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Multilingual Heritage Tourism Promotion: A Hybrid Printed-Digital Model at an Indonesian Karst Museum

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ABSTRACT

Purpose of the study: This study examines the role of Mandarin Chinese-language promotional brochures in enhancing information accessibility for Chinese-speaking visitors and supporting international heritage tourism development at the Indonesia Karst Museum, Wonogiri, Central Java, Indonesia.

Methodology: A qualitative single case study design was employed, utilizing semi-structured interviews with 12 purposively selected participants, structured site observation, documentary analysis, and a five-dimension brochure evaluation rubric. Data were analyzed using Braun and Clarke's six-phase reflexive thematic analysis with NVivo 14.

Main Findings: Chinese-language brochures improved tourism information accessibility for Chinese-speaking visitors and generated documented visit interest. Key challenges included geological terminology translation complexity, limited design capacity, budget constraints, and restricted distribution networks. University–industry collaboration between Sebelas Maret University and DKPPO Wonogiri provided a viable, low-cost mechanism for multilingual promotional capacity development.

Novelty/Originality of this study: This study proposes a hybrid printed-digital multilingual promotion model integrating QR code-enabled digital extensions with printed brochures, specifically designed for resource-constrained heritage destinations in developing countries. It introduces a replicable university–industry partnership framework for generating multilingual promotional capacity at under-promoted geological heritage sites.

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1. INTRODUCTION

Language accessibility has been recognized as a critical component of tourism accessibility because it reduces informational barriers and facilitates meaningful engagement between visitors and destinations, particularly in heritage tourism settings [1]-[3]. Empirical evidence consistently demonstrates that visitors who

encounter their native language in promotional and on-site communication report significantly higher levels of satisfaction, confidence, and revisit intention [4], [5]. Conversely, destinations that neglect linguistically inclusive strategies systematically underperform in international visitor attraction, particularly in the post-pandemic recovery phase where competition for high-value tourist segments has intensified [1]. This dynamic is especially consequential in developing economies, where heritage assets of global significance frequently coexist with promotional infrastructure insufficient to reach international audiences [6]-[8].

Indonesia exemplifies this structural tension at scale. Despite possessing one of Southeast Asia's most diverse portfolios of natural and cultural heritage recognized through multiple UNESCO designations and a nationally proclaimed geopark network international visitor arrivals to Indonesia reached approximately 11.7 million in 2023, recovering yet still lagging behind regional peers such as Thailand (28.2 million) and Malaysia (20.1 million) in the same period [1], [9]. Analysts attribute this persistent gap not to a deficit of touristic merit but to suboptimal international promotion, inadequate multilingual communication, and limited connectivity between heritage site management and international distribution networks [10], [11]. These deficiencies are disproportionately concentrated at the sub-national level, where hundreds of scientifically and culturally significant sites operate with promotional budgets insufficient to sustain even basic multilingual visitor communication.

Among the international visitor segments available to Indonesian heritage destinations, Chinese-speaking tourists represent a strategically critical and underexploited opportunity. China has consistently ranked as the world's largest source of outbound tourism expenditure, with documented visitor preferences for destinations providing Mandarin-language hospitality services, interpretive content, and digital communication through platforms familiar to Chinese users [12], [13]. Chinese tourists also demonstrate strong affinity for geological and nature-based attractions, a preference reinforced by China's own UNESCO Global Geopark network and the growing domestic popularity of geotourism experiences [14], [15]. In the SOLORAYA region of Central Java the administrative territory within which this study's field site is situated a growing population of Chinese nationals engaged in industrial and educational sectors represents an immediately accessible audience for Chinese-language promotional content as documented during fieldwork conducted in 2024 [16]. Nevertheless, Mandarin-language brochures, signage, and interpretive materials remain exceptional rather than standard across Central Java's regional museum landscape, leaving Chinese-speaking visitors without the communicative scaffolding necessary for meaningful heritage engagement [17].

The Indonesia Karst Museum, situated within the UNESCO-recognized Gunung Sewu Karst Zone in Wonogiri Regency, Central Java, represents Indonesia's sole dedicated karst museum and offers a unique synthesis of geological education, natural heritage, and Javanese cultural narrative. Despite its scientific distinction and national significance, the museum remains virtually unknown to international audiences, with Chinese-speaking visitors despite their proximity and documented geotourism interests receiving no Mandarin-language promotional support as of the time this study was conducted in 2024. This representational absence is symptomatic of a broader promotional failure: the museum's considerable assets remain effectively inaccessible to international visitors not due to geographic remoteness or lack of quality, but due to the structural neglect of multilingual destination communication. Addressing this gap requires not only the production of translated materials but a rethinking of the promotional model itself one that integrates printed and digital channels to meet the expectations of contemporary international visitors.

Contemporary destination marketing scholarship recognizes that effective promotion for international heritage audiences requires a hybrid approach combining the credibility of physical materials with the reach and interactivity of digital platforms [18], [19]. Printed brochures retain distinct advantages in heritage and geotourism contexts: they function as tangible souvenirs, operate independently of internet connectivity in remote natural sites, and carry a credibility premium associated with institutional investment [20]. However, the integration of digital extensions such as QR codes linking to multimedia content, virtual tours, or social media channels on platforms widely used by Chinese tourists, including WeChat and Xiaohongshu substantially amplifies the reach and engagement potential of printed materials [12], [21]. This hybrid model, which embeds digital interactivity within physical promotional artifacts, has emerged as a best-practice approach in heritage tourism communication yet remains largely unimplemented at regional heritage sites in developing countries [22].

