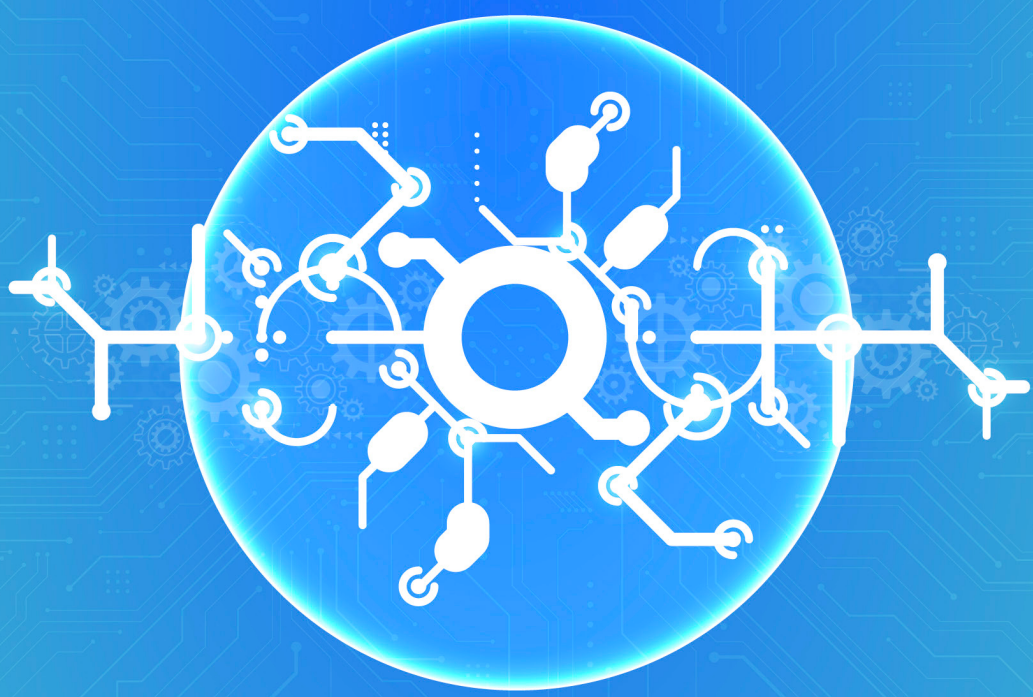




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Betwixt and Between-Weaving Industry of Bangladesh Under Structural Transformation: An Empirical Study on Narsingdi District

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ABSTRACT

The diffusion of industrialization has impacted negatively on the livelihood of the handloom weavers in Bangladesh because people were overwhelmed by the production of the power loom industry. The paper aims to explore how the technological and structural transformation has driven handloom weavers to the verge of extinction. To delve into the intricacies of the issue, both qualitative and quantitative methods were employed. A total of 56 weavers were surveyed and two case studies were conducted in the Narsingdi district. The review examines the effects of technological diffusion in the distribution of income, asset ownership and livelihood trajectories. The results indicate that the power loom sector has significantly substituted the productivity and income of handloom weavers. The ongoing limitation associated with access to capital, the digital divide and insufficient institutional backing sustain the socio-economic inequality between weavers, which is in line with the attributes of an intra-industry dual economy. Through applying dual sector and structural transformation theories to the artisanal industries, the paper has shown that technological diffusion in the traditional sectors can create divergence rather than convergence in livelihoods. The implications of these findings on inclusive industrial policy, financial inclusion policy and targeted technological upgrading in informal rural industries are important.

INTRODUCTION

Structural Transformation (the shift of labor and resources from conventional to modern sectors) has long been cherished as a dominant doorway of economic development of the economy in low- and medium-income countries (Lewis, 1954; Herrendorf *et al.*, 2014). Although such transformations tend to boost aggregate productivity, the impacts on various groups are not equal, especially for workers rooted in traditional artisan industries. According to recent research, technological diffusion and industrial modernization have increasingly been observed to lead to livelihood divergence instead of convergence and thus reinforce dualistic patterns in developing economies (Rodrik, 2016; World Bank, 2021). Therefore, a nuanced understanding is essential of how these dynamics manifest within traditional sectors for the sake of inclusive development policies. The handloom industry in Bangladesh symbolizes of an artisanal sector navigating rapid technological and structural change. The culture of weaving in the region dates back centuries and remains closely interconnected with the country's cultural identity and rural livelihoods. Handloom textiles cherished for their craftsmanship, environmental sustainability and cultural symbolism have long provided employment for socially marginalized communities, particularly smallholder and land-poor households (Ahmed, 1999; Bhattacharya, 2017). As a traditional handicraft sector, handloom weaving continues to serve a momentous role in Bangladesh's textile economy and has historically been among the largest sources of rural non-farm employment (BBS, 2019). The glory and vanity of the handloom industry in Bangladesh has weakened utterly over the

past few decades. BHB indicate a sharp reduction in both employment and productive capacity, with the number of handloom workers declining from approximately 0.9 million in 2013 to about 0.3 million by 2018, alongside a substantial reduction in active looms across major weaving regions (BBS, 2019; Bangladesh Handloom Board, 2020). Although female participation remains relatively high, it indicates the overall decline in sectoral employment. These trends coincide with rising input costs, limited access to institutional credit and weak integration into higher-value textile supply chains, constraining income growth and asset accumulation among traditional weavers (Rahman & Anwar, 2021). Concurrently, the development of the power loom industry has intensified structural transformation within Bangladesh's textile sector. Power loom industry has increasingly displaced handloom weaving by offering lower-cost and quick production and dilapidate the profitability of handloom weavers (Ahmed & Hossain, 2018). Evidence from key weaving hubs such as Tangail, Sirajganj and Narsingdi reveals that many handloom units have been forced to shut down completely. As a result, many weavers have had to leave their hereditary occupation and move into low-paid informal jobs, while others have dropped out of the workforce altogether (Kabeer *et al.*, 2020). These developments reflect a dualistic structural transformation in which power loom weavers accumulate economic benefits while handloom weavers confront lessening incomes and intensified livelihood insecurity. A Plenty of studies have examined how handloom industries decline as countries industrialize but most of this research significantly emphasize on sectoral output, employment

