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Article

Rebuilding Artisan Trust Through Technology: A Study on the Relationship of Psychology, Commerce, and Blockchain in Kashmir's Craft Ecosystem

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Abstract: Kashmir's handicraft sector represents one of the most culturally significant artisan economies in South Asia, yet it continues to suffer from pervasive challenges including value-chain opacity, counterfeit production, low technological readiness, and widespread distrust among artisans. This study investigates how psychological factors, commercial structures, and blockchain-enabled transparency collectively shape artisan trust and livelihood outcomes. Drawing on behavioural, technological, and supply-chain theories, the study develops and empirically tests a tri-dimensional framework using survey data from 262 artisans across major craft clusters in Kashmir. Structural Equation Modeling (SEM) reveals that psychological factors such as perceived fairness, trust disposition, and technology self-efficacy significantly influence both trust and intention to adopt blockchain-based systems. Value-chain opacity emerges as a major negative determinant of artisan trust, while perceived blockchain usefulness substantially enhances both trust and potential direct market access. Artisan trust is further shown to improve motivation and well-being, underscoring its role as a psychological driver of sustained engagement in craft production. Mediation analysis confirms that trust serves as a key mechanism through which blockchain usefulness shapes motivation and market participation. These findings advance theoretical understanding of technology adoption in traditional creative economies and highlight blockchain's dual function as both a transparency tool and a trust-building mechanism. The study provides actionable guidance for managers, policymakers, and cooperatives seeking to rebuild artisan confidence, protect cultural heritage, and integrate Kashmir's crafts into ethically conscious global markets.

Keywords: Kashmir artisans; blockchain; trust; transparency; handicraft sector; behavioural economics; value-chain opacity; artisan motivation; technology adoption; cultural heritage.

INTRODUCTION

Kashmir's handicraft sector stands as one of the most celebrated heritage economies of South Asia, known for its intricate Pashmina shawls, Kani weaves, papier-mâché art, walnut wood carving, carpets, and other artisan-based crafts valued in global luxury markets. Despite this cultural and commercial significance, the sector has been experiencing prolonged structural distress. Artisans, who carry forward centuries-old knowledge, face exploitation by intermediaries, inconsistent demand, inadequate

earnings, limited bargaining power, and intense competition from counterfeit products (Nabi & Pandita, 2022). These challenges have contributed to a deepening trust deficit, making artisans highly vulnerable both economically and psychologically. The disconnect between artisans and markets has widened in recent years, reducing motivation, discouraging youth from entering the craft economy, and weakening the continuity of Kashmir's cultural heritage (Bashir & Bhat, 2023). The absence of transparency in value chains remains a core issue. Traditional commercial structures are dominated by intermediaries who often control pricing, access to materials, and buyer linkages. This opaque system leads artisans to receive only a fraction of the final retail value, despite contributing the labour-intensive stages of production (Iqbal & Wani, 2024). Furthermore, the influx of machine-made imitations particularly in Pashmina and Kani shawls has severely damaged market credibility and eroded the economic viability of authentic producers (UNESCO, 2023). These market distortions reinforce mistrust, reduce artisans' sense of fairness, and exacerbate psychological stress associated with uncertain incomes and limited recognition.

Research in psychology and behavioural economics highlights the centrality of trust, perceived fairness, emotional well-being, and identity attachment in shaping artisan behaviour, productivity, and willingness to adopt new systems (Khan & Abdullah, 2023). Many artisans express anxiety regarding fluctuating market demand, irregular payments, and lack of visibility in supply chains, contributing to motivational decline and creative fatigue (Rafiq & Mir, 2022). Given that craftsmanship often forms a core part of artisan identity, the undervaluation of their work creates emotional strain and a diminished sense of cultural pride (Das & Rout, 2022). These psychological dimensions indicate that solutions focusing solely on technology or commerce cannot succeed unless artisan trust and motivation are explicitly addressed. Against this backdrop, blockchain technology has emerged as a promising tool for authenticity verification, supply chain transparency, and fair value distribution. Blockchain's decentralized and immutable record-keeping capabilities allow every stage of production—from raw material sourcing to final sale to be securely documented, thereby reducing opportunities for fraud and manipulation (Lopez & Dhar, 2023). In global textile and artisan markets, blockchain-enabled QR codes allow consumers to verify product origin, artisan identity, and certification, increasing trust and willingness to pay premium prices (Rosenberg et al., 2022). For artisans, blockchain-supported smart contracts offer the possibility of direct, timely, and transparent payments, reducing dependence on intermediaries who historically controlled the flow of information and capital (Kumar & Raina, 2023). These developments suggest that blockchain can potentially restore confidence among artisans by creating more equitable and traceable commercial relationships. However, the adoption of blockchain and other digital tools in traditional sectors like handicrafts is not straightforward. Studies show that technology acceptance depends heavily on psychological readiness, perceived usefulness, digital literacy, and past experiences of trust or exploitation (Ahmad et al., 2023). Without targeted training, institutional support, and clear communication of benefits, artisans may resist or withdraw from technological interventions. This demonstrates the necessity of an integrated approach that considers the psychological, commercial, and technological dimensions simultaneously. In Kashmir, where artisans have historically operated in conditions of market uncertainty and limited institutional support, rebuilding trust requires more than simply introducing a new technology it requires reshaping relationships, expectations, and systems of value.

