

Digital Adoption and Sustainable Development in Niche Tourism: Evidence from GI-Tagged Handicraft Artisans of the Kumaun Hills of Uttarakhand

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Abstract

Peripheral mountain economies hold rich cultural assets that remain under-utilized in mainstream tourism and economic-development strategies. This paper examines how Niche(special-interest) tourism, anchored in Geographically Indicated (GI-Tagged) handicrafts, contributes to artisan micro-entrepreneurship and sustainable development in the Kumaun hills of Uttarakhand, India, and how far digital-technology adoption strengthens that contribution. Drawing on primary field research among Pehchan-registered artisans across five Kumaun districts (population 7,431; N = 610; systematic sampling), and focusing on eight GI-tagged handicrafts, the study tests two propositions using descriptive statistics, correlation, Garrett ranking, factor analysis, and structural equation modelling. It finds that digital-technology adoption has a significant, positive effect on the promotion and sale of Niche products, and that Niche tourism significantly supports sustainable development across economic, socio-cultural, environmental, and capacity-building dimensions. Beneath these aggregate results lies a pronounced intra-regional digital divide: better-connected Nainital records the highest digital adoption, revenue growth, and online-sales share, while remoter districts such as Champawat and Bageshwar are held back by weak internet connectivity and limited digital skills. Awareness of GI status is high (79.8%), yet formal GI ownership among artisans is low (39.1%). The paper argues that in hill economies the developmental promise of GI-anchored Niche tourism is realized only where digital and connectivity infrastructure allows artisan enterprises to reach markets, and it offers policy measures aligned with Sustainable Development Goal 8.

Keywords: *Niche tourism; geographical indication; handicrafts; digital adoption; sustainable development; artisan entrepreneurship; Kumaun; SDG 8*

1. Introduction

Tourism is among the most significant drivers of livelihoods in the Indian Himalaya, yet its dominant, mass-market form often bypasses local culture and places strain on fragile mountain environments. Niche/special-interest tourism offers an alternative: rather than serving a large, generic market, it caters to smaller, culturally curious segments seeking authentic, place-rooted experiences, and it typically rewards specialized products with higher engagement and margins. In the Kumaun Hills of Uttarakhand, one such specialized

asset is the region's portfolio of traditional handicrafts, several of which now carry a Geographical Indication (GI) tag certifying their origin and cultural distinctiveness.

Despite this cultural wealth, a clear disconnect persists between Kumaun's craft heritage and its effective use in tourism and enterprise. GI-tagged and traditional crafts remain under-leveraged in tourism strategy, the livelihoods of artisan communities remain precarious, and the potential of digital technology to widen artisans' market reach is only partly explored. This study addresses that gap by treating GI handicraft artisans as micro-entrepreneurs within a niche-tourism ecosystem, and by asking how digital adoption and Niche tourism together shape economic and sustainable-development outcomes in the region.

Two questions organize the analysis. First, does digital-technology adoption by artisans significantly improve the promotion and sale of Niche products to tourists? Second, does Niche tourism significantly support sustainable development, economic, socio-cultural, environmental, and capacity-related, in the hill districts of the Kumaun Division? By answering these with primary field evidence, the paper connects artisan entrepreneurship to the broader agenda of inclusive, sustainable economic development captured in Sustainable Development Goal 8.

2. Conceptual Background and Literature

2.1 Niche and special-interest tourism

Niche tourism is tailored to the needs of a particular interest group, focusing on a specific activity, culture, theme, or place. In contrast to mass tourism, large market, generic product, intense competition, and high volumes, Niche tourism serves a concentrated segment with a specialized product, more loyal customers, weaker direct competition, and higher per-unit margins (Novelli, 2005; Robinson & Novelli, 2005). India's Ministry of Tourism has identified several Niche segments for development, including eco and wildlife, sustainable, wellness, and MICE tourism (Ministry of Tourism, n.d.). Cultural and craft tourism, which is the focus here, sits naturally within this family and offers a route to preserving heritage while generating income.