Despite growing scholarly attention to multilingual tourism communication and destination marketing, critical gaps persist in the literature. First, research examining language accessibility in tourism has concentrated disproportionately on digital and social media platforms, with comparatively limited investigation of hybrid promotional strategies that integrate printed and digital media for heritage audiences [23]. Second, the operational challenges specific to multilingual promotion at resource-constrained regional museums including geological terminology translation, limited design capacity, and restricted distribution networks remain empirically underexplored [24], [25]. Third, the potential of higher education–industry partnerships as a scalable mechanism for addressing promotional deficits at heritage sites has received insufficient empirical attention in Southeast Asian contexts [11]. Fourth, and most specifically, no prior study has examined multilingual promotional strategy

development at Indonesian karst heritage sites, leaving a significant contextual gap in both geotourism and destination marketing literatures.

This study addresses these gaps through a qualitative investigation of multilingual promotional material development at the Indonesia Karst Museum, conducted in 2024 in collaboration with DKPPO Wonogiri and Sebelas Maret University's Chinese Language Program. The study's novelty lies in its proposal of a hybrid promotional model that integrates Mandarin-language printed brochures with QR-code-enabled digital extensions, specifically designed for resource-constrained heritage museums seeking to engage Chinese-speaking visitor markets. Unlike prior research that treats printed and digital promotion as competing modalities, this study demonstrates their complementarity within a unified multilingual communication strategy applicable to under-promoted heritage destinations in developing country contexts. Accordingly, this study pursues three objectives: (1) to examine the role of Chinese-language promotional materials in enhancing information accessibility for Chinese-speaking visitors at the Indonesia Karst Museum; (2) to identify operational challenges in implementing multilingual promotional strategies at regional heritage sites; and (3) to evaluate the effectiveness of university–industry collaboration as a model for sustainable multilingual heritage tourism promotion.

2. RESEARCH METHOD

2.1 Research Design

This study employed a qualitative single case study design, grounded in an interpretivist epistemological orientation. The case study approach was selected because the research phenomenon the development and implementation of a Mandarin-language multilingual promotional strategy at a specific heritage institution is inherently contextual, process-oriented, and embedded within a complex institutional, linguistic, and governance landscape that resists meaningful quantification [26]. Within tourism and hospitality management scholarship, qualitative case study methodology is well-established as particularly appropriate for investigations of destination marketing processes, institutional capacity development, and heritage interpretation design in tourism and hospitality scholarship [27]. This study does not seek to generate statistically generalizable estimates; rather, it pursues analytical generalizability the application of inductively derived insights to comparable contexts involving resource-constrained heritage museums in developing country settings seeking to develop multilingual promotional strategies for underserved international visitor segments [28]. The study adopts a qualitative descriptive orientation, generating rich, contextually grounded accounts of the promotional gap, the brochure development process, the challenges encountered, and the stakeholder responses observed. This orientation is consistent with the study's three research objectives: to examine the role of Chinese-language materials in enhancing visitor accessibility, to identify operational challenges in multilingual promotion implementation, and to evaluate university–industry collaboration as a sustainable promotional model.

2.2 Research Setting and Participant Selection

The primary research site was the Indonesia Karst Museum (*Museum Karst Indonesia*), located in Gebangharjo Village, Pracimantoro Sub-district, Wonogiri Regency, Central Java, Indonesia, the nation's only dedicated karst museum, situated approximately 42 km from Wonogiri City within the UNESCO-recognized Gunung Sewu Karst Conservation Zone. This site was selected purposively as Indonesia's sole dedicated karst heritage institution and as a nationally significant but internationally under-promoted geological heritage destination that had received no Mandarin-language promotional materials prior to this study's intervention. The secondary institutional site was the *Dinas Kebudayaan, Pariwisata, Pemuda dan Olahraga* (DKPPO) of Wonogiri Regency the government body responsible for cultural and tourism governance in the regency within which the researcher was embedded as a field placement participant between 1 February and 16 March 2024. This embedded placement facilitated sustained institutional access to internal documents, planning processes, and staff expertise that is not achievable through conventional time-limited external research visits. Extended stakeholder engagement encompassed tourism offices in Wonogiri, Sukoharjo, Surakarta, and Karanganyar Regencies; schools offering Chinese-language curricula within the SOLORAYA region; and the Tourist Information Center at Adi Sumarmo International Airport, Boyolali all selected purposively on the basis of their roles in regional tourism information distribution networks and Chinese-language service provision.

Participants were selected through purposive sampling, targeting individuals with direct knowledge of or experience with the museum's promotional environment, Chinese-language tourism communication needs, or institutional decision-making within the Wonogiri tourism governance structure. This sampling strategy was appropriate given the study's focus on specific institutional and community knowledge that is not uniformly distributed across the population [29]. A total of 12 participants were recruited across three categories, as summarized in Table 1.

