

Potential and strategies for developing agate-based creative tourism

Asep Sufyan Muhakik Atamtajani^{1*} and Husen Hendriyana²

¹ Telkom University, Bandung, Indonesia, Indonesia

² Indonesian Institute of Arts and Culture Bandung, Bandung, Indonesia

*Corresponding author's email: krackers@telkomuniversity.ac.id

Abstract

Agate stones constitute an important component of Indonesia's cultural heritage, valued for their historical significance, symbolic meanings, and aesthetic qualities. In recent years, however, their popularity has declined due to shifting market trends and the weakening of traditional jewelry industries. This study aims to (1) examine the potential of agate as a creative tourism attraction and (2) formulate development strategies for agate-based tourism rooted in traditional jewelry craftsmanship in Pasirjambu. A qualitative case study approach was employed involving agate artisan communities. Data were collected through participant observation, in-depth interviews (n = 4 artisans representing four generational groups), and limited visitor surveys, and were analyzed using SWOT to systematically map internal and external development factors. The findings indicate that agate demonstrates strong potential within creative tourism frameworks, particularly through educational tourism, experiential tourism, and shopping-based tourism. Visitors show interest not only in finished jewelry products but also in production processes, direct artisan interaction, and hands-on workshop experiences. Strategic priorities include strengthening destination branding, diversifying creative tourism products, optimizing digital marketing, and reinforcing Hexa Helix collaboration among artisans, local government, and tourism stakeholders. A community-based development approach is essential to ensure long-term sustainability and improve artisan welfare. This study contributes an operational model for creative industry-based tourism that is adaptable to regions with similar cultural and material resources and supports the revitalization of Indonesia's traditional agate sector.

Keywords

Agate, Creative tourism, IKM, Practice-led research, Hexa helix

Introduction

In the context of the creative industries, agate-based jewelry can be understood as part of craft and product design practices that translate material culture into tangible products. Agate craftsmanship reflects accumulated artisanal knowledge and local cultural expression. However, its potential has not yet been widely explored within

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creative tourism development, particularly in relation to visitor participation, workshop-based experiences, and direct interaction between tourists and artisans.

Agate stones constitute an important component of Indonesia's material culture and have long been associated with traditional jewelry, symbolic meanings, and aesthetic expression. Within the creative industry framework, agate craftsmanship occupies a position at the intersection of craft practice, product design, and cultural heritage. Jewelry produced from natural stones reflects accumulated local knowledge, artisanal skills, and cultural narratives transmitted across generations.

Nevertheless, several recent studies and field observations indicate that the agate sector in a number of regions is facing structural challenges. These include shifting market preferences, limited product innovation, and indications of weakening intergenerational transfer of craftsmanship. Such conditions suggest the need for new strategic approaches to sustain the relevance and economic value of agate-based creative practices.

Within the context of contemporary creative tourism, agate-based craftsmanship presents a promising yet underexplored resource for tourism development. Creative tourism, as defined by Richards and Raymond (2000), emphasizes active visitor participation, experiential learning, and meaningful cultural engagement. This approach allows visitors not only to purchase products but also to understand the processes, values, and cultural narratives embedded in craft production.

Despite this potential, the integration of agate craftsmanship into structured creative tourism experiences remains limited, particularly in village-based tourism contexts. Previous studies have largely focused on craft production or tourism development separately, leaving a gap in understanding how traditional agate jewelry practices can be systematically transformed into participatory tourism assets. Addressing this gap, the present study explores the strategic positioning of agate craftsmanship within creative tourism development frameworks.

The recent expansion of Indonesia's creative industries and tourism sectors has been closely associated with broader digital transformation trends often discussed within the Society 5.0 discourse. In this context, the growing influence of digital culture and social media has reshaped visitor preferences toward visually engaging and experience-oriented tourism activities. Craft workshops, participatory cultural programs, and small-scale creative destinations have gained increasing attention from visitors seeking authentic and shareable experiences. Within this evolving landscape, agate-based creative tourism represents a relevant yet insufficiently developed opportunity, particularly due to the strong visual character of gemstones, the potential for hands-on engagement, and the possibility of direct interaction between visitors and local artisans.

