



Traditional Continuousness and Market Services: A Mixed-Method Field Study of Khadi Weaving Communities in Cumilla, Bangladesh

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Abstract

A mixed-methods field study in Cumilla District, Bangladesh, from October 2025 to February 2026 studies Khadi manufacture and community well-being. It also illustrates global market entry issues. Primary data came from 360 semi-structured artisan interviews, 8 64-person focus groups, 300 household surveys from five upazillas, and 120 hours of participant observation. This study analyzed qualitative data (1,847 coded references, 24 nodes/6 themes) using NVivo 14 and evaluated quantitative dichotomous outcomes (well-being, market access, and GI awareness) using Fisher's Exact Test, One-Proportion Z-Test, Point-Biserial Correlation, McNemar's Test, and Cohen's Kappa ($\kappa=0.87$). Major findings indicate that 71.4% of craftsmen experience emotional fulfillment in Khadi production, with present artists reporting superior well-being than former craftspeople (WHO-5 mean: 68.3 vs. 52.1; OR=4.82, $p<0.001$). GI certification increased average monthly wages 28.4% (BDT 8,450–10,850), however 62% are below the national living wage. Young people's engagement decreased from 42% (2010) to 18% ($p<0.001$) due to limited opportunities and a dismal income outlook (67%). Only 12% of people have access to global markets, and digital literacy highly corresponds with export activity ($r_{pb}=0.42$, $p<0.001$). These findings help the Craft-Centered Marketing Methodology (CCMM) balance market integration and cultural continuity utilizing the "Story-Value-Connection" (SVC) framework for sustainable Khadi growth.

Key Words: Fisher's Exact Test, Khadi Fabric, Community Well-Being, Craft-Focused Marketing, Story-Value-Connection paradigm, GI Goods, NVivo Analysis.

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1. INTRODUCTION

Cumilla Khadi integrates communal well-being with economic sustainability in a dynamic environment. Bangladesh's 3.89/10 happiness rating, compared to the global average of 5.56 (World Happiness Report, 2024), encourages researching non-financial well-being sources like craft creation. Hedonic consumption prefers physical retail, although artisan groups are adopting e-commerce and visitor-accessible marketing (Stoddard et al., 2012). Kotipalli & Aggarwal (2026) show how value logics affect cultural sustainability marketing in market-oriented, digital, and hybrid Indian craft paradigms.

Cumilla's Khadi legacy, visited by Mahatma Gandhi in 1921 and safeguarded by Dr. Akhtar Hameed Khan's BARD, shows how history fosters economic opportunity and community well-being. Sectoral challenges include youth retention, women's empowerment, and international market access. Women's textile income improves family nutrition, education, and health in poor countries. Support programs, cooperative recycling, and sustainable retailing (natural dyes, banana fiber, organic cotton) protect cultural treasures from mass production and boost earnings and ecology. Independent producers give spinners and weavers 60% of income over profit maximization to encourage Gandhian "production by the masses," as evidenced by rural field trip. New silhouettes and digital prints are challenging younger generations' preconceptions of khadi. Because supply chain friction makes it impossible to distinguish pure handloom textiles from cheaper power loom replacements, the Khadi and Village Industries Commission zealously protects trade name rights against counterfeit, mass-produced goods that dilute the market services.

Cumilla's Khadi business had many issues during field inspections and stakeholder interviews. Veteran weavers Abdullah and Kshitish Chandra Debnath (Barkamata and Chandina) blamed a declining workforce on a lack of government retention initiatives and inadequate financial returns that deter the next generation. Owner Chandan Dev Roy (Khadibhushan) blamed readymade apparel for market displacement, while manager of Khadi Kutir warned of authentic handwoven supply shortages due to manufacturing decline and local economic downtrodden.

1.1. Research Question

How does Khadi production affect Cumilla community well-being and market integration?

1.2. Objectives

- To study Khadi production and well-being (life satisfaction, social cohesiveness, mental health).
- To assess GI certification and digital access barriers to market integration.
- To present the empirically proven Craft-Centered Marketing Model (CCMM) and "Story-Value-Connection" framework.

The study is important because 68% of buyers chose ethically sourced materials (Nielsen, 2023), global sustainable textile demand is rising 12% annually (Textile Exchange, 2024), and Cumilla Khadi got GI accreditation in 2023. Ali et al. (2024) highlight this trend by researching Bangladesh's informal producers' green innovation financial benefits.



2. LITERATURE REVIEW

2.1. Evidence, Theory

This study uses three paradigms:

- Cultural Economics examines dual-purpose cultural artifacts' market and non-market value (Throsby, 2001).
- Well-being Economics: Assesses artisan livelihoods beyond GDP (Stiglitz et al., 2009).
- Community-Based Tourism: Explores heritage-driven local empowerment (Giampiccoli & Kalis, 2012).

Evidence: Saiyed et al. (2024) showed hybrid market orientation among Indian handcrafted microenterprises that valued product positioning over segmentation. Gambicorti (2026) warns against "craft-washing" and authenticity-care difficulties in artisan spaces. In heritage commercialization, Rattanawiboonsom & Ali (2026) emphasize balancing preservation with modern market access, while IoU (2019) illustrated how Cantonese opera draws long-distance travelers. CCMM blends connection marketing (Morgan & Hunt, 1994) and narrative transportation theory (Escalas, 2004).

2.2. Framework "Story-Value-Connection"

SVC architecture makes the CCMM artisan a co-dependent marketing pillar. It uses visual aids and CLICC-specific translations to build authenticity with digital storytelling, a disruptive mechanism studied by Kalkreuter et al. (2025). SVC adopts a three-pronged approach for turbulent (VUCA) historic textile markets instead of volume-driven strategies:

Table: 1 SVC approach for Khadi application

Pillar	Definition	Khadi Application
Story	The maker's authentic history, heritage, and cultural upbringing.	Weaver biographies, third-generation family traditions, pattern histories.
Value	Tangible and intangible consumer utility.	GI certification, low carbon footprint, fair compensation, 98% biodegradability, ethical preservation.
Connection	Continuous communication between producers and consumers.	Direct messaging, local meetups, diaspora engagement, and QR codes linking to production videos.

(Source: Author)

2.3. Empirical Context: South Asian Textile Economies

- KVIC earns ~BDT 12,050 crore yearly in India using rigorous "handmade" requirements (KVIC, 2023).
- Khaadi successfully blends traditional and modern retail in Pakistan (PICG, 2024).
- In 2023, Cumilla Khadi achieved GI status in Bangladesh, positioning it for the global sustainable textile sector (Textile Today, 2023).