Table 1. Participant Profile by Category

Category	Description	n	Inclusion Criteria	Contribution to Study
C1 (Institutional informants)	Head of Museum Management Unit (*Kepala UPT Kawasan Wisata Waduk Gajah Mungkur*); Head of DKPPO Tourism Marketing Section (*Kepala Kasi Pemasaran Pariwisata*); two DKPPO tourism promotion officers directly involved in the brochure initiative	4	Direct institutional responsibility for museum promotion or tourism governance in Wonogiri Regency	Insider knowledge of institutional constraints, budget structures, and promotional decision-making processes
C2 (Target audience representatives)	Chinese nationals resident or employed in the Solo-Wonogiri industrial and educational sectors	5	(a) Mandarin Chinese as primary language; (b) current residence or employment in the SOLORAYA region; (c) prior or potential interest in cultural or geological tourism	Direct assessment of brochure readability, content relevance, and translational accuracy from the target visitor community's perspective
C3 (Distribution stakeholders)	Staff at the Tourist Information Center, Adi Sumarmo Airport; representatives from two schools with Chinese-language programs identified as brochure distribution nodes	3	Direct involvement in tourism information dissemination or Chinese-language education within the SOLORAYA region	Assessment of distribution channel feasibility and institutional appetite for multilingual promotional cooperation
Total		12		

Note. Purposive sampling was applied across all three categories. The sample size was determined by the bounded nature of the single case study design and the purposive sampling logic applied across three distinct participant categories, consistent with qualitative case study practice [30]

Category 1 informants provided the institutional perspective central to Research Objectives 2 and 3 specifically, insider accounts of the operational challenges encountered during multilingual brochure development and the governance conditions underpinning university–DKPPO collaboration. Category 2 participants provided the target audience perspective essential to Research Objective 1, offering direct linguistic and cultural assessments of the Mandarin-language brochure from the standpoint of the community the materials were designed to serve. Category 3 stakeholders contributed distribution-specific knowledge that neither institutional informants nor target audience members could provide, given their practical familiarity with information dissemination networks and the logistical realities of brochure distribution across the SOLORAYA region. The three-category design ensured that findings reflect convergent perspectives from supply-side institutional actors, demand-side target audience members, and distribution intermediaries a triangulation of informant positions consistent with the study's methodological commitment to multi-source data convergence.

2.3 Research Instruments

Four instruments were developed to address the study's three research objectives. The instrument grid is presented in Table 2.

Table 2. Research Instrument Grid

Instrument	Type	Participant / Data Source	Thematic Domains / Dimensions	Research Objective Addressed
Interview Guide	Semi-structured, open-ended	C1: Institutional informants (n = 4) C2: Target audience Chinese nationals (n = 5)	(A) Promotional gap assessment (B) Brochure content and design evaluation (C) Distribution strategy assessment (D) Institutional collaboration and sustainability	RO1, RO2, RO3

Instrument	Type	Participant / Data Source	Thematic Domains / Dimensions	Research Objective Addressed
		C3: Distribution stakeholders (n = 3)		
Observation Protocol	Structured, non-participatory	Indonesia Karst Museum (2 site visits: 1 March & 15 March 2024)	(1) Visitor information environment (2) Existing promotional materials (3) Exhibition content and interpretive quality (4) Physical accessibility and visitor flow (5) Chinese-language visitor presence and behavior	RO1, RO2
Documentary Analysis Framework	Systematic document review	DKPPO Wonogiri institutional records; BPS statistics; Indonesian tourism law; UNESCO, ICOM, UNWTO policy documents	(1) Visitor statistics 2019–2023 (2) Institutional planning documents (3) Existing promotional materials (4) Policy and regulatory documents	RO1, RO2, RO3
Brochure Evaluation Rubric	Structured rubric, 5-point rating scale	C1: Institutional informants C2: Target audience + independent bilingual reviewer	(1) Translational accuracy (2) Cultural appropriateness (3) Content comprehensiveness (4) Design quality (5) Production feasibility	RO1, RO2

Note. RO1 = Examine the role of Chinese-language promotional materials in enhancing information accessibility; RO2 = Identify operational challenges in implementing multilingual promotional strategies; RO3 = Evaluate the effectiveness of university–industry collaboration as a model for sustainable multilingual heritage tourism promotion. C1 = Institutional informants; C2 = Target audience representatives; C3 = Distribution stakeholders. All instruments were pilot-tested prior to fieldwork and administered in participants' preferred language (Indonesian, Mandarin Chinese, or a combination).

The semi-structured interview guide served as the primary data collection instrument, enabling in-depth exploration of institutional perceptions, target audience responses, and stakeholder assessments across four thematic domains. The semi-structured format was deliberately selected over a fully structured approach to preserve flexibility for exploratory follow-up probing, recognizing that informants in institutional and community settings frequently raise contextually significant issues not anticipated in advance question sets [31], [32]. Questions were differentiated by participant category to reflect each group's distinct experiential knowledge base: institutional informants (C1) addressed governance, budget, and strategic dimensions; Chinese-speaking target audience representatives (C2) provided direct assessments of brochure linguistic and cultural quality; and distribution stakeholders (C3) evaluated the feasibility of proposed dissemination channels.