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trends or technological adoption at an aggregate level. Limited micro-level empirical evidence reveals that on how structural and technological transformation reshapes income distribution, asset ownership and livelihood trajectories within traditional sectors, predominantly in rural South Asia. Additionally, no literature has focused on the lived experiences of the handloom weavers who have to coexist with the power loom industry in the dual economy and structural transformation literature. Against this backdrop, the present study seeks how technological and structural transformation effects on the livelihoods and income inequality of the handloom weavers in the Narsingdi district of Bangladesh. The analysis using dual economy and structural transformation models, the study examines the dynamics of income, accumulation of assets and occupational mobility among handloom households based on primary survey data. This paper can be useful in the discussion of inclusive industrialization and artisanal sustainability by showing that technological diffusion in conventional industries can produce livelihood divergence, but not convergence. The findings provide practical insights for policymakers, particularly in developing more effective financial services, institutional assistance and industrial strategies that help rural communities grow in an equitable and sustainable way.

LITERATURE REVIEW

The handloom industry of Bangladesh, despite being one of the country's oldest and most significant traditional sectors, is currently facing the threat of gradual decline due to multiple structural and institutional challenges. At the time of Bangladesh's independence, more than one thousand weavers' cooperatives were operational; however, most of these cooperatives later became inactive due to inadequate government planning and the absence of long-term policy support aimed at safeguarding and promoting the sector (Latif, 1997). Research highlights the historical magnitude of handloom weaving as a labor force, community-rooted source of livelihood, particularly among socially marginalized groups (Rahman & Noman, 2019).

Decline in Handloom Units and Employment

Handloom Census shows a significant reduction in operational handloom sectors over the past two decades. Between 2003 and 2018, the handloom units in Bangladesh experienced a downfall by more than one-third, from 183,512 to 116,006. During the same period, employment in this sector dropped sharply from about 888,115 to 301,157 workers, reflecting a significant contraction of both the workforce and productivity. Female engagement also dropped remarkably, highlighting increasing marginalization effects within the industry. To add to the census report, local survey reports have indicated significant decline in the number of people participating in labor and shutting down of handlooms in the long-established weaving centers like Tangail and Manikganj. In Tangail, the operational handloom numbers have been declining in the recent years, and weavers cite the increase

in material costs and declined profits due to constant structural and technological changes as reasons.

Competition in the Market and Structural impediments

Some of these studies examine the fact that handloom industries in Bangladesh have experienced systemic internal inefficiencies such as the lack of access to modern technologies, low technical efficiency and inaccessibility of capital. In this respect, Pande and Arif (2025) based on stochastic frontier analysis considered that most sectors of handloom industries cannot attain optimal efficiency owing to high costs of inputs and adoption of better production techniques, which decreases their profitability. Literature also reiterates the rise of power looms as a major factor in bringing structural change to the textile industry. Power looms eliminate the comparative advantage of the traditional handloom weavers with increased productivity, reduced costs of production and increased market penetration (Rahman & Noman, 2019). Despite the fact, Bangladeshi handloom artisans with their high technical skills that can be compared with the best handloom producing regions in the world; they have found it hard to incorporate the modern technologies into the production stages. According to Asian Development Bank (ADB, 2002), the lack of infrastructures, and lack of institutional support are the greatest impediments to technological development in the sector. Although the employment in handloom weaving has reduced dramatically in the last fifteen years, the sector still sustains livelihood of close to 0.3 million rural weavers. However, the application of the old technology and the continuous lack of working capital is still a major bottleneck that interferes with the smooth production processes (ADB, 2002). Since the early 1970s, the export performance of handloom products has been on a positive upward movement. As Sobhan points out, the unique aspects of designs and high-quality craftsmanship has enabled the handloom products of Bangladesh to take a highly-respected niche in the world markets (Sobhan, 1989). This export potential is often challenged by local weavers who are often struggling to source raw materials of quality in a timely and cost-effective way further contributing to low productivity and income stability (Ahmed, 1999). In the post-independence period, the handloom sectors also experienced substantial labor displacement due to large-scale migration. According to Latif (1997), a significant number of Hindu weavers migrated from Bangladesh to India following independence as a result of religious tensions, insecurity and socio-economic instability. This migration trend has continued over time that leading to the loss of skilled artisans and further weakening the traditional handloom workforce. A handloom enterprise survey conducted by Bangladesh Institute of Development Studies (BIDS) in 1987 estimated the number of looms to be 425300; however, the level of use of this capacity was found to be higher (three-fourths) than the 1978 census. According to the 1978 census, following table shows the numbers of looms in Bangladesh:

Table 1: Numbers of looms in all divisions of Bangladesh

Division	Operational looms	Idle looms	Total looms	Percent
Dhaka	116002	67610	183612	63%
Rajshahi	63 148	42 152	105300	67%
Chittagong	48489	34647	83136	58%
Khulna	32282	32685	64967	50%

Source: Report on Bangladesh handloom census, 1978.

Over time, handloom artisans in Bangladesh gradually improved their patterns and moved toward simpler, more stylized and geometric designs. Since 1972, handloom products from Bangladesh have shown a steady increase in export performance. Their unique designs and high-quality craftsmanship have helped them establish a distinct position in international markets (Ghosh & Akter, 2005). Handloom industries produce a broad spectrum of products including muslin and Jamdani saris, bedcovers, bed sheets, tapestries, upholstery fabrics, placemats, rugs, blankets, satranji, crochet items, tribal textiles, silk fabrics, sofa covers, block-printed materials, tablecloths, napkins, towels, dusters, kitchen textiles, and clothing for men, women and children such as shirts and panjabis.

Cultural Heritage through Decadence

Due to structural, technological and economic shortcomings, the scholarly and media continue to emphasize the cultural importance of handloom weaving in Bangladesh. Renowned items such as Tangail sarees reflect a deep-rooted artisanal legacy, encouraged aimed at achieving UNESCO Intangible Cultural Heritage recognition to support heritage preservation and sustainable economic development. Well-known products like Tangail sarees demonstrate a deep-rooted artisanal legacy, promoted with the purpose of receiving the status of UNESCO Intangible Cultural Heritage with the help of which heritage preservation and sustainable economic development could be promoted. The handloom sector receives the lowest Effective Rate of Protection (ERP), whereas power loom industries receive the highest level of protection. ERP is calculated based on value addition, which reflects returns to land, labor and capital (Ahmed & Islam, 1989). Despite its cultural and economic importance, the technical efficiency of Bangladesh's handloom industry remains low, estimated at approximately 41% (Jaforullah, 1999).