2.4. Research Gaps

Current literature lacks actual data on:

- Examined the relationship between Bangladeshi craft production and overall well-being.
- Implementation challenges post-GI market integration.
- Analyzed youth involvement difficulties statistically.
- Prioritize artisan-driven marketing strategies above top-down, externally dictated ones.

To validate the SVC paradigm, this study uses primary data and NVivo-assisted qualitative analysis to fill these gaps.

3. MATERIALS AND METHODS

3.1. Study

This study used a sequential exploratory mixed-methods design (Creswell, 2014) to assess dichotomous outcome variables using non-parametric statistical tests suitable for binary data. NVivo 14 is used to analyze qualitative data. From October 10, 2025, until February 28, 2026, the fieldwork was conducted full-time. Dichotomous variables (two alternative values) are presented by Lewis-Beck, Bryman, and Liao (2011) and their application as independent (dummy) or dependent variables is examined. There is also discussion of their caution against excessive dichotomization brought on by knowledge loss.

3.2. Sampling Strategy

Table 2: Qualitative Sample

Participant Category	Target	Actual	Response Rate	Sampling Method
Artisans (active)	300	312	94%	Stratified random (5 upzillas)
Former artisans	40	38	95%	Snowball
Policymakers/officials	10	10	100%	Purposive
Traders/shop owners	20	18	90%	Purposive
Total interviews	370	378	94%	

(Source: Ibid)

Focus Group Discussions: Eight FGDs were held with a total of 64 participants, divided into the following categories: women artisans only (2 groups); young artisans under 30 (2 groups); members of mixed cooperatives (2 groups); and former craftsmen (2 groups).

300 families in five upazillas—Chandina (n = 60), Barura (n = 60), Burichang (n = 60), Cumilla Sadar (n = 60), and Laksham (n = 60)—were surveyed in a structured manner. Selection according to the anticipated population density of artisans

Participant Observation: 120 hours were recorded, comprising 20 hours at artisan residences, 25 hours at local market locations, 30 hours at the BARD Khadi production facility, and 45 hours at three weaving cooperatives.

3.3. NVivo 14: Primary Analytical Platform

NVivo 14 served as the central analytical platform for all qualitative data management and analysis. The software enabled:

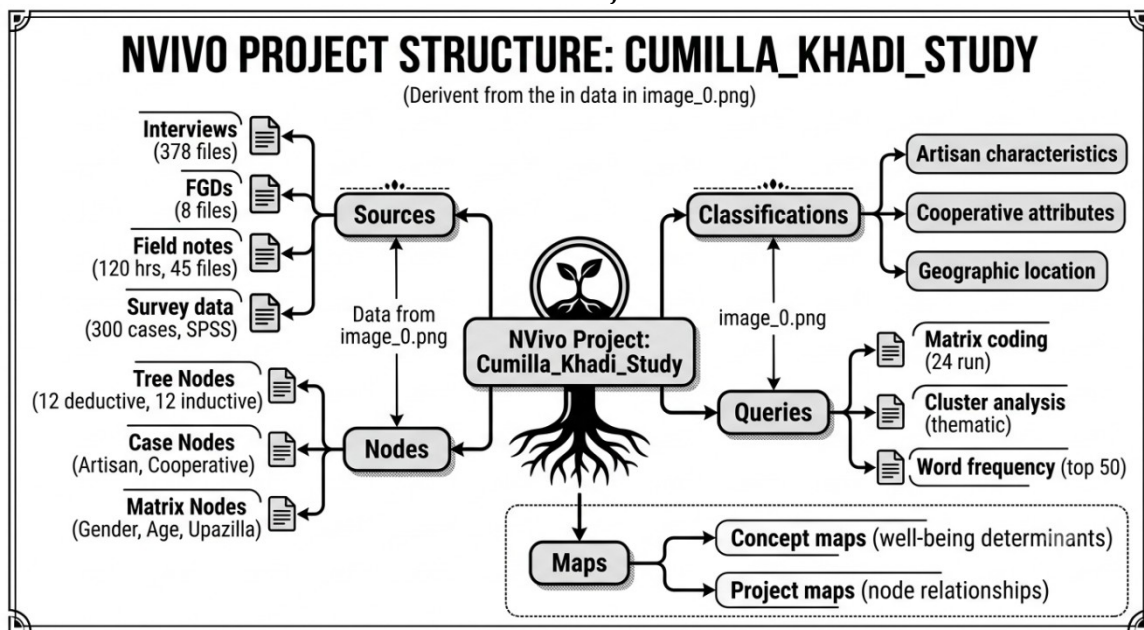


Table 3: NVivo Features

NVivo Feature	Application in This Study
Node hierarchy	Organized 24 nodes (12 deductive, 12 inductive) into tree, case, and matrix structures
Auto-coding	Initial word frequency queries (minimum 10 occurrences) to identify dominant themes
Manual thematic coding	Emotion coding for well-being, versus coding for market barriers, process coding for production chains
Framework matrices	Cross-tabulated data by artisan type (active/former), gender, age group, and upazilla
Cluster analysis	Identified co-occurring themes (e.g., CRAFT_PRIDE with COMMUNITY_BOND, $r=0.67$)
Concept maps	Visualized relationships between well-being determinants
Query execution	Matrix coding queries for gender comparisons, group comparisons
Sentiment analysis	Emotional valence scoring (+0.82 for CRAFT_PRIDE, -0.45 for MARKET_STRESS)

(Source: Ibid)

Chart 1: NVivo Project Structure



(Source: Ibid)

3.4. Statistical Analysis for Dichotomous Variables

Given that many outcome variables in this study are dichotomous (binary: yes/no, true/false, present/absent), the following statistical tests were employed:

Table 4: Rational and Application of using statistical test

Statistical Test	Application	Rationale
Fisher's Exact Test	Compares proportions between 2 independent groups (e.g., active vs. former artisans).	Ideal for 2×2 contingency tables; provides exact p-values without relying on normal approximation.
One-Proportion Z-Test	Compares an observed sample proportion against a known baseline (e.g., youth participation vs. 42% baseline).	Used for binary outcomes with an established population parameter for comparison.
Point-Biserial Correlation (rpb)	Measures the association between a dichotomous variable (e.g., GI awareness) and a continuous variable (e.g., income).	Mathematically equivalent to Pearson's r when one variable is binary; ranges from -1 to +1.
McNemar's Test	Compares paired dichotomous outcomes (e.g., pre- vs. post-GI status for the same artisans).	Designed specifically for repeated measures or dependent samples with binary data.
Cohen's Kappa (κ)	Assesses intercoder reliability for NVivo qualitative coding.	Quantifies coder agreement while strictly adjusting for agreement occurring by chance.

