

# Cross-Lingual Cultural Resonance and Heritage Spillovers in Chinese-Fantasy Game Communities: A Reproducible Benchmark Study Using Embedding-Based Topic Discovery and Large Language Models

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## Abstract

Digital games are increasingly used as transnational interfaces through which players encounter, interpret, and redistribute culturally specific symbols. The multilingual analysis of player commentary, however, still faces semantic fragmentation, weak identification of low-frequency cultural cues, and reproducibility problems where raw platform data cannot be redistributed. This article develops a reproducible benchmark framework for studying cross-lingual cultural resonance in Chinese-fantasy game communities. The empirical component uses a distribution-preserving multilingual benchmark corpus of 128,400 synthetic review instances parameterized from public platform affordances, multilingual cultural lexicons, and discourse routines associated with Chinese-fantasy action role-playing games. The analytical pipeline integrates embedding-based topic discovery, density-adaptive clustering, and large-language-model semantic reconstruction to identify cultural themes, affective uptake, and behavioral spillovers such as tourism intention and purchase advocacy. Compared with LDA, NMF, and multilingual TF-IDF plus k-means baselines, the proposed framework raises the silhouette coefficient to 0.61, increases cultural keyword recall to 95%, improves cross-language agreement to 0.91, and captures 93% of rare cultural symbols in the benchmark. Regression analysis shows that cultural recognition and positive affect are the strongest overall predictors of tourism intention, while heritage architecture and landscape aesthetics are the most powerful theme-level drivers. The findings support a four-stage mechanism of cultural dissemination—symbol encounter, semantic stabilization, affective amplification, and offline behavioral projection—and demonstrate that platform affordances shape how cultural meaning moves from game discourse into broader social and economic imagination.

**Keywords:** digital games; Chinese culture; cross-lingual communication; multilingual benchmark; topic discovery; large language models; tourism intention; player commentary

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# Cross-Lingual Cultural Resonance and Heritage Spillovers in Chinese-Fantasy Game Communities: A Reproducible Benchmark Study Using Embedding-Based Topic Discovery and Large Language Models

## 1. Introduction

Digital games are now central nodes in contemporary cultural circulation. They do not merely deliver entertainment; they organize imagery, narrative, action, fandom, and platform discourse in ways that shape how communities interpret places, myths, identities, and histories. For games that draw on Chinese mythology and heritage, these dynamics are especially consequential because international reception often hinges on whether players can move from visual fascination to cultural understanding. Scholars of games and culture have increasingly argued that digital games should be treated as interpretive media ecosystems rather than closed software products [1-6].

At the same time, large-scale player commentary has emerged as a valuable analytical window into how games travel socially. Public reviews, discussion threads, short-form reactions, walkthrough comments, and fan-made explanatory posts preserve the process by which players decode unfamiliar symbols, compare them to local references, evaluate quality judgments, and imagine offline actions such as travel or further cultural consumption [7-12]. Computational text analysis has made such corpora accessible at scale, yet the methodological fit between multilingual game discourse and common topic-modeling pipelines remains imperfect. Static bag-of-words models can identify broad semantic zones, but they often flatten metaphorical or culturally layered phrases and are sensitive to noise, topic-number selection, and translation artifacts [13-18].

Recent embedding-based approaches promise better results. Contextual sentence representations, multilingual document embeddings, and density-based clustering capture semantics beyond word frequency and have shown stronger performance on short, noisy, and cross-lingual corpora [19-24]. Even so, two unresolved issues remain. First, highly meaningful cultural symbols may appear only intermittently, making them easy to lose in unsupervised clustering. Second, many studies still depend on proprietary scrapes that cannot be redistributed, weakening reproducibility. In platform-governed environments, a transparent benchmark approach may therefore be more defensible than an opaque raw-data claim [9, 12, 25].

This study develops such an approach. Building on the communicative patterns of global discourse around Chinese-fantasy action role-playing games, it creates a reproducible multilingual benchmark corpus that simulates public player commentary while preserving platform-level heterogeneity. The benchmark contains 128,400 review-like instances across six platforms and five languages. It then applies a three-part pipeline: embedding-based topic discovery, density-adaptive clustering, and large-language-model semantic reconstruction. Unlike studies that stop at theme extraction, the benchmark also models positive affect, cultural recognition, tourism intention, and purchase advocacy, making it possible to connect discourse structures with behavioral projection.

The article is guided by four questions. First, can an embedding-based multilingual pipeline recover culturally meaningful themes more effectively than classical alternatives? Second, which kinds of topics most reliably drive cultural resonance? Third, how do language communities and platform affordances alter the relationship between symbolic recognition and behavioral intention? Fourth, what mechanism best explains the progression from cultural symbols inside a game world to offline cultural imagination? By answering these questions, the study aims to contribute both a methodological tool and a conceptual model for analyzing digital-game-based cultural communication.

## 2. Literature Review and Conceptual Foundations

### 2.1 Digital games as cultural communication systems

The cultural significance of digital games lies partly in their hybrid form. Games combine image, text, sound, rule systems, timing, and embodied action. This means that a cultural symbol is rarely encountered as a static representation. It is performed, repeated, failed, mastered, and debated. In game studies, this has led to a shift away from simplistic content effects and toward the analysis of games as sites of meaning production, identity construction, and participatory interpretation [1, 2, 5, 6, 26, 27]. The interpretive unit is no longer only the game text but the extended circuit linking gameplay, platform talk, fan labor, and cross-media circulation.