Policy Responses and Institutional Problems

Though, the Bangladesh Handloom Board (BHB) has been implementing several initiatives to assist the handloom weavers but the sector has not been progressed considerably. Consequently, this weaving sector remains on the decline because of the structural challenges. Apart from this, Ahmed (1999) focuses on two huge competition forces the handloom weavers are experiencing: the influx of garments through legal and illegal ways and the rapid advancement of power textiles. In his regard, Chowdhury

(1989) postulates that handloom economy of Bangladesh is in a state of transition, which is steered by an unequal growth, structural adjustment, economic mobility and laissez faire market conditions. His analysis shows that the rural handloom production grew by an average rate of 3.90% between 1972–73 and 1986–87, which is much higher than the national population growth. To mitigate these challenges, institutional support for handloom weavers facilitated by cooperative societies and the Bangladesh handloom board. Around 79% of weavers work under cooperative industrial unions at the district, subdivision, or thana levels, which are coordinated nationally by the Jatiya Samabay Samity Ltd. (BJSS). The handloom industry has been able to compete with the imported cotton fabrics in India with many of them getting into the country illegally. However, a substantial number of handloom weavers have abandoned traditional hand weaving and shifted to rural power loom weaving in search of better income. Although the handloom sector has demonstrated the capacity to grow and adjust under economic liberalization, many small and poor weavers have not benefited from this change. According to a BIDS sample survey, more than half of handloom weavers live below the poverty line, resulting in uneven and dual growth in the industry. This situation is largely due to the near-complete absence of public support and intervention, leaving the smallest weaving units—despite their strong potential.

Impact of Economic Shocks and Globalization

Globalization and the influx of competitively inexpensive foreign textiles have adversely affected the market for handloom products, weakened demand for handloom products, reducing livelihoods for weavers and threatening the survival of long-established weaving traditions. The Tangail sharee maintains high demand in many countries, including India, Europe, the United States, Japan, and the Middle East. However, in recent years, the industry has lost much of its traditional strength and availability for several reasons. First, the prices of raw materials and handloom machinery have increased sharply. Second, the Indian sharee market has grown rapidly due to cheaper raw materials, strong government support and broad international market access. Third, the Tangail sharee sector is now largely controlled by retailers rather than small weavers. Political instability in recent times has caused serious business losses, and insufficient loan facilities and lack of government support have further

limited the expansion of the industry (Banerjee, Muzib, & Sharmin, 2014). Moreover, the COVID-19 pandemic, have accelerated existing vulnerabilities. For example, the Kumarkhali handloom cluster experienced substantial losses in production and factory closures during the pandemic, exacerbating unemployment and pushing many weavers to seek alternative livelihoods leaving their ancestral occupation.

Synthesis and Gaps

Earlier literature reveals a dual transition: whereby the handloom industry continues to contribute to cultural preservation and capable of providing livelihoods, while simultaneously confronting structural challenges arising from technological diffusion, competitive markets and policy shortcomings. The existing literature calls for more sophisticated analyses of how technological diffusion and structural transformation interacts with socio-economic inequality among weavers. However there remains limited empirical research that incorporates both the qualitative lived experiences of weavers and quantitative livelihood transitions within specific weaving districts which this study aims to address.

History of the Handloom industry

The History of handloom industry is as old as farming. Jamdani weaving carries more than two thousand years of continuous artistic development and includes different cultural and design influences. The early records of muslin and Jamdani were mentioned in Arthashastra by Kautilya around 300 CE when fine producing textiles in Bengal was mentioned. By the seventeenth century, handloom weaving became a well-organized and productive industry that it played a crucial role in the economic life of the Indian subcontinent. The muslin textiles of Bengal became globally renowned for their high-quality artistic beauty and were in great demand by royal families and aristocrats. Henry Patullo remarked in 1972 that Bengal's textile products found unparallel in quality around the globe (Islam & Hossain, 2012). Historical records show that Shantipur has a long tradition of weaving handloom saris for centuries. Weaving activities increased in the medieval period when the indigo-dyed Neelambari sari gave Shantipur a reputation for textile center. The weavers

of Shantipur formed a strong group identity and resisted the unfair Dadni system introduced by the British East India Company. They even went to colonial courts to fight for their rights during the nineteenth century (Islam & Hossain, 2012). Royal support during the Mughal period helped to turn muslin weaving into a refined art form and spread it widely across the region. However, the decline of the textile industry started in the mid-nineteenth century due to the entry of cheap European yarn and the weakening of Mughal rule in India. As a result the support from the elite was lost, the Jamdani industry slowly began to decline (Tanusree, 2005). Even after this decline, Jamdani weaving continued into modern times, with recent support from the Government of Bangladesh to protect and revive this traditional craft. The Swadeshi movement started by Mahatma Gandhi in 1906 encouraged people to reject British cotton textiles and played an important role in reviving handloom production in East Bengal. This movement helped in the growth of major handloom centers such as Baburhat, Tangail, Kamarkhali, and Shahzadpur (Zohir, 1996). After the partition of the Indian subcontinent in 1947, the handloom industry in East Pakistan faced serious problems, mainly because of yarn shortages, as most production was disrupted mills remained in India. Also, many skilled Hindu weavers migrated to the other side of the border. The sector witnessed short-lived expansion in early 1950s due to policy reforms such as withdrawal of import restrictions and removal of sales tax on yarn (Islam & Hossain, 2013). Post-independence period, the Government of Bangladesh set up the Bangladesh Handloom Board in 1978, taking over industry development from the Small and Cottage Industries Corporation. Since its formation, the BHB has undertaken considerable policy interventions to revitalize and sustain the handloom sector. The growth of the handloom industry has not been equal in all areas of Bangladesh. In earlier periods, the sector mainly concentrated in some specific areas with easier availability of raw materials and fairly well marketing and transport opportunities. The table below shows the regions where handloom weaving activities are mostly found in Bangladesh.