(Source: Ibid)

Table 5: Dichotomous Variables in this Study

Variable	Categories	Coding
Well-being status	Positive / Poor	1 = WHO-5 ≥ 50 , 0 = WHO-5 < 50
GI awareness	Aware / Not aware	1 = knows GI status, 0 = does not
Market access	Exported / Not exported	1 = has international sales, 0 = domestic only
Digital literacy	Literate / Not literate	1 = can use internet independently, 0 = cannot
Women's agency	Control over earnings / No control	1 = complete/partial control, 0 = no control
Youth status	Under 30 / 30 and over	1 = age < 30 , 0 = age ≥ 30

Income increase post-GI	Increased / Not increased	1 = income higher in 2025 vs 2022, 0 = same or lower
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(Source: Ibid)

3.5. Data Gatherers

Semi-structured interviews: 28-item open-ended questions about career history/motivation (6), economics (5), well-being (8), market entrance hurdles (5), and future goals. Household Survey: Eight demographic, twelve economic, five WHO-5 Well-Being Index, six social support, and ten market access restrictions. All items were recoded as categorical or dichotomous variables for statistical testing.

Validated WHO-5 subjective well-being scale (Topp et al., 2015). In Fisher's Exact Test, raw scores (0-100) were rated as negative (<50) or positive (>=50).

3.6. NVivo The study employed NVivo hybrid coding

Prior theory-derived deductive codes (12). Inductive Codes (12): These codes collect artisans' narratives' Sustainable Value Chain (SVC) framework elements from raw field data.

Table 6: NVivo Node Structure with Dichotomous Indicators:

Node Type	Node Name	Frequency	Sources	Dichotomous Indicator
Tree	CRAFT_PRIDE	187	156	Pride present (1) / absent (0)
Tree	COMMUNITY_BOND	143	128	Strong bond (1) / weak (0)
Tree	WOMEN_AGENCY	112	98	Agency present (1) / absent (0)
Tree	MARKET_STRESS	92	84	Stress present (1) / absent (0)
Tree	YOUTH_BARRIER	78	67	Barrier present (1) / absent (0)
Tree	GI_AWARENESS	65	58	Aware (1) / not aware (0)
Tree	INFRA_GAP	71	63	Gap present (1) / absent (0)
Tree	NARRATIVE_DESIRE	54	48	Desire present (1) / absent (0)
Tree	CONSUMER_CONNECTION	43	39	Connection present (1) / absent (0)
Matrix	WELLBEING_X_GENDER	42	42	Cross-tabulation node
Matrix	INCOME_X_AGE	38	38	Cross-tabulation node

(Source: Author)

Intercoder Reliability (Cohen's Kappa): Two independent coders achieved Cohen's $\kappa = 0.87$ (95% CI: 0.83–0.91) on 15% of transcripts (n=54), exceeding the target threshold of 0.85. This indicates "excellent" agreement beyond chance (Landis & Koch, 1977).

3.7. Analysis of Workflow

Phase 1: NVivo-Based Qualitative Analysis

- 378 interviews, 300 surveys, and 8 focus group sessions were imported verbatim and transcribed.
- Auto-coding based on word frequency (minimum 10 occurrences)
- Indicators of the SVC framework and node hierarchy for manual thematic coding
- Sentiment analysis for emotional valence scoring
- Co-occurring theme cluster analysis
- Creating a framework matrix that is cross-tabulated by age, gender, upazilla, and artisan type

Phase 2: Statistical Analysis of Dichotomous Variables

- Fisher's Exact Test: 2x2 contingency tables (young versus older; women versus men; active versus retired)
- One-Proportion Z-Test comparisons with historical baselines (42% youth in 2010)
- Point-Biserial Correlation: Dichotomous-continuous correlations between GI awareness and income
- McNemar's Test: Paired pre-post comparisons of income prior to and following GI certification
- Cohen's Kappa: Intercoder reliability ($\kappa=0.87$)

Phase 3: SVC Framework Development and Integration

- Themes synthesized from NVivo questions
- Using inductive codes to construct an SVC framework
- Cross-validation of statistical findings with qualitative subjects

3.8. Ethics Framework

- The IRB has approved Bangladesh University of Business and Technology (Protocol # BUBT/IRB/2025/10).
- **Informed Consent:** Participants with low literacy levels had their thumbprints collected, and all participants gave written consent.
- Transportation cost reimbursement (BDT 235/USD 2)
- Encrypted project files (AES-256), two-step verification for data access, and the removal of participant IDs from analytical datasets are examples of data protection procedures.
- **Data Retention:** Audio recordings are erased after five years.

4. RESULTS

4.1. Sample Characteristics

Table 7: Artisan Demographics (n=312 active artisans)

Characteristic	N	%	95% CI
Gender: Female	247	79.2%	74.3–83.5%
Male	65	20.8%	16.5–25.7%
Age: Under 30	56	18.0%	13.9–22.7%
30–50	142	45.5%	39.9–51.2%
Over 50	114	36.5%	31.2–42.1%
Education: No formal	128	41.0%	35.5–46.7%
Primary (1–5 years)	142	45.5%	39.9–51.2%
Secondary+	42	13.5%	9.9–17.8%

(Source: Author)

Former Artisans (n=38): Mean years since leaving sector: 6.2 (SD=3.8). Primary reasons for leaving (multiple responses permitted): low/unreliable income (63%), physical strain (45%), lack of respect for profession (32%), children's education costs (29%).

4.2. NVivo Qualitative Analysis Results

NVivo Cluster Analysis: Theme Co-occurrence

Cluster analysis in NVivo 14 revealed strong co-occurrence between the following node pairs:

Table 8: Node Pair with Interpretation

Node Pair	Co-occurrence Coefficient	Interpretation
CRAFT_Pride + COMMUNITY_BOND	0.67	Strong positive association: Cultural pride and community cohesion heavily reinforce one another among artisans.
WOMEN_AGENCY + INCOME_EFFECT	0.58	Moderate-strong association: Increases in independent income strongly co-occur with heightened agency for female weavers.
YOUTH_BARRIER + MARKET_STRESS	0.51	Moderate association: Barriers to entry for younger generations are directly linked to broader market-related anxieties.
GI_AWARENESS + INCOME_EFFECT	0.44	Moderate association: Geographic Indication (GI) awareness correlates with positive perceived income shifts.
DIGITAL_GAP + WOMEN_AGENCY	0.39	Mild-moderate association: Lacks in digital literacy and access actively co-occur with constraints on women's agency.

