



Banarasi Silk: A Supply Chain Perspective On Preserving Traditional Craftsmanship In A Modern Industry

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Abstract: This study proposes a new supply chain model for the unorganized Banarasi silk weaving cluster in India. The model integrates technology, design, and market access to improve efficiency, enhance livelihoods, and promote sustainable development. By organizing weavers into clusters, establishing design and training centers, and implementing a digital platform, the model aims to increase revenue opportunities, improve quality control, and reduce lead times. The proposed model has the potential to transform the Banarasi silk industry, promoting economic growth, social development, and cultural preservation.

Index Terms - Banarasi silk, supply chain management, technology integration, cluster development.

I. INTRODUCTION

The Banarasi silk sari, a quintessential symbol of Indian textile heritage, embodies the grandeur and nobility of the holy city of Varanasi. Renowned for its exquisite gold and silver brocade, quality silk, and exceptional needlework, Banarasi silk is a testament to the city's rich cultural legacy. With its intricate designs, metallic visual effects, and compact weaving, Banarasi silk has become synonymous with luxury and elegance.

For centuries, skilled weavers in Varanasi have been perfecting the art of Banarasi silk production, passing down traditional motifs and techniques through generations. From the intricate floral patterns to the majestic animal designs, every Banarasi silk sari tells a story of India's rich cultural diversity. As a testament to its enduring appeal, Banarasi silk continues to be a coveted possession for every Indian woman, transcending generations and time.

The Banarasi silk industry, renowned for its exquisite handmade products, faces unique supply chain challenges that impact its competitiveness in the global market. The industry's reliance on traditional weaving techniques, geographic concentration of production, and complex distribution networks create bottlenecks that hinder efficient supply chain management. This article explores the intricacies of the Banarasi silk supply chain, identifying key challenges and opportunities for improvement.

Through a detailed analysis of the Banarasi silk industry's supply chain, this article aims to provide insights into the potential solutions that can enhance the industry's efficiency, productivity, and competitiveness. By examining the intersections of traditional craftsmanship, geographic constraints, and modern supply chain management principles, this research seeks to contribute to the development of more effective and sustainable supply chain strategies for the Banarasi silk industry.

II. LITERATURE REVIEW

The Banarasi handloom industry, despite having Geographical Indication (GI) registration, is struggling due to poor understanding of GI among weavers, intermediaries obstructing communication between consumers and producers, and lack of effective implementation of government policies. To revive the industry, it's essential to raise awareness among producers and consumers, implement strict laws against false representation of GI, and promote public-private partnerships. Additionally, adopting new technologies, expanding product range, and implementing price regulation mechanisms can help improve efficiency, reduce costs, and increase demand for Banarasi brocade and sarees, ultimately benefiting the weavers and the industry as a whole. [1]

To revitalize the Banarasi silk industry, several marketing strategies and interventions are proposed. These include leveraging designers' relationships, building strategic tie-ups, introducing maximum retail price (MRP), and training people involved in sales activities. Additionally, the industry can benefit from forward integration, strategizing point of purchase, establishing service infrastructure, and regulatory mechanisms to control seller behavior. Other suggestions include emphasizing exports, addressing supply chain management issues, and skill enhancement through training programs to improve sales, communication, and overall efficiency of the industry. [2]

Another study investigated the supply chain operations of the handloom industry, focusing on the motivations, constraints, and opportunities of weavers, retailers, and government stakeholders. The analysis highlights the need for social responsibility and alignment in the supply chain to promote welfare and efficiency. The study identifies three types of organizational systems and proposes improvements to enhance weavers' resources and capabilities, including technological development, demand estimation, infrastructure development, and brand creation. The research emphasizes the importance of collaboration between government, private, and cooperative enterprises to realize the innovative and productive potential of weavers, and suggests exploring how to align customer preferences with weavers' needs and aspirations to promote growth without conflict. [3]

III. PRODUCTION PROCESS OF BANARASI SILK

The production of Banarasi silk sarees involves several stages, beginning with the procurement of high-quality silk yarn from reputable suppliers. The yarn is then degummed, dyed, and treated before being divided into warp and weft threads. The warp threads are prepared by spreading them lengthwise, rolling them onto a wooden log, and transferring them to the warp roll.

The design of the saree is generated on graph paper using pixel calculation, and cards are punched for the jacquard machine to weave the design onto the fabric. The cards are either created by hand or by machine, and a simple weaving takes around 5-6 hours, while complicated designs take 1-2 weeks. The jacquard machine is a looming machine that weaves complicated designs by operating one thread at a time.