From Table 1, it is observed that by ranking in terms of total units from highest to lowest in 2018, the top

Table 2: Ranking of Handloom Concentrated Districts

District	TOTAL UNITS	Share of Total Units (%)	Ranking
Rangamati	29224	25.19%	1
Khagrachhari	18116	15.62 %	2
Bandarban	16830	14.51%	3
Kushtia	10656	9.19%	4
Sirajganj	9766	8.42%	5
Narayanganj	3955	3.41%	6
Bogura	3375	2.91%	7
Tangail	3290	2.84%	8
Pabna	2833	2.44%	9

Moulvibazar	2491	2.15%	10
Total	100,536	86.68%	

Source: Handloom Census, 2018

ten districts are Rangamati, Khagrachhari, Bandarban, Kushtia, Sirajganj, Narayanganj, Bogura, Tangail, Pabna, and Moulvibazar with total units of 29,224, 18,116, 16,830, 10,656, 9,766, 3,955, 3,375, 3,290, 2,833, and 2,491, respectively. A similar ordering of districts in terms of their percentage contribution also shows a consistent trend, with Rangamati alone contributing 25.19% of the total units, followed by Khagrachhari (15.62%) and Bandarban (14.51%). Together, these top ten districts account for 86.68% of total handloom establishments in the country. This clearly indicates that the handloom industry is more concentrated and flourishes predominantly in these regions. Following historical factors are found for declining of the Handloom Industry in Bangladesh. To review different literatures and this part tries to answer that why the handloom weavers are forced and compelled to escape and change their ancestral profession.

- From 1793 the exports of Bengal cotton-goods started to decline because of British commercial policy and the Industrial Revolution in England.
- Then England followed a selfish commercial policy, which was characterized by protective measures against Bengal piece goods.
- During 1799 to 1824, exports from Bengal to England were subjected to a duty of 44 to 85 percent in 1833.
- The Bengal handicrafts faced challenge for Industrial Revolution, which derived its strength from large machinery, large-scale production, complex division of labor etc. Thus power looms started to dominate in this region over the handlooms.

Objectives of the Study

This paper seeks to examine as to what extent Bangladesh Handloom Board (BHB) is able to bring changes in the lives of weavers in Narsingdi. Within this main objective, three secondary objectives also have been examined:

- To compare the dualistic transformation of livelihoods between handloom and power loom weavers.
- To examine the socio-economic and technological drivers influencing occupational transition among handloom weavers.
- To explore the competitive dynamics affecting the livelihood of handloom weavers.

Theoretical Underpinnings: Conceptual and Analytical Framework

This study conceptualizes dualistic change as a method of uneven structural transformation in rural weaving production, where traditional handloom-based weavers coexist with and are increasingly displaced by power loom industries. This conceptualization draws on dual economy theory (Lewis, 1954) and structural transformation frameworks, which examine the transition from traditional

to modern societies and the associated socio-economic inequality (Herrendorf *et al.*, 2014; Rodrik, 2016).

Weavers

A weaver is an individual engaged in the production of textiles by interlacing fibers to create fabrics, carpets, or baskets. Weaving refers to a process of fabric production, generally conducted by means of a loom.

Loom

Loom in Bangla is called tat. It is a tool used to weave fabric by interlacing longitudinal yarns with transverse yarn to obtain fabric. The introduction of loom technology has increased productivity and made textiles production cheaper to create and more affordable to a broader range of people. Looms can be hand operated or power driven hence, they fall under two categories, namely; handlooms and power looms.

Handloom

Handloom is a simple weaving machine, wooden with some metal parts, working by hand and foot without electricity. Handlooms have employed millions of weavers and played a pivotal role in protecting the cultural heritage of Bangladesh. However, over the years power loom and factory-based textile production have weakened the traditional handloom sector. A handloom is defined as a manually operated weaving machine used to produce fabrics, exclusive of those completely made from silk or artificial silk (Khan, 2013). There are several types of handlooms in Bangladesh, including pit looms, Chittaranjan looms, Benarosi looms, Jamdani looms, and waist looms. Benarosi looms are predominantly found in the Mirpur area of Dhaka, Jamdani looms in Rupganj (Tarabo) of Narayanganj district, and waist looms in the Chittagong Hill Tracts (Khan, 2013).

Power Loom

A power loom is a loom that operates using machinery rather than hand or foot power. Historically, power looms were set up in mill weaving rooms and powered by steam engines through belts from overhead shafts. Power looms represent a significant improvement in productivity compared to handlooms.

Dualistic Change

The term dualistic change refers to the quality or condition of being dual. In this study, it is used to understand the dual livelihoods of weavers, distinguishing between handloom weavers and power loom weavers. The differences between these two groups highlight the dual lifestyle and challenges faced by weavers in Bangladesh. The economic activities and livelihoods of weavers depend on stated two types of looms are generally dual

Table 3: Difference between hand loom & power loom

Hand loom	Power loom
Manual operating system	Operated by electric power
Shedding is done by pedal; picking and beating are done manually	Shedding, picking, and beating are done automatically
Low production	High production
Slow running speed	High running speed
Initial investment is low	Initial investment is high
Fewer design varieties can be made	More design varieties are possible
Check and stripe fabrics are usually produced	Usually produces single-color fabrics

Source: Researcher's own

in nature. The sufferings and challenges of handloom weavers have increased due to the growth of power looms. Thus, power loom weavers have emerged as the

competitors of handloom weavers.