This study situates agate-based jewelry within Indonesia's economic transformation discourse by examining its relevance to green economy principles in the creative industry sector. The green economy is commonly associated with resource efficiency,

social value creation, and environmentally responsible production systems [1][2][3][4]. In this context, the present research focuses on how the utilization of locally sourced agate as a natural resource intersects with human resource capabilities in traditional jewelry production, two dimensions that have often been examined separately in previous studies [5][6][7][8][9][10][11]. Rather than treating sustainability as a general policy aspiration, this study investigates how craft-based production and creative tourism integration may contribute to localized value creation and more responsible resource use. The life-cycle perspective in eco-innovative product development further provides an analytical lens for assessing the sustainability implications of gemstone-based creative products [12][13]. Empirically, this research is conducted in the agate artisan cluster of Pasirjambu, West Java, Indonesia. Addressing the limited integration between traditional agate craftsmanship and structured creative tourism development, the study aims to formulate a context-based strategic framework for positioning agate craft as a sustainable creative tourism asset.

This research aims to contribute to strengthening the resilience of local creative economies, particularly in regions with a strong tradition of agate craftsmanship. Preliminary observations indicate two interrelated structural issues. First, the utilization of agate resources has shown signs of stagnation in several local contexts, often associated with limited product innovation and restricted market access, which may reduce the economic value captured by local artisans. Second, although the Hexa Helix model conceptually emphasizes multi-stakeholder collaboration, its operational integration in agate-based creative tourism development remains insufficiently examined. Existing initiatives tend to involve fragmented interactions among government, academia, business actors, communities, media, and tourism stakeholders rather than coordinated value co-creation. Addressing these gaps, this study investigates how agate craftsmanship can be strategically repositioned through an integrated creative tourism framework to support more sustainable local economic development.

The objectives of this research are threefold: (1) to examine the potential of agate craftsmanship as a creative tourism attraction grounded in traditional jewelry practices; (2) to analyze development pathways for agate-based creative tourism using an integrated creative tourism and design-oriented analytical approach; and (3) to evaluate the role of multi-stakeholder collaboration within the Hexa Helix framework in supporting resource optimization, human resource capacity, and community-based value creation in the agate creative sector. [Figure 1](#) illustrates the analytical positioning of the Hexa Helix framework in this study.

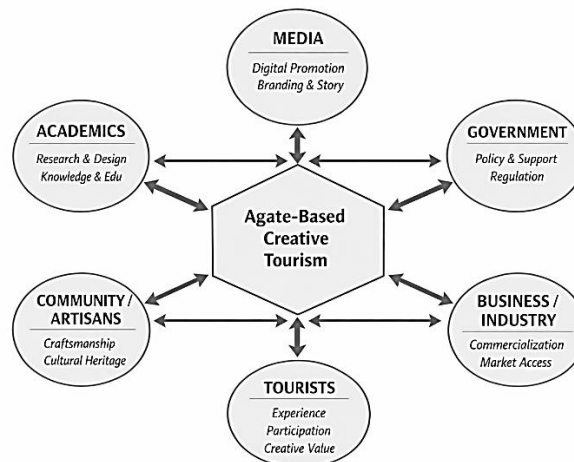


Figure 1. Hexa helix framework in agate-based creative tourism development [14], [15]

The Hexa Helix model is employed in this study as an analytical lens to examine the configuration of multi-stakeholder interactions in agate-based creative tourism development. The model was selected because it extends the traditional Triple and Quadruple Helix perspectives by explicitly incorporating the roles of community and media actors, which are particularly relevant in small-scale creative industry ecosystems. Rather than treating the Hexa Helix as a purely descriptive framework, this study uses it to map the intensity, roles, and interaction patterns among key stakeholders in the Pasirjambu agate cluster. However, it is important to note that the model is applied here as an interpretive analytical tool within a qualitative case context, and further quantitative validation across multiple regions remains an area for future research.

From the tourism perspective, visitors play an essential role not only as consumers but also as active participants in creative experiences, generating multiplier effects for local economies. These include the emergence of supporting activities such as workshops, local retail, cultural events, and culinary services. Referring to the issues, objectives, and focus outlined above, the urgency of this research lies in:

1. Examining how the utilization of agate resources can be strategically repositioned through creative tourism to support innovation, destination competitiveness, and locally grounded economic value creation; and
2. Analyzing the configuration of collaborative networks among stakeholders and their role in shaping the long-term sustainability of agate-based creative tourism and the socio-economic resilience of artisan communities.

This study advances prior work by operationalizing the integration of practice-led research and Design Thinking within a community-based creative tourism context, providing empirically grounded evidence from the agate craft ecosystem in Pasirjambu.