Despite growing global literature on blockchain-based supply chains and artisan empowerment, a significant research gap persists. Existing studies tend to examine either the commercial barriers faced by artisans, or the psychological dimensions of trust and motivation, or the technical potential of blockchain—but rarely integrate these dimensions within a unified framework (Farooq & Lone, 2024). This gap is particularly pronounced in the context of Kashmir, where craft production is deeply embedded in cultural identity and where market challenges are intertwined with emotional and socio-economic vulnerabilities. As a result, there is limited understanding of how blockchain-enabled transparency interacts with artisan psychology and commercial structures to rebuild trust and strengthen livelihoods. In response, this study develops a tri-dimensional framework connecting (1) psychological factors such as trust, motivation, and perceived fairness, (2) commercial challenges including value chain opacity and counterfeit production, and (3) blockchain-based technological solutions aimed at enhancing transparency and authenticity. By analysing these three domains simultaneously, the research seeks to illuminate how technology can serve as a trust-building mechanism rather than merely a functional tool. The study draws on qualitative insights from artisans, traders, and cooperatives, as well as secondary data from contemporary literature on behavioural economics, supply chain management, and blockchain applications. The introduction of blockchain into Kashmir's craft ecosystem represents not only a technological intervention but also a potential catalyst for restoring dignity, recognition, and confidence among artisans. When artisans can verify the authenticity of their work, trace its market journey, receive fair and transparent remuneration, and connect directly with consumers, they experience psychological empowerment that can lead to improved productivity, creativity, and intergenerational continuity. Thus, rebuilding artisan trust through technology is fundamentally a multidimensional challenge—requiring the alignment of emotional, economic, and technological factors. This study positions blockchain as a transformative instrument, but one whose success depends on understanding the intricate interplay of mindset, market structure, and digital innovation.

Literature Review

This section synthesizes existing scholarship on the psychological, commercial, and technological factors

shaping artisan livelihoods, with particular focus on trust, value-chain dynamics, and emerging digital interventions. By reviewing recent studies from behavioural economics, supply chain management, and blockchain applications, the chapter establishes the theoretical foundation for understanding how these dimensions interact in traditional craft ecosystems. The insights drawn from prior research help identify critical gaps and inform the development of the conceptual framework and hypotheses guiding the present study.

Psychological factors, behaviour & trust outcomes

A growing body of research shows that psychological constructs such as perceived usefulness, perceived fairness, and technology self-efficacy are strong predictors of both technology adoption intentions and trust-related behaviours. Work grounded in the Technology Acceptance Model (TAM) demonstrates that perceived usefulness and self-efficacy consistently predict users' behavioural intentions across contexts (Pan, 2020). Recent field and MSME studies extend these findings to low-resource and artisanal settings, showing that technology self-efficacy and prior positive experiences with digital tools increase willingness to try new platforms and reduce anxiety about changing market practices (Mantik, 2024). At the same time, trust disposition and perceived procedural fairness are linked to greater willingness to engage in new exchange relationships and to accept digital verification systems that change traditional buyer–seller dynamics (Norbu, 2024). Taken together, these studies indicate that psychological readiness, comprising perceived fairness, self-efficacy, and trust disposition, operates as a proximal driver of both the intention to adopt novel trade technologies and of baseline trust in market processes.

H_{1a}: *Psychological factors positively influence artisan behavioural.*

H_{1b}: *Psychological factors positively influence trust-related outcomes.*

Value-chain opacity and artisan trust

Empirical analyses of creative and informal sector value chains highlight that information asymmetry, multi-layered intermediaries, and weak authentication mechanisms systematically erode producer bargaining power and trust (UNCTAD, 2024). Recent reports on handicraft clusters and regional case studies emphasize that opaque pricing, lack of product provenance, and the circulation of look-alike or counterfeit goods depress artisans' perceived fairness and reduce their trust in market actors (UNESCO policy pages; industry synthesis reports 2022–2024). Sectoral diagnostics in South Asian craft economies show that the presence of opaque middlemen networks often results in delayed payments, hidden commissions, and misinformation about final retail prices, all of which undermine artisans' confidence that they will be fairly compensated (Innovation for Handicrafts cluster reviews, 2023–2024). These commercial structures therefore constitute a robust negative antecedent to artisan trust, particularly where formal certification and traceability are absent.

H_2: *Value-chain opacity negatively affects artisan trust.*

Blockchain usefulness, artisan trust & market access

Recent applied studies and pilot projects show blockchain's distinct capacity to provide immutable provenance records, QR-based product histories, and tamper-resistant certification—features that directly address the authenticity and traceability problems facing artisans (Aounzou, 2024). Systematic reviews and empirical work in 2022–2024 indicate that when small producers and consumers can verify origin, materials, and artisan identity via a trusted ledger, consumer willingness to pay and perceived product value increase, which in turn improves market opportunities for authentic makers (Tan, 2023; blockchain–consumer trust reviews, 2024). Moreover, case studies of blockchain pilots in craft and GI-tagged products report that verified provenance and embedded storytelling (artisan profiles) support premium pricing and enable more direct-to-consumer (D2C) channels by giving buyers confidence to transact without traditional intermediaries (Aounzou, 2024; industry pilot reports 2023–2024). Thus, perceived usefulness of blockchain—when it is understood and trusted by artisans—functions both as a trust-building mechanism and as a practical enabler of improved direct market access.

H_{3a}: *Blockchain usefulness positively enhances artisan trust.*

H_{3b}: *Blockchain usefulness positively enhances direct market access.*

Artisan trust, Motivation & well-being

Interdisciplinary research on arts, crafts, and well-being shows that recognition, fair compensation, and perceived social value of one's work are closely linked to intrinsic motivation and psychological well-being (Keyes et al., 2024; Bone, 2023). Studies in craft communities indicate that when artisans feel fairly treated and visible to end consumers, their job satisfaction, creative engagement, and commitment to the trade increase factors that are critical for sustaining intergenerational continuity of skills (creative-economy and wellbeing reviews, 2023–2024. Recent craft sector reports and empirical surveys also document that subjective well-being improves when artisans receive transparent feedback, secure payments, and social recognition outcomes that rising trust in market relations helps to deliver (crafts wellbeing syntheses, 2023–2024). Therefore, artisan trust is not merely an economic facilitator but a psychological antecedent that positively influences motivation, pride in craftsmanship, and broader well-being.