Traditional handloom industries are losing their heritage due to various factors, and as a result of this loss,

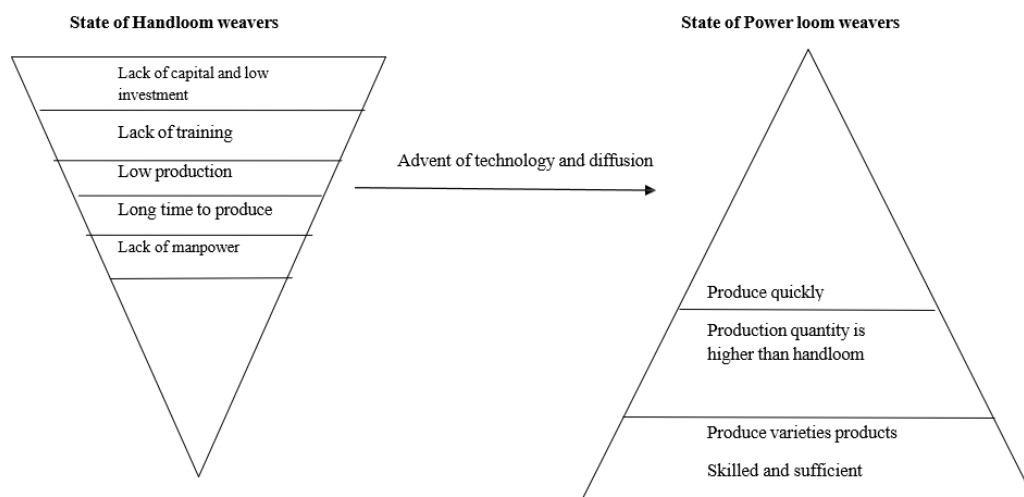


Figure 1: Pattern of dualistic change of handloom and power loom weavers

Source: Researcher's own.

powerful power loom weavers have emerged as the dominant group. The livelihoods and future planning patterns of these weavers are dual because of the use of modern technology. By employing modern technology, power loom weavers create challenges for handloom weavers. Power loom weavers' lifestyle and income networks are higher than those of handloom weavers, whereas handloom weavers remain a weak and powerless group due to insufficient capital and limited access to technology. From the conceptual framework, it can be

easily assessed that handloom weavers' opportunities are shrinking, while power loom weavers are emerging as a dominant and powerful group over handloom weavers due to their control over the economy. Thus, a dualistic pattern of livelihoods and economic contribution is visible in Bangladesh, whereas handloom weavers face multidimensional obstacles. Table shows the dual economic pattern of weavers in Bangladesh.

From Table 4, it can be observed that in the 1989–90 fiscal year, textile mills accounted for approximately

Table 4: Domestic cloths production, 1989 to 2004

Year	Mills (%)	Handlooms (%)
1989-90	18.1	64.7
1990-91	19.3	64.9
1991-92	21.1	63.4
1992-93	23.6	63.3
1993-94	24.0	61.0
1994-95	28.8	57.4

1995-96	37.2	50.6
1996-97	41.5	47.6
1997-98	45.9	43.6
1998-99	51.9	39.0
1999-00	56.2	35.5
2000-01	62.8	30.4
2001-02	66.8	26.6
2002-03	69.0	23.6
2003-04	72.7	21.5

Source: Ghosh & Akter, 2005.

18.1% of cloth production, compared to the handloom sector's share of about 64.7%. However, by the 2003–04 fiscal year, the share of cloth production in textile mills had increased sharply to over 72.7%, while the handloom sector's share declined to 21.5%. From the 1989–90 fiscal year until 2003–04, the share of cloth production in the handloom sector dropped markedly, whereas the share of cloth production in textile mills rose substantially. Table 4 clearly illustrates this upward trend in mill production and the corresponding downward trend in handloom production over the 15-year period.

Theoretical Contribution and Novelty

The present study contributes both conceptually and empirically existing knowledge on the transformation of rural industries, livelihood dynamics of artisans and the impact of technological advancement in developing economies. Firstly, the study apply dual economy and structural transformation theories in traditional artisanal livelihoods by conceptualizing “dualistic transformation” as a coexistence of technologically advanced mechanized production and traditional craft-based livelihoods. Whereas classical dual economy models predominantly focus on transitions from agriculture to industry. This intra-sectoral dualism provides a nuanced understanding of technological inequality that results in livelihood stratification. Secondly, the study contributes to livelihood transition theory by providing empirical evidence on how technological adoption transforms income patterns, asset accumulation and social stratification among rural weavers. The results show that mechanization of production not only raises productivity but also exacerbates socio-economic inequalities, leading to unequal access to capital, land and institutional support. These results offer empirical support to the argument that technological diffusion within informal rural weaving industries leads to uneven and asymmetrical patterns of development. Thirdly, it contributes to the study of informal sector industrialization and artisanal decline by bringing institutional and political economy perspectives together. The results show these negative trends perpetuate marginalization of traditional artisanal due to weak institutional support, access to finance and market monopolization. This indicates that technological adoption in weaving cannot explain livelihood disparities;

different policy and institutional settings mediate the distributional effects of modernization. Fourthly, the article also contributes to development policy and inclusive industrialization debates by identifying structural barriers that restrict handloom weavers from engaging in technological upgrading. By synthesizing micro levels livelihoods with macro level structural transformation processes, the present study generates a framework of inclusive policies for traditional weaving industries in developing countries.

Novelty of the Study

Several important aspects of the current research make it novel.

- The Intra-sectoral Dualism Framework: While previous studies have examined dualism as a dichotomy between agriculture and industry, the contribution of this paper is to provide an argument for the intra-sectoral dualistic transformation within weaving itself, with a focus on technological and socio-economic divergence between handloom and power loom.
- Micro-level Empirical Evidence: Relying on rare village-level empirical evidence on livelihood transitions of weaver, the study employs mixed methods of quantitative survey and qualitative cases studies to capture structural as well as lived experiences of technology adoption.
- Technological advancement and Social Segregation: The study clearly connecting technological advancement to social stratification, asset accumulation and livelihood security, offering a multidimensional analysis of mechanization beyond productivity metrics.
- Contribution to the Sustainable Development Goals (SDGs) and Policy Frameworks: This study contributes to several United Nations SDGs and current development policy frameworks. First, the research connects with SDG 1 (No Poverty) by showing rising vulnerability of livelihoods among handloom weavers and making a case for structural impediments to generating income. Second, it adds SDG 8 (Decent Work and Economic Growth) by analyzing employment dynamics and technological modernization; as well as productivity in the informal weaving sector. Third, the study contributes to SDG 9 (Industry, Innovation and Infrastructure) by examining technological transformation role on rural

industrialization. Lastly, the results are relevant to SDG 10 (Reduced Inequalities), which documents socio-economic stratification due to uneven technological adoption.