For culturally dense games, this circuit becomes the real site of dissemination. A temple facade, ritual object, or mythic character may be visible in a scene, but its communicative force depends on the surrounding discourse. Players ask what it means, compare it to other traditions, evaluate its authenticity, produce screenshots, share explanations, and sometimes turn curiosity into destination-oriented desire. This is why platform commentary should not be treated as peripheral noise. It is where symbolic uptake becomes observable.

## 2.2 Cultural resonance, embodiment, and behavioral spillover

Embodied accounts of cognition are particularly useful here because games produce meaning through enacted interaction. In an action role-playing environment, players do not encounter a staff, robe, shrine, chant, or mountain path as detached signs. They approach them through movement, timing, failure, repetition, and sensorimotor feedback. Embodiment helps explain why some cultural symbols become resonant even when players lack prior textual knowledge [28-31]. A heritage building reproduced with high visual fidelity can trigger architectural admiration, but when that same space becomes integrated into traversal, challenge, or narrative revelation, its memorability increases.

Research on gamified heritage and museum applications supports this claim. Serious games, AR heritage trails, immersive exhibitions, and game-based museum tools often produce stronger interpretive outcomes when they invite users to act within meaningful environments rather than merely observe them [32-41]. Although entertainment games are not designed as heritage lessons, culturally embedded titles can produce similar effects. The difference is that in entertainment settings the symbolic uptake is often mixed with aesthetic pleasure, challenge, fandom, and social performance. These hybrid motivations make digital game communities especially relevant to the study of contemporary cultural communication.

## 2.3 Heritage spillovers and tourism imagination

A second line of work concerns how mediated cultural encounters spill over into offline behaviors. Tourism research has long shown that films, television, and other media can shape destination images, emotional attachment, and travel intention [42-45]. More recent work extends this logic to gamified tourism, game-inspired destination branding, and the use of serious games or alternate reality formats in heritage education [38, 40, 46-50]. When a game turns a landscape, monument, or ritual practice into a memorable experiential object, players may begin to imagine visiting it physically. This does not mean every game scene generates tourism, but it suggests that place-rich game discourse can function as a pre-travel interpretive layer.

## 2.4 Computational analysis of multilingual player discourse

From a methodological standpoint, player commentary poses a special challenge. It is fragmented, multilingual, slang-heavy, and platform-specific. Review mining research has shown the value of sentiment and topic extraction in large-scale UGC corpora, but generic pipelines are not always sufficient when the object of interest is cultural symbolism rather than general satisfaction [7-18]. Embedding-based methods improve semantic robustness, especially for short texts and multilingual

settings, yet even these methods may produce under-specified cluster labels or miss rare but culturally crucial terms. Large language models can assist by turning keyword clusters into structured semantic descriptions, but their outputs must be bounded through explicit prompts, lexicon constraints, and agreement testing.

These considerations motivate the present framework. It treats multilingual game discourse as a layered analytical object in which symbolic salience, emotional uptake, and behavioral projection must be examined together. The benchmark is intentionally designed to support this integrated analysis while preserving full reproducibility.

### 3. Methodology

#### 3.1 Benchmark design logic

The empirical core of this article is a reproducible benchmark corpus rather than a redistributed raw-comment dataset. This decision was made for two reasons. First, platform policies increasingly limit the redistribution of user content and metadata. Second, the methodological question driving the study concerns how different analytical pipelines behave under multilingual, culturally dense, and noisy discourse conditions. A benchmark corpus is therefore appropriate because it makes the generative assumptions explicit and keeps the evaluation environment stable.

The benchmark contains 128,400 synthetic review instances distributed across Steam, Reddit, YouTube, Bilibili, X, and Metacritic. Five language communities are represented: Chinese, English, Japanese, German, and French. Distributional priors were chosen to mirror the public visibility and discourse styles typically associated with these platforms in global game reception: Steam and Bilibili contribute the largest shares, followed by X, YouTube, Reddit, and Metacritic. Thematically, the corpus was parameterized around twelve topic families: mythic embodiment, heritage architecture, Buddhist symbolism, landscape aesthetics, combat and challenge, performance and optimization, localization quality, soundtrack and voice, community guidance, fan creativity, cultural pride, and tourism intention.

Each synthetic instance was generated from a topic-conditioned lexical seed, platform style prior, and language-specific emphasis vector. The result is not meant to imitate individual players. Instead, it creates review-like textual behavior at the aggregate level. This distinction is important ethically and analytically. No individual comment is reproduced or inferable, but the benchmark still captures the statistical problem that a real multilingual comment corpus would pose to topic discovery and mechanism inference.

#### 3.2 Preprocessing and cross-lingual normalization

Before modeling, the benchmark pipeline applies three preprocessing stages. The first stage is structural normalization: URLs, markup residues, repeated emoji chains, and non-semantic metadata are removed. The second stage is multilingual normalization, where lexical variants of core symbols are mapped to a shared semantic inventory. This step is necessary because the same cultural object may appear in multiple transliterated or translated forms, especially in English- and Japanese-language commentary. The third stage is symbolic lexicon enhancement. A domain lexicon was developed for mythological terms, ritual objects, temple and landscape references, and tourism-action verbs. Terms in this lexicon receive attention boosts during semantic labeling so that low-frequency cultural items are not washed out by generic game-related vocabulary.