The weaving process involves interlacing the warp and weft threads using a pit loom, which requires great effort and patience from the weaver. The finished cloth is then rolled onto a patti, and the time it takes to weave a saree depends on the complexity of the design, ranging from 15 days to 6 months. Post-loom processes include washing, cutting, mending, and polishing to produce the finished Banarasi silk saree.

IV. STRUCTURE OF THE BANARASI SILK INDUSTRY

The Banarasi silk industry is characterized by a complex network of stakeholders, including weavers, traders, and merchants. The industry is predominantly family-run, with handlooms and power looms being used for sari production. The two types of looms produce distinct varieties of saris, with unique yarns, designs, and manufacturing processes.

The industry can be categorized into three main types of weavers: individual weavers, master weavers, and cooperative society weavers. Individual weavers are the most exploited, as they bear the entire responsibility of procuring raw materials, designing, and marketing their products. Master weavers, on the other hand, provide material, design, and colour specifications to the weavers and supervise the production process. Cooperative society weavers operate within a collective framework, sharing resources and expertise.

The trading community plays a significant role in the industry, with approximately 300 traders dominating the market. The traders, predominantly Hindus, wield considerable influence over the weaving community, which is primarily Muslim. Weavers are often disconnected from the market, relying on traders for design specifications and distribution channels.

The industry is plagued by exploitation, with weavers receiving meager payments for their products. The lack of access to raw material and retail markets further exacerbates the weavers' vulnerability. The payment system, which often involves post-dated checks and commission agents, adds to the weavers' financial burdens.

V. SUPPLY CHAIN OF BANARASI SILK BROCADE

Supply chain management is crucial in today's competitive economy, where businesses must invest in and pay attention to their supply chains to stay ahead. A supply chain is a network of suppliers, manufacturers, distributors, and customers that work together to produce and deliver a product or service. In the context of Banarasi Silk Sarees and Brocade, the supply chain involves various stakeholders, including gaddidar, shopkeepers, intermediaries, master weavers, and weavers.



Fig.1 Existing Supply Chain Model of Banarasi Silk Brocade

The production of Banarasi Silk Sarees and Brocade involves a complex supply chain, where manufacturers produce on a work-order basis or in anticipation of market demand. Wholesale customers place orders with gaddidar and shopkeepers, who then pass on the order to intermediaries or master weavers, who allocate the job to weavers on a fixed wage per piece or day. The finished products are then sold to retail and wholesale customers through stores and exhibitions.

In the Indian handloom industry, effective supply chain management is critical for global competitiveness. The industry faces challenges such as low productivity, contamination of silk, inadequate spinning, and scarcity of raw materials. To address these challenges, cost rationalization is required at every stage of the supply chain. Additionally, there needs to be more coordination between industry and related trade organizations to make the supply chain more efficient. By streamlining the supply chain, businesses in the Indian handloom industry can improve their competitiveness and deliver high-quality products to customers.

VI. MAIN ISSUES FACED BY BANARASI SILK CLUSTER

The Banarasi silk cluster, once a thriving handloom weaving industry, is currently facing a decline. Weavers in this cluster encounter several supply chain management issues that hinder their productivity and competitiveness. Key challenges in yarn procurement include:

- Inconsistent yarn quality
- Delayed availability of yarn
- Inability to obtain yarn of specified count

These issues are exacerbated by the geographical dispersion of weavers, leading to transportation delays and difficulties in accessing financial support.

During the production process, weavers face additional challenges, including:

- Limited access to improved looms
- Lack of knowledge about creative patterns and market trends
- Inability to adapt designs and patterns to changing market demands

Master weavers, who play a crucial role in the cluster, struggle to establish themselves as marketable and sustainable. The inability to innovate and adapt to changing market trends results in products that fail to attract customer attention, ultimately affecting the livelihoods of weavers in the cluster.

VII. MARKET RESEARCH

In recent years, consumer buying patterns have evolved, particularly in tier 1 and tier 2 cities. An increasing number of customers prefer purchasing from organized retail chains. However, high-net-worth consumers and younger customers are not adequately exposed to the latest designs and forms of Banarasi silk, resulting in missed opportunities for the industry.

To gain a deeper understanding of the Banarasi silk market, we conducted research in Varanasi, focusing on wholesalers and retailers. Our findings provide valuable insights into the market dynamics and consumer behaviour. One of the wholesalers we interacted with was Sona Sarees, a family-run business with over 40 years of experience in selling Banarasi sarees.