The structured observation protocol was applied during two site visits to the Indonesia Karst Museum to generate independent empirical documentation of the physical visitor environment, existing multilingual provision, and exhibition interpretive quality dimensions that cannot be reliably captured through interview data alone and for which participant self-report would be subject to institutional framing effects. The two-visit design served a specific methodological function: the first visit (1 March 2024) established baseline environmental conditions, while the second visit (15 March 2024) served as a verification visit conducted after initial analytical coding, enabling the researcher to return to the site with targeted observational questions arising from preliminary analysis.

The documentary analysis framework provided the historical and institutional context within which primary interview and observational data are situated. Visitor statistics from 2019 to 2023 were particularly critical for establishing the quantitative baseline of the museum's international promotional gap specifically the absence or near-absence of Chinese-speaking visitors that the multilingual promotional initiative sought to address. Policy and regulatory documents from UNESCO, ICOM, and UNWTO provided the international professional standards against which the museum's existing promotional infrastructure was assessed.

The brochure evaluation rubric addressed a methodological challenge specific to this study: the primary researcher's dual role as both the designer of the Mandarin-language brochure and the analyst of its quality. To mitigate confirmatory bias inherent in self-assessment, rubric assessments across all five dimensions were triangulated with independent evaluations from Category 2 participants members of the intended Chinese-speaking visitor audience and, for Dimension 1 (translational accuracy), with an independent bilingual reviewer's assessment. This triangulation strategy ensured that judgments of brochure quality reflected the target audience's

lived linguistic and cultural competence rather than the researcher's own assessments of the translation work [33], [34].

2.4 Data Collection Procedure

Data collection proceeded in three sequential phases, spanning January to March 2024. During the preparatory phase (January 2024), systematic library research was conducted to establish the theoretical and contextual framework, encompassing international literature on multilingual tourism marketing, geological heritage interpretation, and geotourism translation challenges. The interview guide, observation protocol, and documentary analysis framework were developed and finalized during this phase. Institutional access agreements were confirmed with DKPPO Wonogiri prior to field entry, and all prospective participants were contacted and briefed on the study's academic purposes, voluntary nature of participation, and data confidentiality arrangements.

During the primary data collection phase (1 February – 16 March 2024), the researcher was embedded within DKPPO Wonogiri through a structured six-week field placement, enabling continuous access to institutional documents, staff consultations, and promotional planning processes that would not have been accessible through time-limited external visits. Individual semi-structured interviews were conducted at participants' institutional workplaces or, for Chinese-national participants, at mutually agreed neutral locations. Each interview lasted between 45 and 75 minutes, was conducted in the participant's preferred language Indonesian, Mandarin Chinese, or a combination and was audio-recorded with explicit prior consent. One participant declined audio recording; their responses were captured through detailed contemporaneous note-taking during the interview session. Structured site observations were conducted on 1 March and 15 March 2024 in accordance with the observation protocol detailed in Table 2, with systematic photographic documentation supplementing written field notes at both visits. Documentary data were collected concurrently throughout the placement period as institutional materials became accessible through the researcher's embedded position.

During the verification and data management phase (March 2024), audio recordings were transcribed verbatim within one week of each interview to minimize transcription error. Mandarin Chinese and Indonesian transcripts were translated into English by the primary researcher a Mandarin-proficient bilingual and independently reviewed for translation accuracy by a second bilingual reviewer with proficiency in both languages. Discrepancies between the primary and reviewer translations were resolved through discussion and consensus prior to analysis. Member-checking was subsequently conducted with two institutional informants from Category 1, who reviewed summarized interpretive accounts of their interview data and confirmed the accuracy of institutional representations. All transcripts, field notes, photographs, and documents were organized into a structured digital archive, catalogued by data source and participant code, and stored on a password-protected institutional server accessible only to the research team. Data are retained for a minimum of five years in accordance with institutional data management requirements.

2.5 Data Analysis

All transcripts, field notes, and documentary excerpts were analyzed using the six-phase reflexive thematic analysis framework developed by Braun and Clarke [33]. In Phase 1 (*data familiarization*), all data sources were read and re-read, with preliminary analytical observations noted across materials. In Phase 2 (*initial code generation*), systematic line-by-line coding was applied to the full dataset, generating a comprehensive preliminary code set. In Phase 3 (*theme development*), related codes were collated into candidate thematic groupings through iterative sorting and re-examination of coded extracts. In Phase 4 (*theme review*), candidate themes were reviewed against the coded dataset and the full data corpus to assess their coherence, distinctiveness, and grounding in the data. In Phase 5 (*theme definition and labeling*), each theme was defined with a precise analytical description, and a thematic map was constructed to represent the relationships between themes. In Phase 6 (*write-up*), themes were systematically interpreted against the study's theoretical framework and research objectives to generate analytically grounded findings.

Analysis was conducted inductively with themes emerging from the data while remaining theoretically informed by the multilingual destination marketing, geotourism interpretation, and university–industry partnership literatures reviewed in the Introduction. Data management and coding were facilitated using NVivo 14 software, which supported systematic organization of the multi-source, multilingual dataset and enabled efficient retrieval of coded segments during theme review. Five primary analytical themes emerged from this process: (1) the structural dimensions of the museum's international promotional gap; (2) the process and challenges of Mandarin-language brochure development; (3) the design and feasibility of distribution strategy implementation; (4) stakeholder and target audience responses to the promotional materials; and (5) governance implications of university–industry collaboration for sustainable heritage tourism promotion.

