

Digitalization of Cirebon Batik SMEs: E-Commerce Strategies for Heritage Preservation and Profitability

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Abstract

Cirebon batik is both a living cultural heritage and a livelihood base for thousands of micro, small, and medium enterprises (SMEs) clustered in Trusmi. The migration of consumers to digital marketplaces has placed these heritage producers under competitive pressure that threatens their commercial viability and the continuity of traditional craft knowledge. This study investigates how Cirebon batik SMEs design e-commerce strategies that reconcile two often antagonistic objectives: heritage preservation and profitability. Using a qualitative multi-case design, data were gathered through in-depth interviews, focus group discussions, participant observation of online selling, and analysis of platform storefronts across three SME clusters. Effective digitalization emerged not as uniform technology adoption but as a layered repertoire combining marketplace listings, social commerce, live selling, and own-channel storytelling, calibrated to each enterprise's digital maturity. A positive association was found between a constructed Digital Maturity Index and net profit margin, while preservation advanced through motif provenance disclosure and digital cataloguing. The study proposes a Heritage-Profitability Digital Integration model operationalizing authenticity, adaptive capability, multichannel orchestration, value capture, and continuity as governance principles for craft-based digital enterprise.

Keywords: Cirebon Batik; E-Commerce Strategy; Cultural Heritage Preservation; Sme Profitability; Digitalization.

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1. Introduction

Batik is among the most recognizable expressions of Indonesian cultural identity, inscribed by UNESCO as a Masterpiece of the Oral and Intangible Heritage of Humanity. Within this national tradition, Cirebon batik occupies a distinctive position, marked by emblematic motifs such as the Mega Mendung cloud pattern and a coastal aesthetic shaped by centuries of maritime trade. The craft is concentrated in the Trusmi area and adjacent villages, where production is organized largely through micro, small, and medium enterprises (SMEs) that combine household labor, artisanal skill, and locally embedded knowledge. These enterprises are simultaneously cultural custodians and economic units, and their fortunes determine whether a fragile body of craft knowledge is transmitted to the next generation or eroded by market attrition.

The diffusion of digital commerce has transformed the competitive environment in which these heritage producers operate. Across Indonesia and other emerging economies, the migration of consumers to online marketplaces and social platforms has reconfigured how small enterprises reach demand, set prices, and build reputation (Achmad, 2023; Ardianto, 2025; Asanprakit & Kraiwanit, 2024). For SMEs, digitalization has been framed both as an unprecedented opportunity to escape geographic confinement and as a moderating capability without which e-commerce adoption falters (Khan et al., 2025; Aidargaliyeva et al., 2025). The promise is amplified for craft-based enterprises, where online channels can carry not only the product but also the story that confers cultural value (Li et al., 2025).

Yet the empirical record is uneven. While some artisan enterprises have leveraged marketplaces, social commerce, and live selling to expand reach and stabilize revenue (Sin & Susanto, 2025; Huwaida et al., 2024), many others struggle with low digital literacy, logistics fragility, and the price-based competition that platforms intensify (Feng et al., 2025;

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Gerpott & Berends, 2022). For heritage producers a further tension arises: the same digital exposure that lifts sales can accelerate the commodification of motifs, the flattening of provenance, and the imitation of designs, thereby endangering the very authenticity on which long-term value depends (Behre & Cauberghe, 2025; Lugo-Morin, 2025).

Cirebon batik exemplifies this tension with particular intensity. The craft's commercial value is inseparable from its cultural provenance, yet the digital marketplace rewards searchability, price competitiveness, and rapid turnover, conditions that can incentivize the dilution of motif meaning and the substitution of printed imitations for hand-drawn or stamped work. The producers most exposed to these pressures are precisely the micro and home-based enterprises that hold the deepest craft knowledge but the thinnest digital capability. Understanding how some enterprises navigate this terrain successfully, while others are squeezed, is therefore a question of both economic livelihood and cultural survival, and it is this dual stake that motivates the present study.

