

GEO-TAGGED INSTAGRAM ANALYTICS FOR HERITAGE TOURISM AND SERVICES MARKETING: MODELING HOW PLACE-MAKING ATTRIBUTES SHAPE VISITOR IMPRESSIONS IN MALANG, INDONESIA

ANÁLISE DE DADOS DO INSTAGRAM COM GEO-TAGS PARA O TURISMO CULTURAL E O MARKETING DE SERVIÇOS: MODELAGEM DE COMO OS ATRIBUTOS DE CRIAÇÃO DE ESPAÇOS MOLDAM AS IMPRESSÕES DOS VISITANTES EM MALANG, NA INDONÉSIA

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Abstract

Purpose: This study aims to model how place-making attributes—specifically accessibility, comfort and impression, use and activity, and friendliness—shape visitor impressions of heritage urban parks in Malang, Indonesia, as expressed through geo-tagged Instagram content. The study bridges spatial design theory and digital tourism analytics, providing an empirical framework for understanding how physical and experiential qualities of urban heritage spaces influence digital perceptions and emotional responses. **Methods:** The research adopts a descriptive–evaluative design, integrating geo-tagged Instagram analytics with a path analysis framework. Seven historic urban parks in Malang—Alun-Alun Tugu, Alun-Alun Merdeka, Merbabu Park, Cerme Park, Slamet Park, Gayam Park, and Ijen Park—served as the analytical units. Data were obtained through systematic extraction and categorization of user-generated hashtags and location tags into four constructs representing place-making attributes. A series of path analyses were conducted to estimate the direct, indirect, and total effects among the constructs and to evaluate model fit across

Resumo

Objetivo: Este estudo tem como objetivo modelar como os atributos de criação de espaço — especificamente acessibilidade, conforto e impressão, uso e atividade, e acolhimento — moldam as impressões dos visitantes sobre os parques urbanos históricos em Malang, na Indonésia, conforme expressas por meio de conteúdos do Instagram com georreferência. O estudo une a teoria do design espacial à análise do turismo digital, fornecendo um quadro empírico para compreender como as qualidades físicas e experienciais dos espaços urbanos históricos influenciam as percepções digitais e as respostas emocionais. **Métodos:** A pesquisa adota um desenho descritivo-avaliativo, integrando análises de Instagram com geotags a uma estrutura de análise de caminhos. Sete parques urbanos históricos em Malang — Alun-Alun Tugu, Alun-Alun Merdeka, Parque Merbabu, Parque Cerme, Parque Slamet, Parque Gayam e Parque Ijen — serviram como unidades analíticas. Os dados foram obtidos por meio da extração e categorização sistemáticas de hashtags e tags de localização geradas por usuários em quatro constructos que representam



different park contexts. Results: The findings reveal that friendliness-related impressions are predominantly shaped by experiential attributes—comfort/impression and use/activity—rather than by accessibility. Accessibility exhibited limited or non-significant effects in most parks, except for minor direct relationships observed in Cerme Park, Slamet Park, and Ijen Park. Comfort/impression and use/activity consistently demonstrated significant positive effects on friendliness, particularly in Alun-Alun Tugu and Alun-Alun Merdeka. These results suggest that the perceived sociability and emotional warmth of heritage parks arise primarily from on-site experiences and active use patterns rather than physical access conditions. Implications: The study contributes to heritage tourism and services marketing research by operationalizing geo-tagged social media data as a diagnostic tool for measuring experiential place-making attributes. The results highlight the need for experience-led management strategies emphasizing comfort, activity diversity, and human-scale design cues that strengthen visitor attachment and digital visibility. Practically, urban heritage managers can employ Instagram analytics to identify which experiential levers most strongly influence visitor impressions, thereby guiding targeted interventions in heritage park design and promotion.

Keywords: Place-Making. Heritage Tourism. Geo-Tagged Instagram Analytics. Visitor Impressions. Urban Parks. Malang City.

atributos de criação de lugar. Uma série de análises de caminho foi realizada para estimar os efeitos diretos, indiretos e totais entre os constructos e para avaliar o ajuste do modelo em diferentes contextos de parques. Resultados: Os resultados revelam que as impressões relacionadas à simpatia são predominantemente moldadas por atributos experienciais — conforto/impressão e uso/atividade — em vez de pela acessibilidade. A acessibilidade exibiu efeitos limitados ou não significativos na maioria dos parques, exceto por relações diretas menores observadas no Parque Cerme, no Parque Slamet e no Parque Ijen. Conforto/impressão e uso/atividade demonstraram consistentemente efeitos positivos significativos sobre a simpatia, particularmente em Alun-Alun Tugu e Alun-Alun Merdeka. Esses resultados sugerem que a sociabilidade percebida e o calor emocional dos parques patrimoniais decorrem principalmente de experiências no local e de padrões de uso ativo, em vez de condições de acesso físico. Implicações: O estudo contribui para a pesquisa em turismo patrimonial e marketing de serviços ao operacionalizar dados de mídias sociais com geotags como uma ferramenta de diagnóstico para medir atributos experienciais de criação de lugar. Os resultados destacam a necessidade de estratégias de gestão orientadas pela experiência, enfatizando o conforto, a diversidade de atividades e elementos de design em escala humana que fortaleçam o apego dos visitantes e a visibilidade digital. Na prática, gestores de patrimônio urbano podem empregar análises do Instagram para identificar quais alavancas experienciais influenciam mais fortemente as impressões dos visitantes, orientando assim intervenções direcionadas no projeto e na promoção de parques históricos.

Palavras-chave: Criação de Espaços. Turismo do Patrimônio. Análise de Dados do Instagram com Geotags. Impressões dos Visitantes. Parques Urbanos. Cidade de Malang.

1 INTRODUCTION

Recently, the concept of place-making has emerged as a focal point in urban and tourism research, reflecting the growing attention toward how people shape, interpret, and emotionally connect with their environments (Hultman & Hall, 2012; Lew, 2019).

Place-making emphasizes the dynamic relationship between physical design, social interaction, and cultural identity, where urban spaces evolve beyond mere built form into meaningful, lived places (Akbar & Edelenbos, 2020). This perspective marks a shift from viewing heritage and tourism sites as static objects of consumption to recognizing them as interactive social systems that foster belonging, creativity, and memory (Ashworth & Tunbridge, 2011; Khirfan, 2016; Pendlebury & Porfyriou, 2017).

According to Li, Jia, Lusk, and Larkham (2020), place-making consists of several interdependent dimensions that together determine how a space is perceived and experienced. These include accessibility, comfort, use and activity, and friendliness—attributes that define the social and physical quality of public environments. Accessibility reflects spatial connection and ease of movement (Mahvari, Ghalehnoee & Mokhtarzadeh, 2020; Mohamed *et al.*, 2020), while comfort encompasses sensory and affective satisfaction shaped by design and ambience (Wahl *et al.*, 2024). Use and activity capture the vibrancy of social life and diversity of engagement (Lew, 2019; Medayese & Magidimisha-Chipungu, 2022), whereas friendliness represents the human and emotional dimensions of place that promote attachment, trust, and social cohesion (Akbar & Edelenbos, 2021; Djukic *et al.*, 2023).

Within the context of heritage tourism, these dimensions of place-making are particularly critical. Heritage sites and historic urban parks embody layers of cultural meaning, but their perceived value often depends on how visitors experience them physically and emotionally (Rezaei, Ghaderi & Ghanipour, 2022; Samir, Samargandi & Mohammed, 2019). Contemporary heritage management thus recognizes that successful place-making can enhance both visitor satisfaction and local identity, contributing to social sustainability (Tousi, Pancholi, Rashid & Khoo, 2025a; Roe, 2023). This aligns with Mosler's (2019) concept of "everyday heritage," which argues that urban landscapes are constantly redefined through lived practices and shared memory rather than preserved as static monuments.