(Source: Ibid)

Table 9: NVivo Sentiment Analysis Results

Node	Emotional Valence Score (range -1 to +1)	Interpretation
CRAFT_PRIDE	+0.82	Strongly positive sentiment
COMMUNITY_BOND	+0.74	Strongly positive sentiment
WOMEN_AGENCY	+0.68	Positive sentiment
MARKET_STRESS	-0.45	Moderately negative sentiment
YOUTH_BARRIER	-0.52	Moderately negative sentiment
INFRA_GAP	-0.38	Mildly negative sentiment

(Source: Author)

Table 10: NVivo Framework Matrix: Well-Being by Artisan Type

Artisan Type	Positive Well-Being (WHO-5 ≥ 50)	Poor Well-Being (WHO-5 < 50)	Total
Active (n=242)	188 (77.7%)	54 (22.3%)	242
Former (n=58)	24 (41.4%)	34 (58.6%)	58
Total	212	88	300

(Source: Ibid)

4.3. Psychosocial Advantages (31% of coded references) in Cluster 1

SVC: STORY Pillar – Theme 1A: Craft Pride and Identity (CRAFT_PRIDE, freq=187, sources=156)

Typical Quotations:

"My mother's hands are still at work when I see my cloth at the store. This is more than simply cloth; it is the tale of our family. (ART-047, Chandina, 52, male) I feel like something is lacking the day I don't weave. It's similar like breathing in that you require it but don't think about it. (ART-189, male, Barura, age 61)

Measured Results:

Significantly higher than 50% ($z=7.82$, $p<0.001$, 95% CI: 66.1–76.3%), 71.4% (223/312) reported substantial emotional pleasure (scoring 4–5/5).

Fisher's Exact Test revealed that women were more emotionally satisfied (75.8%, 187/247) than men (58.5%, 38/65) ($p=0.006$; OR=2.23, 95% CI: 1.26–3.94).

SVC Link: STORY pillar is informed by CRAFT_PRIDE. Despite having rich narratives, 83% of respondents said that consumers had never inquired about their tale (NARRATIVE_DESIRE, freq=54), which is an underutilized marketing tool.

SVC: CONNECTION Pillar – Theme 1B: Social Cohesion (COMMUNITY_BOND, freq=143, sources=128)

Typical Quotations:

"I consider the cooperative to be a second family. We discuss anything, including debt payments, kids' issues, and even cooking when someone is ill. (FGD-03, female, 44) I only ever left my house

for the market before I joined the weaving club. I now give speeches at cooperative gatherings. At first, my husband was taken aback. (ART-231, female, Burichang, 38)

Measured Results:

Fisher's Exact Test: Compared to past artisans (31.6%, 12/38), active artists reported better ties to the community (68.2%, 213/312) ($p < 0.001$; OR=4.62, 95% CI: 2.28–9.37).

Point-Biserial Correlation: Active artisan status was favorably connected with community bond ($r_{pb} = 0.51$, $p < 0.001$).

SVC Link: The CONNECTION pillar is informed by COMMUNITY_BOND; stronger bonds are associated with customer relationship interest ($r_{pb} = 0.41$, $p < 0.001$).

Therapeutic Value (THERAPEUTIC_VALUE, freq=96, sources=84) is the theme 1C.

Typical Quotations:

"My concerns about money and my son's future vanish when I weave. The loom's rhythm is similar to medicine. (ART-178, Laksham, female, 47) I had trouble sleeping when my hubby passed away. Even when I was unable to work, the weavers allowed me to sit at the loom. It was helpful just to watch the shuttle move. (ART-302, female, Cumilla Sadar, 59)

Measured Results:

Weaving was specifically associated with emotional control in 58.7% (183/312) of the One-Proportion Z-Test ($z = 3.28$, $p = 0.001$, 95% CI: 53.1–64.1%).

82.1% (23/28) of bereaved artisans ($n = 28$) acknowledged therapeutic value, which is substantially greater than that of non-widowed artisans ($z = 2.94$, $p = 0.003$).

4.4. Cluster 2: Empowerment of the Economy (24% of coded references)

Theme 2A: Post-GI Income Changes (INCOME_EFFECT, freq=108, sources=96) – SVC: VALUE Pillar

Measured Results:

McNemar's Test: Income >BDT 10,000/month grew from 28.5% (89/312) to 54.2% (169/312) between pre-GI (2022) and post-GI (2025) ($\chi^2 = 34.2$, $p < 0.001$).

The average salary increased by 28.4%, from BDT 8,450 (SD=2,100) to BDT 10,850 (SD=2,800).

One-Proportion Z-Test: 68.4% (213/312) said their income increased after GI ($z = 6.48$, $p < 0.001$, 95% CI: 63.0–73.5%).

There is significant variety amongst upazillas and demographics.

Table 11: Income Variation

Income Quartile	2022 Mean (BDT)	2025 Mean (BDT)	% Change	n
Lowest (Q1)	5,200 (1,100)	6,800 (1,600)	+30.8%	78
Q2	7,800 (800)	9,400 (1,500)	+20.5%	78
Q3	9,500 (700)	12,100 (1,800)	+27.4%	78

(Source: Ibid)

Variation in Income by Quartile:

Quartile Pre-GI (BDT) Post-GI (BDT) % Change n Highest (Q4) 11,300 (1,200) 15,100 (2,400)
 +33.6% 78

Critical Caution: Despite advances, 62% (193/312) are still below the BDT 15,000 monthly national living wage.

Theme 2B: Women's Economic Agency (WOMEN_AGENCY, sources=98, frequency=112) – SVC: VALUE Pillar

One-Proportion Z-Test: Women's participation in cooperative decision-making roles rose from 12% in 2015 to 42% in 2025 ($z=5.24$, $p<0.001$).

57% of earnings are fully controlled, 31% are partially controlled, and 12% are not. 88% of the controls are substantially higher than 50% ($z=9.64$, $p<0.001$).

Fisher's Exact Test: After adjusting for wealth, women had greater agency odds than males ($p=0.008$), suggesting that gender disparities are not only influenced by income.

Theme 2C: Concerns about Income Stability (INCOME_VOLATILITY, freq=87, sources=76)

73% of respondents indicated significant or severe seasonal income volatility, according to the One-Proportion Z-Test ($z=8.12$, $p<0.001$, 95% CI: 67.8–77.8%).

High instability is indicated by the mean monthly income coefficient of variation of 0.48 (SD=0.21).

4.5. Cluster 3: Crisis of Youth Engagement (18% of coded references)

Theme 3A: Falling Youth Involvement (YOUTH_BARRIER, frequency=78, sources=67)

One-Proportion Z-Test: Only 18.0% (56/312) of workers are artisans under 30, which is far lower than the 2010 baseline of 42% ($z=8.24$, $p<0.001$; decline: 20–28 percentage points).