The existing literature on SME e-commerce has matured along several largely separate tracks. A first track examines adoption antecedents and digital readiness, treating e-commerce as a technological choice moderated by organizational and environmental factors (Khan et al., 2025; Bucevska & Bucevska, 2025; Feng et al., 2025). A second track investigates channel and marketing tactics, including conversion-rate optimization, social commerce, live selling, and AI-enabled personalization that drive transactional performance (Zimmermann & Auinger, 2023; Awad, 2024; Medjedel et al., 2024). A third, more recent track foregrounds rural and developmental outcomes of e-commerce, linking online channels to poverty reduction, farmer income, and territorial resilience (Cao & Li, 2025; Zhang et al., 2024; Maghfiroh et al., 2025; Lugo-Morin, 2025). Running parallel to these is a cultural-economy literature concerned with how traditional handicrafts negotiate digital markets and how authenticity is signaled online (Li et al., 2025; Behre & Cauberghe, 2025).

The state of the art therefore offers robust insight into either the commercial mechanics of SME digitalization or the cultural dynamics of heritage marketing, but rarely both at once, and almost never within the specific institutional and craft context of Cirebon batik. Studies that address Indonesian MSMEs tend to treat digital innovation as a generic empowerment lever (Achmad, 2023) or to focus on consumer-side adoption and social commerce behavior (Huwaida et al., 2024; Kurniadi & Rana, 2023), leaving the producer-side strategic reconciliation of preservation and profit underexplored.

The novelty of this study is threefold. First, it analytically couples two outcomes that the literature usually treats in isolation: heritage preservation and profitability, examining the conditions under which they reinforce rather than undermine each other. Second, it shifts the unit of analysis from consumer intention to the strategizing artisan enterprise, surfacing the layered channel repertoires that heritage SMEs actually enact. Third, it advances a context-grounded Heritage-Profitability Digital Integration (HPDI) model that operationalizes authenticity, adaptive capability, multichannel orchestration, value capture, and continuity as measurable governance principles for craft-based digital enterprise.

Building on these gaps, this study aims to: (a) map the e-commerce channel architecture employed by Cirebon batik SMEs; (b) analyze how these enterprises calibrate digital strategies to reconcile heritage preservation with profitability; (c) identify the structural barriers and organizational enablers that shape digitalization outcomes; and (d) develop the HPDI model applicable to heritage-based SME contexts. The study contributes theoretically by integrating the technology-organization-environment perspective, dynamic capabilities, and authenticity theory, and practically by generating actionable guidance for artisans, cluster associations, and policymakers in the creative economy.

2. Literature Review

2.1. E-Commerce Strategies for SMEs

E-commerce strategy for small enterprises is increasingly understood as a portfolio rather than a single platform decision. Marketplace participation lowers entry barriers and confers reach, but exposes sellers to intense price competition and assortment crowding (Gerpott & Berends, 2022; Jena & Meena, 2025). Social commerce embeds selling within social interaction, leveraging informativeness and word-of-mouth to convert engagement into purchase (Asanprakit & Kraiwani, 2024; Huwaida et al., 2024). Live selling adds synchronous interactivity and affective arousal that can lift conversion, particularly for visually rich and story-laden products (Sin & Susanto, 2025; Li et al., 2025). Own-channel webstores, though demanding, allow control over brand narrative and margin (Akin, 2024; Bernovskis et al., 2024). Conversion-rate optimization and AI personalization further shape the performance of each channel (Zimmermann & Auinger, 2023; Awad, 2024; Medjedel et al., 2024).

2.2. Digitalization and SME Profitability

A substantial body of work links digitalization to firm-level economic outcomes. Digital adoption is associated with productivity gains, sales expansion, and improved profitability, although the magnitude depends on scale, capability, and synergy with complementary strategies such as certification (Liu et al., 2024; Sodokin et al., 2023; Dimovski et al., 2025). For SMEs specifically, digitalization functions as a moderating capability that translates market access into realized performance (Khan et al., 2025; Aidargaliyeva et al., 2025; Feng et al., 2025). National and regional analyses confirm that e-commerce contributes measurably to growth where digital infrastructure and literacy are present (Bucevska & Bucevska, 2025; Kargabayeva et al., 2025; Wurarah et al., 2025). Evidence from West Java's agricultural value chains further shows that shortening intermediary layers and strengthening producer institutions markedly raise the producer's share of final value, underscoring that profitability gains hinge on supply-chain structure as much as on channel access (Nendi et al., 2026).