H_4: *Artisan trust positively influences artisan motivation and well-being.*

Intention to adopt and direct market access

Evidence from digital-market pilots and D2C platform studies shows that intention to adopt (when converted into actual adoption) frequently translates into expanded market reach and reduced intermediary dependence. Recent evaluations of D2C and traceability platforms for small producers demonstrate that producers who adopt digital authentication and online storefronts secure more direct buyers, higher margins, and more predictable sales flows (D2C empirical reviews 2023–2024 Patel & Mehra

type pilots). Moreover, blockchain and QR-based provenance systems combined with e-commerce enable artisanal producers to access premium niche markets that prioritize authenticity and ethical sourcing, thereby improving direct market access (Aounzou, 2024; UNCTAD Creative Economy Outlook, 2024). Behavioral research also shows that adoption intention is a robust proximate predictor of platform use in low-resource settings when facilitating conditions (training, access) are present (Mantik, 2024). Hence, intention to adopt blockchain and related tools is expected to have a positive downstream effect on artisans' ability to engage directly with markets.

H_5: *Intention to adopt blockchain positively improves direct market access.*

Contemporary studies examining technology, outcomes pathways increasingly emphasise trust as a key mediator. Research on blockchain's social effects finds that blockchain's transparency and immutable provenance records foster stakeholder trust, which in turn leads to downstream socio-economic benefits such as higher willingness to buy, better producer morale, and expanded market participation (Tan, 2023; Norbu, 2024). Pilot evaluations in artisanal and small-producer contexts report that blockchain-enabled authenticity verification increases both consumer confidence and artisans' own sense of recognition; these psychosocial shifts then mediate improvements in revenue, motivation, and market connections (Aounzou, 2024; Osei & Boateng, 2024). Recent mediation studies in supply-chain contexts therefore indicate that blockchain's positive effects on outcomes such as motivation and market access operate partly through the rebuilding of interpersonal and institutional trust, rather than exclusively through transactional or technical improvements.

H_6: *Blockchain usefulness improves artisan motivation through the mediating role of artisan trust.*

H_7: *Blockchain usefulness improves market access through the mediating role of artisan trust.*

Research Methodology

This section outlines the methodological framework adopted to investigate how psychological factors, commercial structures, and blockchain-enabled transparency influence artisan trust and market outcomes in Kashmir's handicraft ecosystem. It details the research design, sampling strategy, data collection procedures, and analytical techniques used to empirically validate the proposed conceptual model. By employing a structured and systematic approach, this chapter ensures the reliability, validity, and robustness of the findings presented in subsequent sections.

Research Design

This study adopts a mixed-method, explanatory, and cross-sectional research design to investigate how psychological, commercial, and technological factors particularly blockchain technology shape artisan trust within Kashmir's handicraft ecosystem. The design is grounded in the Technology Acceptance Model (TAM), Trust Theory, and Value Chain Theory, which together explain how artisans' psychological readiness, commercial transparency, and digital capabilities influence trust-related outcomes. The quantitative component focuses on empirically testing the hypothesized relationships among psychological constructs (trust, perceived fairness, motivation), commercial constructs (value-chain transparency and pricing fairness), and blockchain-related constructs (perceived usefulness, traceability, transparency, and intention to adopt). The qualitative component complements the quantitative findings by exploring artisans' lived experiences, historical patterns of exploitation, perceptions of counterfeit products, and their willingness to participate in blockchain-enabled systems. The integration of these methods allows the study to assess both direct and mediated effects, particularly how blockchain-enabled transparency may rebuild trust by reshaping value-chain interactions and improving perceptions of fairness.

Research Objectives

The primary objective of this study is to examine how artisan trust in Kashmir's handicraft sector can be rebuilt through the strategic use of technology, particularly blockchain, while accounting for the psychological and commercial realities that shape artisan livelihoods. The research seeks to understand the psychological challenges, including trust deficits, motivation barriers, and perceptions of fairness that influence artisan behaviour. It further aims to analyse the commercial inefficiencies such as opaque value chains, unfair pricing structures, and counterfeit product circulation that undermine artisan confidence and economic stability. In exploring the potential of blockchain technology, the study evaluates how transparency, traceability, and authenticity verification can enhance trust and reshape market interactions. Ultimately, the research intends to develop an integrated framework that combines psychological insights, commercial structures, and blockchain-based solutions, while offering practical recommendations for policymakers, NGOs, and artisan groups to strengthen Kashmir's craft ecosystem in a holistic and sustainable manner.

Population and Sampling

The population for this study consists of artisans, traders, exporters, cooperatives, and handicraft-sector intermediaries operating across four major craft clusters in Kashmir: Srinagar, Budgam, Ganderbal, and Anantnag. These regions were selected because they represent the densest concentrations of Pashmina weavers, Kani shawl makers, papier-mâché artists, carpet artisans, and walnut wood carvers. Artisans in these districts have historically experienced challenges related to price exploitation, lack of market access, and counterfeit competition, making them ideal for studying trust recovery using digital technologies. The sampling strategy follows a stratified purposive approach to ensure representation of different craft types, artisan demographics, and market roles. The sampling unit includes active artisans, cooperative members, master craftsmen, traders, and export-house representatives who are directly involved in production, pricing, marketing, or distribution activities.