Parallel to these theoretical developments, the rise of social media and digital technologies has transformed how visitors engage with and represent places. Platforms such as Instagram have become integral to tourism behavior, where geo-tagged photos, captions, and hashtags act as digital traces of place experience (Nguyen, Camacho & Jung, 2017; Chen, Parkins & Sherren, 2018; Loke, Teramoto, Camargo & Eccles, 2022).

Through these posts, visitors express emotional, aesthetic, and cognitive impressions that mirror the underlying spatial qualities of destinations (Kádár & Klaniczay, 2022). Research utilizing geo-tagged data has shown how visual content can map tourist movements (Domènech, Mohino & Moya-Gómez, 2020), identify emerging attractions (Payntar, 2022), and cluster destinations according to visitor engagement (Basirati & Laachach, 2025; Zhou & Chen, 2023).

However, while the use of big data and social media analytics in tourism research has expanded, there remains limited understanding of how place-making attributes manifest in user-generated digital content. Most studies to date focus either on descriptive mapping of tourist flows or sentiment analysis without linking these outputs to theoretical constructs of place-making (Amorim Maia, 2018; Luberg, n.d.; Nolasco-Cirugeda *et al.*, 2022). Moreover, despite growing attention to participatory and digital heritage practices (Horvath & Farooqi, 2025; Slattery, 2022; Tousei *et al.*, 2025b), the integration between spatial design theory and data-driven visitor analytics remains fragmented. This gap is particularly pronounced in Southeast Asia, where empirical studies combining heritage tourism, digital media, and place-making remain scarce (Akbar & Edelenbos, 2020; Nag, 2025).

Building on these insights, the present study adopts a place-making framework to analyze how heritage spaces in Malang, Indonesia—specifically its historic urban parks—are experienced and represented by visitors through geo-tagged Instagram posts. These parks, including Alun-Alun Tugu, Alun-Alun Merdeka, Ijen Park, Merbabu Park, Cerme Park, Slamet Park, and Gayam Park, serve as both physical heritage nodes and digital landscapes of interaction where history, leisure, and emotion converge. Malang's case provides a unique opportunity to explore how cultural identity is reconstructed in hybrid spaces that are simultaneously local, historical, and mediated online.

There is now a growing body of literature that illustrates the social and affective dimensions of place-making across cultural contexts. For instance, Akbar and Edelenbos (2020) examined how community-driven place-making in Indonesian kampungs fostered inclusion and identity, while Akbar and Edelenbos (2021) framed place-making as a participatory social process. Similarly, Djukic *et al.* (2023) and Nag (2025) highlighted how heritage-driven place-making networks strengthen local tourism economies, and Li *et al.* (2020) proposed aligning "placeness factors" with perceived design qualities to

enhance satisfaction. Studies like Mahvari *et al.* (2020), Mohamed *et al.* (2020), and Medayese & Magidimisha-Chipungu (2022) reaffirm that accessibility and comfort directly affect perceptions of livability and well-being, while Lew (2019) and Wahl *et al.* (2024) associate these with quality of life and sustainable urban experience.

Nevertheless, a **research gap** persists in linking these established place-making dimensions with quantitative digital evidence of visitor perception and emotion. Although scholars such as Basirati & Laachach (2025), Kádár & Klaniczay (2022), and Loke *et al.* (2022) have used Instagram to explore tourist behavior, few have conceptualized such digital data as proxies for spatial and social place-making constructs. Likewise, while Tousei *et al.* (2025a, 2025b) and Rezaei *et al.* (2022) investigated heritage tourism within smart city and user-experience frameworks, empirical studies operationalizing how accessibility, comfort, use, and friendliness interact to shape digital impressions remain extremely limited.

The main objective of this research is to model how these place-making attributes—accessibility, comfort and impression, use and activity, and friendliness—collectively shape visitor impressions as expressed through geo-tagged Instagram content. This study thereby bridges spatial design theory and digital tourism analytics, providing an integrated framework that connects physical characteristics of heritage spaces with emotional and perceptual responses captured through online behavior.

The **novelty** of this research lies in its synthesis of place-making theory, heritage tourism, and big data analytics into a unified empirical approach. By using geo-tagged Instagram data as indicators of collective visitor experience, the study offers a new lens for understanding how urban heritage sites are experienced and reimagined in the digital era. Beyond academic contribution, this framework has practical implications for heritage management, urban planning, and tourism marketing, as it demonstrates how digital traces can inform more inclusive, responsive, and sustainable place-making strategies in historic urban settings.

2 LITERATURE REVIEW AND HYPOTHESES

2.1 The conceptual model

The concept of place-making has evolved as a central framework in understanding how people experience and ascribe meaning to urban spaces. It encapsulates the process through which public spaces are designed, used, and interpreted by communities, integrating social, physical, and cultural dimensions of place (Hultman & Hall, 2012; Ng, 2016). In the tourism context, place-making reflects the dynamic interaction between spatial design, visitor perception, and cultural expression, forming the foundation of heritage-based experience and destination branding (Ashworth & Tunbridge, 2011; Rezaei *et al.*, 2022).

Recent scholarship situates place-making not merely as a design outcome but as an ongoing social process involving co-creation between users, communities, and environments (Akbar & Edelenbos, 2021; Djukic *et al.*, 2023). The physical qualities of accessibility, comfort, and activity serve as "hard" components of place-making, while friendliness and emotional connection constitute the "soft" elements that generate sense of place and attachment (Lew, 2019; Li *et al.*, 2020). When visitors engage with heritage settings through digital lenses, such as geo-tagged Instagram posts, these tangible and intangible dimensions of place-making become encoded into visual, spatial, and emotional narratives (Loke *et al.*, 2022; Kádár & Klaniczay, 2022).

In this study, geo-tagged Instagram analytics are employed to model how the core constructs of place-making—Accessibility (X1), Comfort and Impression (X2), Use and Activity (X3), and Friendliness (X4)—shape visitor impressions in Malang's heritage parks. The theoretical foundation draws from *place theory* and *social place-making perspectives* (Akbar & Edelenbos, 2020; Mou *et al.*, 2024), which posits that place quality arises from the interplay between environmental affordances and human experiences.

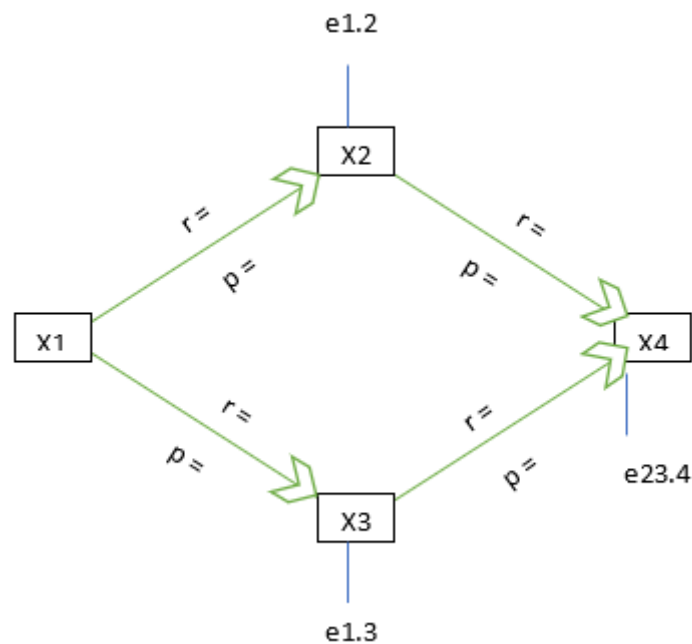
Figure 1 illustrates the conceptual path model, where Accessibility and Use and Activity are considered exogenous constructs, influencing Comfort and Impression and Friendliness as endogenous outcomes. These relationships mirror the layered nature of urban experience: accessibility enables participation, participation enhances comfort and social use, and both feed into perceived friendliness and emotional impressions of place.