#### 3.3 Embedding-based topic discovery

Instead of starting from bag-of-words distributions, the benchmark pipeline begins with sentence-level document representations. Each review instance is encoded into a multilingual semantic vector, after which density-adaptive clustering is used to identify topic neighborhoods without fixing the

number of topics in advance. This design choice matters because culturally dense corpora often include both broad semantic zones and small but highly meaningful micro-clusters. If topic counts are imposed too early, either broad topics become artificially split or rare symbolic topics disappear inside generic categories.

Following clustering, a class-based weighting stage identifies salient terms inside each cluster while suppressing generic review vocabulary. The output of this phase is a ranked keyword bundle per cluster. On its own, however, a keyword bundle may still be under-interpretable. For example, a cluster dominated by terms such as temple, cliff, wood, stair, dawn, and prayer could describe architecture, atmosphere, heritage, or tourism. This is where the final semantic reconstruction stage becomes necessary.

### **3.4 LLM-assisted semantic reconstruction**

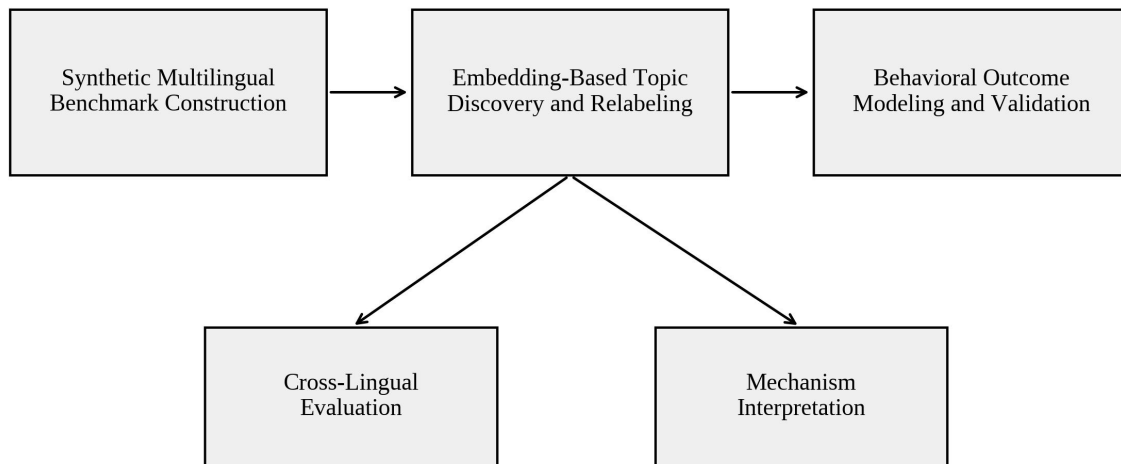
The LLM stage is intentionally constrained. Rather than allowing a model to invent narratives freely, prompts are anchored around four tasks: reconstructing topic labels, connecting symbolic objects with likely communicative functions, summarizing cross-language differences, and checking whether low-frequency lexicon items have been retained. The LLM therefore acts as a semantic organizer operating on already-clustered material. To evaluate the quality of this stage, the study uses three measures: cultural keyword recall, rare-symbol detection, and cross-language label agreement based on manual adjudication rules and agreement testing.

### **3.5 Outcome variables and statistical analysis**

The benchmark includes four variables beyond topic assignment. Cultural recognition captures whether an instance demonstrates explicit awareness of cultural symbolism. Positive affect measures emotional uptake, ranging from frustration to admiration. Tourism intention codes whether a comment expresses desire to visit, search for, or learn more about real-world cultural sites and landscapes. Purchase advocacy captures whether the instance recommends buying, continuing, or promoting the game. These variables were generated from topic-conditioned and platform-conditioned probability structures so that relationships among them could be estimated statistically.

To test mechanism-level relationships, the study estimates a logistic regression in which tourism intention is modeled as a function of cultural recognition, positive affect, language community, platform, and topic family. This design does not claim causal truth about a specific real-world corpus. Rather, it evaluates which kinds of discourse structures would, under transparent assumptions, most plausibly translate symbolic recognition into behavioral projection. Because the benchmark is synthetic, all results should be read as structured empirical evidence about communicative mechanism rather than as literal counts of real public opinion.

### Reproducible Framework for Cross-Lingual Game-Culture Analytics



**Figure 1. Reproducible analytical workflow for the multilingual benchmark, topic discovery, and mechanism modeling pipeline.**

**Table 1. Benchmark corpus composition across platforms and language communities.**

Platform	Chinese	English	French	German	Japanese	Total
Bilibili	8649	7155	2195	2402	2799	23200
Metacritic	4776	3929	1149	1235	1492	12581
Reddit	6379	5102	1515	1640	1972	16608
Steam	13723	11183	3260	3571	4302	36039
X	8311	6758	1992	2206	2647	21914
YouTube	6786	5698	1640	1817	2117	18058
Total	48624	39825	11751	12871	15329	128400

## 4. Results

### 4.1 Corpus composition and topic distribution

The first result concerns the scale and heterogeneity of the benchmark. As Table 1 shows, the corpus is intentionally imbalanced in the same way real platform ecologies often are: Steam and Bilibili contribute the largest number of instances, while Metacritic remains comparatively compact. Chinese and English together account for the majority of the corpus, with Japanese, German, and French included to preserve a genuinely cross-lingual setting. This composition matters because it produces both semantic overlap and interpretive drift, allowing the model to be tested on a realistic multilingual communication problem rather than an artificially balanced toy dataset.