A total of 300 questionnaires were distributed across the four districts through artisan associations, cooperatives, NGOs, and cluster development offices. Following data cleaning and validity checks, 262 usable responses were retained for final analysis, which exceeds the recommended minimum sample size for Structural Equation Modeling, as suggested by Hair et al. (2022). These responses represent individuals rather than entire units, meaning each participant offered a personal professional perspective shaped by their role in the craft ecosystem. In addition to the survey, in-depth interviews were conducted with 32 participants, including 22 artisans, 6 traders, and 4 institutional stakeholders. Four focus group discussions were conducted in Srinagar, Budgam, Ganderbal, and Anantnag with groups of 6–8 artisans each, allowing deeper exploration of trust dysfunctions, market dynamics, and technology acceptance behaviour. This composition of respondents across multiple nodes of the value chain strengthens the generalizability and contextual richness of the findings.

Instrument Design

Data for the study were collected using a structured questionnaire developed by combining validated measurement scales with context-specific constructs relevant to artisan livelihoods. The instrument was divided into four major sections. The first section captured demographic details such as craft type, years of experience, education level, cooperative membership, and dependence on intermediaries. The second section measured psychological variables, including artisan trust, perceived fairness, and motivation, drawing from established trust and behavioural economics literature. The third section measured commercial constructs, including perceived transparency of the value chain, pricing fairness, and perceived impact of counterfeit products. The fourth section consisted of blockchain-related constructs, including perceived usefulness, perceived ease of use, traceability benefits, intention to adopt blockchain, and perceived impact on artisan identity and recognition. Each construct was measured on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Prior to full deployment, the instrument underwent a pilot test with 25 artisans to ensure clarity, linguistic accuracy, and contextual relevance. Feedback led to minor revisions, particularly simplifying technical terminology associated with blockchain. Reliability tests from the pilot phase confirmed that all scales achieved Cronbach's alpha values above the recommended threshold of 0.70 (Nunnally, 1978), demonstrating internal consistency.

Data Collection Procedure

Data collection was conducted to accommodate varying literacy levels among artisans. Trained field investigators administered the survey in Kashmiri or Urdu, depending on participant preference, and read aloud the items where required. Respondents were provided assurances of confidentiality, and informed consent procedures were strictly followed. Semi-structured interviews and focus groups were audio-recorded with permission and later transcribed and translated into English. In addition to primary data collection, the study also implemented a small blockchain demonstration with two artisan groups in Srinagar and Budgam, where sample products were assigned QR codes and basic ledger entries were explained and tested. This hands-on demonstration enabled participants to reflect on usability, perceived benefits, and expected challenges of adopting blockchain in real commercial practice. Ethical approval for the full study, including human participants and the blockchain pilot, was obtained from the Institutional Ethics Committee.

Data Analysis Techniques

The analysis proceeded through multiple stages using SPSS 28.0 and AMOS 28.0. Descriptive statistics were first computed to profile artisan demographics, commercial experiences, and baseline trust levels. Data screening was then undertaken to address missing values, outliers, and normality deviations. Reliability analysis using Cronbach's alpha and Composite Reliability confirmed strong internal consistency of all constructs. Convergent and discriminant validity were assessed using the Average Variance Extracted and the Fornell–Larcker criterion following Hair et al. (2022), ensuring strong construct validity. Confirmatory Factor Analysis (CFA) was conducted to validate the measurement model, and model fit indices, including χ^2/df ratio, CFI, TLI, GFI, and RMSEA, indicated strong model adequacy based on Hu and Bentler's (1999) thresholds.

Following CFA, Structural Equation Modeling (SEM) was used to test the hypothesized relationships among psychological, commercial, and blockchain-related constructs. Mediation analysis was performed to examine whether blockchain-enabled transparency mediates the relationship between commercial fairness and artisan trust. Bootstrapping procedures with 5,000 resamples were used to test the significance of direct and indirect effects, following Preacher and Hayes (2008). Variance Inflation Factor (VIF) values were assessed to rule out multicollinearity issues, with all values falling below the acceptable threshold of 5. Qualitative interview and focus-group data were analysed using thematic analysis, allowing deeper interpretation of trust experiences, exploitative practices, generational attitudes, and technology adoption concerns. These qualitative findings were triangulated with quantitative results to enhance interpretative validity and offer a holistic view of the artisan trust ecosystem.

Data Analysis

This section presents the empirical analysis conducted to evaluate the proposed framework linking psychological factors, commercial conditions, and blockchain-enabled transparency to artisan trust and livelihood outcomes. Using data collected from artisans across major handicraft clusters, a series of statistical techniques including descriptive analysis, reliability and validity assessment, Confirmatory Factor Analysis (CFA), and Structural Equation Modeling (SEM) were employed to test the study's hypotheses. The results provide

quantitative evidence on how trust, technology adoption, and market structures interact within Kashmir's craft ecosystem. The following sections detail each stage of the analysis and its implications for the research objectives.

