

From Heritage Cloth to a Digital Learning Ecosystem: A Technopreneurship-Based Vocational Education Design for Investigating Batik Lasem Consumer Behavior

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Abstract. This conceptual paper proposes a vocational-education ecosystem that positions Batik Lasem, a Chinese-Javanese heritage craft from Central Java, as both a learning resource and a living market laboratory. The design integrates local-wisdom literacy, technopreneurship, digital consumer analytics, and artisan-school collaboration to investigate how perceived authenticity, cultural identity, product qualia, and digital heritage engagement shape consumer value, attitude, purchase intention, and loyalty. An integrative literature synthesis is translated into a testable research framework and a project-based learning cycle for vocational students. The model bridges education and industry by converting consumer insight into digital storytelling, product innovation, and evidence-based business decisions while safeguarding cultural meaning. It offers a practical route for sustainable local economic growth in the digital era.

Keywords: Batik Lasem; local wisdom; vocational education; technopreneurship; consumer behavior; cultural heritage; digital ecosystem

1 Introduction

The central challenge of the digital economy is not merely how local cultural products can enter wider markets, but how economic modernization can occur without erasing the cultural knowledge that gives those products their meaning. This problem is particularly relevant to Batik Lasem, a hand-drawn batik tradition from Rembang Regency, Central Java, whose visual language reflects long-standing interaction between Javanese and Chinese-Indonesian communities. Recent research describes Lasem batik motifs as visual narratives that preserve ethnic identity, cultural memory, and intercultural adaptation [1]. Research on Lasem's heritage environment likewise indicates that visitor satisfaction is strongly connected to perceived cultural authenticity and meaningful heritage experiences [2]. Therefore, Batik Lasem should be treated not only as a commodity, but also as a heritage system involving artisans, narratives, production skills, places, consumers, and intergenerational learning.

At the same time, cultural sustainability requires market sustainability. Heritage products survive when new generations understand them, producers can earn viable incomes, and consumers perceive sufficient cultural, aesthetic, functional, and emotional value. A recent Batik Lasem study found that heritage identity and product quality are important in building brand loyalty and symbolic meaning [3]. Studies of intangible cultural heritage products more broadly show that cultural identity, consumer knowledge, authenticity, scarcity, and product characteristics can influence purchase intention [4–6]. These findings suggest that consumer research is not external to heritage preservation; it can become a mechanism for understanding which cultural meanings are recognized, misunderstood, valued, or ignored by contemporary markets.

Vocational education is strategically positioned to connect these two requirements. Its strength lies in applied learning, industry relevance, and the development of occupational and entrepreneurial competence. Studies in Indonesian vocational education emphasize that technopreneurship should combine entrepreneurial orientation with technology use, while scientific and project-oriented technopreneurship learning can strengthen entrepreneurship learning outcomes [7,8]. More recent work also stresses that Indonesian vocational entrepreneurship education needs practical skills, a contextual mindset, active collaboration with industry, and digital technology integration [9,10]. Local-wisdom-based learning further provides evidence that cultural context can strengthen entrepreneurial competencies among vocational learners [11].

Based on these converging streams, this paper proposes a conceptual design in which Batik Lasem becomes a living laboratory for vocational technopreneurship. Students do not merely learn to sell batik online; they learn to document heritage knowledge, formulate consumer-research questions, gather and interpret market data, develop digital narratives, test product or service concepts, and return evidence to artisans and micro, small, and medium enterprises (MSMEs). The model directly responds to the PIC SEME theme, “Bridging Local Wisdom in Education and Industry for Sustainable Economic Growth in the Digital Era,” by making local wisdom the content of learning, industry collaboration the setting of learning, technology the means of inquiry, and sustainable local economic value the shared outcome.

Accordingly, this paper addresses three questions: (1) how can a technopreneurship-based vocational learning model be conceptually integrated with Batik Lasem heritage knowledge; (2) which consumer-behavior constructs are appropriate for studying Batik Lasem as an intangible-cultural-heritage product; and (3) how can the resulting consumer insight feed back into vocational learning and the local batik ecosystem? The contribution is a dual-layer framework that integrates an educational design with a testable consumer-behavior model rather than treating curriculum development and market research as separate activities.