Empirical studies support the relevance of these linkages. For example, Li *et al.* (2020) found that perceived accessibility strongly correlates with users' satisfaction and perceived safety in historic districts. Mahvari *et al.* (2020) demonstrated that spatial access quality directly enhances perceived place quality and comfort in public squares. Similarly, Mou *et al.* (2024) and Rezaei *et al.* (2022) confirmed that place-based experiences—mediated through design attributes such as openness, sociability, and activity diversity—significantly influence behavioral intentions in heritage tourism.

The current study thus integrates physical, experiential, and affective components of place-making within a digital analytics framework, using Instagram data to assess how these constructs manifest in user-generated impressions.

Figure 1

Conceptual Path Model Framework



(Source: Author, adapted from Place-Making Theory)

2.2 Hypothesis development

2.2.1 Accessibility and comfort/impression

Accessibility represents the degree to which a space is physically connected, visually permeable, and functionally inclusive (Mohamed *et al.*, 2020; Mahvari *et al.*, 2020). In heritage urban parks, accessibility enables visitors to engage with historic narratives and spatial experiences seamlessly, influencing their comfort and perceived ease of movement. Studies have established that environments with higher connectivity and legibility foster more positive affective impressions and longer durations of stay (Li *et al.*, 2020; Tousei *et al.*, 2025a).

H1: Accessibility has a positive and significant effect on Comfort and Impression.

2.2.2 Accessibility and use/activity

Place-making theory posits that movement precedes meaning—spaces that are easily reachable invite more frequent and diverse use (Nguyen *et al.*, 2017; Domènech *et al.*, 2020). Geo-tagged analytics confirm that high-accessibility areas tend to show dense digital activity clusters, signifying active visitor engagement (Nolasco-Cirugeda *et al.*, 2022; Basirati & Laachach, 2025).

H2: Accessibility positively and significantly influences Use and Activity.

2.2.3 Use/activity and comfort/impression

Use and Activity encompass the range and intensity of behaviors taking place within a space, from social interaction to leisure participation (Akbar & Edelenbos, 2020). Active use contributes to a sense of vitality and liveliness that shapes visitors' comfort and positive impressions (Lew, 2019; Medayese & Magidimisha-Chipungu, 2022). When visitors perceive spaces as animated, inclusive, and participatory, they are more likely to report positive emotions and impressions (Khirfan, 2016; Li *et al.*, 2020).

H3: Use and Activity have a positive and significant impact on Comfort and Impression.

2.2.4 *Comfort/impression and friendliness*

Comfort and Impression synthesize visitors' sensory and emotional responses, which are foundational to perceptions of friendliness and hospitality (Hultman & Hall, 2012; Roe, 2023). According to Akbar & Edelenbos (2021), spaces that evoke comfort through environmental coherence and human-scale design foster perceived friendliness and attachment. In social media-based studies, friendliness is reflected in affective language and emoji sentiment used in geo-tagged posts (Liu, 2022; Chen *et al.*, 2018).

H4: Comfort and Impression have a positive and significant influence on Friendliness.

2.2.5 *Use/activity and friendliness*

Public spaces characterized by high levels of participatory activity and social visibility tend to nurture interpersonal warmth and friendliness (Samir *et al.*, 2019; Djukic *et al.*, 2023). Tousi *et al.* (2025b) identified that cultural heritage sites facilitating co-use and co-creation of space through shared activities significantly enhance perceived friendliness and sense of belonging.

H5: Use and Activity positively and significantly affect Friendliness.

2.3 Theoretical integration

The present conceptualization is grounded in Place Theory and Social Place-Making Theory, both emphasizing the interaction between spatial form, human behavior, and collective meaning. According to Akbar and Edelenbos (2021), place-making evolves through social negotiation and experiential feedback loops, where individual impressions form the cognitive layer of place identity. Lew (2019) and Li *et al.* (2020) argue that

successful place-making enhances not only spatial usability but also emotional resonance and digital visibility.

In the digital era, this study situates *place-making* within an online–offline continuum, where visitor impressions expressed on social media serve as measurable indicators of urban quality and heritage experience (Nguyen *et al.*, 2017; Loke *et al.*, 2022; Zhou & Chen, 2023). By employing geo-tagged Instagram analytics, the research bridges traditional spatial theories with contemporary data-driven approaches, demonstrating how accessibility, comfort, activity, and friendliness collectively shape perceived heritage value and digital place identity in Malang's historic urban parks.

3 METHODOLOGY

This study adopted a descriptive and evaluative research design to examine visitor impressions of historic urban parks in Malang City as expressed through social media. The descriptive component was used to provide a systematic portrayal of the policy context, spatial characteristics, and digital visibility patterns across parks. The evaluative component was employed to assess visitor impressions by applying Instagram geo-tagging and path analysis within a place-making framework.

The research setting was BWP Malang Tengah (Central Malang Urban Area), which contains a concentration of heritage-relevant urban parks. The study objects were seven historic parks that remain observable and identifiable today: Alun-Alun Tugu, Alun-Alun Merdeka, Merbabu Park, Cerme Park, Slamet Park, Gayam Park, and Ijen Park. These parks were selected because they represent established historic public spaces in the city core and have identifiable Instagram location tags and/or hashtag activity relevant to the study.

Data collection followed a non-probability sampling approach using accidental sampling logic. The "respondents" were operationalised as Instagram users whose posts included location tags and/or hashtags referring to the seven historic parks. Primary data were collected through observation and extraction of park-related Instagram geo-tags and hashtags. Secondary data were used to support descriptive profiling of the study area (e.g., policy documents and spatial references relevant to green open space and heritage-related zoning).

The conceptual model was derived from the place-making perspective ("makes a great place") and operationalised into four constructs: Accessibility (X1), Comfort and Impression (X2), Use and Activity (X3), and Friendliness (X4). Place-making indicators were translated into observable measures through a classification procedure in which Instagram hashtags and geo-tagged content were coded into the four constructs. The coded outputs were aggregated at the park level to form the analytical dataset.

3.1 Path analysis procedure and assumptions

Path analysis was applied to evaluate the hypothesised relationships among the four constructs and to estimate direct effects, indirect effects, and total effects. In this study, impressions were treated as initially unobservable and were transformed into observable measures using nominal scoring (0/1) at the indicator stage; subsequently, a correlation matrix was used as the basis for estimating the structural relationships. The path model was used to examine plausible causal relationships among variables in a non-experimental setting by modelling how upstream place-making attributes relate to downstream impressions.