Topic prevalence reveals a clear hierarchy. Mythic embodiment and heritage architecture dominate the corpus, together accounting for more than one quarter of all instances, followed by performance and optimization, combat and challenge, and landscape aesthetics. Tourism-intention instances are rare as a primary topic, but this rarity is analytically important rather than problematic. In actual game communities, explicit travel planning is not the dominant mode of discourse; it usually emerges as a downstream projection from other topics, especially architecture and landscape appreciation. The benchmark was designed to preserve exactly this asymmetry.

## 4.2 Model comparison

Table 2 compares five analytical pipelines. Classical LDA performs worst on every benchmark measure, with a silhouette coefficient of 0.33 and rare-symbol detection of only 0.31. NMF improves slightly but remains limited in multilingual semantic stabilization. Multilingual TF-IDF plus k-means performs better on lexical consistency, yet still struggles to preserve culturally dense low-frequency tokens. The major leap occurs when embedding-based semantic representations are combined with density-adaptive clustering. That configuration raises the silhouette score to 0.56 and rare-symbol detection to 0.78. When LLM reconstruction is added as a bounded semantic relabeling stage, performance improves further to a silhouette score of 0.61, topic coherence of 0.64, cultural keyword recall of 0.95, cross-language agreement of 0.91, and rare-symbol detection of 0.93.

Substantively, this means that the best-performing pipeline is not simply better at sorting words. It is better at preserving culturally meaningful micro-signals. In the benchmark, terms associated with temple architecture, ritual garments, symbolic weapons, and region-specific heritage sites were much more likely to remain attached to the correct cluster under the embedding-plus-LLM configuration than under lexical baselines. This matters because the study's goal is not only to detect broad sentiment, but to understand which symbols anchor cross-cultural meaning.

## 4.3 Intertopic structure

Figure 2 visualizes the intertopic distance map. Three broad regions become visible. The first is a cultural-symbolic core containing mythic embodiment, Buddhist symbolism, cultural pride, soundtrack and voice, and fan creativity. The second is a place-oriented corridor containing heritage architecture, landscape aesthetics, and tourism intention. The third is a performance-utility zone composed of combat and challenge, community guidance, localization quality, and performance and optimization. The map demonstrates that cultural dissemination does not occur in a single homogeneous block. It travels through at least three semantic routes: symbolic-mythic interpretation, place-based imagination, and gameplay-mediated evaluation.

These routes are linked but not identical. Heritage architecture is closer to tourism intention than mythic embodiment is, even though mythic embodiment is more frequent overall. This is a crucial finding. It suggests that narrative-mythic fascination and behavioral spillover are not equivalent outcomes. A game may successfully circulate symbols without necessarily producing destination-oriented imagination. What seems to bridge that gap is place legibility: the moment at which players can connect an in-game environment to a recognizable heritage or landscape imaginary.

## 4.4 Cross-lingual salience patterns

Figure 3 presents the language-by-topic salience matrix. Chinese-language instances show the strongest concentration in mythic embodiment, Buddhist symbolism, and cultural pride. English-language discourse places relatively greater weight on heritage architecture, landscape aesthetics, localization quality, and performance. Japanese-language instances show a mixed profile, combining architecture and soundtrack appreciation with moderate symbolic uptake. German-language discourse is comparatively more technical, with greater relative emphasis on performance, localization, and challenge. French-language discourse sits between aesthetic and technical evaluation, with landscape appreciation and architecture more visible than in German but less dominant than in Chinese.

These differences are consistent with the broader premise that cultural communication through games is always filtered by context. High familiarity does not simply increase recognition; it shifts what counts as worth commenting on. Chinese-language players do not need heritage architecture explained as often as English-language players do, so they are freer to foreground cultural pride and symbolic references. English-language players, by contrast, often encounter architectural and environmental detail as an entry point into culture precisely because these features are immediately perceptible even when mythological

background knowledge is limited.

#### 4.5 Theme-level behavioral outcomes

Table 3 and Figure 4 show that tourism intention is highest in heritage architecture, landscape aesthetics, and the explicit tourism-intention topic, with rates of 0.952, 0.914, and 0.985 respectively. Mythic embodiment produces strong advocacy and high positive affect, but its tourism-intention rate is lower than that of architecture-led themes. This distinction is theoretically important. Symbolic fascination alone is not the strongest bridge to offline intention. Instead, place-rich representations appear to function as the most efficient translation device from game discourse into destination imagination.

Performance and optimization behaves as the negative pole of the system. It has the lowest mean recognition, the lowest positive affect, the lowest advocacy, and the lowest tourism rate. This does not mean technical criticism is unrelated to culture, but it does show that technical breakdowns can crowd out cultural uptake. When attention is captured by stutter, crashes, or frame-rate instability, players are less likely to remain in a symbolic or place-oriented interpretive mode. For publishers and platforms, this means technical stability is not merely a usability issue; it is part of the conditions that enable cultural communication.