2 Literature Foundation

2.1 Batik Lasem as heritage culture and market meaning

Batik Lasem is distinctive because cultural hybridity is embedded in its motifs, color traditions, craft processes, and social history. Haryanti et al. show that hand-drawn Lasem batik combines Chinese symbolic forms and Javanese patterns in ways that function as cultural storytelling [1]. This means that consumer evaluation may depend not only on fabric quality or price, but also on whether buyers perceive the object as culturally authentic, meaningful, and connected to a credible production tradition. The heritage environment of Lasem adds another layer: architecture, batik businesses, and cultural spaces jointly shape visitor perceptions and satisfaction [2]. Thus, the “product” that consumers encounter can be understood as a bundle of cloth, story, place, maker, cultural identity, and experience.

This interpretation is consistent with research on intangible cultural heritage products. Zhang, Guo, and Guo found that cultural identity positively influences purchase intention and that consumer knowledge strengthens this effect; perceived scarcity also helps explain why handmade heritage products can be valued differently from machine-made products [4]. Li, Romainoor, and Sun found in a batik context that creativity, beauty, eco-friendliness, and consumer attitude are important for purchase intention [5]. Earlier cross-cultural research on traditional cultural products similarly identified cultural and historical authenticity, aesthetics, craftsmanship, and consumer cultural orientation as relevant to purchasing responses [6].

For Batik Lasem, these studies imply that consumer behavior should be examined through heritage-sensitive variables. A purely transactional model based on price and promotion would underrepresent the symbolic and educational dimensions of the product. The proposed design therefore centers four antecedent domains: perceived authenticity, cultural identity, product qualia, and digital heritage engagement. These are expected to shape perceived heritage value and consumer attitude, which in turn influence purchase intention, loyalty, and advocacy.

2.2 Vocational education and technopreneurship

Technopreneurship in vocational education refers to the integration of entrepreneurial capability with the ability to identify, adopt, and create value through technology. Sakti, Yetti, and Wulansari argue that vocational institutions should develop graduates who possess not only an entrepreneurial spirit but also technology-based entrepreneurial capacities [7]. Hidayat et al. similarly demonstrate the relevance of technopreneurship-oriented scientific learning and learner readiness to entrepreneurship learning outcomes in higher vocational education [8]. In this paper, technology is not restricted to e-commerce. It includes digital data collection, social-media analytics, visual storytelling, customer-relationship tools, digital prototyping, marketplace experimentation, and evidence-based decision making.

This direction is consistent with the shift from entrepreneurship learning as classroom theory toward practical, collaborative, and digitally integrated learning. Widodo et al. propose an Indonesian vocational entrepreneurship model emphasizing entrepreneurial mindset, practical skills, and active industry collaboration [9]. Sultono et al. identify the importance of integrating entrepreneurship and digital technology across subjects, extracurricular activities, career development, and practice-oriented learning [10]. The implication is that a Batik Lasem project should be organized as an authentic production-and-research environment rather than as a one-off cultural assignment.

Local wisdom provides the ethical and contextual foundation for this environment. Tahir and Hasan report higher entrepreneurship competency among vocational students exposed to local-wisdom-based learning than among those without such exposure [11]. In the Batik Lasem context, local wisdom includes motif meanings, craft ethics, tacit production knowledge, intergenerational stories, local language and place identity, artisan relationships, and norms regarding appropriate cultural representation. Technopreneurship therefore becomes culturally responsible innovation: technology is used to extend, interpret, and economically sustain heritage, not to detach products from their cultural origin.

2.3 Consumer behavior as an educational object

The proposed model treats consumer research as a vocational competence. Students learn to translate cultural and business questions into measurable constructs, design instruments, collect consent-based data, analyze patterns, and communicate findings to partner MSMEs. This approach transforms consumer behavior from a marketing topic into an interdisciplinary learning object connecting heritage studies, entrepreneurship, statistics, digital media, design, and customer experience.

A key educational principle is reciprocal value. Artisans and MSMEs contribute authentic cultural knowledge and real business problems; vocational teachers provide learning design and methodological supervision; students contribute data collection, digital content, prototypes, and analysis; consumers contribute feedback; and the resulting evidence returns to both curriculum and industry. The ecosystem is therefore cyclical rather than linear. Its success is measured not only by student grades or short-term sales, but by improved heritage literacy, entrepreneurial

competence, ethical digital capability, consumer understanding, and locally retained economic value.