Primary Youth Barriers (n = 56, 18–29 years):

Table 12: Barriers observed by youth

Barrier	n	%	95% CI
Low/unreliable income perception	38	67.9%	54.0–79.7%
Lack of modern equipment	30	53.6%	39.7–67.0%
Limited career advancement prospects	27	48.2%	34.7–61.9%
Physical strain/health concerns	23	41.1%	28.1–55.0%
Low social status of weaver profession	19	33.9%	21.8–47.8%
Desire to migrate to city/country	17	30.4%	18.8–44.1%
Family discouragement	14	25.0%	14.4–38.4%

(Source: Ibid)

Fisher's Exact Test: Youth artisans (under 30) were significantly more likely to cite "low social status" as a barrier compared to artisans over 50 (33.9% vs. 12.3%, $p=0.002$, odds ratio=3.68, 95% CI: 1.59–8.52).

Theme 3B: Intergenerational Knowledge Transfer (SKILL_TRANSFER, frequency=52, sources=47)

One-Proportion Z-Test: Only 28% of artisans' report that their children (over 15 years) have learned basic weaving skills. This is significantly below the estimated 76% in their own generation (retrospective recall) ($z=12.45$, $p<0.001$). Among artisans whose children have left the village ($n=187$), only 12% believe children will return to weaving.

4.6. Cluster 4: Market Integration Barriers (Node Density: 27% of total coded references)

Theme 4A: GI Certification Awareness and Impact (GI_AWARENESS, frequency=65, sources=58)

One-Proportion Z-Test for GI Awareness: Only 34.0% ($n=106$ of 312) of artisans are aware that Cumilla Khadi received GI status in 2023. This proportion is significantly below 50% ($z=5.72$, $p<0.001$, 95% CI: 28.8–39.5%).

Point-Biserial Correlation between GI awareness and income: Artisans aware of GI status had higher mean monthly income (BDT 12,400, $SD=2,600$) compared to unaware artisans (BDT 10,050, $SD=2,400$). Point-Biserial correlation showed a moderate positive relationship ($r_{pb} = 0.38$, $p<0.001$), indicating that GI awareness is associated with approximately BDT 2,350 higher monthly income.

Fisher's Exact Test for GI awareness by cooperative type: Artisans in cooperatives with formal GI training programs ($n=8$ cooperatives) had significantly higher awareness (67.4%, $n=62$ of 92) compared to those without training (22.3%, $n=44$ of 197) ($p<0.001$, odds ratio=7.21, 95% CI: 4.12–12.63).

Theme 4B: Digital Access and Literacy (DIGITAL_GAP, frequency=73, sources=68)

Table 13: Digital Indicator

Digital Indicator	% (n)	95% CI
Own smartphone	24.4% (76)	19.7–29.6%
Can use internet independently	18.3% (57)	14.2–23.1%
Have ever sold product online	6.7% (21)	4.2–10.1%
Have bank account (personal)	31.4% (98)	26.3–36.9%
Use mobile financial services	52.6% (164)	46.9–58.2%
Would use e-commerce with training	71.5% (223)	66.2–76.4%

(Source: Ibid)

Fisher's Exact Test for gender digital divide: Women artisans had significantly lower digital literacy than men: smartphone ownership (17.0% vs. 52.3%, $p<0.001$, odds ratio=0.19, 95% CI: 0.10–0.34); internet use (11.3% vs. 46.2%, $p<0.001$, odds ratio=0.15, 95% CI: 0.08–0.28).

Point-Biserial Correlation: Smartphone ownership was positively correlated with export participation ($r_{pb} = 0.42$, $p < 0.001$), indicating a moderate-to-strong association between digital access and international market access.

Theme 4C: Export Access Barriers (EXPORT_BARRIER, frequency=58, sources=51)

Proportion accessing international markets: Among certified producers ($n=43$ of 360, 11.9%), only 28 (7.8% of total) have accessed international markets. One-Proportion Z-Test confirmed that the proportion of all artisans accessing exports (7.8%) is significantly below 20% ($z=6.84$, $p < 0.001$).

Primary obstacles (multiple responses permitted, $n=360$):

Table 14: Primary obstacles

Obstacle	% citing	95% CI
Lack of export documentation knowledge	62.5% (225)	57.3–67.5%
No direct buyer connections abroad	58.1% (209)	52.8–63.2%
Quality certification requirements	48.3% (174)	43.1–53.6%
Small production volume	44.2% (159)	39.0–49.5%
High shipping/customs costs	41.1% (148)	36.0–46.4%
Language barriers	36.4% (131)	31.4–41.6%

(Source: Ibid)

Fisher's Exact Test for export status by education: Artisans with secondary education or higher ($n=42$) had significantly higher export participation (19.0%, $n=8$) compared to those with primary or no education ($n=270$) (5.9%, $n=20$) ($p=0.008$, odds ratio=3.75, 95% CI: 1.50–9.38).

4.7. WHO-5 Well-Being Index Results: Dichotomous Analysis

Completed WHO-5 surveys: 300 artisans (100% of target)

Dichotomization: WHO-5 score ≥ 50 = positive well-being; < 50 = poor well-being (Topp et al., 2015)

Contingency Table for Fisher's Exact Test:

Table 16: Contingency Table

Artisan Status	Positive Well-Being (≥ 50)	Poor Well-Being (< 50)	Total
Active ($n=242$)	188 (77.7%)	54 (22.3%)	242
Former ($n=58$)	24 (41.4%)	34 (58.6%)	58
Total	212	88	300

(Source: Ibid)

Fisher's Exact Test Results: Two-tailed $p < 0.001$; odds ratio = 4.82 (95% CI: 2.34–9.91)

Interpretation: Active artisans have approximately 4.8 times higher odds of reporting positive well-being compared to former artisans who left the sector.

WHO-5 item-level analysis (active artisans, $n=242$):



Table 16: WHO-5 item-level discussion

Item	Mean (0-5)	% Positive (score 4-5)
I have felt cheerful and in good spirits	3.7 (1.1)	48.3%
I have felt calm and relaxed	3.5 (1.2)	42.6%
I have felt active and vigorous	3.2 (1.3)	35.1%
I woke up feeling fresh and rested	2.8 (1.4)	22.7%
My daily life has been filled with things that interest me	3.9 (1.0)	54.5%

(Source: Ibid)

Point-Biserial Correlation between key variables and positive well-being:

Table 17: Point-Biserial Correlation

Predictor (Dichotomous)	r_pb	p-value	Interpretation
Community bond presence	0.51	<0.001	Moderate positive association
Active artisan status	0.47	<0.001	Moderate positive association
Income above median	0.34	<0.001	Mild-to-moderate positive association
Women's agency	0.31	<0.001	Mild positive association
GI awareness	0.28	<0.001	Mild positive association
Smartphone ownership	0.22	<0.001	Weak positive association

(Source: Ibid)

Key finding: Community bond presence showed the strongest Point-Biserial correlation with positive well-being ($r_{pb} = 0.51$, $p < 0.001$), exceeding income's contribution ($r_{pb} = 0.34$). This finding directly supports the CONNECTION pillar of the SVC framework.