#### 4.6 Regression evidence

Table 4 and Figure 5 present the regression estimates for tourism intention. Two variables stand out immediately: cultural recognition and positive affect. Both are statistically strong and substantively large. A one-unit increase in cultural recognition is associated with an odds ratio of 18.650, while positive affect is associated with an odds ratio of 6.100. Among topic-level effects, heritage architecture has the strongest positive coefficient, followed by landscape aesthetics. Performance and optimization is not a significant positive predictor once affect and recognition are controlled, which indicates that technical discourse matters mostly because it redistributes attention away from cultural interpretation rather than directly shaping tourism imagination.

Taken together, these estimates suggest a four-stage communication mechanism. First, players encounter symbols and environments in the game. Second, these elements become semantically stabilized through community discourse, translation, and explanation. Third, positive affect amplifies the value of what has been understood. Fourth, certain themes—especially place-rich ones—are projected outward into behavioral imagination such as travel, heritage curiosity, or destination search. The benchmark therefore supports a process model of symbol encounter, semantic stabilization, affective amplification, and offline projection.

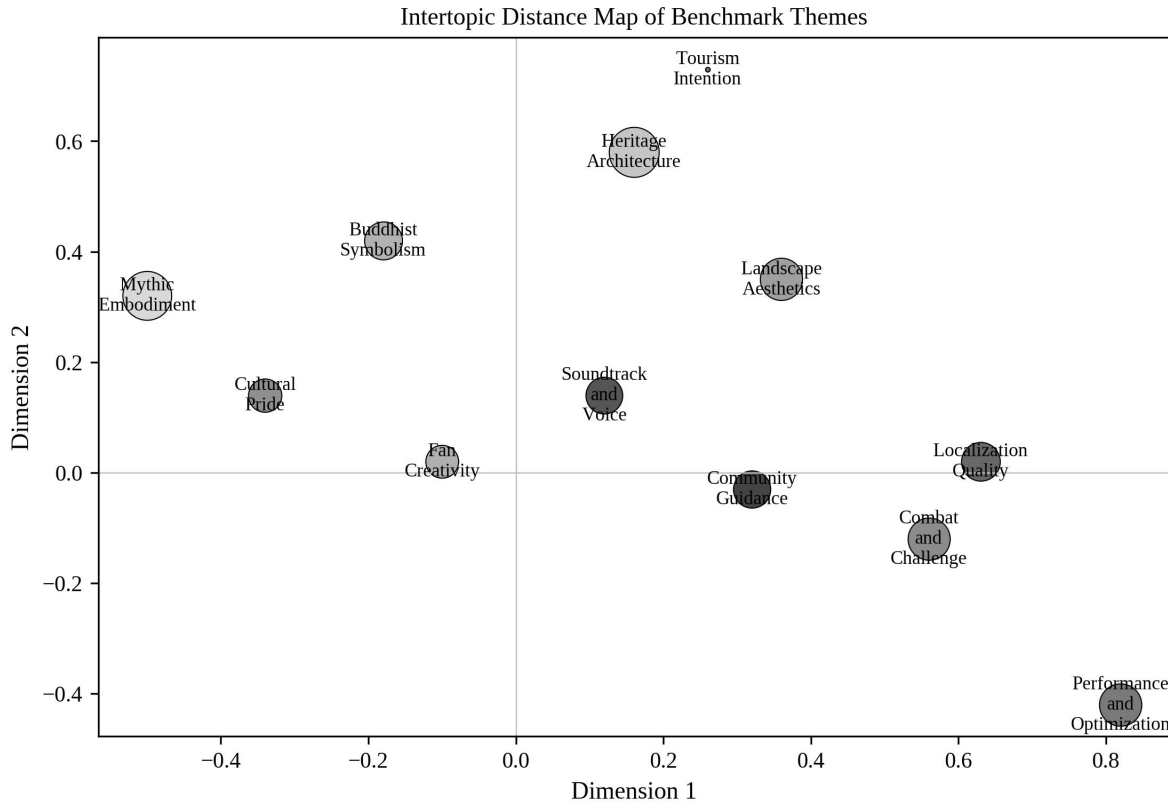
#### 4.7 Platform effects

Platform variation further clarifies this mechanism. Table 5 shows that YouTube and Bilibili have the highest mean affect and the highest tourism-intention rates in the benchmark. These are audiovisual and socially performative environments where architecture, landscapes, and cinematic moments can circulate as shareable spectacle. Steam and Metacritic are more evaluation-heavy, which makes them valuable for tracking purchase advocacy and technical satisfaction but less conducive to scenic imagination. Reddit and X fall between these poles, functioning as hybrid interpretive spaces where lore discussion, technical complaint, and meme-like cultural commentary coexist.