Sona Sarees manufactures its sarees from weavers in Mikipur village and sells them through various channels, including online platforms like WhatsApp and their website. They also have a retail presence in Varanasi and internationally in cities like London, Canada, and Dubai. Interestingly, they had a brief stint with selling on Amazon but discontinued it due to the platform's commission charges. This highlights the challenges faced by small businesses in navigating e-commerce platforms.

Our research also revealed that the Covid-19 pandemic had a significant impact on the Banarasi silk market. Wholesalers like Sona Sarees reported a substantial decline in sales, and retailers struggled to clear their inventory. Furthermore, the pandemic led to a shift in consumer preferences, with many opting for synthetic sarees over silk due to budget constraints. This trend was particularly evident during the wedding season, which is typically a peak period for Banarasi silk sales.

VIII. EXISTING DISTRIBUTION PRACTICES IN THE BANARASI SILK INDUSTRY

The Banarasi silk industry employs a multi-tiered distribution system, characterized by numerous intermediaries between raw material suppliers and end-consumers. The industry's distribution channels can be categorized into three primary forms: wholesale, retail, and institutional sales.

1. Wholesale Distribution

The wholesale market dominates the Banarasi silk industry, with wholesalers accounting for the majority of transactions. Wholesale buyers from across India purchase products based on local preferences and interests. Importers also engage with wholesalers to place orders. This market is cyclical, with increased sales during festivals and weddings.

2. Retail Distribution

Wholesalers sell their products through retail outlets or to local shopkeepers. Retail establishments in Varanasi offer a diverse range of products, but the organized retail structure is lacking. Some large manufacturers have retail presence in major cities, operating as wholesale retailers.

3. Institutional Sales

The Banarasi silk industry has made limited attempts to establish institutional relationships with organized retail chains. As a result, institutional sales are negligible. The industry's unorganized structure and lack of strategic linking have hindered its ability to tap into this significant market.

8.1. Impact of globalisation on the Banarasi silk industry

Globalisation has had a profound impact on the Banarasi silk industry, making it a part of the global village. While over 80% of the assessed population is aware of the Banarasi brocade handcraft, the industry still struggles to adapt to the digital age. Despite the growth of e-commerce, 88% of Banarasi brocade buyers still prefer to purchase offline, citing concerns over authenticity and diversity.

The impact of globalisation on Banarasi silk weavers has been particularly significant. The influx of power looms and mills has led to the production of counterfeit fabrics, which are often passed off as original. This has resulted in a loss of livelihood for many skilled weavers. Furthermore, the increasing labour force in the industry has led to a surplus of workers, driving down wages and prices. The fluctuating prices of silk and artificial shortages created by suppliers have also pushed weavers into precarious situations.

8.2. Challenges Faced by Weavers

The majority of poor weavers are unable to afford silk due to rising prices, forcing them to turn to low-cost synthetic fibres. This has resulted in the use of low-quality raw materials, leading to a decline in the quality of the final product. Traders often cite weave faults as a justification for their actions, further exacerbating the challenges faced by weavers. The situation highlights the need for support and protection for Banarasi silk weavers to ensure the sustainability of this traditional craft.

IX. SWOT ANALYSIS OF THE BANARASI SILK INDUSTRY

Strengths:

1. **Distinct Range of Products:** Banarasi brocade has a rich history dating back to the Mughal era, making it a unique and sought-after product.
2. **Historical Importance:** As a historical craft, Banarasi brocade is an Indian specialty that has gained global recognition, attracting tourists and enthusiasts alike.
3. **Skills Imbued Through Generations:** Artisans and their families have honed their skills through generations, ensuring authentic and high-quality products.
4. **Originality and Unfeasible Mass Production:** The intricate designs and hand-woven nature of Banarasi silk sarees make mass production unfeasible, preserving their exclusivity.
5. **GI Tags:** The Geographical Indication (GI) tag ensures authenticity and prevents unauthorized use of Banarasi silk sarees.

Weaknesses:

1. **Artisans' Migration:** Insufficient wages have led to artisans migrating from the craft, threatening the industry's sustainability.
2. **Less Technological Upgradation:** The handloom sector lacks technological advancements, hindering efficiency and productivity.
3. **Lack of Awareness:** Weavers are often unaware of government benefit schemes, missing out on potential support.

Opportunities:

1. **Digital India:** Online platforms offer a chance to bridge the gap between producers and consumers, increasing accessibility and sales.
2. **Government Initiatives:** Schemes and programs launched by the government can promote the craft, improve artisans' livelihoods, and enhance the industry's overall competitiveness.
3. **Skill Enhancement:** Initiatives like the National Skill Development Corporation's training programs can upskill artisans, increasing productivity and quality.