Descriptive Statistics

The descriptive results show that artisan trust is moderate (M = 3.12) while perceived fairness, value-chain transparency, technology self-efficacy and direct market access remain relatively low. This profile is consistent with recent field studies that document persistent market opacity, limited direct sales channels, and low digital readiness among craft producers (UNESCO, 2023; Financial Literacy and Digital Awareness among Artisans report, 2024). The relatively higher mean for perceived usefulness of blockchain indicates openness to technological solutions if concrete benefits are demonstrated (Aounzou, 2024). In sum, the descriptive patterns imply a dual challenge: artisans are receptive to technology-driven remedies but face structural and psychological barriers that must be addressed concurrently (Musa, 2024; Gupta, 2022)

Table 1: Descriptive statistics

Construct	Mean	S.D.
Artisan Trust Index	3.12	0.84
Perceived Fairness	2.98	0.79
Value-Chain Transparency	2.74	0.86
Blockchain — Perceived Usefulness	3.40	0.77
Technology Self-Efficacy	2.86	0.82
Market Access (Direct Sales)	2.69	0.90
Intention to Adopt (Blockchain)	3.05	0.83
Motivation & Well-being	3.00	0.81

Reliability & Convergent Validity

All constructs produced high internal consistency (Cronbach's α > .80) and composite reliability values above recommended thresholds, with AVE > .50 for each construct—indicating reliable and convergent measurement of latent variables (Hair et al., 2022). These psychometric results validate the adapted scales in a handicraft context and mirror other applied studies on technology acceptance and trust in small producer settings (Gupta, 2022; Musa, 2024). Robust reliability supports the claim that the survey captured distinct psychological, commercial, and technological dimensions relevant to artisan trust and blockchain adoption (Aounzou, 2024).

Table 2: Reliability and convergent validity

Construct	No. of items	Cronbach's α	Composite Reliability (CR)	AVE
Artisan Trust Index	6	0.90	0.92	0.62
Perceived Fairness	4	0.86	0.88	0.58
Value-Chain Transparency	5	0.85	0.89	0.55
Blockchain — Perceived Usefulness	5	0.88	0.90	0.61
Technology Self-Efficacy	4	0.82	0.85	0.53
Market Access	4	0.80	0.84	0.51
Intention to Adopt	4	0.87	0.89	0.60
Motivation & Well-being	5	0.89	0.91	0.63

Correlation Matrix

Correlation analysis shows moderate, positive associations among perceived fairness, value-chain transparency, blockchain usefulness, intention to adopt, and artisan trust (r ≈ .39–.66, p < .01). These patterns conform to theoretical expectations from TAM and trust theories where perceived benefits and fairness correlate with adoption intention and trust (Gupta, 2022; Musa, 2024). Importantly, pairwise correlations remain well below multicollinearity thresholds (r < .85), indicating that constructs are related but empirically distinct—an essential condition before SEM (Kline, 2016; Hair et al., 2022). Practically, the matrix suggests that interventions improving transparency and perceived usefulness of blockchain are likely to increase both adoption intent and trust simultaneously (Yazıcılar Sola & Güzel, 2024.

Table 3: Correlation matrix (Pearson's r)

*(Partial matrix showing key constructs; **p** < 0.01 two-tailed for starred coefficients)*

Constructs	1	2	3	4	5	6	7
1. Artisan Trust	1						
2. Perceived Fairness	0.61**	1					
3. Value-Chain Transparency	0.58**	0.64**	1				
4. Blockchain — Usefulness	0.55**	0.49**	0.53**	1			

5. Tech Self-Efficacy	0.47**	0.41**	0.39**	0.50**	1		
6. Intention to Adopt	0.62**	0.51**	0.56**	0.66**	0.52**	1	
7. Motivation & Well-being	0.64**	0.57**	0.51**	0.48**	0.44**	0.59**	1

Confirmatory Factor Analysis — Loadings & Measurement Model

Confirmatory Factor Analysis produced standardized loadings > .65 across items and CR/AVE values that satisfy conventional benchmarks. These results indicate good convergent validity (items strongly reflect their latent constructs) and confirm that the measurement model reliably represents psychological, commercial, and blockchain-related dimensions (Hair et al., 2022). This measurement robustness is critical in contexts like handicrafts where constructs—such as perceived fairness or technology self-efficacy—may behave differently than in industrial settings (Financial Literacy study, 2024). By establishing a sound measurement foundation, the CFA supports subsequent structural analyses testing causal hypotheses.

Table 4: CFA — Standardised loadings, CR and AVE (summary)

Construct	Items	Std. loadings (range)	CR	AVE
Artisan Trust	6	0.72 – 0.85	0.92	0.62
Perceived Fairness	4	0.70 – 0.82	0.88	0.58
Value-Chain Transparency	5	0.68 – 0.80	0.89	0.55
Blockchain — Usefulness	5	0.74 – 0.86	0.90	0.61
Tech Self-Efficacy	4	0.66 – 0.78	0.85	0.53
Intention to Adopt	4	0.75 – 0.84	0.89	0.60
Motivation & Well-being	5	0.73 – 0.86	0.91	0.63

Measurement Model Fit Indices

The measurement model exhibits acceptable-to-excellent fit: $\chi^2/df \approx 2.34$, CFI ≈ .946, TLI ≈ .932, RMSEA ≈ .061, SRMR ≈ .052. These indices fall within widely accepted thresholds for SEM and indicate the hypothesised factor structure maps well onto the observed data (Hu & Bentler criteria; Hair et al., 2022). Good model fit in this socio-cultural setting suggests that the tri-dimensional framework—psychology, commerce, blockchain—is empirically coherent for Kashmir's craft ecosystem and suitable for structural hypothesis testing (Aounzou, 2024; Yazıcılar Sola & Güzel, 2024.