2.2 Geographical Indications as a cultural-economic institution

A Geographical Indication is an intellectual-property right applied to goods whose qualities or reputation are tied to their geographical origin. Internationally it is recognized under the Paris Convention and the TRIPS Agreement; in India it is governed by the Geographical Indications of Goods (Registration and Protection) Act, 1999, in force since 2003, with registration valid for ten renewable years and administered through the GI Registry under the Controller General of Patents, Designs and Trade Marks, with DPIIT as the nodal department (Government of India, 1999; WTO, 1994). For traditional crafts, a GI can protect authenticity, support a price premium, and anchor place-based marketing, provided artisans and markets are aware of and able to use it (Lalitha & Vinayan, 2019; Chaudhary et al., 2022).

2.3 Digital adoption and sustainable development

A growing literature links artisans' adoption of digital tools, social media, e-commerce, digital payments, to wider market access and improved returns, while cautioning that connectivity gaps and digital-skill deficits can reproduce existing inequalities in remote regions (Shafi et al., 2024). In parallel, Niche and cultural

tourism is widely argued to advance sustainable development along economic, socio-cultural, and environmental dimensions, and to depend on deliberate capacity building (UNWTO & UNEP, 2005; Sati, 2020). Bringing these strands together, this study positions digital adoption as a potential amplifier of the developmental value of GI-anchored Niche tourism, and tests that proposition empirically. Prior work has rarely combined Niche tourism, GI handicrafts, digital adoption, and sustainability within a single hill-region study, which is the gap the present research addresses.

3. Objectives and Hypotheses

The study pursues five objectives: to examine Niche tourism in the Kumaun Hills; to analyze the impact of artisans' digital-technology adoption on the promotion and sale of Niche products; to assess the impact of Niche tourism on the region's sustainable development; to identify the challenges of developing and promoting Niche products; and to suggest measures to improve their market positioning. Two principal null hypotheses are tested:

- H01: Digital-technology adoption does not significantly impact the promotion and sale of Niche products to tourists (with sub-hypotheses on the correlation between adoption and revenue/engagement, the relative effectiveness of social versus traditional media, and returns on digital investment).
- H02: Niche tourism has no significant impact on sustainable development in the hill areas of the Kumaun Division (with sub-hypotheses on economic conditions, socio-cultural position, environmental conservation, and sustainable capacity building).

Research model and hypothesis structure

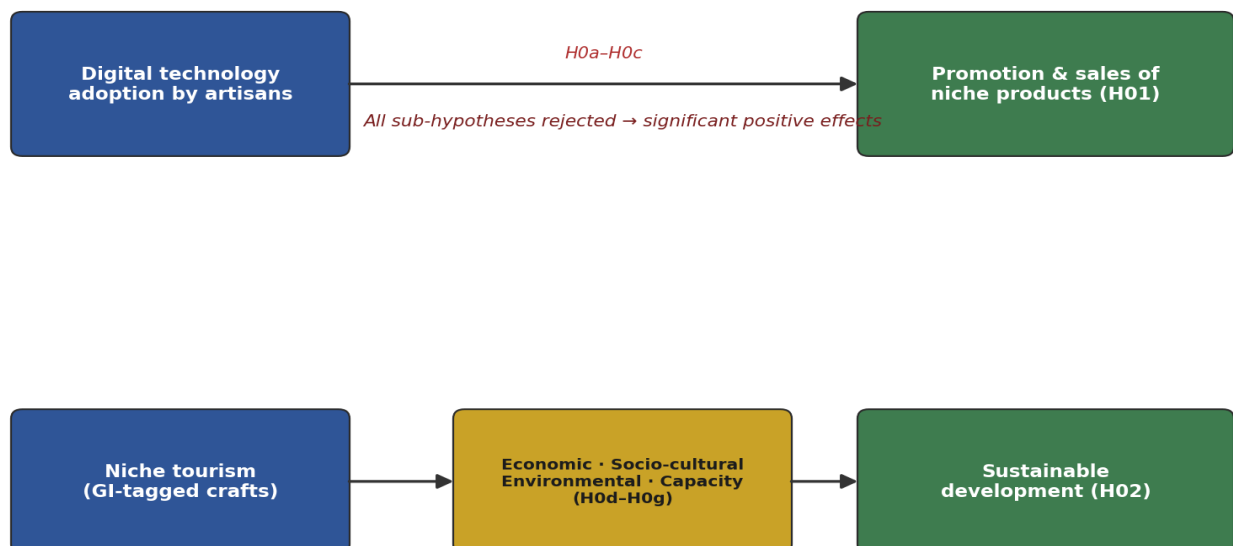


Figure 1. Research model and hypothesis structure. Source: author.