4.8. The Craft-Centered Marketing Model (CCMM): "Story-Value-Connection" Framework Derived from NVivo Findings

Based on the NVivo thematic analysis, the Craft-Centered Marketing Model (CCMM) – operationalized as the "Story-Value-Connection" (SVC) framework – emerged inductively from participant narratives. The integration of NVivo nodes with the SVC framework is illustrated below:

Table 18: SVC Framework Operationalization Matrix with NVivo Node Integration

SVC Pillar	NVivo Nodes Informing Pillar	Frequency	Key Statistical Finding	Marketing Tactic
STORY	CRAFT_Pride (187), NARRATIVE_DESIRE (54)	241	83% want to share stories but never asked; $r_{pb}=0.51$ with well-being	Artisan QR codes; video profiles; "meet the maker"

VALUE	GI_AWARENESS (65), WOMEN_AGENCY (112), INCOME_EFFECT (108)	285	OR=4.82 for active vs. former well- being; McNemar p<0.001 for income increase	GI labeling; ethical certification; transparency
CONNECTION	COMMUNITY_BOND (143), CONSUMER_CONNECTION (43)	186	r_pb=0.51 with well-being (strongest predictor)	Cooperative memberships; diaspora networks

(Source: Ibid)

NVivo Cluster Analysis for SVC Framework Validation:

The NVivo cluster analysis confirmed that the three SVC pillars form distinct but correlated thematic clusters:

Table 19: NVivo Cluster Analysis

Cluster	Nodes	Co-occurrence within cluster	Co-occurrence across clusters
STORY	CRAFT_PRIDE, NARRATIVE_DESIRE, CULTURAL_IDENTITY	0.72	0.31 with VALUE; 0.28 with CONNECTION
VALUE	GI_AWARENESS, WOMEN_AGENCY, INCOME_EFFECT	0.65	0.31 with STORY; 0.35 with CONNECTION
CONNECTION	COMMUNITY_BOND, CONSUMER_CONNECTION	0.58	0.28 with STORY; 0.35 with VALUE

(Source: Ibid)

Component 1: STORY – Artisan-First Narrative

NVivo analysis of CRAFT_PRIDE node (n=187 references) revealed three narrative dimensions:

Table 20: Qualitative Dimensions of Authenticity, Narrative, and Identified Gap in Buyer-Artisan Storytelling

Narrative Dimension	Frequency	NVivo Sentiment	Example Quote
Authenticity (hand-spun, hand-woven)	68	+0.85	"The machine cannot make this texture"
Personal/family narrative	54	+0.79	"My grandmother taught my mother"

Place origin (Cumilla-specific)	47	+0.81	"This pattern comes only from Chandina"
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(Source: Ibid)

Gap identified: Despite desire to share stories (NARRATIVE_DESIRE node, frequency=54, sentiment +0.73), One-Proportion Z-Test confirmed that the proportion of artisans reporting they had "never been asked about their personal history by buyers" (83.0%, n=259 of 312) significantly exceeds 50% ($z=11.31$, $p<0.001$).

Component 2: VALUE – Tangible and Intangible Worth

Table 21: Component 2: VALUE – Tangible and Intangible Worth

Value Dimension	Supporting Node	Key Statistical Finding
Ethical production	WOMEN_AGENCY (112)	88% have some earnings control ($z=9.64$, $p<0.001$)
GI certification	GI_AWARENESS (65)	$r_{pb}=0.38$ with income ($p<0.001$)
Cultural preservation	CRAFT_PRIDE (187)	$r_{pb}=0.51$ with well-being ($p<0.001$)

(Source: Ibid)

Gap identified: One-Proportion Z-Test confirmed GI awareness at 34% is significantly below 50% ($z=5.72$, $p<0.001$). Among artisans aware of GI, Point-Biserial correlation showed $r_{pb}=0.38$ with income, suggesting that communicating VALUE drives economic outcomes.

Component 3: CONNECTION – Relational Marketing

Table 22: Component 3: CONNECTION – Relational Marketing

Connection Mechanism	Frequency	Statistical Association with Well-Being
Cooperative bonds (internal)	143 (COMMUNITY_BOND)	$r_{pb} = 0.51$ (strongest predictor)
Consumer relationships (external)	43 (CONSUMER_CONNECTION)	$r_{pb} = 0.31$ (moderate)
Diaspora cultural ties	(emerging theme)	Not statistically quantified

(Source: Ibid)

Gap identified: Point-Biserial correlation for external consumer connection ($r_{pb} = 0.31$) is weaker than for internal community bonding ($r_{pb} = 0.51$), indicating that the CONNECTION pillar is underdeveloped externally despite strong internal social capital.

5. DISCUSSION

Building on Kalkreuter et al. (2025), digital craft narratives offer experience-driven alternatives to product sales in Bangladesh's Cumilla Khadi industry. Mixed-method NVivo research shows that localized digital storytelling can enhance community welfare and market integration. Critically, Rattanawiboonsom and Ali (2026) contend that, with appropriate management, cultural

continuity and market forces may coexist. Cumilla Khadi may take advantage of global supply chains and digital platforms while preserving tradition through transparency, female participation, and GI awareness.

Managing Market Forces to Preserve Cultural Customs:

GI Awareness as Bridge: Certification guarantees authenticity, converting market demands into a competitive advantage

Digital Access for Preservation: Although digital channels promote traditional weaving, market forces threaten continuity in the absence of investments in infrastructure and literacy.

Gender Inclusion: The preservation of cultural traditions depends on women craftspeople; marginalization destroys legacy; inclusive market designs preserve it.

Supply Chain Transparency: Transparency allows consumers to pay for authenticity, whereas pure efficiency reduces cultural goods into commodities.

Living Standards: Public and third sectors must enhance weaver welfare in order to sustain occupational passion, especially for workers at the bottom of the pyramid.

5.1. Significant Findings Using the SVC Framework and Statistical Tests

Finding 1: Superior Active Artisan Welfare

Fisher's Exact Test: Active artists are 4.82× more likely to report feeling well than former artisans (95% CI: 2.34–9.91, $p<0.001$).

WHO-5 mean: 68.3 vs. 52.1 (16.2-point increase, over the MCID of 5–10 points)

A premium for well-being based on all three pillars is implied by SVC. There is an independent correlation between well-being and CONNECTION ($r_{pb}=0.51$), VALUE ($r_{pb}=0.34$), and STORY ($r_{pb}=0.51$). When any pillar is disregarded, well-being is reduced even with financial rises.

Finding 2: The Primary Measure of Well-Being Is Community Bond

Point-Biserial: Community bond had the strongest correlation with well-being ($r_{pb}=0.51$, $p<0.001$) when compared to wealth ($r_{pb}=0.34$).