Method

This research adopts a Practice-Led Research (PLR) approach as the primary methodological framework to investigate the development of agate-based creative

tourism grounded in traditional jewelry craftsmanship. PLR is particularly relevant for design and craft studies because it enables knowledge generation through iterative creative practice and reflective inquiry [30]. Within this framework, design thinking is employed as an operational process to structure the stages of exploration, ideation, prototyping, and evaluation in transforming agate resources into creative tourism experiences. The study also draws conceptually on Swann's discussion of the relationship between Action Research and design practice to support its context-sensitive and intervention-oriented orientation [29]. However, Action Research is not positioned as the main research design but rather as a complementary perspective informing stakeholder engagement. This integration ensures methodological coherence between creative practice, analytical reflection, and context-based development objectives.

In the exploratory stage, the researchers systematically identified the potential of agate resources, traditional jewelry techniques, cultural narratives, and tourism opportunities through qualitative field inquiry. Data were collected using participant observation at artisan workshops in Pasirjambu, semi-structured interviews with local artisans, community representatives, and tourism actors, as well as visual and process documentation of agate production activities. The collected data were analyzed using thematic analysis to map key potentials, constraints, and development opportunities related to agate-based creative tourism. The findings from this exploratory phase then informed the subsequent concept development stage, in which creative tourism scenarios were formulated by integrating product design innovation, artisan–visitor interaction models, hands-on workshop experiences, and destination branding strategies.

Subsequently, experimentation was conducted through the development and limited field testing of agate-based creative tourism prototypes, including jewelry product variations, structured workshop formats, and visitor experience scenarios. The experimental phase involved iterative prototyping with local artisans in Pasirjambu and pilot testing with selected participants consisting of visitors and community members. Evaluation was carried out using user experience assessment, observation sheets, and short questionnaires to measure key indicators, including design coherence, experiential value, visitor engagement, and perceived cultural authenticity. The collected data were analyzed descriptively to examine the feasibility and experiential performance of the proposed creative tourism model. This stage follows the practice-based research principles outlined by Hendriyana [30] and is conceptually grounded in sustainable design principles and culturally responsive creative practices [31][32].

This study constitutes applied research in the context of creative industry development, emphasizing the interaction between ethics, aesthetics, and sustainability in creative tourism practices [33]. Beyond proposing a conceptual model, the research implemented pilot interventions within agate artisan communities in Pasirjambu through prototype workshops, product development trials, and collaborative tourism

simulations. The proposed framework was subjected to limited field validation involving artisans and visitors to assess its operational feasibility, experiential coherence, and perceived socio-economic relevance. The findings indicate that the model functions not only as a conceptual construct but also as an implementable framework for strengthening agate-based creative tourism at the community level. The operational stages of the practice-led research are structured through a design thinking framework, as illustrated in Figure 2. This framework guides the research process from empathy and problem definition to ideation, prototyping, testing, and the development of a sustainable creative tourism model.

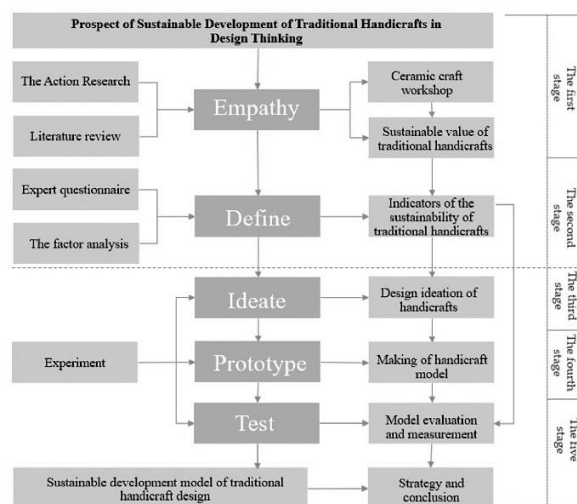


Figure 2. Design thinking-based practice-led research framework for agate-based creative tourism development, adapted from Hendriyana (2021, p. 59)

Referring to green product-based creative industries [33], environmental and socio-cultural activism [34], [35], and community participatory creative education [36], [37], the application of innovation strategies in this research emphasizes sustainable use of natural gemstone resources and responsible creative production. The conceptual framework developed integrates principles of ecological modeling [37] and the interaction of ethics and aesthetics in creative practices [32], adapted to the characteristics of agate materials, traditional jewelry craftsmanship, and local tourism contexts.