4. Data and Methods

The study uses a mixed evidence base. Primary data were gathered through structured surveys (questionnaires and schedules) and in-depth interviews with artisans; secondary data drew on the literature, government reports, and industry and media sources. The study focuses on eight GI-tagged handicrafts of Kumaun- Bhotia Dann, Uttarakhand Aipan, Ringal craft, Tamta (copperware), Thulma, Bicchu Buti (nettle) fabric, Kumauni Rangwali Pichhoda, and Likhai wood carving, selected from the 27 GI-tagged products registered in Uttarakhand as of July 2024. The population comprised 7,431 artisans registered under the Pehchan ID scheme of the Ministry of Textiles across five Kumaun districts. A sample of 610 was drawn by systematic sampling: the Cochran (1977) formula indicated 384 respondents proportionately, which was raised by a further 20% as a practical margin, and a floor of 100 respondents per district was applied to avoid under-representing smaller districts (Champawat's entire registered base of 78 was included). Within each district, respondents were selected at fixed sampling intervals- for example, every sixteenth artisan in Almora ($3,022 \div 187$). Analysis employed descriptive statistics (means, standard deviations, cross-tabulation, and Garrett ranking; Garrett & Woodworth, 1969), correlation, factor analysis, and structural equation modelling SEM.

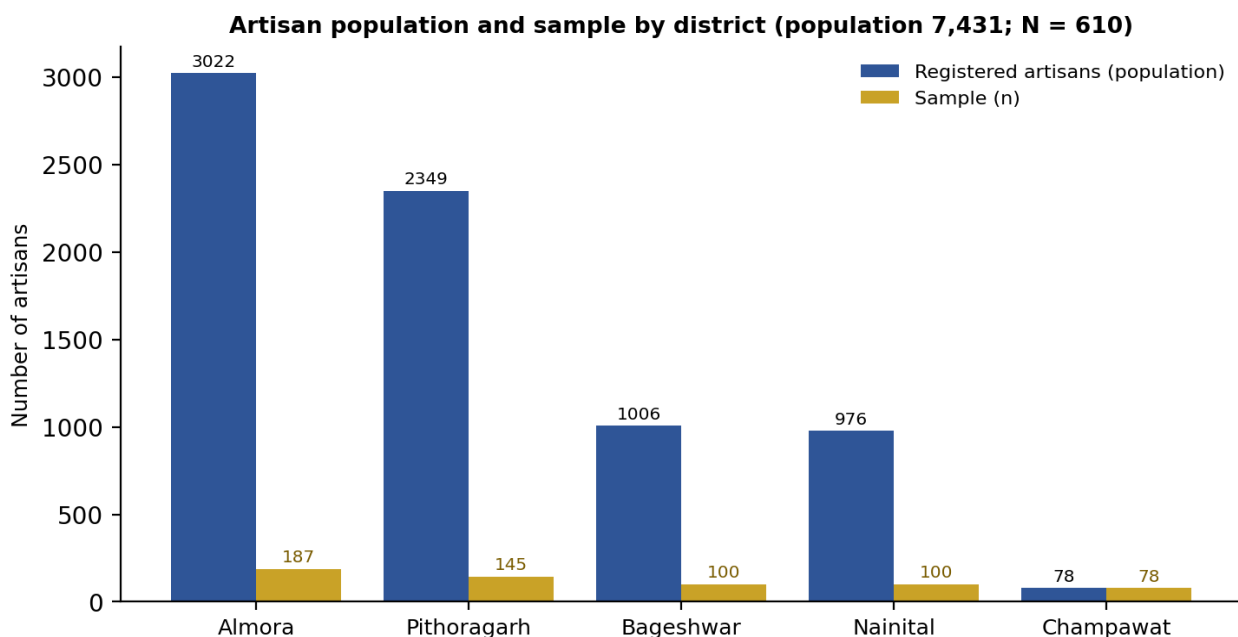
Study area: Kumaun districts surveyed (highlighted), within Uttarakhand