The data analysis using path analysis followed five main steps:

1. Designing the model based on concepts and theory
2. Checking assumptions
3. Estimating path coefficients
4. Assessing model validity
5. Interpreting the results

In the structural notation used in this study, the constructs were defined as follows: X1 = Accessibility, X2 = Comfort and Impression, X3 = Use and Activity, and X4 = Friendliness. The use of path analysis required that the data satisfy core regression-based assumptions. First, relationships among variables were assumed to be linear, meaning that associations follow straight-line functional forms rather than curvilinear patterns. Second, the residual terms were assumed not to be correlated with preceding variables in the model and not to be correlated with each other; this implies that relevant variables should be included in the system so that endogenous variables can be expressed as linear combinations of exogenous and/or other endogenous variables with an accompanying

residual. When exogenous variables are correlated, such correlations are treated as given and are not further decomposed. Third, the normality assumption was considered important for statistical inference, particularly because many observed variables tend to concentrate around the centre of a distribution. Fourth, homogeneity (homoscedasticity) was assumed, meaning that the variance of endogenous variable scores is relatively constant across levels of the exogenous variables. Fifth, path analysis is most appropriate for variables measured on interval or ratio scales and is less suitable for nominal or ordinal scales; therefore, when nominal/ordinal indicators were used, the correlation coefficients were derived through appropriate non-parametric correlation approaches and were then incorporated into the correlation matrix used for path estimation.






In summary, the methodology combined (i) descriptive profiling of the study context, (ii) Instagram-based geo-tagging data collection and coding to operationalise place-making constructs, and (iii) path analysis to quantify direct and indirect relationships among accessibility, comfort and impression, use and activity, and friendliness as core components of visitor impressions in Malang's historic urban parks.



4 RESULTS

4.1 Green open space (RTH) policy orientation in Malang City

Malang City's green open space (RTH) policy emphasizes ecological balance, urban livability, and social-cultural sustainability. RTH is positioned as a strategic urban infrastructure supporting microclimate regulation, water infiltration, aesthetic quality, and public well-being. Within this framework, historic urban parks function as key elements of the city's environmental and cultural landscape.

Table 1*Location, Area and Conditions of Historic City Parks in Malang City*

No.	RTH Name	Location	Area (Ha)	Photo
1.	Monument Square Park	Jalan Tugu	0,7432	
2.	Taman Alun-Alun Merdeka	Jalan Merdeka	2,4782	
3.	Merbabu Park	Merbabu Street	0,4182	
4.	Cerme Park	Cerme Street	0,1838	
5.	Garden of Survival	The Garden of Eden	0,4919	

No.	RTH Name	Location	Area (Ha)	Photo
6.	Chicken Garden	Taman Gayam Road	0,578	
7.	Ijen Park	Ijen Street	0,1896	

Source: Preparation of the RTH Achievement Action Plan and Public RTH Achievement Information System, 2019

Table 2, highlights that Malang City's *Urban Green Open Space (RTH)* policy adopts a multidimensional strategy balancing ecological, social, cultural, spatial, and identity functions. Ecologically, RTH supports environmental sustainability through microclimate regulation, air quality improvement, and water infiltration. Socially, it serves as an inclusive public realm that promotes interaction and recreation. Culturally, it preserves urban heritage and strengthens local identity. From a spatial perspective, it maintains equilibrium between built-up areas and environmental capacity. Finally, in terms of city identity, the policy reinforces Malang's image as the "City of Flowers," symbolizing a green, aesthetic, and sustainable urban environment.

Table 2

Policy Objectives and Strategic Functions of Urban Green Open Spaces (RTH)

Policy Dimension	Strategic Orientation
Ecological function	Microclimate regulation, air quality improvement, water infiltration
Social function	Public interaction, recreation, inclusivity
Cultural function	Preservation of urban heritage and identity
Spatial control	Balancing built-up areas and environmental capacity
Urban identity	Reinforcement of "Malang City of Flowers" concept

4.2 Identification of geotagging in historic urban parks

Geotagging analysis was conducted using Instagram location tags and hashtags to capture user-generated representations of historic urban parks. This method enables the identification of spatial impressions and activity patterns based on digital engagement.

Figure 2

Identification of Geotagging in Historic Urban Parks



Table 3 shows that Slamet Park overwhelmingly dominates Instagram engagement, with the highest number of geo-tagged hashtags (6,451) across all place-making attributes—accessibility, friendliness, comfort & impression, and use & activity. In contrast, other parks such as Cerme, Gayam, and Ijen record minimal digital activity, indicating limited visitor engagement and online visibility.

Table 3*Distribution of Instagram Geotagging by Place-Making Attributes*

Urban Park	Accessibility	Friendliness	Comfort & Impression	Use & Activity	Total Hashtags
Tugu Square	38	23	44	48	595
Merdeka Square	35	22	37	38	157
Merbabu Park	35	27	39	38	368
Cerme Park	14	5	12	14	21
Slamet Park	111	138	205	188	6,451
Gayam Park	1	3	7	7	27
Ijen Park	26	1	9	2	35
Total	260	219	353	335	7,654

Table 4 reveals that only a small portion of total hashtags (around 15%) are directly related to identifiable place-making attributes, with *comfort & impression* (4.61%) and *use & activity* (4.38%) being the most represented. This suggests that visitors' digital expressions focus more on experiential and activity-based aspects rather than accessibility or friendliness.

Table 4*Relative Contribution of place-making attributes (%)*

Attribute	Frequency	Percentage (%)
Accessibility	260	3.40
Friendliness	219	2.86
Comfort & Impression	353	4.61
Use & Activity	335	4.38
Other / uncategorized hashtags	–	84.75
Total	7,654	100.00

Table 5. confirms the dominance of Slamet Park as the central digital node, accounting for 84.3% of total Instagram visibility, far surpassing all other parks. Alun-Alun Tugu and Merbabu Park follow distantly, while the remaining parks exhibit minimal digital presence. Overall, this pattern indicates a highly uneven distribution of online engagement, where a few heritage parks function as the city's primary digital landmarks.

Table 5*Ranking of Historic Urban Parks by Digital Visibility*

Rank	Urban Park	Total Hashtags	Share (%)
1	Slamet Park	6,451	84.3
2	Tugu Square	595	7.8
3	Merbabu Park	368	4.8
4	Merdeka Square	157	2.1
5	Ijen Park	35	0.5
6	Gayam Park	27	0.4
7	Cerme Park	21	0.3

4.3 Path analysis results*4.3.1 Path analysis results (integrated model: Tugu Park Square)***Table 5***X Path Analysis Results for Alun-Alun Tugu Park*

Relationship	Effect Type	β	p-value	Results
Accessibility (X1) → Comfort & Impression (X2)	Straight	0.085	0.108	Not significant
Accessibility (X1) → Use & Activity (X3)	Straight	0.005	0.945	Not significant
Accessibility (X1) → Friendliness (X4)	Straight	0.048	0.320	Not significant
Comfort & Impression (X2) → Friendliness (X4)	Straight	0.159	< 0.001	Significant
Use & Activity (X3) → Friendliness (X4)	Straight	0.579	< 0.001	Significant
Accessibility (X1) → X2 → X4	Indirect	0.014	0.149	Not significant
Accessibility (X1) → X3 → X4	Indirect	0.003	0.947	Not significant
Accessibility (X1) → Friendliness (X4)	Indirect total	0.017	0.692	Not significant
Predictive relevance (Q ²)	—	0.315	—	Moderate

The path analysis results indicate that accessibility does not have a statistically significant direct effect on comfort and impression ($\beta = 0.085$; $p = 0.108$), use and activity ($\beta = 0.005$; $p = 0.945$), or friendliness ($\beta = 0.048$; $p = 0.320$). In addition, no significant indirect or total indirect effects of accessibility on friendliness were identified ($p > 0.05$). Conversely, comfort and impression ($\beta = 0.159$; $p < 0.001$) and use and activity ($\beta = 0.579$; $p < 0.001$) exhibit significant direct effects on friendliness, indicating that friendliness perceptions are primarily shaped by experiential qualities rather than access-related factors. The model demonstrates moderate predictive relevance with a Q² value of 0.315, suggesting that approximately 31.5% of the variance in the endogenous constructs is explained by the model.