2.3. Digital Heritage Preservation and Authenticity

For craft-based enterprises, digital channels are not merely conduits for transactions but arenas in which cultural value is constructed and contested. Research on traditional handicrafts shows that platform visibility and youth-led content can revitalize demand while supporting the transmission of intangible heritage (Li et al., 2025). At the same time, authenticity must be actively signaled: certification labels, provenance disclosure, and narrative framing increase perceived credibility and willingness to pay, mitigating the commodification risk that accompanies mass digital exposure (Behre & Cauberghe, 2025; Anwar et al., 2025). Studies of rural digital economies caution that digitalization can simultaneously enable cultural preservation and generate new dependencies on external platforms (Lugo-Morin, 2025).

2.4. Theoretical Framework

This study integrates three theoretical lenses. The technology-organization-environment perspective frames e-commerce adoption as conditioned by technological readiness, organizational resources, and the competitive-institutional environment (Khan et al., 2025; Feng et al., 2025). Dynamic capabilities theory explains how enterprises sense market shifts, seize channel opportunities, and reconfigure routines to sustain advantage in volatile digital markets (Anwar et al., 2025; Akin, 2024). Authenticity theory accounts for how heritage producers maintain perceived genuineness as a source of differentiated value online (Behre & Cauberghe, 2025). Together these lenses inform the proposed HPDI model.

3. Methods

3.1. Research Design

This study adopts a qualitative research design consistent with its interpretive epistemology and the situated complexity of heritage-based digital enterprise. A multi-case study approach enables comparative analysis across enterprises that differ in digital maturity while preserving sensitivity to the local specificities of the Cirebon batik craft system (Shenjere & Middelberg, 2023; Peprah et al., 2024).

3.2. Study Area and Cases

Fieldwork was conducted between January 2025 and January 2026 in the Cirebon batik production area of West Java, Indonesia, centered on Trusmi and surrounding villages. Cases were drawn from three SME clusters selected to maximize variation in digital maturity and market orientation: Cluster A, established workshops in the Trusmi commercial hub with mature online operations; Cluster B, peri-urban enterprises with emerging digital practices; and Cluster C, home-based artisan units with nascent or intermittent online presence. This variation supports analysis of how strategy and outcomes differ across readiness levels.

3.3. Participants and Sampling

Informants were selected through purposive sampling to ensure representation of the key actor categories in the craft-commerce system. A total of 33 informants participated, comprising batik workshop owners, artisans, online sales staff, marketplace and logistics intermediaries, a cluster association representative, and a local creative-economy officer. Three focus group discussions were conducted, one per cluster. Table 1 summarizes the informant profiles.

Table 1. Profiles of Key Informants

Code	Category	Role	Cluster	Method
INF-01	Owner-Producer	Batik workshop owner	A	Interview
INF-02	Owner-Producer	Batik workshop owner	B	Interview
INF-03	Artisan	Master pattern-maker	A	Interview
INF-04	Artisan	Stamp (cap) artisan	C	FGD
INF-05	Digital Staff	Online sales admin	A	Interview
INF-06	Digital Staff	Social media / live host	B	FGD
INF-07	Intermediary	Marketplace reseller	B	Interview
INF-08	Intermediary	Logistics agent	A	Interview
INF-09	Community Actor	Cluster association rep.	A	Interview
INF-10	State Actor	Creative-economy officer	-	Interview
INF-11	Home Producer	Home-based artisan	C	FGD
INF-12	Home Producer	Home-based artisan	C	FGD

3.4. Data Collection

Three primary methods were used. In-depth interviews followed semi-structured guides, each lasting 60-90 minutes, and were audio-recorded and transcribed verbatim. Focus group discussions, with 6-9 participants per session, explored shared experiences of digital selling and heritage concerns. Participant observation of online selling practices included live-selling sessions, marketplace storefronts, and social-commerce activity. Documentary analysis covered platform listings, order and pricing records shared by informants, and cluster association materials, enabling triangulation across sources.