3 Method

This paper uses an integrative conceptual-design approach. The design was developed by synthesizing peer-reviewed literature on Batik Lasem heritage, intangible-cultural-heritage consumer behavior, vocational entrepreneurship, technopreneurship, digital integration, and local-wisdom-based learning. The synthesis followed three analytical steps. First, heritage-specific market constructs were identified from research on Batik Lasem and comparable cultural products. Second, vocational-learning mechanisms were derived from technopreneurship and entrepreneurship-education studies. Third, both streams were mapped into a single educational-industry feedback system.

The result is not presented as an empirically validated model. Instead, it is a set of theoretically grounded relationships that can be tested in a subsequent field study in Central Java. This distinction is important because no primary survey, experiment, or interview data were collected for the present conceptual paper. The proposed model is therefore intended to guide instrument development, sampling, learning implementation, and hypothesis testing.

3.1 Proposed variables and hypotheses

Perceived authenticity refers to the degree to which consumers believe Batik Lasem represents credible cultural origin, handmade practice, historical continuity, and genuine artisan narratives. Cultural identity refers to the degree to which consumers connect Batik Lasem with collective belonging, regional or national cultural meaning, or personal cultural self-expression. Product qualia refers to perceived beauty, creativity, craftsmanship/delicacy, and eco-value. Digital heritage engagement refers to the extent to which consumers interact with and learn from digital stories, maker profiles, motif explanations, short videos, virtual catalogues, or QR-linked product histories.

These antecedents are proposed to influence perceived heritage value, defined as the combined functional, emotional, social, cultural, and learning value associated with Batik Lasem. Perceived heritage value is expected to strengthen consumer attitude, which then influences purchase intention, brand loyalty, and advocacy. Consumer knowledge is also expected to strengthen the relationship between cultural identity/authenticity and purchase intention because informed consumers can better interpret heritage cues [4].

The conceptual hypotheses are: H1, perceived authenticity positively influences perceived heritage value; H2, cultural identity positively influences perceived heritage value; H3, product qualia positively influences consumer attitude and perceived heritage value; H4, digital heritage engagement positively influences consumer knowledge and perceived heritage value; H5, perceived heritage value positively influences consumer attitude; H6, consumer attitude positively influences purchase intention; and H7, purchase intention and perceived heritage value positively influence loyalty and advocacy. Consumer knowledge is proposed as a moderator of the effects of authenticity and cultural identity on purchase intention.

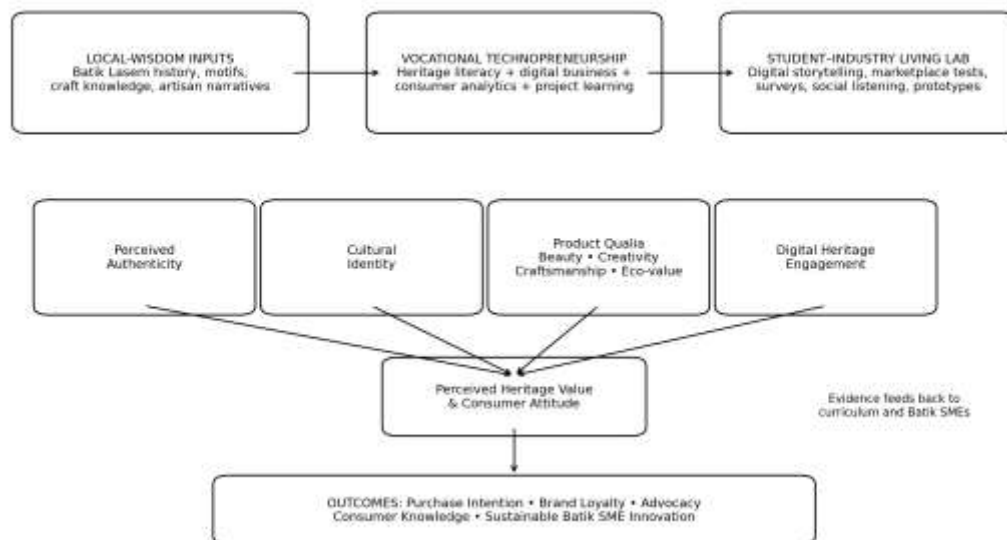


Fig. 1. Proposed dual-layer ecosystem linking vocational technopreneurship, Batik Lasem consumer research, and sustainable heritage innovation.