4.3.2 Path analysis results (Merdeka Park Square)

Table 6

Path Analysis Results for Merdeka Park Square

Relationship	Effect Type	β	p-value	Results
Accessibility (X1) → Comfort & Impression (X2)	Straight	0.047	0.101	Not significant
Accessibility (X1) → Use & Activity (X3)	Straight	0.012	0.750	Not significant
Accessibility (X1) → Friendliness (X4)	Straight	0.019	0.605	Not significant
Comfort & Impression (X2) → Friendliness (X4)	Straight	0.466	< 0.001	Significant
Use & Activity (X3) → Friendliness (X4)	Straight	0.219	< 0.001	Significant
Accessibility (X1) → X2 → X4	Indirect	0.022	0.103	Not significant
Accessibility (X1) → X3 → X4	Indirect	0.003	0.744	Not significant
Accessibility (X1) → Friendliness (X4)	Indirect total	0.024	0.117	Not significant
Predictive relevance (Q ²)	—	0.283	—	Moderate

The results demonstrate that accessibility does not exert a statistically significant direct effect on comfort and impression ($\beta = 0.047$; $p = 0.101$), use and activity ($\beta = 0.012$; $p = 0.750$), or friendliness ($\beta = 0.019$; $p = 0.605$). Furthermore, no significant indirect or total indirect effects of accessibility on friendliness were observed ($p > 0.05$). In contrast, comfort and impression ($\beta = 0.466$; $p < 0.001$) and use and activity ($\beta = 0.219$; $p < 0.001$) show strong and statistically significant direct effects on friendliness. The structural model exhibits moderate predictive relevance, as indicated by a Q² value of 0.283, suggesting that approximately 28.3% of the variance in the endogenous constructs is explained by the model.

4.3.3 Path analysis results (Merbabu Park)

Table 7

Path Analysis Results for Merbabu Park

Relationship	Effect Type	β	p-value	Results
Accessibility (X1) → Comfort & Impression (X2)	Straight	0.240	0.341	Not significant
Accessibility (X1) → Use & Activity (X3)	Straight	0.055	0.828	Not significant
Accessibility (X1) → Friendliness (X4)	Straight	0.196	0.318	Not significant
Comfort & Impression (X2) → Friendliness (X4)	Straight	0.492	0.177	Not significant
Use & Activity (X3) → Friendliness (X4)	Straight	0.300	0.343	Not significant
Accessibility (X1) → X2 → X4	Indirect	0.118	0.508	Not significant
Accessibility (X1) → X3 → X4	Indirect	0.016	0.874	Not significant
Accessibility (X1) → Friendliness (X4)	Indirect total	0.102	0.637	Not significant
Predictive relevance (Q ²)	—	0.530	—	High

Brief Interpretation (Q1 Results Style)

The path analysis results reveal that none of the direct structural relationships in the Merbabu Park model are statistically significant ($p > 0.05$). Accessibility does not significantly influence comfort and impression ($\beta = 0.240$; $p = 0.341$), use and activity ($\beta = 0.055$; $p = 0.828$), or friendliness ($\beta = 0.196$; $p = 0.318$). Likewise, comfort and impression ($\beta = 0.492$; $p = 0.177$) and use and activity ($\beta = 0.300$; $p = 0.343$) do not exhibit significant direct effects on friendliness. Furthermore, no significant indirect or total indirect effects of accessibility on friendliness are observed. Despite the absence of significant path coefficients, the model demonstrates strong predictive relevance, as indicated by a Q^2 value of 0.530, suggesting that 53.0% of the variance in the endogenous constructs is explained by the model.

4.3.4 Path analysis results (Cerme Park)

Table 8

Path Analysis Results for Cerme Park

Relationship	Effect Type	β	p-value	Results
Accessibility (X1) → Comfort & Impression (X2)	Straight	0.092	0.709	Not significant
Accessibility (X1) → Use & Activity (X3)	Straight	0.077	0.755	Not significant
Accessibility (X1) → Friendliness (X4)	Straight	-0.262	0.044	Significant
Comfort & Impression (X2) → Friendliness (X4)	Straight	0.134	0.516	Not significant
Use & Activity (X3) → Friendliness (X4)	Straight	0.658	< 0.001	Significant
Accessibility (X1) → X2 → X4	Indirect	0.012	0.828	Not significant
Accessibility (X1) → X3 → X4	Indirect	0.051	0.791	Not significant
Accessibility (X1) → Friendliness (X4)	Indirect total	0.063	0.753	Not significant
Predictive relevance (Q^2)	—	0.533	—	High

The results indicate that accessibility has a statistically significant direct effect on friendliness ($\beta = -0.262$; $p = 0.044$), whereas its effects on comfort and impression ($\beta = 0.092$; $p = 0.709$) and use and activity ($\beta = 0.077$; $p = 0.755$) are not significant. Moreover, use and activity exerts a strong and significant direct effect on friendliness ($\beta = 0.658$; $p < 0.001$), while comfort and impression does not show a significant relationship with friendliness ($\beta = 0.134$; $p = 0.516$). No significant indirect or total indirect effects of accessibility on friendliness are observed ($p > 0.05$). The model demonstrates high predictive relevance, as reflected by a Q^2 value of 0.533, indicating that approximately 53.3% of the variance in the endogenous constructs is explained by the structural model.

4.3.5 Path analysis results (Slamet Park)

Table 9

Path Analysis Results for Slamet Park

Relationship	Effect Type	β	p-value	Results
Accessibility (X1) → Comfort & Impression (X2)	Straight	0.004	0.904	Not significant
Accessibility (X1) → Use & Activity (X3)	Straight	-0.010	0.818	Not significant
Accessibility (X1) → Friendliness (X4)	Straight	0.067	0.049	Significant
Comfort & Impression (X2) → Friendliness (X4)	Straight	0.032	0.403	Not significant
Use & Activity (X3) → Friendliness (X4)	Straight	0.436	< 0.001	Significant
Accessibility (X1) → X2 → X4	Indirect	0.000	0.938	Not significant
Accessibility (X1) → X3 → X4	Indirect	-0.004	0.817	Not significant
Accessibility (X1) → Friendliness (X4)	Indirect total	-0.004	0.824	Not significant
Predictive relevance (Q ²)	—	0.200	—	Low– moderate

In Slamet Park, accessibility exerts a small but statistically significant direct effect on friendliness ($\beta = 0.067$; $p = 0.049$). In contrast, accessibility does not significantly influence comfort and impression or use and activity ($p > 0.05$). Use and activity emerges as the strongest predictor of friendliness ($\beta = 0.436$; $p < 0.001$), while comfort and impression remains non-significant. No significant indirect or total indirect effects are detected. The Q² value of 0.200 indicates limited predictive relevance, suggesting that friendliness in Slamet Park is only partially explained by the proposed model.