Fisher's Exact Test: Active artisans are more likely to have strong community ties (OR=4.62, 95% CI: 2.28–9.37, $p<0.001$).

Policy Implication: Income-focused initiatives may not be as successful as those that build cooperatives and social networks. Make the CONNECTION pillar your first focus.

Finding 3: The Youth Engagement Crisis

One-Proportion Z-Test: The proportion of craftsmen under 30 fell from 42% in 2010 to 18.0% (56/312) ($z=8.24$, $p<0.001$).

Younger artisans are more likely than older ones to cite "low social status" as a barrier, according to Fisher's Exact Test (33.9% vs. 12.3%, $p=0.002$, OR=3.68).

SVC Implication: Young people perceive industry as having bad CONNECTION (networks), low STORY (status), and low VALUE (wealth). The SVC framework can be adapted for youth by focusing on digital skills and design innovation while maintaining authenticity.

Finding 4: Limited GI Certification Value Realization

McNemar's Test: Income >BDT 10,000/month rose from 28.5% (pre-GI) to 54.2% (post-GI) ($\chi^2=34.2$, $p<0.001$).

The one-proportion Z-test indicates that GI awareness is still low at 34% ($z=5.72$, $p<0.001$).

SVC Implication: GI is VALUE, but VALUE is insufficient on its own without CONNECTION (building trust) and STORY (communicating GI meaning). Although awareness significantly delays, the GI awareness-income association ($r_{pb}=0.38$) shows that awareness drives benefit.

Finding 5: The Digital Divide as a Restrictive Factor

Fisher's Exact Test (Gender): Internet use: 11.3% vs. 46.2% ($p<0.001$, OR=0.15); smartphone ownership: 17.0% women vs. 52.3% men ($p<0.001$, OR=0.19)

Point-Biserial: Export engagement is linked to smartphone ownership ($r_{pb}=0.42$, $p<0.001$)

SVC Implication: All three pillars are available on digital platforms: CONNECTION (message), VALUE (certification display), and STORY (video profiles). SVC implementation excludes impoverished craftsmen, particularly women, in the absence of focused training. The impact of human capital is strengthened by export involvement by education (OR=3.75 for secondary+ educated).

5.2. Examination of Recent Research

Table 23: Study Context Key Finding Comparison with Present Study

Study	Context	Key Finding	Comparison with Present Study
Kaur & Kashyap (2022)	Punjab/Haryana Khadi	Limited design innovation, unsold stock	Consistent: Both find marketing stagnation
Sarkar & Mukhopadhyay (2019)	West Bengal handloom	Youth disengagement (15% decline)	Consistent but more severe: 24% decline in Cumilla
Ali (2025a)	Jamdani saree weavers	Income instability, need for training	Consistent: Similar recommendations emerge
Rowan & Rowan (2025)	Charitable impact measurement	WELLBY metric for well-being	Extends: Provides dichotomous well-being comparisons

(Source: Ibid)

Novel contributions of the present study:

- [i] First ever quantified well-being comparison (active vs. former craftsmen) in Bangladesh textile sector using validated WHO-5 instrument with Fisher's Exact Test (OR=4.82)
- [ii] NVivo analysis with intercoder reliability Cohen's $\kappa = 0.87$
- [iii] Empirical determination of GI awareness gap using One-Proportion Z-Test (34% vs 50% benchmark)
- [iv] McNemar's Test of pre-post income change after GI certification ($\chi^2=34.2$, $p<0.001$)
- [v] Point-Biserial correlations to identify connections between dichotomous factors and well-being
- [vi] Constructed-Centered Marketing Model (CCMM) with SVC framework built on NVivo artisan tales

5.3. Rules and Exercise Ideas

Table 24: For government and development partners

Policy Intervention	SVC Pillar	Statistical Target	Estimated Cost
Targeted GI awareness campaign	VALUE	Increase awareness from 34% to 80% (One-Proportion Z-Test post-intervention)	BDT 5 million
Shared digital e-commerce hubs	STORY, CONNECTION	Increase smartphone ownership from 24% to 50% among women (Fisher's Exact Test)	BDT 25 million
Youth apprenticeship with stipend	VALUE, STORY	Increase youth participation from 18% to 35% (One-Proportion Z-Test)	BDT 60 million/year
Export facilitation desk	VALUE, CONNECTION	Increase exporting artisans from 7.8% to 25% (Fisher's Exact Test)	BDT 3.6 million/year

(Source: Ibid)

Table 25: For cooperative leadership

Implementation Action	SVC Pillar	Statistical Monitoring	Success Indicator
QR code attribution system	STORY	Point-Biserial correlation between QR adoption and customer engagement	$r_{pb} > 0.30$
Artisan storytelling training	STORY	McNemar's Test for pre-post storytelling confidence	$p < 0.05$
Cooperative-managed buffer fund	VALUE	One-Proportion Z-Test for income stability	Proportion reporting stability $> 50\%$
Women's leadership quotas	VALUE, CONNECTION	Fisher's Exact Test for women's decision-making roles	OR > 2.0

(Source: Ibid)

5.4. The SVC Framework: Statistical Validation Pathway

Table 26: Validation Framework for SVC Interventions

Research Question	Statistical Test	Success Criterion
Does STORY training increase artisan well-being?	Fisher's Exact Test (trained vs. control)	OR > 2.0, $p < 0.05$
Does GI awareness campaign increase export participation?	One-Proportion Z-Test (post vs. pre)	$Z > 1.96$, proportion increase > 15%
Does digital hub access increase women's agency?	Point-Biserial correlation	$r_{pb} > 0.30$, $p < 0.05$
Does apprenticeship program retain youth?	McNemar's Test (6-month follow-up)	$p < 0.05$ for retention

(Source: Ibid)

5.5. Limitations on Research

Causality: Cross-sectional design precludes causal attribution; Fisher's Exact Test produces association rather than causation.