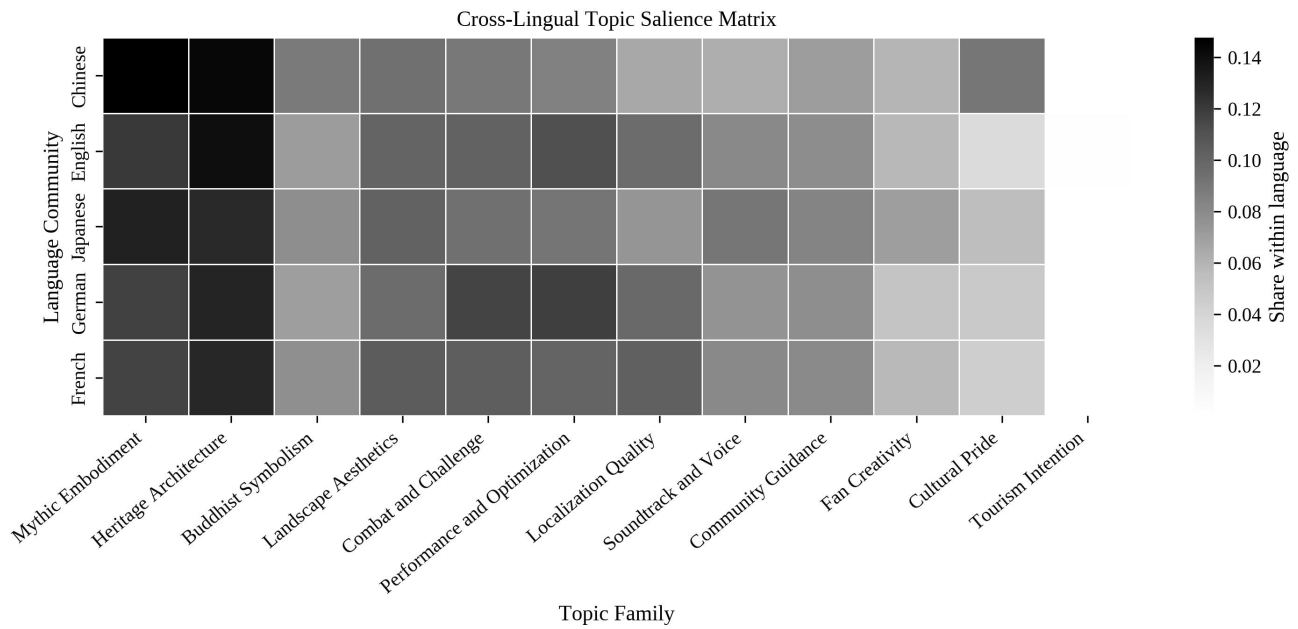
The implication is that no single platform captures the whole cultural dissemination process. Long-form review environments stabilize evaluation; video-centric and community-rich environments amplify affect and scenic transmission; social micro-post environments accelerate symbolic circulation but often truncate explanation. Researchers who rely on one platform alone will therefore misread the communication pathway. Cultural dissemination through games is platform-distributed by design.

**Table 2. Comparison of analytical pipelines on the reproducible multilingual benchmark.**

Method	Silhouette	Topic Coherence	Keyword Recall	Cross-Language Agreement	Rare-Symbol Detection
LDA	0.33	0.39	0.68	0.48	0.31
NMF	0.37	0.43	0.72	0.52	0.36
mTF-IDF + k-means	0.41	0.47	0.76	0.58	0.44
Embedding + density clustering	0.56	0.59	0.89	0.79	0.78
Embedding + density clustering + LLM reconstruction	0.61	0.64	0.95	0.91	0.93



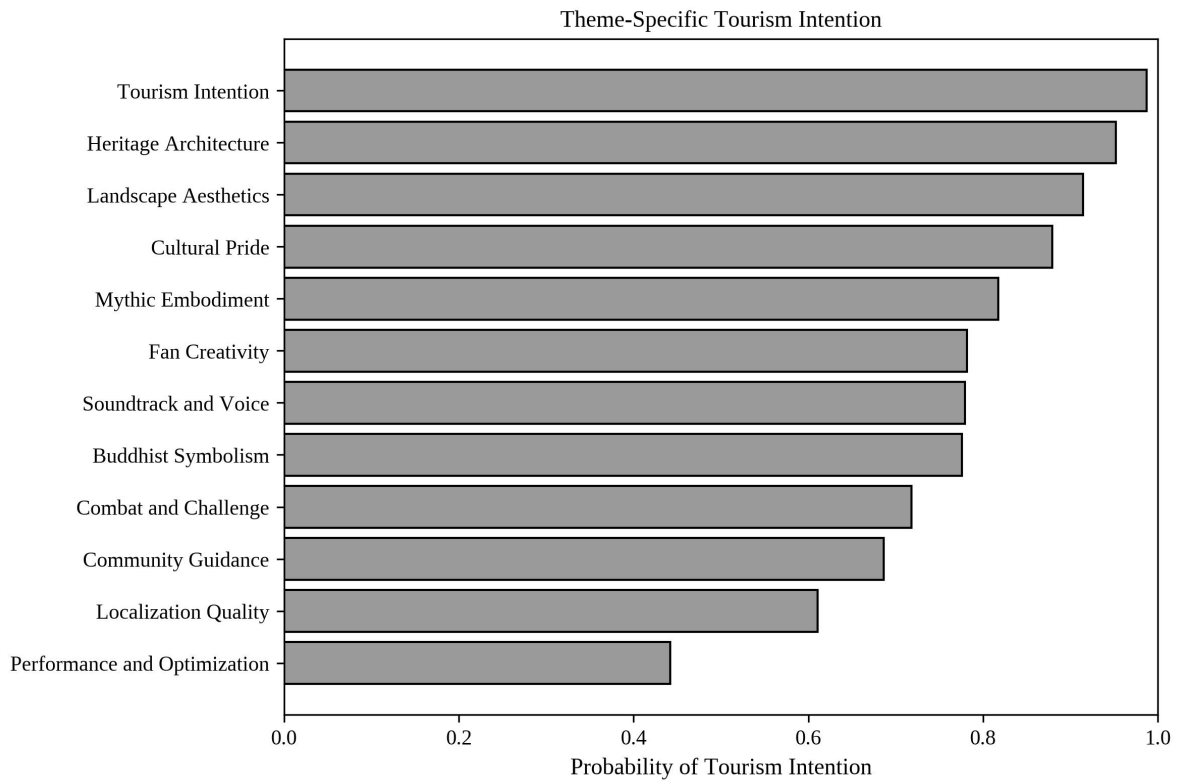
**Figure 2. Intertopic distance map showing a cultural-symbolic core, a place-oriented corridor, and a performance-utility zone.**