4.3.6 Path analysis results (Ijen Park)

Table 10

Path Analysis Results for Ijen Park

Relationship	Effect Type	β	p-value	Results
Accessibility (X1) → Comfort & Impression (X2)	Straight	0.525	< 0.001	Significant
Accessibility (X1) → Use & Activity (X3)	Straight	0.463	0.005	Significant
Accessibility (X1) → Friendliness (X4)	Straight	-0.003	0.990	Not significant
Comfort & Impression (X2) → Friendliness (X4)	Straight	-0.005	0.979	Not significant
Use & Activity (X3) → Friendliness (X4)	Straight	0.208	0.292	Not significant
Accessibility (X1) → X2 → X4	Indirect	-0.002	0.980	Not significant
Accessibility (X1) → X3 → X4	Indirect	0.096	0.361	Not significant
Accessibility (X1) → Friendliness (X4)	Indirect total	0.094	0.556	Not significant
Predictive relevance (Q ²)	—	0.455	—	Moderate–high

For Ijen Park, accessibility has a strong and significant direct effect on comfort and impression ($\beta = 0.525$; $p < 0.001$) and use and activity ($\beta = 0.463$; $p = 0.005$). However, none of the structural paths leading to friendliness are statistically significant ($p > 0.05$), indicating that friendliness is not directly shaped by accessibility, comfort, or activity-related attributes in this context. No indirect or total indirect effects are observed. Despite this, the model demonstrates moderate-to-high predictive relevance ($Q^2 = 0.455$), suggesting that accessibility primarily functions as an upstream experiential driver rather than a determinant of social interaction outcomes.

4.4 Compilation of path analysis results

Based on the path analysis conducted across six urban parks in Malang City, the structural model tested five hypothesized direct relationships: (1) accessibility \rightarrow comfort and impression, (2) accessibility \rightarrow friendliness, (3) accessibility \rightarrow use and activity, (4) comfort and impression \rightarrow friendliness, and (5) use and activity \rightarrow friendliness.

Table 11

Compilation of Significant Direct Effects Across Urban Parks

Structural Path	Parks with Significant Direct Effect	Share of Parks (%)
Accessibility (X1) \rightarrow Comfort & Impression (X2)	Ijen Park	17%
Accessibility (X1) \rightarrow Friendliness (X4)	Cerme Park, Slamet Park	33%
Accessibility (X1) \rightarrow Use & Activity (X3)	Ijen Park	17%
Comfort & Impression (X2) \rightarrow Friendliness (X4)	Merdeka Square, Tugu Square	67%
Use & Activity (X3) \rightarrow Friendliness (X4)	Merdeka Square, Tugu Square, Cerme Park, Slamet Park	67%

Source: Authors' analysis

Figure 3

A Map of the Direct Influence of Access on Comfort & Impact

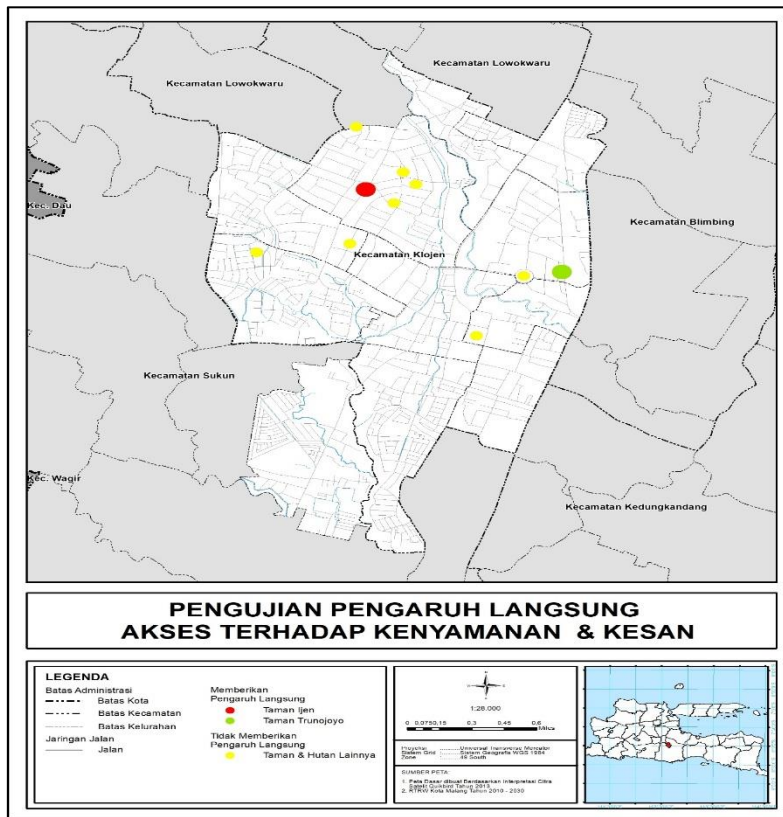
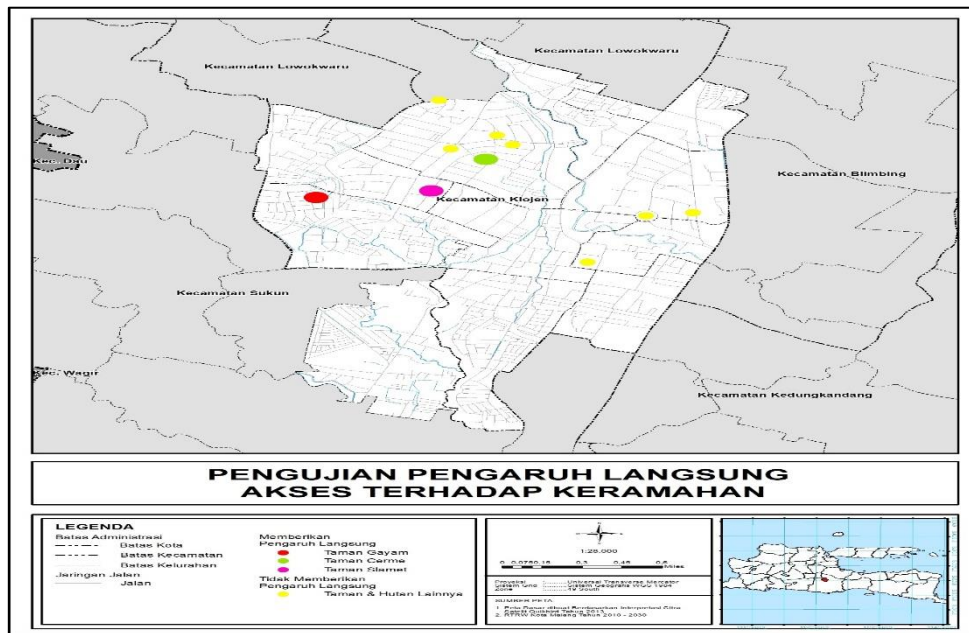


Figure 4

Testing Map of the Direct Impact of Access on Hospitality



5 DISCUSSION

This study is not intended as a replication of earlier research that uses geo-tagged photos to map visitor trajectories, spatial preferences, or landscape values (Chen *et al.*, 2018; Domènech *et al.*, 2020; Nolasco-Cirugeda *et al.*, 2022). Rather, the intention was to test whether geo-tagged Instagram analytics can be used to model how place-making attributes shape visitor impressions in historic urban parks and to clarify which attributes operate as the most consequential drivers for heritage tourism and services marketing. In conceptual terms, the study is consistent with the view that place-making is a socially produced process in which meanings and outcomes emerge through interaction and everyday use (Akbar & Edelenbos, 2021), and that social impacts of place-making can be traced through how people experience and communicate public space (Akbar & Edelenbos, 2020). Within this framing, Instagram traces can be treated as an applied evidence base that captures how visitors "see" and narrate heritage-related public spaces through shareable experiential cues (Liu, 2022; Loke *et al.*, 2022).