Table 5: Measurement model fit

Fit index	Recommended	Obtained
χ^2/df	< 3.0	2.34
CFI	> 0.90	0.946
TLI	> 0.90	0.932
RMSEA	< 0.08	0.061
SRMR	< 0.08	0.052
GFI	> 0.90	0.918

Structural Model — Hypotheses Testing Table (with Standardized & Unstandardized Estimates

All hypothesised direct effects are statistically significant and meaningful in magnitude. Psychological readiness strongly predicts intention to adopt blockchain (β = .45, B = .62) and contributes to artisan trust (β = .38, B = .50), and opacity undermine producer welfare and trust (Khan, 2024; UNESCO, 2023). Blockchain perceived usefulness shows the largest positive direct effect on artisan trust (β = .52, B = .72), suggesting that when artisans recognise traceability and authenticity benefits, their confidence in market systems is substantially restored—consistent pilots and D2C platform studies (HUB/Drishtee reports; which aligns with TAM extensions stressing the role of perceived usefulness and self-efficacy in behavioural intent (Gupta, 2022; Musa, 2024). Value-chain opacity exerts a substantive negative effect on trust (β = −.39, B = −.48), empirically confirming literature that intermediarie

with recent case studies on blockchain for artisanal traceability (Aounzou, 2024; MDPI case studies, 2024). The downstream paths (trust → motivation; intention to adopt → market access) indicate that psychological and technological variables translate into socio-economic outcomes, echoing findings from applied traceability Financial Literacy study, 2024).

Table 6: SEM path coefficients (standardized β and unstandardized B)

Hypothesis	Path	Standardized β	Unstandardized B	SE (B)	t-value	p-value	Result
H1a	Psychological Factors → Intention to Adopt	0.45	0.62	0.10	6.21	< 0.001	Supported
H1b	Psychological Factors → Artisan Trust	0.38	0.50	0.094	5.34	< 0.001	Supported
H2	Value-Chain Opacity (–)	−0.39	−0.48	0.095	−5.02	< 0.001	Supported

	→ Artisan Trust						
H3a	Blockchain Usefulness → Artisan Trust	0.52	0.72	0.097	7.45	< 0.001	Supported
H3b	Blockchain Usefulness → Market Access (Direct)	0.36	0.46	0.094	4.88	< 0.001	Supported
H4	Artisan Trust → Motivation & Well-being	0.41	0.55	0.097	5.67	< 0.001	Supported
H5	Intention to Adopt → Market Access (Direct)	0.34	0.45	0.11	4.11	< 0.001	Supported

Notes:

- *Standardized βs are reported for comparability across constructs; unstandardized B indicates the raw change in the dependent variable per unit change in the predictor.*
- *SE = standard error of B. All paths are significant at p < 0.001.*

Mediation Analysis (Bootstrapping) — Indirect Effects

Bootstrapped mediation tests show that artisan trust partially mediates blockchain's influence on both motivation (indirect B ≈ .21) and market access (indirect B ≈ .27), with 95% bootstrap CIs excluding zero (Preacher & Hayes, 2008). Partial mediation implies blockchain confers both direct operational benefits (e.g., enabling direct sales through verified provenance) and indirect psychological benefits by rebuilding trust—this dual pathway is emphasized in recent literature advocating combined techno-institutional and social interventions for small producers (Yazıcılar Sola & Güzel, 2024 Aounzou, 2024). Practically, this suggests that technology deployments should be paired with trust-building, training, and branding interventions to maximize livelihood returns.

Table 7: Mediation (bootstrapped indirect effects — 5,000 resamples)

Mediation path	Direct effect (B)	Indirect effect (B)	Total effect (B)	95% CI (bootstrap)	Mediation type
Blockchain → Motivation (via Artisan Trust)	0.18 (p < 0.01)	0.21	0.39	[0.14, 0.29]	Partial mediation
Blockchain → Market Access (via Artisan Trust)	0.36 (p < 0.001)	0.27	0.63	[0.18, 0.36]	Partial mediation

Results and Discussion

The analysis provides a comprehensive understanding of artisans' psychological, commercial, and technological perceptions within Kashmir's handicraft ecosystem. The descriptive findings reveal moderate levels of artisan trust accompanied by lower perceptions of fairness, value-chain transparency, and technology self-efficacy. These patterns reinforce longstanding concerns about systemic opacity, pricing uncertainty, and limited digital readiness that shape artisans' daily experiences. Similar structural constraints have been documented across global artisanal and creative economies, where intermediated chains restrict producers' participation in formal and digital markets (UNESCO, 2023; Gupta, 2022). Despite these challenges, artisans reported relatively higher perceived usefulness of blockchain, indicating a growing awareness of authenticity verification, traceability, and fair commercialization benefits. This aligns with recent evidence showing that blockchain tends to generate favorable perceptions among small producers when its value proposition is clearly communicated (Aounzou, 2024; Yazıcılar Sola & Güzel, 2024. However, consistently low ratings for direct market access highlight the sector's continued dependence on intermediaries, reflecting a persistent structural barrier that weakens earnings, autonomy, and psychological motivation (Khan, 2024. Taken together, the descriptive patterns suggest a fertile yet constrained environment where artisans express interest in digital tools but continue to face entrenched systemic impediments. The psychometric assessment reinforces the reliability and validity of the adapted scales used to measure psychological, commercial, and technological constructs. High internal consistency, strong convergent validity, and robust factor loadings confirm that artisans clearly distinguish between fairness, trust, technological usefulness, transparency, and market outcomes. The measurement model demonstrated strong structural validity, with excellent global fit indices (CFI ≈ .94, TLI ≈ .93, RMSEA ≈ .06), validating the conceptualization of the tri-dimensional framework. These results indicate that artisan perceptions are empirically coherent and theoretically robust, despite contextual and linguistic variations associated with traditional craft sectors. This strengthens the applicability of contemporary behavioral and technology-adoption models within informal and culturally embedded economies. Correlation patterns further support theoretical linkages, revealing moderate-to-strong associations among fairness, transparency, trust, blockchain usefulness, intention to adopt, and downstream livelihood outcomes. None of the correlations approached multicollinearity thresholds, reinforcing the structural suitability of the model. Particularly notable is the strong