The research therefore provides inclusive industrialization frameworks, creative economy policies and financial inclusion strategies advocated by global policy institutions such as the World Bank, UNIDO, and UNESCO. This study synthesizes micro-level livelihood dynamics with macro-level industrial transformation processes, providing evidence-based insights to formulate contextualized interventions aimed at supporting traditional artisanal industries as part of national development strategies.

MATERIALS AND METHODS

The current study adopted the mixed-method research approach to provide a deep-rooted and comprehensive perspective on livelihood changes among weavers. A mixed-method design seems appropriate because it can combine quantifiable data on socio-economic indicators with qualitative contextual insights about the experience and struggles of handloom and power loom weavers. The research was conducted in Kandile village of Amdia Union under Narsingdi district, as the locality is historically known for its notable tradition of weaving. This area was purposively selected because of its longstanding heritage of textile production and presence of both handloom and power loom industries which laid an appropriate backdrop for comparative analysis.

Sampling Strategy

A total of 56 respondents were surveyed as quantitative method, comprising 30 handloom weavers and 26 power loom weavers. Considering the relatively, a purposive sampling technique was carried out to identify who were actively engaged in weaving activities and possessed relevant occupational experience. The sample size is considered suitable for this micro-level analysis as the prime objective of the present study is to identify livelihood patterns and transformations at the structural level within a specific population over time, rather than derive nationally representative estimates.

Data Collection Methods

Diverse techniques were used to collect primary data, ensuring methodological triangulation. The quantitative information was collected by a structured questionnaire including closed and open-ended questions for demographics, income, pattern of work, access to credit and technology adoption. The questionnaire was pre-tested with a small group of respondents to ensure its validity and reliability before being finalized.

To provide deeper contextual understanding, qualitative methods were employed, including:

- Case studies of purposively chosen households to understand intergenerational and livelihood dynamics and
- Participant observation to gain insights into working conditions, production processes, and social relations among the weaver community.

As Secondary sources different government reports, academic journals, previous research studies and publications were reviewed to contextualize and support the primary findings.

Data Analysis

Quantitative data was systematically coded and analyzed using descriptive statistical techniques, including percentage to identify the socio-economic trends and differences between handloom and power loom workers. Qualitative data obtained from case study and observations were analyzed using thematic analysis, which allowed the identification of recurring patterns related to livelihood change, technological transformation and institutional constraints. The data has been analyzed on the basis of conceptual framework which has been developed from established theoretical and empirical literature on structural transformation, dualistic development and rural livelihoods.

Ethical Considerations

Throughout the research, the ethical considerations were maintained strictly. Participation in the study was voluntary and informed consent was provided to all respondents before data collection. Confidentiality and anonymity of participants were strictly maintained and it was assured that the collecting information was used only for research purposes.

RESULTS AND DISCUSSION

Quantitative Findings of the study Involvement in weaving

From the field visit, it is observed that near about all of the handloom weaver's family members both male and female, young and old are involved in weaving because it is their heritage and passion whereas among power loom weavers about 1/2 young male weavers are involved, female weavers do not engaged them in power loom industry. 16 years ago, all (26 power loom) weavers were handloom weavers and they managed capital, loans from relatives, co-operatives none of them got loans from BHB. On the other hand, 30 handloom weavers could not be able to save capital by themselves and their income and profit are not so satisfactory that they would pay loan in due time. The number of handlooms are decreasing since 1995 and now they have only 162 handlooms. This transition reflects a clear dualistic income pattern on the conversion of traditional versus mechanized weaving systems.

Table 5 presents respondents' awareness and interaction with the Bangladesh Handloom Board and weavers' cooperative societies. Only 1 Weaver took loan from BHB among 56 and 2 of them have personal connection with Weaver Society. From the above table, we can see that those who interact with weaver society, they easily get membership of the weaver society. Rest of the weavers replied that they do not have membership of weaver society due to lack of lobbying. So BHB only provided small credit and those weavers have 5 or more

Table 5: Number of responses according to familiarity with BHB

Interaction with	Frequency	BHB	Weaver Society	Total
Yes	3	1	2	5.36%
No	53	-	-	94.64%
Total	56	-	-	100

handlooms only they avail themselves of the credit facility from BHB. They believe that it is dysfunctional and unresponsive institution, so they are not interested in getting membership of BHB. Such limited institutional interaction reflects weak policy and inadequate delivery of services to traditional weavers. Respondents indicated that credit programs were limited to operators operating five or more looms and that loan procedures were complex and insufficient. These findings align with recent study showing that artisanal producers in developing economies

often remain excluded from formal institutional support mechanisms (World Bank, 2021; ADB, 2019).

Table 6 demonstrates identical differences of housing structure between handloom and power loom weavers. Above table shows that 26 handloom weavers have tin shed houses and 4 handloom weavers have brick buildings. On the contrary, 9 power loom weavers have tin shed houses and 17 power loom weavers have brick buildings. It can be said that power loom weavers have more brick building than handloom weavers and of

Table 6: Distribution of the respondents by house structure

House structure	Handloom weavers	Power loom weavers
Tin shed	26	9
Building	4	17
Total	30	26

course structure of house determines the status. It can be assessed that handloom weavers are in lower strata than the power loom weavers. Housing quality serves as a proxy indicator of socio-economic status and asset accumulation. The findings focus on the fact that power loom weavers enjoy comparatively higher living standards due to increased income and capital accumulation.

Property also acts as a vital actor to determine the social

strata of a specific person. The above table shows that 7 (12.5%) handloom weavers have land property and 23 handloom weavers have not land property. On the contrary, all of the power loom weavers have land property. It clearly indicates the better state of power loom weavers. Land ownership reflects long-term economic security and social stratification, indicating that mechanization

Table 7: Distribution of the respondents by land property

Land property	Handloom weavers	Power loom weavers
Yes	7 (12.5%)	26 (46.42%)
No	23 (41.07%)	0
Total	30	26

has contributed to wealth accumulation and upward social mobility among power loom weavers. These findings are consistent with structural transformation literature, which indicates that technological adoption increases productivity and wealth accumulation, while traditional loom artisan remains economically vulnerable (Herrendorf *et al.*, 2014).