3. RESULTS AND DISCUSSION

3.1 Theme 1: The Indonesia Karst Museum as a Multi-Segment Heritage Tourism Product

The Indonesia Karst Museum constitutes a distinctive multi-dimensional heritage tourism product that integrates geological science, natural landscape, cultural heritage, and architectural innovation within a single destination experience. Its three-floor interior exhibition structure addresses distinct thematic registers: the ground floor presents karst geology as a scientific discipline through specimen panels, mineral displays, and geological chronology; the basement level explores the socio-cultural dimensions of karst habitation through dioramas, scale models, and community artefacts; and the upper floor provides a multipurpose auditorium suitable for educational lectures, documentary screenings, and cultural events. The architectural concept deliberately integrates the physical building with the surrounding natural karst environment through a 'back to nature' design philosophy, positioning the museum as simultaneously an interpretation center and a component of the geological landscape itself.

The museum's immediate surroundings constitute an outdoor geological tourism complex of exceptional scientific richness. Table 3 summarizes the five principal geological features within the site's conservation zone.

Table 3. Geological Sites of the Indonesia Karst Museum Conservation Zone

Site Name	Geological Type	Key Characteristics	Tourism Experience
Goa Tembus	Horizontal cave	50m tunnel; two entrances; museum frontage location	Walk-through; accessible for all fitness levels
Goa Sodong	Deep horizontal cave	4,000m+ tunnel; active speleothems; underground river; Hindu temple above entrance	Cave exploration; spiritual-cultural experience
Goa Potro-Bunder	Mineral crystal cave	Distinctive calcite crystal formations; characteristic speleothem architecture	Visual geology education; photography
Luweng Sapen	Vertical karst pit	Underground river; water supply for three villages; vertical descent geology	Adventure caving; hydrology education
Goa Gilap	Dolina cave	Dolomite-crystal vertical cliffs; unique stalactite formations	Geological wonder viewing; scientific research

Note. Source: DKPPO Wonogiri institutional documentation; authors' field observation data (2024).

Institutional informants consistently affirmed the site's multi-segment appeal. One DKPPO officer observed: *"The museum is not just for scientists. We have visitors who come for the caves, visitors who come for the Javanese culture, and visitors who come just to see the building. But none of them come from China, because they don't know we exist"* (C1-02, personal communication, February 2024). This observation encapsulates the central paradox documented across all five analytical themes: a destination of objectively high tourism quality rendered internationally invisible by the absence of targeted multilingual communication.

This finding is consistent with contemporary destination competitiveness literature, which emphasizes that destinations achieve stronger competitive positions when they effectively communicate their value propositions to multiple market segments and translate destination attributes into accessible visitor experiences [35], [36]. The Indonesia Karst Museum's multi-segment appeal therefore enhances the value of multilingual promotional materials by broadening accessibility and increasing the likelihood of attracting diverse visitor groups.

3.2 Theme 2: The Structural Promotional Gap and Its Self-Reinforcing Dynamics

Analysis of DKPPO Wonogiri visitor records from 2019 to 2023 reveals a trajectory that simultaneously demonstrates the destination's growing domestic appeal and its persistent failure to attract international visitors. Domestic visitation grew consistently during the post-pandemic recovery period, while the museum recorded near-zero international arrivals throughout the same period. Table 4 presents the visitor pattern data.

Table 4. Indonesia Karst Museum Visitor Data 2019–2023: Domestic vs. International

Year	Domestic Visitors	YoY Growth (%)	International Visitors	International Share
2019	~38,000	Baseline	< 50	< 0.1%
2020	~12,000	−68.4% (COVID-19)	0	0.0%
2021	~18,000	+50.0%	0	0.0%
2022	~29,000	+61.1%	< 20	< 0.1%
2023	~35,000	+20.7%	< 30	< 0.1%

Note. Source: DKPPO Wonogiri visitor records (2019–2023). Domestic figures are estimated from institutional reporting data; international visitor figures based on guestbook registration records.

The head of DKPPO's Tourism Marketing Section articulated the institutional logic sustaining this gap: *"We know we should make materials in other languages. But our budget is limited, and we must spend it where it*

gives results. Right now, the results are domestic visitors. International visitors we have almost none, so there is no budget case to make materials for them" (C1-01, personal communication, February 2024). This statement reveals a circular promotional trap with significant governance implications: the absence of international visitors is interpreted as evidence of insufficient demand rather than as evidence of insufficient promotional reach, generating institutional reluctance to invest in the very multilingual materials that would break the cycle.

This finding supports previous research indicating that heritage destinations in developing countries often encounter a self-reinforcing cycle in which limited international demand reduces investment incentives, while inadequate investment simultaneously constrains their ability to attract international visitors [37]. The standard market logic of investing promotional budgets where returns already exist structurally excludes destinations like the Indonesia Karst Museum from the internationalization processes that would generate the visitor flows justifying further investment. Ref [10] similarly identify this coordination failure as characteristic of Indonesian regional tourism governance, noting that sub-national tourism offices systematically underinvest in international promotion relative to their actual promotional potential. Breaking this cycle requires proactive multilingual promotional investment treated as demand generation rather than demand response a reframing that the university DKPPO collaboration modeled in this study sought to instantiate.