Figure 2. Study area - the five surveyed Kumaun districts (highlighted) within Uttarakhand. District boundaries from an open India district GeoJSON (indicative); study coverage per author's field research.

District	Registered artisans (population)	Sample (n)	Sampling interval (k)
Almora	3,022	187	16
Pithoragarh	2,349	145	16
Bageshwar	1,006	100	10
Nainital	976	100	10
Champawat	78	78	census (all)
Total	7,431	610	—

Table 1. Population and sample by district. Source: author's field research (Pehchan ID scheme).



Source: author's field research (Pehchan ID scheme, Ministry of Textiles).

Figure 3. Artisan population and sample by district (total population 7,431; N = 610). Source: author's field research.

5. Results

5.1 Respondent profile

The artisan sample was slightly more female than male (53.2% versus 46.8%), concentrated in the 31–40 age group (45.5%), and modestly educated, with the largest share having completed schooling to the twelfth standard (38%). Incomes were low: around 51.6% reported annual income below ₹2.5 lakh, and only 3.2% above ₹10 lakh. Among the eight crafts, Tamta (copperware) products accounted for the largest share of respondents (about 29%). Local tradition and culture was the most cited inspiration for entering the craft (42.6%), and family continuity the most common reason for establishing the enterprise (45.9%), underlining the heritage-rooted, household character of artisan entrepreneurship in the region.

5.2 GI awareness and ownership

Awareness of GI tagging was high: 79.8% of artisans were aware of the GI system, yet only 39.1% actually held a GI tag for their product, an awareness–ownership gap of note. Awareness and ownership were somewhat higher among women (82.2%) than men (75.8%), and, strikingly, higher among lower-income (84% below ₹2.5 lakh) and less-formally-educated artisans (84.7% with schooling up to class ten) than among their higher-income and post-graduate counterparts. District-wise, Champawat recorded the highest combined awareness-and-ownership (88%) and Pithoragarh the lowest (70.2%). The pattern suggests that GI

engagement in Kumaun is rooted in traditional practitioner communities rather than concentrated among the more affluent or formally educated.

5.3 Digital adoption and the sale of Niche products (H01)

Digital adoption varied sharply across districts. Nainital led on every dimension, about 88.5% of artisan businesses used social media and 82.3% used digital payments, while Champawat lagged furthest behind, with the lowest adoption of E-commerce (35.8%), social media (71.8%), and digital inventory tools (25.6%). These differences tracked outcomes closely. Revenue growth after digital adoption was highest in Nainital (about 90%, with average craft revenue rising from roughly ₹45,000 to ₹85,570), followed by Almora (around 70%), and lowest in Champawat (around 50%). Social media was the leading product-discovery channel in Nainital (45.6% of tourists), whereas in the remoter Champawat traditional media (31.2%) and word of mouth (17.5%) still dominated.

The share of GI-product sales occurring online followed the same gradient, about 65% in Nainital, 45% in Almora, 42% in Pithoragarh, 38% in Bageshwar, and 35% in Champawat, while the leading barrier, poor internet connectivity, ran in the opposite direction, cited by 72.3% of respondents in Bageshwar and 70.2% in Pithoragarh but only 35.4% in Nainital. Digital-skill deficits mirrored this divide. Returns on digital investment were nonetheless favorable across the board, with payback periods between roughly 3.4 months (Almora, the strongest at about ₹2.62 returned per ₹1 invested) and 5.4 months (Bageshwar). On the strength of these results, the sub-hypotheses under H01 were rejected: digital-technology adoption has a significant and positive impact on the promotion and sale of Niche products.