A first empirical message concerns the uneven distribution of digital visibility across Malang's historic parks. The results show a highly concentrated pattern of engagement, where one park dominates overall hashtag volume. From a tourism and services marketing perspective, this concentration suggests that user-generated content can serve as a practical proxy for destination salience and experiential appeal within a portfolio of heritage public spaces. This logic is consistent with location-intelligence research that demonstrates how location-based social networks enable knowledge generation for destination management and marketing decisions (Vassakis *et al.*, 2021; Vassakis *et al.*, 2023). It also aligns with work showing that geotagged media can help detect "on-the-rise" attractions and shifts in visitor interest over time (Payntar, 2022). Recent developments further indicate that Instagram photo analytics can be scaled through machine learning to profile and cluster tourism destinations, strengthening the managerial usefulness of platform data for segmentation and strategic targeting (Basirati & Laachach, 2025). From an operational standpoint, such digital concentration implies that some parks already function as "earned media hubs," while others remain digitally peripheral and may require more deliberate experience design to increase visibility and engagement.

A second empirical message relates to how Instagram content maps onto a place-making lens. Although the coding scheme distinguishes accessibility, comfort/impression, use/activity, and friendliness, a large share of hashtags remains uncategorised. This result is theoretically informative because it indicates that visitors' spontaneous narratives often extend beyond predefined constructs. Similar challenges have been documented in social-media-based assessments of intangible benefits associated with green and cultural environments, where lived meanings and affective responses are difficult to fully capture through conventional categories (Amorim Maia, 2018). In heritage contexts, this also resonates with "everyday heritage" thinking, which emphasises that heritage meanings are frequently produced through routine practices rather than through formal interpretation alone (Mosler, 2019). Accordingly, Instagram content can be understood as a form of everyday meaning production, with important implications for branding and communication strategies in heritage tourism.

Turning to the structural evidence, the most policy- and marketing-relevant finding is that friendliness-related impressions are primarily shaped by experiential and activity-related attributes in the parks where significant pathways emerge. Specifically, significant results consistently highlight that comfort and impression and use and activity are the place-making dimensions most closely associated with friendliness impressions. This pattern supports the argument that social experience outcomes in heritage public spaces are more sensitive to on-site experiential cues and to opportunities for participation than to purely functional access conditions. Such a reading is aligned with conceptualisations of place-making as co-produced through practice and interaction rather than delivered as static infrastructure (Akbar & Edelenbos, 2021; Akbar & Edelenbos, 2020), and it is consistent with research emphasising that historic environments are evaluated through perceived experiential qualities and placeness-related design cues (Li *et al.*, 2020; Khirfan, 2016). It is also compatible with tourism place-making scholarship which treats destinations and public spaces as governed and enacted places, where the experience is shaped by what visitors can do and how the setting feels, rather than by access alone (Hultman & Hall, 2012; Lew, 2019).

Importantly, the significant pathways do not imply uniformity across all parks. Instead, the results point to site-specific configurations, with only selected parks demonstrating significant relationships for particular pathways. This heterogeneity is

consistent with heritage place-making studies that emphasise how users' perspectives and the local context condition the perceived outcomes of place-making interventions (Rezaei *et al.*, 2022). It also aligns with evidence that authenticity perceptions in heritage settings can shape how visitors translate place cues into behavioural and evaluative outcomes (Mou *et al.*, 2024). From a regeneration perspective, heritage and place-making processes are widely understood to produce uneven outcomes across sites due to differences in governance, spatial form, and symbolic positioning (Pendlebury & Porfyriou, 2017). Stakeholder perception research similarly indicates that competitive heritage place-making is shaped by divergent priorities and interpretations among actors, which can contribute to differentiated outcomes and strategic choices (Nag, 2025). Therefore, the observed heterogeneity should be treated as theoretically coherent evidence that park-level modelling is valuable precisely because it avoids assuming that a single intervention logic will work everywhere.

The role of accessibility deserves a more nuanced interpretation. While some studies emphasize access as a core determinant of place-making outcomes—particularly in contexts where linkage and permeability vary substantially (Mahvari *et al.*, 2020; Mohamed *et al.*, 2020)—the present findings suggest that accessibility becomes influential only in selected contexts, and otherwise does not consistently operate as the primary driver of friendliness impressions. One plausible explanation is that centrally located heritage parks often share broadly comparable access conditions, making access less differentiating. Another explanation is measurement-related: Instagram tends to foreground visually and socially engaging moments, which may privilege experience and activity signals over functional travel considerations. This interpretation agrees with research arguing that online visual information plays a distinct role in shaping what becomes salient in tourism experiences (Liu, 2022) and that Instagram-based heritage consumption reflects what visitors choose to highlight through their lens (Loke *et al.*, 2022). Hence, where significant effects emerge for comfort/impression and use/activity, they can be interpreted as capturing the experiential dimensions most readily transformed into shareable visitor impressions.

These findings have direct implications for heritage tourism marketing and services marketing, particularly in relation to city branding and the co-creation of place meaning. Historic urban parks can be positioned as heritage experience touchpoints that

contribute to the city's brand through visitor-generated narratives. Evidence from Instagram-based heritage branding research suggests that such narratives can form part of sustainable co-creation processes, where users participate in circulating and shaping the meaning of built heritage (Kádár & Klaniczay, 2022). The networking perspective on heritage for sustainable tourism similarly emphasises the importance of linking heritage assets, experiences, and actors to generate coherent value and visibility (Djukic *et al.*, 2023), while placemaking-oriented heritage tourism research highlights that fostering cultural tourism requires designing for engagement and experience rather than relying solely on physical conservation (Samir *et al.*, 2019). In addition, smart cultural tourism research demonstrates that geotagged social media can be used to identify and rank cultural resources, supporting service development and visitor-facing applications (Nguyen *et al.*, 2017), and crowd-sourced geotag data can be consolidated for travel recommendations (Luberg, n.d.). This broader literature supports positioning the present model as a practical diagnostic tool for marketing-relevant experience design across a heritage park portfolio.

The study also connects with emerging debates about participation and everyday heritage practices. Alternative heritage practices, such as participatory walking, illustrate how heritage value can be activated through embodied and citizen-centered engagement rather than only through formal interpretive frameworks (Horvath & Farooqi, 2025). In a comparable manner, Instagram posting can be interpreted as distributed, everyday participation through which visitors communicate place meanings and experiential cues. From a planning and governance perspective, this resonates with arguments about the right to healthy place-making and well-being, which frame public space quality as a matter of public value and inclusive urban practice (Ng, 2016). At the same time, social-media-visible green and cultural assets can become implicated in broader socio-spatial dynamics, including uneven value capture and gentrification pressures; social-media-based ecosystem service assessments have been used to explore such intangible dynamics (Amorim Maia, 2018). This suggests that UGC-informed heritage marketing should be embedded within inclusive governance aims rather than treated solely as a visibility-maximisation exercise.

Overall, this research contributes to tourism, heritage, and services marketing by demonstrating how geo-tagged Instagram analytics can operationalise place-making

attributes and identify the most consequential experiential pathways that shape visitor impressions in historic urban parks. It complements earlier geotag-based work focused on values, trajectories, and interest areas (Chen *et al.*, 2018; Domènech *et al.*, 2020; Nolasco-Cirugeda *et al.*, 2022) and extends destination location-intelligence approaches (Vassakis *et al.*, 2021; Vassakis *et al.*, 2023) by focusing on the mechanisms that connect place-making attributes to socially oriented visitor impressions. In substantive terms, the supported relationships underscore that, in the parks where significant pathways emerge, enhancing comfort/impression and use/activity is likely to be the most effective route to strengthening friendliness-related impressions, thereby offering a clear experience-led orientation for heritage tourism and services marketing strategies.