From Figure 2, we see that even though the weavers

are not making more profit as they expected but 94% of handloom weavers expressed their interest to continue their ancestral profession rather than change their occupation. This finding shares their passion and values that it is not merely a source of income but is also deeply intertwined with the respondents' cultural identity and traditional way of life. Due to economic pressures

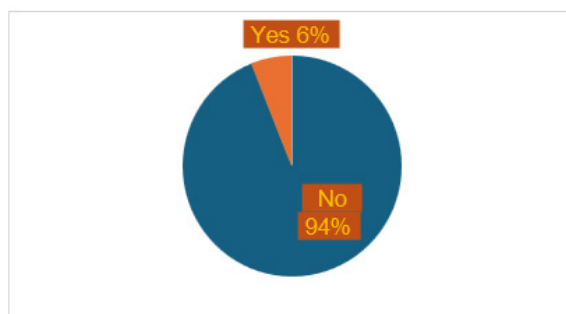


Figure 2: Distribution of the respondents to change this profession

and technological competition posed by power looms, handloom weavers are being increasingly threaten the sustainability of traditional handloom livelihoods and the preservation of this cultural heritage.

Access to raw materials and credit

The raw materials are taken from the local market by handloom weavers. They collect all raw materials from Mahajon as credit facilities, because they do not get any loan facilities from different local banks. This reliance on informal credit is indicative of ongoing financial exclusion of rural artisans, a common problem that present studies

of small-scale industries in South Asia reveal (IFC, 2020). The present study encompasses four varieties of weavers in kandile village, They are: From the above table, we can see that 26 power loom weavers fall under self-sufficient weavers, 3 handloom weavers are Rokom weavers, 11 handloom weavers are Loan earner weavers and the percentage of workers class is high for poverty and their contribution to the socio-economic development is very significant by their labor and skill. This classification reflects the economic stratification of and unequal livelihood opportunities among members of the weaving

Table 8: Classification of weavers

Self-sufficient weavers	Rokom weavers	Loan earner weavers	Worker weavers
They have permanent and running capital.	They have lack of running capital and they have to adopt various types of strategies for loan.	They work for loan by investing their labor.	They have no capital and they work in weaving factory as labor.
26	3	11	16

community.

Qualitative Findings of the study

Here two case studies are discussed to assess the difference between handloom weavers and power loom weavers. Washim Mia (52), a Muslim male handloom weaver from Kandile village, is an embodiment of the hereditary handloom weaving culture in Bangladesh. As born in

a weaving family, he has been witnessed by weaving activities within his extended family. His grandfather, parents and other relatives used to weave different items such as gamcha, lungi and sarees, making weaving the central occupation of the household economy. From early childhood, he assisted his family in weaving and gradually took this novel profession as full-time because weaving was considered his primary livelihood, formal schooling



Figure 3: A tragic extinction of a handloom weaver

received limited attention. He was enrolled in a madrasa for approximately five years before leaving his schooling. He married at the age of nineteen and now supports a household of seven, including three sons and two daughters. He is not interested in disclosing his monthly income. He said, "... Monthly income cannot bear the expenses of my family and that is why I am a farmer and a fisherman too." His wife and girls help him with weaving. Weaving is his hereditary occupation but now he wants to give up because handloom is less demandable than power loom. Lack of manpower, lack of support, lack of capital, productions is not sufficient to meet the demand of the market these are the major obstacles of

him. Despite weaving being his ancestral occupation, he regretted abandoning the profession. Once upon a time their name and fame were spread outside the Kandile village but now they are in tarnished image. Fishing and farming support his family not weaving. He has no satisfactory money or other sources to take loan to buy power loom and to recruit, to pay them properly. He is upset that in one life it would never possible for him and that is why he is in the way of extinction. For want of capital many weavers became distressed and their looms lie in extinction. A chain of exploitation is working for him. He observed that power loom has benefited large producers but marginalized hand loom weavers. Kandile

village once enjoyed regional recognition for its handloom products; however, he believes the reputation of local weaving has deteriorated in recent years. He says ‘fishing and farming provide more reliable income than weaving’. While having a sense that power loom technology could provide greater gains, he cannot afford enough money or credit to acquire mechanized equipment or hire workers. He added that hundreds of local weavers have stopped using their looms because the crisis had made it hard for them to be paid, so now equipment was left to gather dust and homes were economically vulnerable. The life experience of Washim Mia reflects wider structural change in the handloom sector, ranging from technological displacement to capital constraints and livelihood diversification. His case exemplifies how such

artisanal households navigate economic transition while seeking to retain inherited skills in the face of shifting market conditions.

Md. Montazuddin Mir (48), a Muslim male power loom weaver from Kandile village, represents a successful transition from handloom to power loom. After his birth he also has been observing the activities of handloom in his family and he learnt this at childhood by way of playing with toy but now he has 18 power looms where 19 workers/weavers are working. He has completed S.S.C. and he also belongs in a joint family. He produces three pieces in his factories. His produced cloths are sold various places along with Madhobdi. His monthly income ranges between BDT 60,000 and 80,000, enabling him to



Figure 4: Transition from handloom weaving to Power Loom

construct a two-storied residential building and improve his household’s economic condition. He is satisfied with his earnings and he has a plan to buy another 8 power looms for the enlargement of his business. He accommodated loan from bank. He said, “Power loom has given me the chance to extend my ancestral occupation”. For the huge production in short time, more profit and less labor the handloom weavers and master weavers have shifted from handloom to power loom. He told that younger generations are interested in power loom business because of their greater income possibilities and the perceived economic stability. The case describes how the adoption of technology, availability of credit and entry into the market can facilitate upward mobility and entrepreneurial development in the traditional weaving community.

Thematic Analysis

The results indicate that there are numerous themes that are interconnected and explain the current change of the weaver community in Kandile village of Bangladesh.

Intergenerational Knowledge and Gendered Division of Labor

Handloom weaving is a family oriented occupation that is a part of cultural heritage. Weaving activities are involved by almost all of the members of the handloom weavers such as women and children. This is indicative

of the traditional household mode of production of the artisanal industries. On the contrary, power loom is a male dominated industry with the young men being the major participants as machine operators and their role played by women being minimal. This transformation exhibits a change of family labor systems to mechanize and gendered division of labor.