Threats:

1. **Increase in Power Looms:** Power looms pose a threat to the handloom industry, as they offer faster and cheaper production methods, potentially reducing demand for handmade products.
2. **Poor Wages:** Unsatisfactory wages may lead to artisans abandoning the craft, jeopardizing the industry's future.
3. **Rise in Prices of Raw Materials:** Increasing raw material costs may lead to higher production costs, ultimately affecting the prices of finished goods and potentially reducing demand.

X. PESTEL ANALYSIS OF THE BANARASI SILK INDUSTRY

Political Factors

1. The GI Tag provides legal protection and guarantees quality and uniqueness, allowing companies to differentiate their products from mass-produced imitations.
2. Government initiatives, such as the ODOP margin money scheme and training programs, have supported the industry.
3. The government has also provided loans and tool kits to weavers.

Economic Factors

1. The industry is influenced by per capita income, national income, resource mobilization, infrastructure development, employment generation, capital formation, and industrial development.
2. The imposition of GST has negatively impacted weavers, who struggle with paperwork and formalities.
3. Lack of infrastructure development, including proper drainage and sewage lines, hinders the industry.

Social Factors

1. Artisans are often disconnected from consumers, making it difficult to understand demand.
2. Working conditions are challenging, but artisans continue to work in these conditions.
3. Customer segmentation is based on demographics and willingness to purchase Banarasi silk sarees.

Technological Factors

1. The industry lacks technological upgradation, particularly in the handloom sector.
2. The government has introduced schemes like the Technology Upgradation Fund Scheme (TUFS) to support technological advancements.

3. Power looms have replaced handloom machines, dominating the market.

Environmental Factors

1. Chemical dyes used by dyers contribute to pollution.
2. Power looms generate noise pollution, and waste materials from manufacturing and printing processes harm the environment.
3. Implementing sustainable dyes can help mitigate environmental concerns.

Legal Factors

1. The GI Tag protects weavers' livelihoods, skills, and identities by preventing duplication.
2. Government programs, such as the Handloom Mark and Health Insurance Scheme, support handloom weavers.
3. Labor laws are somewhat unfavorable, making life challenging for Banarasi Brocade weavers.

To drive organizational improvements and resource allocation, they must conduct thorough needs assessments. In the context of Banarasi silk production, our analysis revealed inefficiencies in raw material sourcing and inter-process transitions. To address these gaps, we propose a revamped supply chain model for weavers, aimed at streamlining operations, reducing lead times, and enhancing the overall production-to-consumer journey.

XI. FINDINGS

1. **Inefficient Supply Chain:** The current supply chain of the Banarasi silk industry is inefficient, with multiple intermediaries, lack of transparency, and limited market access.
2. **Limited Technological Adoption:** The industry has limited technological adoption, particularly in the handloom sector, hindering efficiency and productivity.
3. **Weaver Migration:** Insufficient wages and lack of benefits have led to weaver migration, threatening the industry's sustainability.
4. **Quality Control Issues:** Quality control issues persist due to lack of standardization, inadequate training, and limited access to quality raw materials.
5. **Market Access Limitations:** Weavers have limited market access, relying on intermediaries, and lack exposure to modern designs and trends.

XII. SUGGESTIONS

1. **Implement Digital Platform:** Develop a digital platform to connect weavers, designers, and buyers, enhancing transparency, efficiency, and market access.
2. **Provide Training and Skill Development:** Offer training and skill development programs to weavers, focusing on modern designs, trends, and quality control.
3. **Establish Quality Control Mechanisms:** Implement quality control mechanisms, including standardization, certification, and regular audits.
4. **Promote Sustainable Practices:** Encourage sustainable practices, such as using eco-friendly dyes, reducing waste, and implementing environmentally friendly production methods.
5. **Foster Market Linkages:** Foster market linkages by connecting weavers directly with buyers, retailers, and exporters, enhancing market access and revenue opportunities.

XIII. MODEL OVERVIEW

Based on the analysis done on the cluster a new supply chain model is suggested. The proposed model aims to organize the Banarasi silk weaving cluster, improve efficiency, and enhance the livelihoods of weavers. The model integrates technology, training, and market access to create a sustainable and scalable supply chain.