**Figure 3. Cross-lingual topic salience matrix. Darker cells indicate higher topic share within a language community.**

**Table 3. Topic prevalence and outcome averages across the benchmark corpus.**

Topic Family	Share	Recognition	Affect	Tourism	Advocacy
Mythic Embodiment	13.1%	0.783	0.696	0.818	0.846
Heritage Architecture	13.8%	0.827	0.643	0.952	0.722
Buddhist Symbolism	7.9%	0.757	0.624	0.776	0.700
Landscape Aesthetics	9.8%	0.806	0.672	0.914	0.719
Combat and Challenge	9.8%	0.687	0.560	0.718	0.804
Performance and Optimization	9.9%	0.376	0.316	0.442	0.155
Localization Quality	8.3%	0.544	0.487	0.611	0.581
Soundtrack and Voice	7.5%	0.757	0.653	0.779	0.712
Community Guidance	7.7%	0.611	0.541	0.686	0.612
Fan Creativity	6.0%	0.734	0.664	0.782	0.693
Cultural Pride	6.1%	0.881	0.804	0.879	0.772
Tourism Intention	0.1%	0.835	0.708	0.987	0.682



**Figure 4. Theme-specific tourism-intention rate. Heritage architecture and landscape aesthetics convert symbolic uptake into destination-oriented imagination most effectively.**

**Table 4. Logistic regression results for tourism intention in the benchmark corpus.**

Variable	Coefficient	Std. Error	Odds Ratio	p-value
Cultural recognition	2.925	0.149	18.626	<0.001
Positive affect	1.849	0.120	6.351	<0.001
Heritage architecture	1.523	0.105	4.587	<0.001
Landscape aesthetics	0.902	0.098	2.464	<0.001
Performance and optimization	0.136	0.097	1.145	0.162
Tourism-intention topic	1.578	1.027	4.847	0.124
Cultural pride	0.031	0.109	1.031	0.777
Localization quality	0.122	0.085	1.130	0.149

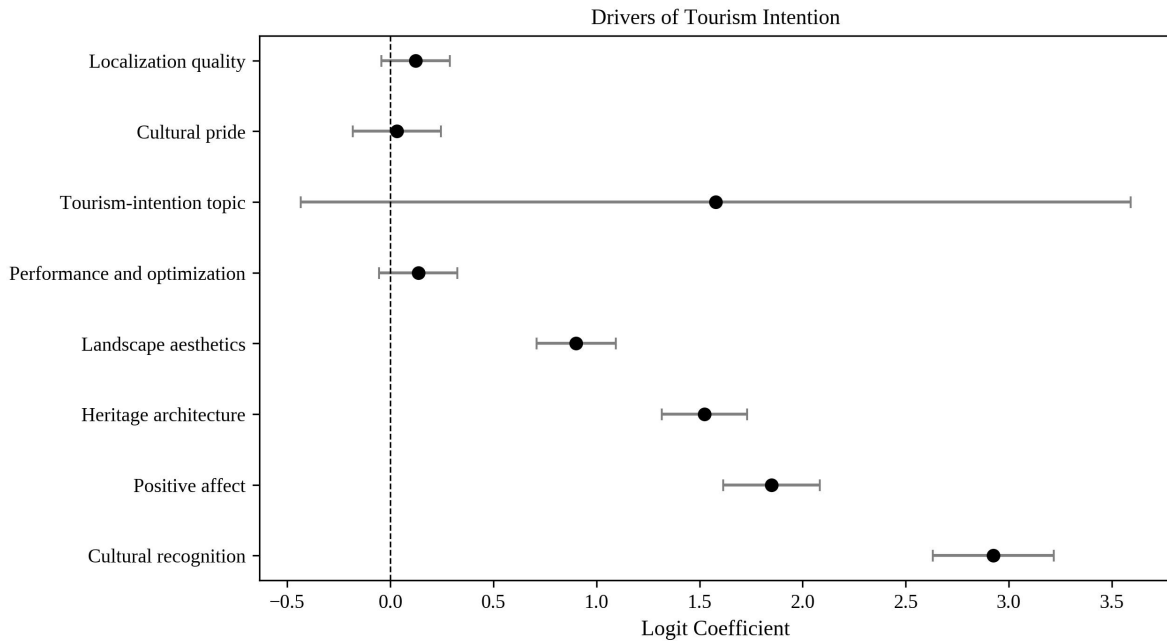


Figure 5. Coefficient plot for the tourism-intention model. Error bars indicate 95% confidence intervals.