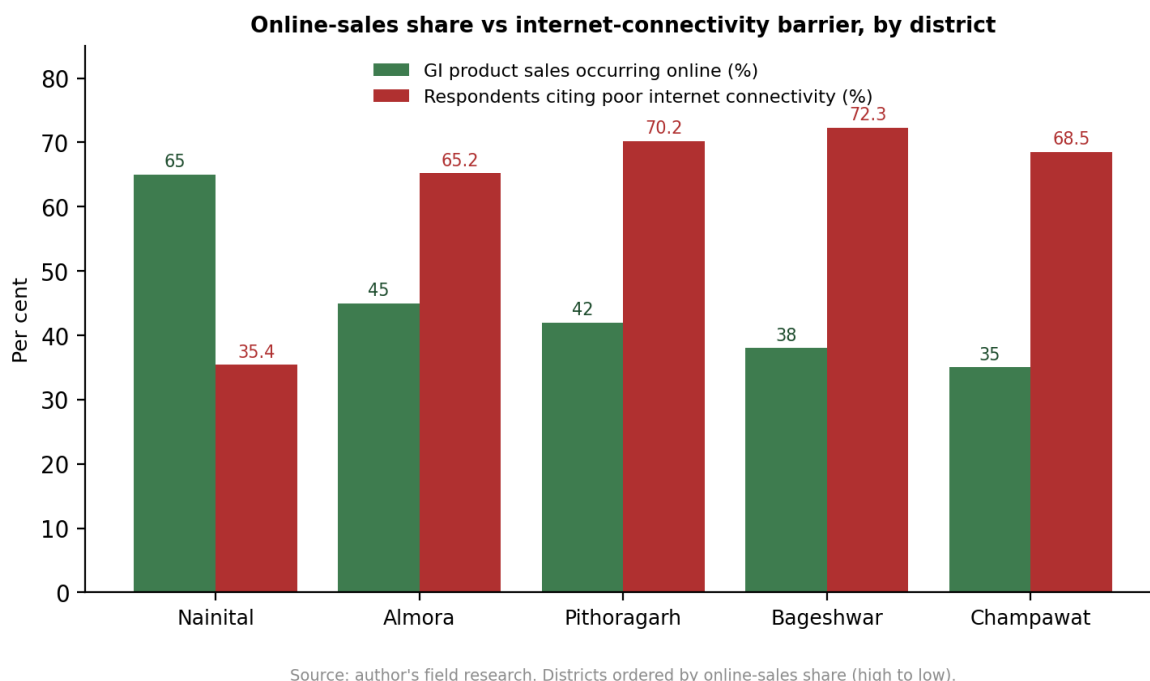


Figure 4. The intra-regional digital divide: online-sales share versus internet-connectivity barrier, by district.

5.4 Niche tourism and sustainable development (H02)

Using factor analysis and SEM, Niche tourism was found to have a significant positive impact across all four sustainability dimensions tested economic conditions of locals, socio-cultural position, environmental conservation, and sustainable capacity building leading to rejection of the sub-hypotheses under H02. Niche tourism, in other words, is associated not only with improved local incomes but also with cultural continuity, environmental awareness, and stronger community capabilities, consistent with its positioning as a lower-impact alternative to mass tourism in an ecologically sensitive region.

5.5 Challenges in developing and promoting Niche products

Garrett ranking of artisan responses identified coping with innovation as the foremost development challenge and resistance to change as the foremost promotion challenge, with limited government support and the difficulty of market expansion also prominent. Challenges were textured by geography and craft: the time-consuming GI-registration process was the leading grievance in Almora, Bageshwar, and Nainital; unhealthy competition affected Bhotia Dann and Aipan producers in Pithoragarh; and disputes over the geographical origin of goods, together with registration delays, troubled Likhai wood carving and Bicchu Buti fabric in the Nainital–Pithoragarh belt. Champawat artisans additionally reported limited awareness of the Pehchan scheme itself.

