, there is no quality control, lack of standardization and exploitative dominance by the intermediaries. Artisans do not have much bargaining power, and pricing decisions are controlled by the traders. Feedback mechanisms from customers are nonexistent.

6.3 Society-Related Factors

The majority of the workshops work in residential facilities that have poor infrastructure. Poverty is perpetuated by illiteracy, bad habits, social influences, and ignorance. The craft work is considered to be subsistence work and not a highly regarded cultural work.

6.4 Human Resource–Related Factors

The low morale and job dissatisfaction are caused by poor wages, sanitation, electricity, drinking water, welfare schemes, and job security. The owners of the workshop recognize such problems but attribute them to low profit margins and absence of government support.

Table 2: Summary of Qualitative Factors Affecting Poshak Making

Skill-Related	Business-Related	Society-Related	Human Resource–Related
Lack of formal training	Unorganized operations	Illiteracy	Low wages

Weak innovation	Liquidity constraints	Unhealthy habits	Poor working conditions
Informal learning	Middlemen exploitation	Social obligations	No welfare schemes
Skill erosion	No quality control	Cultural undervaluation	Low job satisfaction

7. System Dynamics Interpretation

The system exhibits:

- Loops: Skill Quality Demand Income Skill retention.
- Balancing loops: Low income ‣ Skill attraction ‣ Quality deterioration ‣ Demand decrease.

Lack of institutional intervention reinforces vicious cycles, causing long-term deterioration, though there is high demand.

8. Policy Context and Existing Schemes

There are a number of government programs, such as:

- Baba Saheb Ambedkar Hastshilp Vikas Yojana.
- Marketing Support and Service Scheme.
- Design and Technology Upgrading Scheme.
- Export Promotion Scheme
- Research and Development Scheme.
- Training and Extension Scheme.
- Bima Yojana on artisans of Handicrafts.

Nonetheless, gaps in implementation, low involvement of artisans, poor incentives, and poor monitoring make them less effective (Jena, 2010).

9. Research Methodology

9.1 Research Design

A systems-based and qualitative research design in the form of an exploratory study was implemented.

9.2 Data Collection

- **Primary Data:**

o Unstructured interviews with artisans, traders, temple authorities

o Semi-structured schedules focusing on production, costs, skills, and markets

- **Secondary Data:**

o Government publications

o Newspaper articles

o Prior academic studies

9.3 Analytical Tools

- Causal Loop Diagrams (CLDs)
- Stock–Flow Modeling'
- Thematic Content Analysis

10. Analysis and Findings

System Dynamics analysis showed that poshak-making ecosystem is controlled by reinforcing loops that either can create growth or speed up the decline based on income stability and market access. Lack of branding and institutional connection heightens the vulnerability. The seasonal demand trends also contribute to income uncertainty.

11. Strategic Intervention: Blue Ocean Strategy

Using the ERRC grid, the study proposes:

- **Eliminate:** Excessive dependence on intermediaries
- **Reduce:** Price-based competition
- **Raise:** Product authenticity, craftsmanship visibility
- **Create:** Heritage branding, experiential retail, global niche markets

12. Discussion

The merging of System Dynamics and Blue Ocean Strategy gives a clear picture of how the traditional crafts can shift their operations which are driven by survival to a sustainable business. Strategic innovation is a reinforcing mechanism with the capacity to overcome systemic weaknesses.

13. Implications

- Theoretical Implications: Applies System Dynamics to the cultural and craft-based economies.
- Managerial Implications: Gives a decision-making model to artisan cooperatives and entrepreneurs.
- Policy Implications: Promotes systematic intervention along MSME, tourism and cultural heritage policy.

14. Conclusion

The paper confirms that the sustenance of traditional craft enterprises needs a systematic knowledge and tactical novelty. System Dynamics exposes the leverage points that are critical whereas the Blue Ocean Strategy provides avenues to long-term resiliency. The poshak-making industry of Mathra-Vrindavan can be made alive by the policy, market and innovation based intervention.

This paper shows that poshak production in MathuraVrindavan is supported by the high demand of the culture but limited by the vulnerabilities of the system. System Dynamics shows that in the absence of structural intervention, the constant strengthening of negative feedback loops will keep weakening artisan livelihoods. The key aspects that should be used to transform this traditional craft to a sustainable cultural enterprise are strategic innovation, institutional support, and participatory governance.

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