Structural Transformation amid Technological Adoption

The falling numbers of handlooms over the years since 1995 and growth of power loom depicts structural change due to the productivity differentials, market demand and competition. Conversely, the power loom leads to increased production, less time of production and greater profits. In the meantime, handloom production cannot compete because of lower productivity and low demand in the market.

Capital Access and Institutional exclusion

Credit by Bangladesh Handloom Board (BHB) was given to only one respondent and membership of a cooperative society was negligible. Respondents found formal institutions to be ineffective because of their limiting eligibility, low loan values and institutional cumbersome processes. This means that weavers rely on informal credit provided by mahajons (middlemen), which makes the interdependence relations stronger and reduces

economic self-sufficiency.

Livelihood Inequality and Socio-economic Stratification

There is an explicit difference between the handloom and power loom weavers:

- Power looms tend to be more of having brick houses.
 - All Power loom weavers own land and most of the handloom weavers are landless.
 - The operators of power loom belong to the self-sufficient category and the handloom workers are concentrated under the loan earners and wage laborers.
- These indicators exhibit a growing and tarnishing socio-economic disparity between the handloom and power loom weavers.

Desire to shift to ancestral occupation

As depicted in figure 2, even in the face of economic difficulties, 94 percent of handloom weavers reported that they would like to pursue the ancestral weaving culture which is an indication of a high level of cultural attachment. Economic limitations and technological competition pose a great threat to the sustainability of handloom livelihoods. Nevertheless, household income is often supplemented by alternative activities like farming and fishing undertaken by the handloom weavers. This diversification implies that there is economic instability in the traditional weaving and that it is exposed to market fluctuation.

Discussion

The present paper reveals that the weaving sector in rural Bangladesh is experiencing a significant transformation that is influenced by the technological diffusion, market and institutional forces. First, the replacement of handloom by power loom is an exemplary instance of industrialization in the countryside. This technological adoption increases productivity and profitability, enabling capital accumulation and entrepreneurial expansion. Same trends are recorded in artisanal industries in South Asia. Second, institutional complexity as a significant limitation. The lack of accessibility of BHB and cooperative societies demonstrates that the policy structures and the demands of small producers fail to match. Arduous eligibility regulations and red tape make it hard to hold onto their traditional heritage and forcing weavers into informal credit systems that perpetuate dependency and reduce profitability. Third, the results show that there is growing socio-economic disparity among weaving communities. The adoption of power looms is correlated with better housing conditions, ownership of land and income stability whereas the handloom households experience a decrease in profitability and livelihood insecurity. This divergence reinforces larger arguments that diffusion of technology may result in unequal development in cases where there is unequal access to capital and markets. Fourth, the persistence of handloom weaving despite declining economic viability reflects the cultural

embeddedness of artisanal production. Weaving is also used as an identity factor and as a heritage symbol that is why they continue to participate despite unfavorable economic times. However, without policy intervention, this cultural resilience alone may not prevent sectoral decline.

Triangulation of Findings

The quantitative data, qualitative case studies and field observations are triangulated to increase the credibility and validity of findings.

Technological Transition: Questionnaire survey shows a gradual decline in handlooms and expansion of power looms. Case Study 2 (Montazuddin Mir) presents the idea of successful technological adoption in lieu of handloom weaving and income increase whereas Case Study 1 (Washim Mia) shows inability to positive transition due to capital constraints.

Institutional Access: Both quantitative data and qualitative results reveal minimal interaction with BHB and cooperative societies and institutional ineffectiveness and barriers to credit access.

Socio-economic Inequality: The quantitative information shows that housing pattern and ownership of the land is better than handloom weavers. The fact is proved by Case Study 2-Montazuddin Mir who has a better housing and business facilities, unlike Case Study 1-Washim Mia who experiences a financial crisis due to technological gap.

Cultural Persistence vs Economic Reality: Survey outcomes show that there is a high level of commitment to continuing weaving as family heritage. But according to qualitative evidence case-1, there is the frustration and the tarnishing image of handloom production.

Recommendations

Our choices, values and cultural practices are rapidly changing by the rapid flow of westernization and technological structural transformation. We Bangladeshi people are xenocentrism in attitude that lag our local products like weaving products. Ethnocentrism attitude promotes foreign products replacing local weaving cloths that transform our choices. Consequently, we should support our local handloom industry to save the artisan communities and preserve our cultural heritage. By promoting and investing in handloom products, we can help the economy and keep this craft alive. Everyone should work, think and conduct research more to represent our hereditary prestigious weaving culture to spread it from generation to generation. Followings are some policy suggestions to be concerned-

Policy Suggestions

- Bangladesh government in turn should subsidize, offer low interest loans and grants to this weaver community so that they can live dignified lives in this competitive world.
- Good trade regulations and protection can ensure the

local handloom products are not drowned by imported fabrics, more so by the neighbouring countries.

- Programs on skill training and microfinance can make women engage more.
- Focusing more on hilly areas can help balanced growth and improve the performance of the whole sector. Certification systems can differentiate handloom products and increase consumer trust.

CONCLUSION

Xenocentrism attitude is one of the major barriers to preserve, promote and represent our weaving products both in global and local market effectively. Over the past few years, a good number of handloom weavers have gradually dumped their traditional work due to various socio-economic issues. This has led to the situation that handloom industry is not expanding as it was and its activity is slowing down. Although the strong cultural attachment to traditional weaving, the structural and technological issues endanger the sustainability of the handloom livelihoods. The study contributes to the literature of rural industrial transformation by illuminating how a change in technology can produce uneven developmental results and increase social-economic disparities in the conventional sectors. The results of the present study shows the poor patronage and oblivious attitude of the government to various factors such as globalization, monopolistic market, high cost of raw materials, lack of availability of working capital, unavailability of loan by the government, insufficiency of transporting facility, superiority of Indian clothes. The study also highlights that the handloom industry has been severely affected by inadequate patriotic feeling and poor support of the policy. Relying on these findings, the opportunity of taking positive and supportive steps as a means of minimizing the existing gaps in this sector has been examined. The present study would provide input for formulation of policies on weaver community.

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