3.2 Proposed empirical research design

A future empirical test can use a mixed-method sequential design. The first phase should involve interviews and focus groups with Batik Lasem artisans, MSME owners, heritage activists, vocational teachers, students, and selected consumers. This phase would validate local terminology, sensitive cultural meanings, digital practices, and item wording. The second phase would use a structured consumer survey with respondents who have seen, visited, purchased, or seriously considered Batik Lasem. Purposive and intercept sampling can be combined across batik outlets, heritage-tourism locations, exhibitions, schools, and digital channels in Rembang and other Central Java cities.

For quantitative testing, a target of at least 300 valid responses is recommended to support structural equation modeling with multiple latent constructs and subgroup analysis. Items can use a five- or seven-point Likert scale. Measurement validation should assess indicator reliability, internal consistency, convergent validity, discriminant validity, and common-method bias. Structural analysis can then test direct, mediated, and moderated paths. Multi-group comparison may examine differences by generation, prior Batik Lasem knowledge, place of residence, purchase experience, and level of digital engagement. Qualitative follow-up interviews should be used to explain statistically strong or unexpected relationships rather than relying on numerical results alone.

Ethically, the study should distinguish cultural documentation from commercial appropriation. Artisan permission is needed before digitizing stories, motifs, photographs, or workshop knowledge. Students should be trained in informed consent, privacy, respectful representation, data minimization, and transparent attribution. The research should also avoid presenting sacred, restricted, or community-sensitive meanings as generic marketing content.

3.3 Proposed Vocational Technopreneurship Learning Design

The educational design is organized as a six-stage “Heritage-to-Market Learning Cycle.” Each stage produces both a learning outcome and an industry-useful output. The cycle can be implemented within entrepreneurship, marketing, fashion, craft, digital business, multimedia, or cross-program teaching-factory activities.

3.1 Stage 1: Heritage immersion and problem framing

Students begin with guided field learning involving artisans, batik houses, heritage spaces, and community narratives. They document production stages, motif meanings, maker histories, and current business challenges. The output is a verified heritage brief and a problem statement, for example: why do younger consumers appreciate Batik Lasem visually but hesitate to purchase, or which story formats increase understanding of a motif without oversimplifying its cultural meaning?

3.2 Stage 2: Consumer-research design

Students convert the problem into variables, interview questions, survey items, and sampling plans. Teachers introduce reliability, validity, bias, ethics, and basic analytics. Industry partners review whether the questions are relevant to real decisions. The output is a research instrument linked to a clear decision such as product development, pricing communication, digital storytelling, market segmentation, or visitor experience.

3.3 Stage 3: Digital data collection and consumer analytics

Students gather data using digital forms, QR-linked surveys, marketplace feedback, social-media interaction metrics, and structured observations. More advanced cohorts can conduct text coding of online reviews or simple dashboard analysis. The emphasis is not on collecting the largest possible dataset, but on producing valid and interpretable evidence. Students compare consumers with different levels of knowledge and purchase experience to identify how heritage meaning affects market response.

3.4 Stage 4: Technopreneurial prototyping

Consumer insight is translated into prototypes. Possible outputs include a QR-based “story of the cloth,” a digital product passport, motif-learning cards, short-form videos featuring artisans, a heritage-sensitive marketplace catalogue, product bundles for first-time buyers, or redesigned visitor experiences. Technology is used to improve traceability, interpretation, access, and customer experience while the original craft process and attribution remain visible.

3.5 Stage 5: Market experiment and reflection

Selected prototypes are tested with consumers through A/B content comparisons, small exhibitions, digital campaign experiments, or pre-order simulations. Students compare engagement, comprehension, attitude, and purchase intention while recording qualitative feedback. The learning task requires reflection on both commercial performance and cultural integrity: a high-click campaign is not automatically successful if it distorts heritage meaning.

3.6 Stage 6: Knowledge return to the ecosystem

Students present evidence and recommendations to artisans, partner MSMEs, teachers, and local stakeholders. Datasets are anonymized, cultural documentation is archived according to agreed permissions, and reusable learning modules are created for the next cohort. The cycle then restarts with new questions generated by industry feedback. In this way, the school becomes a local knowledge intermediary connecting heritage preservation, consumer understanding, and digital enterprise.

3.4 Expected Contributions and Discussion

The first contribution is conceptual integration. Existing literature often discusses heritage preservation, consumer behavior, and vocational entrepreneurship in separate domains. The proposed model connects them through a reciprocal mechanism: local wisdom shapes the learning content; technopreneurship shapes the learning process; consumer research generates market evidence; and market evidence returns to cultural producers and curriculum. This architecture responds to the need for vocational education that is simultaneously industry-relevant and culturally grounded.