3.3 Theme 3: Multilingual Brochure Development - Process, Challenges, and Solutions

The development of the Mandarin-language brochure proceeded through four sequential stages content selection, translation, graphic design, and print production each generating distinct challenges that illuminate the operational dimensions of multilingual promotion at resource-constrained heritage sites.

Content selection followed a visitor information hierarchy model, prioritizing information addressing the primary decision-making needs of potential visitors at each stage of the visitor journey: awareness, interest, decision, and experience. Six information modules were selected for inclusion: cover identification; location and access; cave and karst site descriptions; architectural concept; ground-floor exhibition content; and basement and upper-floor descriptions. This structure aligns with destination brochure information architecture principles emphasizing the sequential alignment of content with visitor curiosity and information-seeking progression [20].

Translation constituted the most technically demanding stage, generating challenges across three dimensions. First, geological and geomorphological terminology including stalactite (钟乳石), stalagmite (石笋), dolina, karst (喀斯特), and speleothem presented terminological gaps in available Indonesian-Chinese reference resources, requiring consultation with geology instructors and cross-referencing with Chinese geological texts. Second, structural divergence between Indonesian and Mandarin Chinese including differences in sentence structure, classifier usage, and topic-comment organization necessitated creative re-expression rather than direct structural translation. Third, the culturally specific Javanese philosophical concept of Hasta Brata required cultural mediation and explanatory annotation for Chinese-speaking audiences without parallel conceptual frameworks in their cultural repertoire.

Target audience participants (C2) provided direct assessments of translation quality. One Chinese-national participant commented: *"The geological terms are correct I can understand what kind of cave formations you are describing. But the Hasta Brata section was confusing at first. The explanation you added helps, but it needs to be longer to really explain what it means in Javanese culture"* (C2-03, personal communication, March 2024). Another noted: *"Some sentences feel a bit like they were translated from Indonesian directly. A Chinese person would say it differently. But the meaning is clear"* (C2-01, personal communication, March 2024). These responses indicate functional translational adequacy while identifying specific dimensions cultural annotation depth and natural Chinese expression requiring refinement in subsequent versions. Table 5 presents the key translation challenges and adopted solutions.

Table 5. Selected Translation Challenges and Solutions in the Mandarin-Language Brochure

Source Term	Challenge	Strategy	Chinese Rendering	Assessment
Stalaktit (stalactite)	Initial confusion with stalagmite	Geology teacher consultation + Chinese geological text cross-reference	钟乳石	Verified accurate
Stalakmit (stalagmite)	Initially confused with stalactite	Same as above	石笋	Verified accurate
Luweng (vertical karst pit)	No Indonesian-Chinese dictionary equivalent	Explanatory paraphrase + original term in quotation marks	垂直洞穴 ('luweng')	Functionally adequate
Hasta Brata	Javanese philosophical concept with no Chinese equivalent	Extended explanatory paragraph with cultural context	Hasta Brata + 3-sentence	Culturally mediated; comprehension confirmed

Source Term	Challenge	Strategy	Chinese Rendering	Assessment
Dolina (karst depression)	Partial approximation available; geomorphological specificity at risk	Technical qualifier added to standard term	cultural annotation 喀斯特洼地	Contextually adequate

Note. Source: Authors' translation process documentation and C2 participant feedback (2024).

These translation challenges extend the findings of Li et al. (2022), who identified the absence of systematic geotourism translation frameworks as a critical gap in heritage interpretation practice. The present study's documentation of specific geological-cultural terminology challenges in the Indonesian-Mandarin context contributes empirical case evidence to this gap, demonstrating that the complexity of geological, cultural, and philosophical terminology encountered even in a single brochure project exceeds the capacity of general-purpose translation resources and requires the integration of linguistic, scientific, and cultural competencies.

Graphic design produced a six-panel folded brochure centered on a full-building exterior photograph of the museum as the primary visual element a deliberate choice that differentiates the brochure from generic landscape tourism materials and signals the destination's distinctive built-natural integration. *Print production* at a local facility imposed paper quality constraints below standard professional destination marketing materials a compromise with implications for first-impression credibility, given documented relationships between perceived production quality and destination quality perception (Hudson & Hudson, 2022).

3.4 Theme 4: Distribution Strategy - Channel Effectiveness and Stakeholder Engagement

The completed brochure was distributed through five channels selected to maximize reach within the Chinese-speaking target audience while operating within the study's logistical constraints. Table 6 presents the distribution channel assessment.

Table 6. Mandarin-Language Brochure Distribution Channels: Reach and Effectiveness Assessment

Channel	Target Audience	Estimated Reach	Effectiveness Assessment
Direct personal distribution	Chinese nationals in Solo and Wonogiri	15–25 individuals	High: generated direct visit request
Institutional/office distribution	DKPPO offices across SOLORAYA	~50–100 visitors/month across 4 offices	Moderate: ensures availability at official information points
Special venue distribution	Museum site; Adi Sumarmo Airport TIC	Museum visitors + arriving international passengers	High strategic value: targets active information-seekers
School placement	5 schools with Chinese-language programs	Hundreds of students and teachers	Medium: builds long-term awareness; educational visit potential
Digital/website	Wonogiri tourism website	Unlimited geographic reach	High cost-efficiency: perpetual availability at zero marginal cost

Note. Source: Authors' distribution records and stakeholder interview data (2024).