relationship between artisan trust and both intention to adopt blockchain and motivation, suggesting that trust functions as a psychological bridge between digital acceptance and socio-economic well-being. This reflects emerging research showing that trust amplifies the psychosocial benefits of technological interventions among creative and marginalized producer communities (Financial Literacy Report, 2024; Aounzou, 2024). The structural model provides strong empirical support for all hypothesized relationships, confirming that psychological, commercial, and technological determinants jointly shape artisan trust and livelihood outcomes. Psychological factors significantly predicted both intention to adopt blockchain and artisan trust, echoing research demonstrating that perceived fairness, identity-based trust, and self-efficacy are crucial drivers of digital acceptance, particularly in traditional sectors where emotional and cultural barriers remain strong (Musa, 2024; Das & Rout, 2022). Value-chain opacity emerged as a significant negative predictor of artisan trust, validating long-standing accounts of how information asymmetry, hidden commissions, and counterfeit infiltration erode producer confidence (UNESCO, 2023; Khan, 2024. Blockchain usefulness showed the strongest positive effect on trust and significantly improved direct market access, aligning with global findings that blockchain can resolve authenticity challenges, enhance consumer trust, and unlock premium market channels for cultural goods (Aounzou, 2024; Yazıcılar Sola & Güzel, 2024. Artisan trust also significantly predicted motivation and well-being, demonstrating the psychological empowerment effect of transparency and recognition, consistent with research on the emotional value of acknowledgment in creative labor (Rafiq & Mir, 2022; Bashir & Bhat, 2023). Mediation analysis revealed that artisan trust partially mediates the relationship between blockchain usefulness and both motivation and market access. This indicates that blockchain's benefits extend beyond operational and transactional improvements to include relational and psychological impacts. Trust enhances artisans' confidence, sense of visibility, and emotional connection to their craft—factors that facilitate greater engagement in market activities and openness to digital transformation. This dual-function mechanism aligns with recent scholarship arguing that blockchain in informal and creative economies creates value not only by improving traceability but also by strengthening the relational foundations of market participation (Aounzou, 2024; Yazıcılar Sola & Güzel, 2024. The partial nature of the mediation further suggests that while blockchain is a powerful tool, it must be complemented by broader institutional, educational, and cooperative initiatives that reinforce fairness and recognition—echoing behavioral economics insights on the importance of perceived justice in shaping long-term adoption and livelihood outcomes (Sharma & Gupta, 2024). Overall, the findings affirm the tri-dimensional framework integrating psychology, commerce, and blockchain. Blockchain presents a promising pathway for rebuilding artisan trust and improving market access, but its success hinges on the parallel strengthening of psychological readiness and institutional support structures. The results underscore the need for multi-stakeholder interventions that combine transparency-enhancing technologies with capacity building, trust restoration, and systemic value-chain reforms. This integrated understanding establishes a foundation for designing targeted policies, cooperative-led traceability solutions, and technology-enabled empowerment programs across Kashmir's craft sector.

Theoretical implication

This study makes several significant theoretical contributions by integrating psychological, commercial, and technological perspectives into a unified framework for understanding artisan trust and technology adoption in traditional craft ecosystems. First, the research advances trust theory by demonstrating that artisan trust is not solely an interpersonal or institutional construct but is also shaped by perceptions of technological transparency and fairness. The findings extend contemporary trust literature by showing that blockchain-enabled provenance and verification mechanisms function as *digital trust substitutes*, thereby reducing reliance on interpersonal or historically embedded market relationships. This expands existing theories that traditionally conceptualize trust as socially rooted, suggesting instead that trust can be technologically mediated in low-governance contexts. Second, the study contributes to the Technology Acceptance Model (TAM) and its later adaptations by emphasizing the critical role of *psychological readiness*—including perceived fairness, identity-based trust, and technology self-efficacy in predicting adoption intentions in artisanal and informal-sector environments. Whereas TAM research often focuses on organizational or consumer contexts, this study extends its applicability to craft-based, culturally embedded economies, demonstrating that technology adoption is deeply intertwined with artisans' lived experiences of marginalization and historical distrust. The results show that perceived usefulness of blockchain has both direct and mediated effects, thereby reinforcing the TAM proposition while incorporating emotion-, identity-, and equity-based constructs relevant to indigenous creative communities. Third, the findings extend socio-technical systems theory by illustrating how technological interventions such as blockchain function within a broader ecosystem of psychological and commercial determinants. The study proposes a

tri-dimensional framework in which technological, behavioural, and market forces interact to shape livelihood outcomes. This integrated model challenges linear models of innovation diffusion that treat psychological, commercial, and technical variables as separate predictors. Instead, the study demonstrates that trust operates as a central mediating mechanism, connecting transparency (a technological attribute) with motivation and well-being (psychological outcomes). Such a framework enriches socio-technical theory by positioning trust as the bridge between technological affordances and socio-economic transformation.

The research adds to emerging scholarship on blockchain in informal and creative economies, where empirical validation remains limited. Most blockchain studies emphasize industrial supply chains, financial sectors, or large-scale agriculture. By applying blockchain theory to Kashmir's handicraft sector, this study broadens the conceptual domain of blockchain utility, showing that it serves not only as a tool for transparency and traceability but also as a catalyst for psychological empowerment, identity reinforcement, and market democratization. This challenges dominant narratives that frame blockchain purely as an efficiency-enhancing or fraud-mitigating technology, instead highlighting its socio-symbolic function in restoring dignity and cultural value to marginalized artisans. Finally, by empirically confirming the mediating role of artisan trust between blockchain usefulness and socio-economic outcomes, the study contributes to mediation theory within behavioural economics and ICT4D research. It shows that technological solutions generate impact not merely by altering structural conditions but by reshaping internal perceptions, emotions, and expectations. This insight underscores the necessity of integrating behavioural constructs into digital development frameworks and highlights trust as a pivotal mechanism through which digital interventions translate into meaningful livelihood improvements.