3.5. Data Analysis

Data were analyzed using six-phase reflexive thematic analysis, supported by NVivo software for coding. Codes were developed inductively and then organized into themes corresponding to channel architecture, heritage practices, profitability mechanisms, and barriers. To structure cross-case comparison, two composite descriptors were constructed from coded indicators: a Digital Maturity Index (DMI) and a Heritage Integration Score (HIS), defined in Section 4. Triangulation across interviews, FGDs, observation, and documents, together with member-checking of preliminary findings, enhanced credibility and trustworthiness.

3.6. Ethical Considerations

All participants provided informed consent, and confidentiality was protected through informant codes. The study observed Indonesian data-protection norms and the ethical standards of the authoring institution. Care was taken to respect the intellectual and cultural ownership of batik motifs throughout data collection and reporting.

4. Result and Discussion

4.1. E-Commerce Channel Architecture

Analysis of enterprise practices revealed a layered channel architecture rather than a single mode of online selling. Four channels recurred across cases: marketplace listings on national platforms, social commerce on messaging and social media, live selling, and own-channel webstores. Crucially, enterprises combined these channels in distinct repertoires aligned to their digital maturity. Table 2 maps the channels to their strategic function and the principal preservation and profitability levers each affords.

Table 2. E-Commerce Channel Architecture of Cirebon Batik SMEs

Channel	Strategic Function	Profitability Lever	Heritage Lever
Marketplace	Reach & discovery	Volume, search visibility	Standardized motif tags
Social Commerce	Relationship & trust	Repeat orders, low cost	Story-led posts, provenance
Live Selling	Conversion & demo	Real-time conversion	Process demonstration, narration
Own Webstore	Brand & margin	Higher margin, control	Curated catalogue, authentication

Figure 1 presents the conceptual framework that connects heritage assets and SME resources, through the e-commerce strategy platform, to the dual mechanisms of preservation and profitability that jointly produce a sustainable digital heritage enterprise.

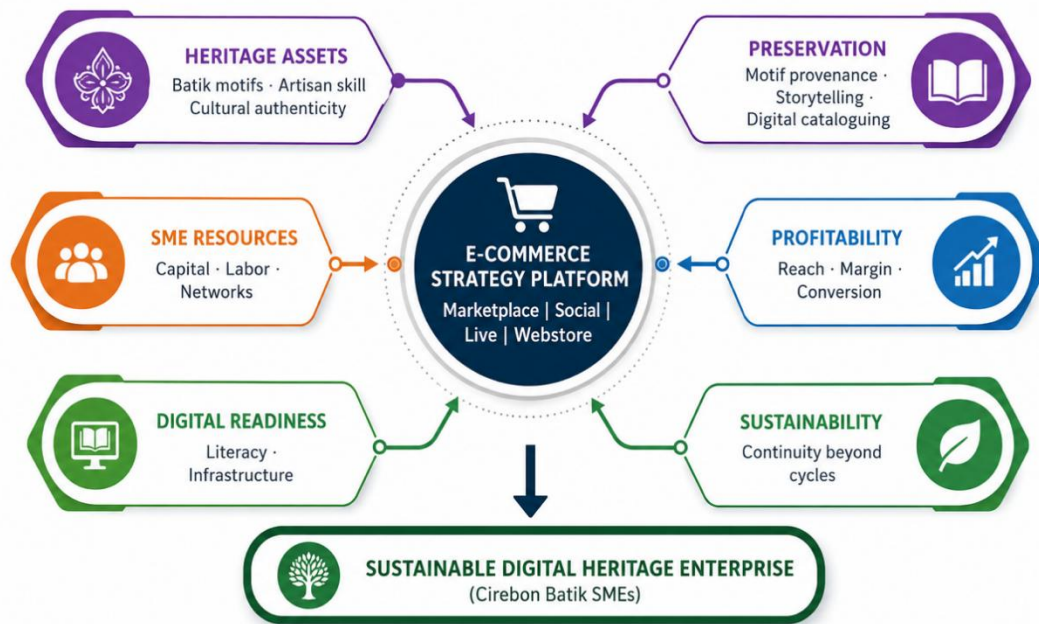


Figure 1. Conceptual framework linking heritage assets, e-commerce strategy, and dual outcomes.