Based on the exploratory findings and prototype evaluations, agate-based creative tourism demonstrates potential to function not only as a cultural attraction but also as an emerging sustainable creative economy model. Field observations and pilot workshop results indicate that the integration of gemstone craftsmanship, participatory visitor experiences, and community-based management can contribute to environmental awareness, artisan empowerment, and the strengthening of local tourism value chains. These findings suggest that the proposed approach provides a feasible pathway for developing agate-based creative tourism in a more sustainable and community-oriented direction.

Results and discussion

The results of this applied research demonstrate several key outcomes related to the development of agate-based creative tourism. First, the study confirms the realization of agate-based creative tourism concepts that integrate traditional jewelry craftsmanship, experiential activities, and cultural narratives. These include the development of creative products, hands-on workshops, and interactive learning experiences that allow visitors to engage directly with agate artisans and production processes.

Second, the study identifies added value emerging from the transformation of local artisan environments into creative tourism destinations. Field observations in agate-producing areas, particularly in Pasirjambu, indicate that production spaces such as small workshops and community studios have begun to function as educational and experiential tourism sites. This spatial reconfiguration enables visitors to engage directly with gemstone processing and jewelry-making activities, thereby enhancing destination attractiveness while maintaining the cultural authenticity of local craftsmanship. The findings suggest that the adaptive use of artisan production spaces can support the development of community-based creative tourism with tangible socio-cultural benefits.

Third, the study identifies the formation of collaborative networks involving academics, local government, artisan communities, media, and business actors within the Hexa Helix framework. Field implementation in Pasirjambu shows that these actors contributed through differentiated roles, including knowledge facilitation by universities, policy and program support from local government, production expertise from artisan groups, promotional mediation by media, and market linkage by business actors. The collaboration was operationalized through joint workshops, prototype development activities, and community-based tourism simulations. Observational findings indicate that this multi-actor coordination supports resource optimization, human resource strengthening, and community empowerment, thereby reinforcing destination governance and contributing to the more sustainable development of agate-based creative tourism.

From the implementation process, it can be observed that agate-based creative tourism fosters awareness of sustainable resource use and cultural preservation. Rather than excessive extraction or purely commercial exploitation, agate utilization within creative tourism emphasizes responsible sourcing, value-added processing, and long-term cultural sustainability. Visitors gain insight into the ethical dimensions of craftsmanship, including material selection, production techniques, and cultural meanings embedded in agate jewelry.

The decline of traditional jewelry industries has prompted artists and artisans to reframe agate craftsmanship not merely as a product-oriented activity but as a cultural and experiential practice. Similar approaches have been observed in art-based initiatives

addressing social and cultural issues [12]. For instance, exhibitions and community-based creative programs have demonstrated the potential of art and craft to convey broader narratives beyond aesthetics alone [18], [19].

In developing agate-based creative tourism, researchers examined the potential of local resources embedded within artisan communities [20], as well as the interaction between creative practices and key stakeholders such as policymakers, local communities, and tourism actors [21]. One strategic approach is presenting agate craftsmanship in situ—within artisan villages—allowing visitors to experience production processes firsthand. This approach not only enhances tourism appeal but also stimulates local economic activities, including supporting sectors such as culinary services and creative retail [7]. Consequently, social and economic transformations driven by creative tourism become feasible [22], [23].

The economic impact of agate-based creative tourism is expected to support the growth of small and medium creative enterprises (IKM) and encourage the emergence of community-based start-ups [24], [25], [26], [27]. In this study, the term IKM (small and medium enterprises—SMEs) refers to small-scale craft-based production units involved in agate jewelry manufacturing and creative tourism in Pasirjambu. In the Indonesian context, IKM is functionally equivalent to SMEs within the craft-based creative economy. By integrating craftsmanship, tourism experiences, and entrepreneurship, agate-based creative tourism contributes to a resilient local creative economy.

The following framework presents the theory of Practice-Led Research and Design Thinking adapted for agate-based creative tourism development, serving as a reference for operational strategies in the field.

To operationalize the development of agate-based creative tourism in Pasirjambu, this study adopts a Design Thinking approach integrated with Practice-Led Research. The framework translates conceptual stages into structured field activities involving artisan communities and multi-stakeholder collaboration within the Hexa Helix ecosystem.