The second contribution is to Batik Lasem sustainability. Heritage preservation can become fragile when it is separated from everyday economic life. By investigating authenticity, cultural identity, product qualia, consumer knowledge, and digital engagement, MSMEs can learn which attributes create value for different consumer segments. Such evidence can support better storytelling, product presentation, visitor experiences, and market segmentation without reducing Batik Lasem to decorative motifs. The goal is value translation rather than cultural simplification.

The third contribution is pedagogical. Students encounter authentic uncertainty: consumer responses are not predetermined, industry problems may be ambiguous, and cultural meanings require careful verification. These conditions are more suitable for technopreneurial learning than simulated classroom cases because learners must combine technical, analytical, entrepreneurial, communicative, and ethical competence. The model also allows vocational schools to become producers of locally relevant evidence rather than passive users of standardized teaching materials.

The fourth contribution is digital inclusion for heritage SMEs. Digital transformation is frequently framed as adoption of marketplaces and social media. The proposed model expands it to include consumer analytics, digital provenance, data-informed storytelling, and iterative experimentation. This allows technology to serve both economic and educational functions. It can improve market reach while helping consumers understand why handmade Batik Lasem is culturally and economically different from mass-produced imitation.

Nevertheless, several risks must be managed. Consumer preferences can pressure producers toward homogenization if sales metrics become the only decision criterion. Digital platforms can detach motifs from their makers, accelerate imitation, and reward simplified narratives. Student projects may unintentionally extract cultural knowledge without adequate reciprocity. Therefore, the model requires governance principles: artisan attribution, informed permission, contextual accuracy, data protection, shared benefit, and explicit boundaries between innovation and inappropriate modification of cultural expressions.

3.5 Implications for Sustainable Economic Growth

Sustainable economic growth in a heritage region depends on the capability to create value that remains locally anchored. The proposed ecosystem supports this in four ways. First, it strengthens human capital by developing vocational graduates who understand entrepreneurship, digital tools, research, and cultural context. Second, it strengthens MSME decision quality through low-cost consumer evidence and iterative prototyping. Third, it strengthens cultural capital by documenting and teaching heritage meanings in collaboration with knowledge holders. Fourth, it strengthens relational capital by creating recurring collaboration among schools, artisans, businesses, consumers, and local institutions.

The model also changes how “industry linkage” is understood. Instead of industry merely receiving interns or evaluating graduate skills, Batik Lasem enterprises become co-educators and co-research partners. Conversely, vocational schools do not position themselves as outside consultants; they contribute through structured student learning that generates useful but ethically governed outputs. This mutuality is central to bridging education and industry under the conference theme.

4 Conclusion

Batik Lasem provides a strong context for reimagining vocational education as a local-wisdom-based technopreneurship ecosystem. Its value lies not only in the finished textile but in the relationship among craft skill, cultural memory, identity, place, storytelling, and contemporary consumer interpretation. A vocational program can make those relationships visible by combining heritage immersion, consumer research, digital analytics, prototyping, market experimentation, and knowledge return to artisans and MSMEs.

The conceptual framework proposed in this paper links perceived authenticity, cultural identity, product qualia, digital heritage engagement, consumer knowledge, perceived heritage value, attitude, purchase intention, loyalty, and advocacy. It simultaneously links these market variables to a six-stage vocational learning cycle. Future research should empirically test the model in Central Java and evaluate both consumer outcomes and educational outcomes. If validated, the approach can provide a replicable model for other Indonesian heritage industries in which local wisdom is not treated as an ornamental curriculum topic, but as an active source of innovation, evidence, and sustainable economic value.

Table 1. Operational logic of the proposed learning ecosystem

Learning stage	Student competence	Industry/heritage output	Evidence generated
Heritage immersion	Cultural literacy; problem framing	Verified heritage brief	Field notes; artisan validation
Research design	Survey/interview design; ethics	Decision-focused research plan	Instrument and sampling protocol
Digital analytics	Data literacy; interpretation	Consumer segment insight	Survey, review, engagement data
Prototyping	Digital content; business modeling	Heritage-sensitive prototype	User feedback; concept tests
Market experiment	Experimentation; reflection	Evidence for communication/product decisions	Engagement, attitude, intention
Knowledge return	Presentation; collaboration	Recommendations and reusable learning assets	Dashboard, report, archive

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