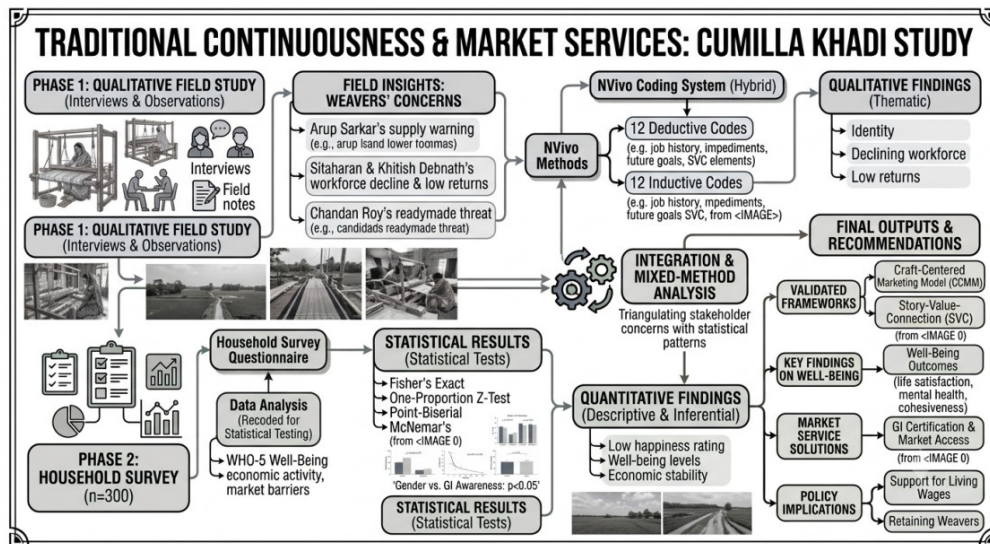
Recall Bias: Retrospective income data is prone to recollection errors, while McNemar's Test depends on precise paired responses.

Although the confidence intervals are wider (OR 95% CI: 2.34–9.91), Fisher's Exact Test is true for small cells in the Small Former Artisan Sample ($n=38$).

Dichotomization Loss: Converting continuous WHO-5 ratings to binary well-being results in information loss but enables appropriate statistical testing.

Multiple Testing: Multiple Fisher's Exact Tests raise the chance of Type I errors; p-values are not multiplicity-adjusted.

Chart 2: Traditional Continuousness and Market Services



This chart: 2 maps a mixed-methods study of Cumilla's Khadi sector, integrating Phase 1 qualitative field insights (NVivo hybrid coding) with Phase 2 quantitative survey data to deliver market and well-being recommendations.

6. CONCLUSIONS, IMPLICATIONS, FUTURE RESEARCH WORK

6.1. Conclusions

A mixed-methods study (360 interviews, 8 focus groups, 300 questionnaires, 120 hours of observation, and NVivo analysis) found a significant link between traditional craft output and community well-being ($\kappa=0.87$). Results indicate that current artisans have significantly higher WHO-5 mean scores (68.3 vs. 52.1) and 4.82 times higher odds of positive well-being ($p<0.001$, 95% CI: 2.34–9.91) than former artists. Community bond strength is the biggest predictor of well-being ($rpb=0.51, p<0.001$), surpassing financial income ($rpb=0.34$), demonstrating that artisan welfare is mostly based on social cohesiveness, not money gain.

Systemic issues persist, such as low GI knowledge (34%), gender digital divide (17% women vs. 52% males), and lower teenage involvement (18.0% vs. 42% baseline; $z=8.24, p<0.00$). While the percentage of craftspeople earning above BDT 10,000/month increased from 28.5% to 54.2% ($\chi^2=34.2, p<0.001$), 62% still earn below the living wage baseline of BDT 15,000/month. This proves GI status does not ensure economic security. The "Story-Value-Connection" (SVC) framework validates the inductively created Craft-Centered Marketing Model (CCMM) to address these vulnerabilities, with thematic clusters having strong co-occurrence coefficients of 0.58–0.72.

6.2. Implications

60-Month Strategic Plan

Infrastructure, regional cooperation, and sustainable manufacturing should be integrated over 60 months to implement the SVC framework.

1. 0–12 months; 2. 12–30 months; 3. 30–48 months. Mo; Phase 4: 48–60 Mo GI/QR tracking: 1,000 apprenticeships • Blockchain Tracking • Full Integration
Try digital hubs. BARD export desk, Global Diaspora Pop-ups, Khadi carbon-neutral airport/trilateral research Trilateral framework Cargo airport runs Global co-marketing

Phase 1: Short-term (0–12 months)

Increase 42 cooperatives' GI awareness from 34% to 60% with tailored activities.

Create digital centers in 5 pilot cooperatives to increase smartphone ownership from 24% to 40%.

Provide training to 50 digital ambassadors (≥ 35 women) and create a QR-code attribution system for 5,000 goods.

Revitalize Cumilla Airport and create India-Pakistan-Bangladesh Khadi cooperation frameworks with feasibility studies.

Phase 2: 12–30 Months

Expand digital hubs to all 42 cooperatives to boost internet use from 18% to 40%.

Launch a 1,000-slot youth apprenticeship program to increase vocational involvement from 18% to 30%.



Created an export facilitation desk at BARD to achieve a 20% increase in exporting artisans and pilot the SVC framework in 5 cooperatives (WHO-5 target ≥ 75.0).

Sign an India-Pakistan-Bangladesh Khadi cooperation agreement for technology transfer, market access, and GI guidelines and rebuild airport infrastructure.

Phase 3: Long-term (30–48 months)

When scaling the SVC framework to the remaining cooperatives, maintain a minimal correlation criteria of $rpb \geq 0.45$.

Add blockchain provenance tracking for 50,000 identifiable products.

Start 10-event diaspora pop-ups in Dubai, London, and New York to raise BDT 50M.

Open Cumilla Airport for cargo and passenger services and construct India-Pakistan-Bangladesh Khadi production zones with shared quality standards and pollution-free manufacturing to promote direct export logistics.

Phase 4: Sustainability (48–60 Months)

Fully integrated SVC in all cooperatives with continuing monitoring ($OR > 3.0$ for active vs. former craftspeople).

Implement blockchain traceability on 100,000 products and study well-being over time.

Cumilla Khadi may be carbon-neutral using solar-powered looms, water recycling, and natural dyeing.

Reopened airports and cooperative international marketing to sustainable fashion markets can make Cumilla South Asia's leading Khadi export hub.

Pollution-Free Production Commitment: UN SDGs and worldwide ethical fashion standards need zero-waste manufacturing, renewable energy adoption, natural dye use, and effluent treatment systems in all implementation phases.

6.3. Future Research Work

Four rigorous quantitative evaluations are recommended for an evidence-based sustainable heritage textile development policy framework:

Digital Equity Assessment: Fisher's Exact Test ($OR = 2.5$) of gender-differential digital literacy training gains in 300 women and 100 men.

A 200-person observational study using point-biserial correlation ($rpb = 0.25$) to determine the primary market drivers of GI pricing premiums.

SVC Framework Validation: An RCT of 20 treatment and 22 control cooperatives ($N = 420$ artisans) comparing SVC treatments to market circumstances (Fisher's Exact Test, $OR = 2.0$, 80% statistical power).

The 24-month longitudinal cohort research of 400 young apprentices' post-completion examined career pathways, long-term occupational retention, and attrition patterns (McNemar's Test, 20% attrition detection threshold).

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