Figure 3 demonstrates the field implementation of design thinking and practice-led research in developing agate-based creative tourism in Pasirjambu. Each stage was operationalized through empirical activities involving artisan communities, local stakeholders, and tourism actors. The model integrates exploration, co-design, prototyping, and validation processes to generate measurable experiential, cultural, and economic value. Thus, the framework functions not merely as a conceptual model but as an empirically grounded approach to community-based creative tourism development.

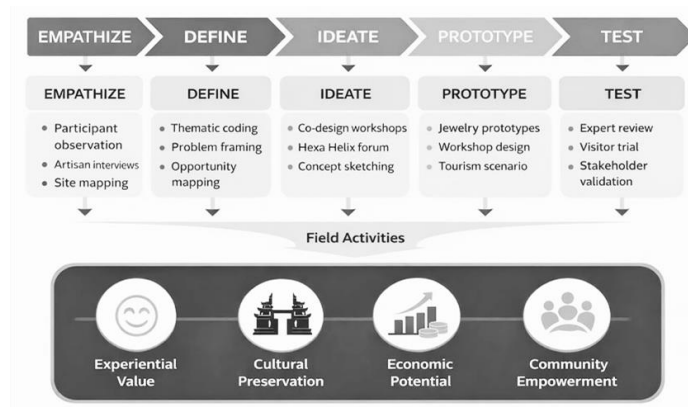


Figure 3. Operational design thinking framework for agate-based creative tourism and craft entrepreneurship (IKM).

In this study, the Design Thinking framework was implemented through a sequence of field-based activities. The empathize stage involved participant observation and semi-structured interviews with agate artisans in Pasirjambu (n = 4, representing four generational cohorts) selected using purposive generational sampling to identify production constraints and tourism opportunities. The define stage employed thematic analysis of field data to formulate key opportunity areas for creative tourism development. During the ideate stage, co-design workshops were conducted with Hexa Helix stakeholders to generate alternative tourism concepts. The prototype stage produced experimental outputs, including jewelry products, workshop modules, and visitor experience scenarios. Finally, the test stage utilized expert review, limited visitor trials, and stakeholder feedback to evaluate coherence, experiential quality, and implementation feasibility, drawing on cognitive evaluation perspectives in eco-design research to ensure measurable design performance [28].

Table 1. Operational mapping of the design thinking process

Stage	Field Activity	Data Source	Output
Empathize	Observation & interviews	Artisans, workshops	Problem identification
Define	Thematic analysis	Field notes	Design opportunity
Ideate	Co-design sessions	Hexa Helix actors	Tourism concepts
Prototype	Prototype development	Design experiments	Creative tourism model
Test	Expert review & trials	Visitors & stakeholders	Validation results

Discussions

The development of agate-based creative tourism in Pasirjambu demonstrates a shift from conventional craft production toward an integrated experience-oriented model. Rather than functioning solely as a jewelry manufacturing activity, the design process shows how traditional agate craftsmanship can be repositioned as a participatory tourism asset. Field observations and iterative design exploration indicate that the combination of product design, spatial experience, and visitor interaction creates additional value beyond the material product itself.

The conceptual stage began with the development of jewelry form concepts and workshop-based tourism scenarios. A series of exploratory sketches was produced to investigate form, scale, composition, and aesthetic identity rooted in traditional agate



craftsmanship. The analytical importance of this stage lies in translating tacit artisan knowledge into design parameters that can be communicated to visitors. The resulting working drawings, comprising orthographic views, material specifications, and ergonomic adjustments, functioned as mediating tools between traditional craft practices and contemporary tourism presentation.

Prototype development further revealed the importance of experiential validation. Mock-ups and functional prototypes were used not only to test production feasibility but also to simulate visitor engagement within workshop settings. Limited trials with selected stakeholders (expert reviewers and pilot visitors) indicated that partially open production processes increased perceived authenticity and visitor interest. This finding reinforces the role of practice-led design in bridging craft production and tourism experience.

At the production level, the selection and preparation of locally sourced agate stones remained a critical determinant of both product quality and narrative authenticity. The systematic sorting of stones based on color, texture, hardness, and visual character reflects the persistence of tacit material knowledge among artisans. When these processes are intentionally exposed within tourism settings, they transform from purely technical steps into interpretive moments for visitors. This shift confirms that the value of agate craftsmanship in creative tourism lies not only in the final product but also in the visibility of the making process.