Managerial implication

The findings of this study provide several actionable insights for managers, craft-sector leaders, cooperatives, NGOs, exporters, and technology implementers working within the handicraft ecosystem. First, the strong influence of psychological factors on both trust and technology adoption underscores the need for managers to prioritize trust-building and emotional engagement strategies when introducing technological solutions. Rather than treating blockchain or digital tools as purely technical upgrades, managers must communicate their benefits in terms that resonate with artisans' lived experiences—fair pricing, recognition, identity protection, and dignity in work. Training and on boarding programs should therefore integrate storytelling, hands-on demonstrations, and peer-led capacity-building to strengthen technology self-efficacy and reduce fear of digital systems. Also the study highlights that value-chain opacity significantly erodes artisan trust, suggesting that managers must take deliberate steps to improve transparency. Export houses, cooperatives, and private craft enterprises should adopt transparent pricing structures, disclose commission margins, and share product journey information with artisans. Implementing QR-based provenance tools, real-time order tracking, and transparent payment dashboards can create a healthier commercial environment where artisans feel respected and informed. Managers who embrace transparency will not only strengthen worker loyalty but also enhance the organization's credibility with international buyers seeking ethically sourced and traceable products.

The evidence that blockchain usefulness directly enhances both trust and market access indicates that managers have an opportunity to leverage blockchain strategically as both an operational and branding tool. Provenance records, digital certificates, and immutable artisan profiles can differentiate authentic Kashmiri crafts from counterfeits and machine-made imitations. Managers in retail, e-commerce, and export firms should integrate blockchain verification into their branding, enabling premium pricing and building a reputation for authenticity. This strategic use of technology can open high-value markets—such as luxury fashion, ethical gifting, and cultural tourism—creating competitive advantage for firms that adopt first. The positive effect of artisan trust on motivation and well-being suggests that managers must understand trust not simply as a social ideal but as a productivity and performance driver. Motivated artisans produce higher-quality products, innovate more readily, and show greater continuity in skill transfer. Managers should therefore design recognition initiatives such as artisan spotlights, certificates of authenticity bearing artisan names, or digital portfolios that reinforce pride and emotional connection to the craft. These practices strengthen retention and foster a healthier, more resilient workforce.

The relationship between adoption intention and improved market access has significant managerial implications for digital transformation strategies. Managers should actively support artisans in transitioning to hybrid or fully digital selling models, including marketplace onboarding, virtual exhibitions, WhatsApp storefronts, and cross-border e-commerce channels. Providing basic digital tools, transaction support, content creation assistance, and logistical integrations will accelerate artisans' ability to reach buyers directly. This reduces dependence on

intermediaries, increases margins, and helps organizations build diversified revenue streams. Finally, the mediation effect of trust indicates that technology initiatives will fail if rolled out without parallel relational and organizational changes. Managers must therefore frame blockchain adoption as part of a broader cultural shift towards transparency, fairness, and collaboration. Effective change management should include continuous communication, grievance redressal systems, participatory decision-making, and feedback loops where artisans can voice concerns and shape implementation strategies. This inclusive approach will increase acceptance, enhance long-term adoption, and maximize the socio-economic returns of digital interventions.

Limitations and future research Directions

Although this study offers valuable insights into the psychological, commercial, and technological determinants of artisan trust, several limitations should be acknowledged to contextualize the findings and guide future inquiry. First, the research relies on cross-sectional data, which restricts the ability to establish causality among psychological perceptions, technological acceptance, and livelihood outcomes. Trust formation and blockchain adoption are dynamic processes that may evolve over time; therefore, longitudinal studies could better capture how artisans' trust, motivation, and market participation change as blockchain-based systems mature. While the study employs a robust sample of artisans across several districts, the findings may not fully represent the heterogeneity of all craft clusters in Kashmir or other regions of India. Variations in craft type, skill levels, cooperative membership, and socio-economic backgrounds may influence artisans' perceptions differently. Future research should therefore incorporate comparative samples across diverse craft clusters, rural–urban contexts, and gender groups to enhance generalizability. Although blockchain usefulness and transparency were measured as perceived constructs, the study does not directly observe blockchain implementation in real-time artisan settings. Perceptions may differ from actual experiences once artisans engage with blockchain-enabled platforms. Future studies could incorporate experimental or quasi-experimental designs in which artisans participate in live blockchain pilots, enabling researchers to evaluate real-world usability, behavioural responses, and economic impacts. The study focuses primarily on artisans' perspectives, while the broader handicraft ecosystem involves multiple stakeholders including exporters, intermediaries, cooperatives, government agencies, and consumers. These actors shape pricing, authenticity verification, and market access in significant ways. Future research should employ multi-stakeholder frameworks or network analyses to understand how blockchain adoption may redistribute power, reshape incentives, and alter supply-chain governance structures. Although psychological constructs such as perceived fairness, trust, and self-efficacy were included, other relevant behavioural factors such as risk aversion, cultural attachment to traditional systems, and intergenerational attitudes were not examined. These factors may moderate or mediate artisans' willingness to adopt new technologies. Future research can extend the theoretical model using behavioural economics, identity-based motivation theory, or cultural psychology frameworks to capture deeper drivers of technology adoption. Finally, the study acknowledges but does not fully analyze infrastructural limitations such as digital access, connectivity, and cost constraints that may affect blockchain implementation in remote craft regions. Future research should integrate technological readiness assessments and cost–benefit analyses to determine the feasibility and scalability of blockchain interventions in low-resource artisanal environments.

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