6 RESEARCH LIMITATIONS

This study has various limitations. For instance, the operationalisation of place-making attributes relies on geo-tagged Instagram content and hashtag-based categorisation. Consequently, a substantial proportion of user-generated hashtags falls outside the predefined categories, indicating that the current coding scheme may not fully capture the breadth of experiential meanings expressed by visitors. Therefore, future researchers should investigate more advanced construct operationalisation strategies, for example by integrating systematic text analytics and image-based content classification to refine the measurement of accessibility, comfort/impression, use/activity, and friendliness from UGC.

Additionally, the suggested model could be tested in multiple destinations and across different types of heritage public spaces. However, such a study is not feasible in a single snapshot investigation, as it would require coordinated multi-site data collection and the assembly of sufficiently large and comparable geo-tagged datasets for each destination to ensure robust model estimation and meaningful cross-site comparison. Other studies could implement a different methodology to include a comparative design across cities with distinct heritage tourism profiles and governance contexts, thereby assessing whether the observed place-making pathways are stable or context-specific.

Another limitation concerns the temporal scope of observation. Social media engagement is sensitive to seasonality, special events, and platform dynamics; thus, the

visibility ranking and impression structure captured within one time window may not represent longer-term patterns. A further limitation is that geo-tagged Instagram traces reflect the behaviour of social-media-active users and tend to privilege visually salient experiences. As a result, the dataset may under-represent visitor segments who do not post online or whose experiences are not readily translated into shareable content.

Finally, the testing of multiple structural relationships across several parks may be considered an analytical challenge, particularly when the magnitude and significance of paths vary by site. However, the use of SEM-based path analysis provides a systematic way to estimate and interpret the structural relationships while maintaining an integrated theoretical model.

Table 12

Ten main limitations of the present study

No.	Source of limitation	Explanation
1	Platform-based data coverage	The study relies on geo-tagged Instagram traces; impressions of visitors who do not use Instagram, do not post, or do not geotag content are not captured.
2	Representativeness of UGC	User-generated content may reflect specific demographic and behavioural segments, limiting generalisability to the broader visitor population.
3	Temporal limitation	Visibility patterns and hashtags may vary due to seasonality, special events, or changes in platform dynamics; a single time window may not represent longer-term trends.
4	High share of uncategorised hashtags	A substantial portion of hashtags cannot be mapped to the predefined place-making attributes, constraining construct specificity and interpretive completeness.
5	Measurement equivalence across parks	The same coding logic may not capture park-specific meanings equally well, which may affect comparability of constructs across sites.
6	Cross-sectional design	The analysis is based on a snapshot and cannot assess dynamics over time or infer changes attributable to interventions.
7	Construct operationalisation constraints	Place-making attributes are inferred from coded hashtags (proxy indicators) rather than direct psychometric measurement, which may reduce precision.
8	Unequal digital visibility across parks	Highly skewed post volumes across parks may reduce estimate stability for low-visibility parks and may affect robustness of park-level structural results.
9	Model specification scope	The proposed attributes may not fully represent other determinants of visitor impressions (e.g., authenticity cues, heritage interpretation intensity, safety perceptions).
10	Potential bias from model reduction	Retaining only statistically supported paths may introduce bias; therefore, model refinement should be theory-driven rather than significance-driven.

Yet another study may also analyse additional constructs that are relevant to heritage tourism and services marketing, such as authenticity perceptions, destination image, electronic word-of-mouth intensity, and behavioural intentions. Comparative analysis of different destinations can provide mixed findings, and a broader evidence base would enable stronger inference about which place-making pathways are robust across contexts.

It also seems plausible that visitor segments behave differently in how they generate and interpret social media content. Therefore, further investigation should be made regarding segment-level differences, for example comparing local residents versus tourists, or different age-related cohorts, provided that sufficiently comparable data are available. Such segmentation would allow future studies to examine whether particular place-making attributes are more salient for some groups than for others.

Lastly, the present study should be interpreted as an initial step toward an operational UGC-based diagnostic framework for historic urban parks. While a larger and more representative dataset could strengthen generalisability, practical constraints often limit the feasibility of assembling extensive multi-platform, multi-city geo-tagged datasets within a single project. Nevertheless, methodological limitations—particularly representativeness, cross-sectional inference, and construct operationalisation—should be carefully considered to enhance transparency and robustness in future research.

7 CONCLUSION

This study examined how geo-tagged Instagram analytics can be used to model the relationships between place-making attributes and visitor impressions in historic urban parks in Malang, Indonesia, with a specific focus on relevance for heritage tourism and services marketing. The findings provide evidence that digital engagement with historic parks is highly uneven, indicating that a small number of parks function as dominant "earned media" nodes within the city's public-space and heritage experience portfolio. In substantive terms, the supported structural relationships indicate that friendliness-related visitor impressions are most consistently shaped by experiential and activity-oriented attributes—namely comfort/impression and use/activity—rather than by accessibility alone. These results reinforce the proposition that place-making outcomes in

heritage public spaces are largely produced through on-site experiential cues and the availability of meaningful activities, and that the mechanisms linking place-making to impressions can vary across parks, reflecting context-dependent configurations rather than a uniform model.

Overall, the study contributes to tourism, heritage, and services marketing research by demonstrating that geo-tagged UGC can be operationalised as a diagnostic evidence base for identifying which place-making levers are most consequential for visitor impressions in heritage-related public spaces. The model therefore supports a practical, experience-led orientation for heritage park management, where visibility patterns and impression drivers can inform targeted interventions across a portfolio of historic parks.

8 RECOMMENDATIONS

The results suggest that management and marketing efforts should prioritise experience-led interventions that strengthen the attributes most closely associated with favourable visitor impressions. In practical terms, enhancing use-and-activity opportunities is likely to be beneficial where activity-related attributes emerge as significant drivers of friendliness impressions, particularly through light programming that supports social interaction and repeat use (e.g., flexible spaces for community micro-events and improved micro-infrastructure that enables lingering). In parallel, improving comfort and impression cues through heritage-sensitive servicescape upgrades—such as cleanliness, shading, seating quality, lighting, perceived safety cues, and coherent wayfinding—can strengthen experiential impressions and support positive user narratives.

Accessibility should be treated as a baseline service standard that safeguards inclusivity and usability, while investments in access improvements should be guided by location-specific constraints rather than assumed as the primary differentiator of visitor impressions. Given the strong concentration of digital visibility, a portfolio approach is also recommended: highly visible parks can be leveraged as flagship touchpoints within heritage tourism marketing, while digitally peripheral parks can be supported through experience packaging and cross-promotion (e.g., thematic heritage walking routes that

link multiple parks), thereby redistributing attention and strengthening the coherence of the city's heritage experience offering.

Finally, the use of geo-tagged UGC should be institutionalised as a monitoring tool for destination services marketing. Routine tracking of geotag volumes, recurring hashtag themes, and temporal peaks can provide actionable "market signals" for adjusting experience design and evaluating intervention effectiveness over time. Future research should strengthen construct specificity by integrating mixed-method validation (e.g., observation or surveys) and by applying text-and-image analytics to reduce the share of uncategorised content, as well as extending modelling to downstream marketing outcomes such as destination image, electronic word-of-mouth, and behavioural intentions.

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