Key stages in the agate craftsmanship presented in [Table 2](#).

Table 2. Stages of agate jewelry production in creative tourism context

No.	Production Stage	Description	Supporting Illustration (Reference)
1	Selection and Cleaning	Selection of agate stones based on color, texture, translucency, and visual uniqueness, followed by cleaning to remove impurities and residues.	
2	Cutting and Shaping	Cutting and shaping agate stones according to jewelry design specifications, considering proportion, symmetry, and material efficiency.	

- 3 Polishing and Finishing Polishing and surface finishing to enhance visual clarity, color depth, and aesthetic quality of the stone.



- 4 Jewelry Assembly Assembly of polished agate stones using metal settings or alternative materials, integrating craftsmanship and design aesthetics.



- 5 Quality Control and Packaging Final inspection to ensure product quality, durability, and visual consistency, followed by packaging suitable for tourism retail and souvenirs.



- 6 Display and Presentation Display and presentation of finished products within creative tourism spaces such as galleries, workshops, or souvenir areas to enhance visitor experience.



Beyond manual craftsmanship, the study also highlights the role of appropriate technology in supporting production consistency without undermining traditional values. Rather than introducing large-scale industrial systems, the intervention focused on ergonomic and precision-support tools suitable for small-scale artisan environments. Field feedback suggests that such technological mediation improves productivity and comfort while maintaining the perceived authenticity valued in creative tourism contexts. Importantly, the presence of more accessible tools also increases the attractiveness of the craft sector for younger potential artisans, indicating implications for intergenerational regeneration.

From a tourism systems perspective, agate-based creative tourism operates as a composite product integrating tangible artifacts and experiential services. The findings show that its effectiveness depends on the alignment of three key components: attractions, supporting facilities, and accessibility.

First, agate jewelry, live workshops, and artisan studios function as primary experiential attractions. Visitor observations indicate strong engagement with hands-on activities and visual documentation opportunities, confirming the growing relevance of shareable craft experiences in contemporary tourism behavior.

Second, supporting facilities such as thematic studios, galleries, souvenir outlets, and complementary amenities play a significant role in extending visitor dwell time and perceived destination quality. The spatial integration of craft production within these facilities strengthens the identity of the destination as a creative tourism environment rather than a conventional retail space.

Third, accessibility factors including transport connectivity, affordability, and spatial legibility influence visitor flow and repeat visitation potential. The Pasirjambu case suggests that even strong craft assets require adequate access systems to function effectively as tourism destinations.

Overall, the study demonstrates that the integration of traditional craftsmanship, experiential design, and appropriate technological support enables agate-based creative tourism to function as a viable community-based creative economy model. Empirical observations from Pasirjambu indicate that this approach contributes to three domains: increased experiential value for visitors, strengthened cultural visibility of local agate craftsmanship, and expanded economic opportunities for artisan communities. These findings position agate-based creative tourism not merely as a cultural attraction but as an operational strategy for sustainable local creative economy development.

Conclusion

This study confirms that agate-based creative tourism in Pasirjambu can be operationally developed through the integration of practice-led research, Design Thinking, and Hexa Helix collaboration. Empirical findings from field observations, co-design activities, and limited stakeholder validation indicate that repositioning

traditional agate craftsmanship into an experience-oriented tourism model generates measurable cultural, experiential, and economic value.

The study identifies three principal contributions. First, the operationalization of the Design Thinking stages, from empathize to test, demonstrates how tacit artisan knowledge can be translated into structured tourism experiences. Second, the integration of appropriate production-support tools improves process consistency and artisan comfort while preserving the authenticity required in creative tourism settings. Third, the Hexa Helix-based collaboration model strengthens coordination among local stakeholders, supporting the sustainability of agate-based creative tourism initiatives in Pasirjambu.

From a theoretical standpoint, this research extends the discourse on creative tourism by providing an empirically grounded application of practice-led design within small-scale craft communities. Practically, the study offers a replicable framework for regions seeking to revitalize local gemstone or craft industries through experience-based tourism development.

However, this study has several limitations. The empirical scope is based on a limited number of artisan participants representing four generational groups, and visitor-based quantitative evaluation remains preliminary. In addition, the implementation was conducted within a single regional context, which may affect broader generalization.

Future research should incorporate larger visitor samples, longitudinal economic impact measurements, and cross-regional comparative studies to further validate the scalability and robustness of agate-based creative tourism models.

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