The direct personal distribution channel generated the most immediately observable behavioral response. A Chinese-national participant who received the brochure stated: *"I had no idea there was a karst museum so close to Solo. Reading this made me want to go immediately. Can you take me there?"* (C2-05, personal communication, March 2024). This direct visit request which resulted in a documented museum visit constitutes a proof-of-concept demonstration that language-targeted printed promotion generates measurable demand-generation effects even in resource-constrained regional contexts.

Distribution stakeholders provided assessments of channel feasibility. The Tourist Information Center representative noted: *"We welcome Chinese materials. Many Chinese tourists pass through the airport but we have nothing to give them. This brochure fills a real gap"* (C3-01, personal communication, March 2024). A school representative observed: *"Our Chinese language teachers could use this as real teaching material. And if students want to visit, we can organize a school trip"* (C3-02, personal communication, March 2024). These responses indicate that distribution channels are not merely passive dissemination nodes but active sites of promotional multiplier effects where brochures can generate educational engagement and curriculum-linked visit planning beyond their direct informational function.

These findings extend Ref [38] documentation of Chinese tourists' information-seeking behavior, which emphasizes the continued role of institutional and print materials alongside digital platforms in the pre-visit

information journey. The airport Tourist Information Center emerges as a particularly high-value distribution point, consistent with the hybrid promotional model proposed in this study: a physical brochure at the point of arrival, integrated with QR code access to digital multimedia content, creates an information touchpoint at the precise moment when arriving international visitors are most actively seeking destination options [39], [40].

3.5 Theme 5: University–Industry Collaboration as a Sustainable Promotional Model

The collaboration between Sebelas Maret University's Chinese Language Program and DKPPO Wonogiri demonstrated that higher education–government partnerships represent a viable and scalable mechanism for addressing the multilingual promotional deficits that characterize regional heritage tourism governance in Indonesia. The partnership model operated through a structured field placement that simultaneously generated institutional value for DKPPO a completed Mandarin-language brochure at minimal cost and academic value for the university empirical research data and applied language learning context.

Institutional informants consistently identified the partnership model as the enabling condition for the brochure's realization. The DKPPO head observed: *"Without the university student, we would never have done this. We don't have the Chinese language capacity, and we don't have the budget to hire a translator. This collaboration gave us something we could not produce ourselves"* (C1-01, personal communication, February 2024). A tourism promotion officer elaborated: *"I think this should become a regular program not just for Chinese, but for Japanese, Korean, Arabic. Every semester, a student can produce materials in their language. This would solve our international promotion problem without costing us money"* (C1-03, personal communication, March 2024).

This finding substantively confirms and extends Ref [11] framework of university contributions to co-creating sustainable tourism destinations, which identifies higher education institutions as particularly valuable partners in addressing promotional capacity gaps in resource-constrained destinations. The present study adds an important dimension absent from Rinaldi et al.'s European context: the linguistic capital embedded in language program students represents a specific and reproducible form of promotional resource that can be mobilized through structured field placement arrangements at near-zero marginal cost to destination management organizations. Ref [10] identify the absence of such inter-institutional coordination as a systemic weakness in Indonesian tourism governance; the model documented here offers a concrete, low-cost institutional mechanism for addressing this gap.

The sustainability of the model, however, is contingent on institutional commitment from both parties. As one DKPPO officer cautioned: *"The student worked hard and produced a good result. But when the placement ended, nothing continued. We still have no one who can speak Chinese with visitors, and the brochures will run out. Without a formal program, this is a one-time project, not a solution"* (C1-04, personal communication, March 2024). This observation identifies the critical transition from project to program as the central governance challenge for the model's scalability a challenge that requires formalizing the placement arrangement, establishing quality review processes for student-produced materials, and creating institutional incentive structures that sustain participation across academic cohorts.

3.6 Integrated Implications for Heritage Tourism Promotion in Developing Country Contexts

The findings of this study directly address the four research gaps identified in the Introduction: the digital bias in language accessibility research, the underexplored operational challenges of multilingual promotion at resource-constrained museums, the insufficient empirical attention to university–industry partnership models in Southeast Asian heritage contexts, and the complete absence of prior research on multilingual promotional strategy development at Indonesian karst heritage sites. The five themes collectively generate an integrated analytical framework for understanding the structural conditions, operational challenges, and institutional mechanisms of multilingual heritage tourism promotion at resource-constrained regional destinations in developing country contexts.

Three theoretical contributions merit particular emphasis. First, this study extends destination competitiveness theory [41], [42] by providing micro-level empirical evidence that language accessibility constitutes a fundamental rather than supplementary competitive determinant, particularly for heritage destinations operating in developing-country contexts where promotional infrastructure deficits systematically suppress international visibility. The positive behavioral responses of Chinese-speaking brochure recipients confirm that modest targeted multilingual communication investment generates hospitality value disproportionate to its cost, demonstrating the applicability of service quality frameworks [43] in small-scale regional heritage contexts that the macro-oriented marketing literature consistently overlooks.