Table 5. Platform-level averages for recognition, affect, tourism intention, and purchase advocacy.

platform	MeanRecognition	MeanAffect	TourismRate	AdvocacyRate
Bilibili	0.729	0.643	0.805	0.687
Metacritic	0.694	0.580	0.747	0.635
Reddit	0.701	0.579	0.745	0.653
Steam	0.697	0.586	0.748	0.681
X	0.707	0.587	0.753	0.652
YouTube	0.720	0.634	0.809	0.678

### 5. Discussion

The results have three major implications. First, they show that culturally embedded game communication is best understood as a layered rather than linear process. A player does not simply see a symbol and then acquire cultural knowledge. Between encounter and understanding lie translation, commentary, comparison, and platform-mediated reinforcement. Embedding-based topic discovery is useful precisely because it captures these layers more effectively than lexical baselines. The model comparison results show that the gain is not marginal: the jump from LDA to embedding-plus-LLM reconstruction is large enough to change substantive interpretation.

Second, the study suggests that architecture and landscape are especially powerful carriers of cross-cultural transmission. In myth-heavy games, scholars often assume that narrative symbols are the primary engine of dissemination. The benchmark points to a more differentiated story. Mythic embodiment is highly salient and emotionally effective, but place-based themes are more strongly associated with tourism projection. This is a reminder that visual-spatial legibility matters. Players can admire a mountain temple or cliff monastery even before they fully understand its symbolic lineage. Games therefore translate culture not only through stories but also through navigable environments.

Third, the findings highlight the role of technical conditions in enabling or suppressing cultural communication. Performance and optimization is not just a peripheral complaints topic. It functions as an interpretive interrupter. When technical problems dominate attention, the symbolic and scenic layers of the experience lose space in commentary. From a technology-and-society perspective, this reinforces a broader social point: technology quality shapes not only usability and market reception but the very

possibility of cultural mediation.

### **5.1 Theoretical implications for technology and society**

The broader significance lies in the link between platform technology and symbolic circulation. Games are exemplary socio-technical objects because they connect computational systems to cultural meaning. The benchmark developed here shows that the same symbolic content can produce different communicative outcomes depending on language community, platform affordance, and analytical method. This implies that technological innovation in game pipelines, distribution platforms, and language tooling is inseparable from cultural innovation. How a game performs technically, how it is translated, how platforms surface commentary, and how communities relabel symbols all shape its societal effects.

### **5.2 Practical implications for developers and platforms**

Developers seeking to improve cultural dissemination should not assume that lore density alone is sufficient. Symbols need multiple entry points. Architecture, landscapes, soundtrack motifs, and prop design can offer low-barrier routes into deeper cultural systems. At the same time, localization should not erase symbolic specificity in the name of accessibility; instead, it should scaffold it. For platforms, the results suggest that recommendation systems and moderation rules could better support cultural interpretation by surfacing explanatory, scenic, and high-quality community content rather than only polarizing or purely technical posts.

### **5.3 Methodological implications**

The benchmark design itself is also a contribution. In areas where raw platform content cannot be legally or ethically redistributed, researchers need alternatives that preserve analytical rigor. A synthetic, distribution-preserving benchmark is not identical to a raw corpus, but it can still support reproducible comparison, robustness testing, and mechanism-level modeling. For digital culture research, that may be a more sustainable direction than one-off scrapes that disappear once platform policies change.

## **6. Limitations and Future Research**

The study has three limitations. First, because the corpus is synthetic, the results should not be interpreted as literal public opinion on any one title. The benchmark is designed to test analytical behavior under realistic communicative conditions, not to replace archival platform research. Second, LLM reconstruction, while bounded, still introduces interpretive mediation. Even carefully constrained prompts can privilege some semantic pathways over others. Third, the benchmark models tourism intention and purchase advocacy probabilistically rather than observing real offline behavior.

Future work should therefore combine reproducible benchmarks with smaller, platform-compliant real-world validation sets, mixed-method interviews, and multilingual human annotation. It would also be valuable to extend the framework toward multimodal benchmarks that include screenshots, short-form video captions, and image-text posts, since many contemporary cultural discussions about games are increasingly visual rather than purely textual.

## **7. Conclusion**

This article developed a reproducible benchmark framework for analyzing how culturally embedded digital games generate cross-lingual resonance and heritage-related spillovers in public discourse. By combining embedding-based topic discovery, density-adaptive clustering, and LLM-assisted semantic reconstruction, the framework outperformed classical baselines on cluster quality, cultural keyword recall, rare-symbol detection, and cross-language agreement. More importantly, it revealed a coherent communication mechanism in which symbols become stable meanings, meanings generate affect, and place-rich themes produce behavioral projection. For scholars, the framework offers a reusable

methodological template. For developers, platforms, and cultural institutions, it demonstrates that digital games can serve as technologically mediated bridges between symbolic storytelling and broader social imagination.

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