4.2. Comparative Channel Adoption Across Clusters

Adoption of the four channels varied systematically across the three clusters. Mature workshops in Cluster A operated all four channels in an orchestrated manner, peri-urban enterprises in Cluster B emphasized marketplace and social commerce, and home-based units in Cluster C relied predominantly on social messaging with limited marketplace

presence. Figure 2 depicts the comparative adoption rates, expressed as the share of enterprises in each cluster actively using a channel.

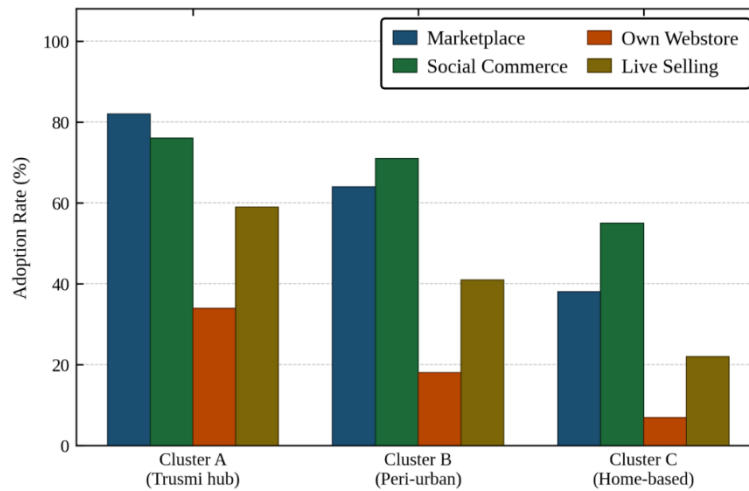


Figure 2. Comparative e-commerce channel adoption (%) across three SME clusters.

As one mature-workshop owner explained, the channels were understood as complementary rather than substitutable: marketplace listings attracted first-time buyers, while live selling and social messaging converted and retained them. A home-based artisan, by contrast, described reliance on a single messaging channel and intermittent posting, constrained by limited time, devices, and confidence. These accounts illustrate how digital maturity governs the breadth of the channel repertoire an enterprise can sustain.

4.3. Digital Maturity, Heritage Integration, and Performance

To compare cases, a Digital Maturity Index and a Heritage Integration Score were constructed from coded indicators, and each enterprise's self-reported net profit margin was recorded. Table 3 reports the composite descriptors by cluster. The Digital Maturity Index aggregates channel breadth, operational routines, and capability indicators, while the Heritage Integration Score captures the extent of provenance disclosure, narrative authentication, and motif cataloguing in online presentation.

Table 3. Digital Maturity, Heritage Integration, and Profitability by Cluster

Cluster	DMI (0-100)	HIS (0-100)	Net Profit Margin (%)	Dominant Repertoire
A (Trusmi hub)	78	71	24.6	Four-channel orchestration
B (peri-urban)	54	49	16.8	Marketplace + social
C (home-based)	31	58	11.3	Social messaging only

A consistent pattern emerged: enterprises with higher digital maturity reported higher profitability. Notably, the Heritage Integration Score did not decline monotonically with digital maturity. Cluster C, though digitally immature, retained strong craft authenticity in direct artisan-to-buyer messaging, whereas Cluster A actively re-encoded authenticity into scalable digital form through cataloguing and narration. This indicates that preservation and profitability need not trade off when authenticity is deliberately translated into the digital channel.

Figure 3 visualizes the association between the Digital Maturity Index and net profit margin across all sampled enterprises, showing a positive relationship that is consistent with the cluster-level pattern.