13.1. Key Components

1. **Weaver Clusters:** Organize weavers into clusters based on geographic location, skill level, and product specialization. Each cluster will have a leader who will facilitate communication and coordination.
2. **Digital Platform:** Develop a digital platform (mobile app/web portal) to connect weavers, designers, and buyers. The platform will enable:
 - a. Order management and tracking
 - b. Design sharing and collaboration
 - c. Payment processing and settlement
 - d. Quality control and feedback mechanisms

3. Design and Training Centres: Establish design and training centres to provide weavers with:
 - a. Access to modern designs and trends
 - b. Training on new weaving techniques and technologies
 - c. Quality control and assurance
4. Raw Material Supply Chain: Establish partnerships with reliable raw material suppliers to ensure consistent quality and availability of silk yarns and other materials.
5. Marketing and Sales: Create a marketing and sales strategy to promote Banarasi silk products to domestic and international markets. This will include:
 - a. Branding and packaging
 - b. Social media and digital marketing
 - c. Trade shows and exhibitions
 - d. Partnerships with retailers and wholesalers
6. Payment and Settlement: Implement a secure and transparent payment system to ensure timely and fair payments to weavers.
7. Quality Control and Assurance: Establish a quality control and assurance mechanism to ensure that products meet high standards of quality and authenticity.

13.2. Benefits

1. Improved efficiency: The digital platform and organized cluster structure will streamline communication, reduce lead times, and increase productivity.
2. Enhanced Livelihoods: Weavers will have access to better designs, training, and market opportunities, leading to increased earnings and improved livelihoods.
3. Increased Transparency: The digital platform and payment system will ensure transparency and accountability throughout the supply chain.
4. Better Quality Control: The quality control and assurance mechanism will ensure that products meet high standards of quality and authenticity.
5. Increased Market Access: The marketing and sales strategy will promote Banarasi silk products to domestic and international markets, increasing market access and revenue opportunities.

The proposed supply chain model aims to organize the Banarasi silk weaving cluster, improve efficiency, and enhance the livelihoods of weavers. By leveraging technology, design, and market access, the model has the potential to increase revenue opportunities, improve quality control, and promote sustainable development in the cluster.

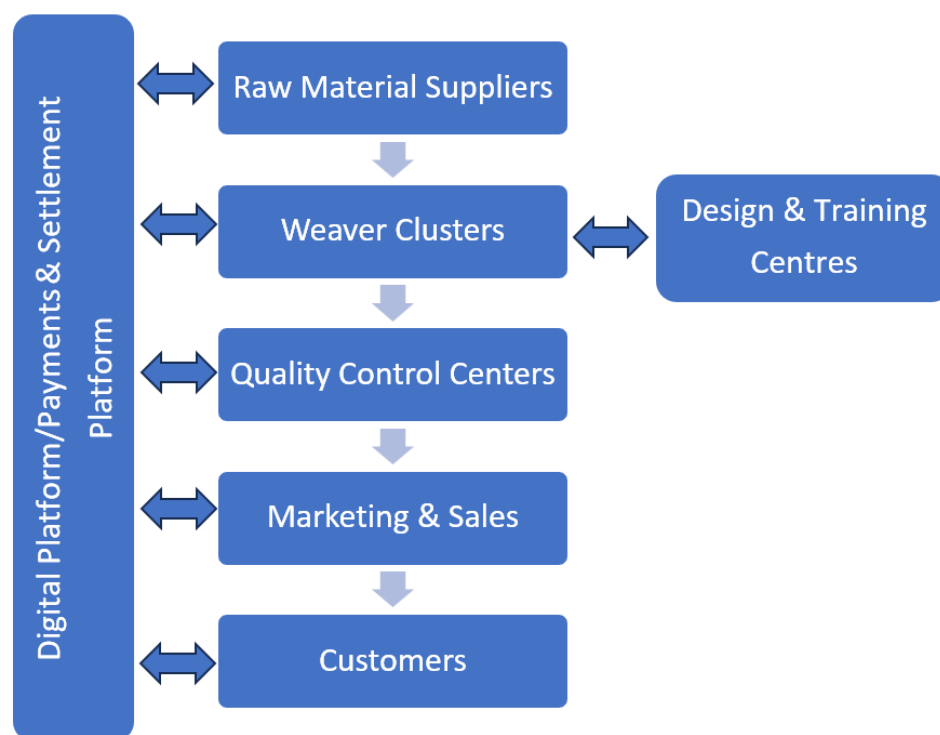


Fig.2 Proposed Supply Chain Model for Banarasi Silk Brocade

XIV. CONCLUSION

The Banarasi silk industry faces significant challenges, including inefficient supply chains, limited technological adoption, weaver migration, quality control issues, and market access limitations. To address these challenges, a digital platform, training and skill development programs, quality control mechanisms, sustainable practices, and market linkages are essential. Implementing these suggestions can enhance the industry's efficiency, productivity, and competitiveness, ultimately improving the livelihoods of weavers and promoting sustainable development in the cluster.

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