6. Discussion

Digital adoption as an amplifier of niche-tourism enterprise. The results position digital tools as the decisive lever converting GI-anchored craft into viable micro-enterprise. Where artisans are digitally active most visibly in Nainital, revenue, online-sales share, and discovery through social media all rise together, and investment pays back within months. This supports treating digital capability as a core systemic condition of the artisan entrepreneurial ecosystem rather than an optional enhancement.

An intra-regional digital divide. The headline finding that both hypotheses are rejected should not obscure the sharp inequality beneath it. The near-mirror relationship between online-sales share and internet-connectivity barriers (Figure 4) shows that the benefits of digitalization accrue unevenly: gateway districts capture them, while remoter districts, Champawat, Bageshwar, are constrained by connectivity and skills. Left unaddressed, digitalization risks widening rather than narrowing intra-regional disparities.

The awareness–ownership gap. High GI awareness (79.8%) alongside low GI ownership (39.1%) indicates that the institution is recognized but under-utilized, held back by a registration process that artisans repeatedly described as slow and complex. This echoes evidence from other Indian handicraft clusters, where GI awareness among artisans has not translated into ownership or benefit (Chaudhary et al., 2022). Closing this gap is a low-cost, high-return intervention: it activates an asset the region already possesses.

Implications for sustainable, inclusive development. That Niche tourism significantly advances economic, socio-cultural, environmental, and capacity dimensions locates GI craft tourism firmly within the SDG-8 agenda of decent work and inclusive growth, particularly salient given that GI engagement is strongest among lower-income, women, and traditional-practitioner artisans. The developmental promise, however, is conditional on building the digital and connectivity infrastructure that lets artisan enterprise reach the market.

7. Recommendations

- Strengthen artisans' digital presence: targeted digital-literacy programmes, attractive social-media and e-commerce listings, QR codes on product tags linking to craft stories, and onboarding to platforms such as GeM and Gaatha.
- Close the connectivity gap: coordinate with telecom providers to improve internet infrastructure in remoter districts, and offer subsidies or digital assistance where the cost of adoption is a barrier (notably Nainital's higher-cost segments and the lower-adoption districts).
- Activate the GI institution: district-level GI-facilitation centres and digital processing to simplify a registration process artisans find slow and complex, with collective branding and quality certification to curb unhealthy competition and origin disputes (e.g., Ringal, Rangwali Pichhoda, Bhotia Dann, Aipan).
- Integrate crafts with tourism: develop craft-tourism circuits and collaborations with homestays, cafés, and tour guides, and showcase GI products on official state and district tourism platforms and at national fairs.
- Build capacity and inclusion: district-wide promotion to avoid a sense of exclusion (notably Champawat), awareness of the Pehchan scheme, and workshops with the State Handicrafts Development Board and design institutions to adapt traditional crafts for contemporary markets.

8. Limitations and Future Scope

The study is bounded by its geographical focus on the Kumaun Hills, its selection of eight handicraft products, potential response biases, and the practical constraints of fieldwork in difficult mountain terrain, including language and cultural barriers. Future work could pursue a longitudinal assessment of Niche tourism's impact, extend the analysis to other Himalayan regions, examine youth engagement and entrepreneurship, explore cross-border tourism potential, and investigate the role of emerging AI-enabled digital tools in craft promotion.

9. Conclusion

This study examined how Niche tourism, anchored in GI-tagged handicrafts, and the digital adoption of artisans jointly shape economic and sustainable-development outcomes in the Kumaun Himalaya. Across five districts and 610 artisan respondents, digital-technology adoption emerged as a significant, positive driver of niche-product promotion and sales, and Niche tourism as a significant contributor to sustainable development across economic, socio-cultural, environmental, and capacity dimensions. Yet the aggregate findings rest on an uneven foundation: a marked intra-regional digital divide, a high-awareness but low-ownership relationship to GI status, and a registration process that dampens realization. The policy priority, accordingly, is to build the digital, connectivity, and institutional infrastructure that allows Kumaun's artisan micro-entrepreneurs to convert cultural heritage into decent, sustainable livelihoods, advancing the inclusive-growth ambitions of Sustainable Development Goal 8.

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