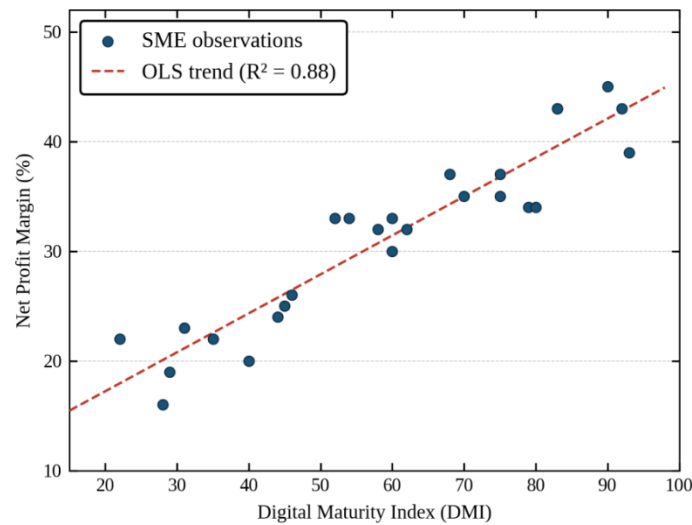


Figure 3. Association between Digital Maturity Index and net profit margin across enterprises.

4.4. Heritage-Profitability Digital Integration Index

To operationalize the joint pursuit of preservation and profit, the study derives a composite Heritage-Profitability Digital Integration (HPDI) index. The index weights five principles, each measured by enterprise-level indicators. Table 4 presents the principles, indicators, measurement formulae, and weights.

Table 4. HPDI Model: Principles, Indicators, and Measurement Formulae

Principle	Indicator	Formula / Measure	Weight (%)
Authenticity	Provenance disclosure rate	$AU = (\text{Disclosed motifs} / \text{Total listed}) \times 100\%$	20
Adaptive capability	Channel reconfiguration rate	$AC = (\text{Channels adapted} / \text{Total channels}) \times 100\%$	20
Multichannel orchestration	Active channel breadth	$MO = (\text{Active channels} / 4) \times 100\%$	20
Value capture	Net profit margin	$VC = (\text{Net profit} / \text{Revenue}) \times 100\%$	25
Continuity	Knowledge-transfer activities	$CO = (\text{Trained successors} / \text{Target}) \times 100\%$	15

Note: Indicator rates are computed independently within their formulae (each may reach 100%) before multiplication by the assigned weight to yield the composite HPDI score.

The composite score aggregates the five weighted indicators, as expressed in Equation (1):

$$HPDI = 0.20 \cdot AU + 0.20 \cdot AC + 0.20 \cdot MO + 0.25 \cdot VC + 0.15 \cdot CO \quad (1)$$

Applying the formula to the cluster descriptors yields HPDI scores that distinguish mature, transitional, and nascent enterprises while explicitly rewarding both value capture and continuity. The model thus reframes digitalization success for heritage SMEs as the balanced achievement of profitability and preservation rather than the maximization of either alone.

4.5. Barriers and Enablers

Seven recurrent factors constrained or facilitated digitalization. Table 5 presents the barriers alongside the enabling conditions identified across cases.

Table 5. Barriers and Enablers in the Digitalization of Cirebon Batik SMEs

No.	Dimension	Key Barriers	Key Enablers
1	Capability	Low digital literacy, time scarcity	Cluster training, youth involvement
2	Logistics	Shipping cost & fragility of goods	Aggregated logistics agents
3	Market	Price-based platform competition	Brand storytelling, own webstore
4	Heritage	Motif imitation & commodification	Provenance disclosure, certification
5	Finance	Limited working capital	Microfinance, marketplace credit
6	Technology	Device & connectivity gaps	Shared digital facilities
7	Institutional	Weak IP protection for motifs	Cluster association, local policy

4.6. Discussion

The findings confirm and extend the SME digitalization literature. Consistent with capability-centered accounts, digital maturity rather than mere platform presence predicted profitability (Khan et al., 2025; Feng et al., 2025; Aidargaliyeva et al., 2025). The layered channel repertoire observed here echoes evidence that marketplace, social commerce, and live selling perform distinct and complementary functions (Asanprakit & Kraiwanit, 2024; Sin & Susanto, 2025; Li et al., 2025). At the same time, the study departs from the dominant framing by demonstrating that heritage preservation can be embedded within, rather than sacrificed to, commercial digitalization. Where authenticity was deliberately re-encoded into digital form through provenance disclosure and narration, enterprises captured the credibility premium documented in signaling research (Behre & Cauberghe, 2025; Anwar et al., 2025) while sustaining cultural continuity.