Second, the documentation of the circular promotional trap wherein the absence of international visitors is interpreted institutionally as evidence of insufficient demand rather than insufficient promotional reach identifies a specific and generalizable form of market failure in heritage tourism governance. This mechanism, consistent with Ref [10] analysis of Indonesian tourism policy failures and Ref [6] documentation of infrastructure investment gaps in Southeast Asian developing economies, extends the destination marketing literature by demonstrating how performance-based budget allocation logic structurally excludes under-promoted heritage destinations from the internationalization processes that would justify sustained promotional investment.

Third, this study extends recent geotourism translation and interpretation research [44], [45] by providing contextually specific empirical evidence of the challenges that characterize heritage translation practice in the Indonesian–Mandarin language pair, including geological terminology gaps, structural linguistic divergence, and the need for cultural mediation. While previous studies have highlighted the difficulties of achieving semantic, stylistic, and cultural equivalence in geotourism communication, the present study demonstrates how these challenges emerge in the context of Indonesian heritage tourism promotion and require adaptive translation strategies sensitive to both linguistic and cultural differences. Furthermore, this study contributes to the university–industry collaboration literature by identifying language-program field placements as a practical, reproducible, and low-cost institutional mechanism for generating multilingual promotional capacity at regional heritage sites that lack in-house linguistic resources.

From a policy perspective, the circular promotional trap documented in Theme 2 implies that national and regional tourism authorities in Indonesia and comparable developing country contexts should establish targeted grant mechanisms specifically designed to fund initial multilingual promotional investment at under-promoted heritage sites treating early-stage multilingual promotion as market development infrastructure rather than as discretionary expenditure. From a managerial perspective, destination management organizations should prioritize the formalization of university partnership arrangements into standing institutional programs, incorporating quality review protocols, distribution network agreements, and cross-cohort continuity mechanisms that prevent the one-time project dynamic identified in Theme 5. From an educational perspective, language program administrators should recognize structured tourism promotional fieldwork as a high-value applied learning context that serves institutional research, professional development, and community engagement objectives simultaneously, and should formalize such placements within credit-bearing curriculum frameworks with clearly defined deliverables, quality standards, and institutional oversight.

Several limitations should inform the interpretation of this study's findings. First, the single-site, single-language-pair scope constrains the generalizability of specific findings particularly regarding translation challenges and distribution channel effectiveness to other heritage sites and language pairs; challenges in the Indonesian-Mandarin context may differ substantially from those in Indonesian-Japanese, Indonesian-Arabic, or Indonesian-Korean promotional translation. Second, the target audience sample (C2, n = 5) was small and geographically concentrated within the Solo-Wonogiri industrial corridor, limiting the representativeness of brochure quality assessments across the broader Chinese-speaking visitor population. Third, the researcher's dual positionality as both designer of the promotional materials and qualitative analyst of their quality introduces interpretive risk that member-checking and independent bilingual review partially but not fully mitigate. Fourth, the absence of a systematic visitor origin tracking system at the museum precluded precise attribution of observed visitor behavior change to the brochure initiative, limiting impact assessment to qualitative behavioral indicators.

Future research should address these limitations through comparative multi-site designs encompassing additional heritage destinations and language pairs, longitudinal mixed-methods approaches integrating quantitative visitor origin tracking with qualitative reception research, and experimental evaluation of the hybrid printed-digital promotional model specifically the QR code-enabled digital extension component across varying Chinese-speaking visitor age and demographic segments.

4. CONCLUSION

This his study examined the development and implementation of a Mandarin-language promotional brochure at the Indonesia Karst Museum, Wonogiri, to enhance information accessibility for Chinese-speaking visitors. The findings demonstrate that Mandarin-language promotional materials improved visitor access to information and generated direct visit inquiries, indicating the potential of language-targeted promotion to increase international engagement with under-promoted heritage destinations. The study also identified key challenges in multilingual promotion, including the translation of geological terminology, adaptation of Javanese cultural concepts, and limited design capacity and distribution networks. Furthermore, the collaboration between Sebelas Maret University's Chinese Language Program and DKPPO Wonogiri demonstrates that university–industry partnerships provide a practical and cost-effective approach to developing multilingual promotional capacity for resource-constrained heritage destinations.

Three key conclusions emerge from this study. First, language accessibility is a strategic determinant of international heritage destination competitiveness. Second, inadequate multilingual promotion creates a cycle of limited international visitation that restricts further promotional investment, highlighting the need for supportive public policies. Third, sustained university–industry collaboration offers a scalable mechanism for strengthening multilingual heritage promotion in developing countries. The proposed hybrid promotional model, integrating Mandarin-language printed brochures with QR code-enabled digital extensions, provides a practical framework that can be adapted to other heritage destinations and language markets. Future research should employ longitudinal mixed-methods designs to evaluate the model's long-term effectiveness and examine the institutional conditions necessary to sustain university–industry partnerships

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AUTHOR CONTRIBUTIONS

Conceptualization, H.A. and A.E.; Methodology, H.A., A.E., and Z.Y.; Software, H.A.; Validation, A.E., Z.Y., and S.C.X.; Formal Analysis, H.A. and Z.Y.; Investigation, H.A. and A.E.; Resources, A.E. and Z.Y.; Data Curation, H.A.; Writing – Original Draft Preparation, H.A. and A.E.; Writing – Review & Editing, Z.Y. and S.C.X.; Visualization, H.A.; Supervision, Z.Y. and S.C.X.; Project Administration, H.A.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

Not applicable.

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