The persistence of motif commodification risk, however, underscores the caution raised in rural digital-economy scholarship that e-commerce can lift producer incomes while platform dependence generates new vulnerabilities (Maghfiroh et al., 2025; Lugo-Morin, 2025). For Cirebon batik SMEs, this implies that profitability gains are durable only when paired with institutional protection of motifs and with continuity mechanisms that transmit craft knowledge. This parallels evidence from rice supply chains in the same West Java region, where cooperative membership and reduced intermediary dependency are the decisive determinants of producer margins (Nendi et al., 2026). In the Indonesian setting, such protection sits alongside broader consumer- and contract-protection regimes that shape trust in digital and credit-based transactions (Aminullah, 2026; Laoemoery & Dananjaya, 2026). The HPDI model operationalizes precisely this balance, offering a design and evaluation tool for heritage-based digital enterprise.

The qualitative accounts further illuminate the mechanisms behind these patterns. Owners in the mature cluster framed digital channels as an integrated funnel rather than isolated outlets, deliberately moving buyers from discovery toward relationship:

“The marketplace brings strangers to us, but it is the live session and the chat where they learn the meaning of the Mega Mendung and decide to pay more. We never lower the story to win on price.” (INF-01, batik workshop owner, Cluster A).

Artisans emphasized that narration was itself a form of preservation, since explaining a motif online reproduced the cultural knowledge attached to it. As one master pattern-maker observed, the act of describing provenance to distant buyers reinforced the very transmission that the craft depends upon:

“When I explain why a pattern is drawn this way, the young staff also learn it. The phone camera has become a place to teach, not only to sell.” (INF-03, master pattern-maker, Cluster A).

By contrast, home-based producers described the structural ceiling on their participation, where limited devices, connectivity, and time confined them to a single messaging channel and exposed them to imitation by larger sellers:

“My work is shared and copied, then sold cheaper by people who never touched the wax. I have only one phone and little time, so I cannot chase every platform.” (INF-11, home-based artisan, Cluster C).

These narratives substantiate the quantitative pattern in Tables 3 and 5: digital maturity expands the channel repertoire and the capacity to re-encode authenticity at scale, while capability, logistics, and institutional protection gaps disproportionately constrain the smallest heritage producers. Taken together, the evidence positions the HPDI model

not as an abstract scorecard but as a diagnostic that surfaces exactly where targeted support can convert cultural endowment into durable, preservation-consistent profitability.

5. Conclusion

5.1. Conclusion

This study examined how Cirebon batik SMEs design e-commerce strategies that reconcile heritage preservation with profitability. The evidence shows that successful digitalization is a layered, capability-dependent practice in which marketplace, social commerce, live selling, and own-channel storytelling are orchestrated according to enterprise maturity. Profitability rose with digital maturity, and preservation was sustained where authenticity was actively translated into digital form. The proposed HPDI model integrates authenticity, adaptive capability, multichannel orchestration, value capture, and continuity into a single, measurable framework, demonstrating that for heritage SMEs preservation and profit are complementary rather than competing objectives.

5.2. Recommendations

Cluster-level digital capability programs should be established to pair experienced youth with master artisans, broadening channel repertoires while transmitting craft knowledge. In parallel, a shared provenance and authentication system for Cirebon motifs including digital cataloguing and certification—should be developed to protect authenticity and command a credibility premium online. Logistics and packaging solutions ought to be aggregated at the cluster level to reduce shipping costs and product-fragility losses for individual SMEs. The HPDI model should be adopted as a monitoring and evaluation framework so that public and association support rewards balanced preservation-profitability outcomes rather than sales volume alone. Institutional protection of batik motifs needs to be strengthened, and SMEs should be linked to microfinance and marketplace credit to convert digital reach into durable profitability. Finally, longitudinal research should be commissioned to assess the sustainability of heritage-SME digitalization beyond funding and platform-promotion cycles.

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