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Research article

Are facilities and infrastructure gender-sensitive? Investigating their effects on revisit intentions in hot spring tourism

Aceng Gima Sugiama [1], Dwi Suhartanto [1], Muhammad Aliff Asyraff [2], Nonon Rofi Nurzaki [1] and Nenden Wahyudi [1]

[1] Department of Commerce Administration, Politeknik Negeri Bandung, Indonesia
[2] Department of Tourism and Management, Universiti Teknologi MARA, Malaysia

ABSTRACT

This study investigates the influence of facilities and infrastructure on tourist satisfaction and loyalty, and how these factors ultimately affect the intention to revisit hot spring tourism (HST) destinations. It also explores whether perceptions of facilities and infrastructure differ based on gender in relation to satisfaction, loyalty, and revisit intention. Data from 367 respondents were collected using a quantitative design through an online survey conducted in six HST destinations in West Java, Indonesia. The suggested research model was assessed using the PLS-SEM. The results show that the provision of facilities plays a significant role in enhancing satisfaction, loyalty, and revisit intention. Infrastructure, despite being positively related to loyalty and the intention to revisit, does not have a direct effect on overall tourist satisfaction. Higher levels of satisfaction are found to strengthen loyalty, which in turn increases the likelihood of repeat visits. Further analysis reveals a prominent gender-based pattern. Both male and female tourists consider facilities to be a direct contributor to satisfaction and subsequent loyalty, although this relationship is more pronounced among male tourists. Infrastructure is also found to significantly strengthen loyalty for both genders, with female tourists reporting a slightly stronger effect. It is interesting to note that whereas infrastructure clearly and favorably affects female tourists' contentment, it has no discernible effect on male tourists' satisfaction. These insights provide practical guidance for HST managers striving to enhance infrastructure and facility provision to support sustained destination development. The importance of inclusive facilities remains, but HST destinations may benefit from prioritizing gender-responsive facilities that address diverse visitor needs.

KEYWORDS
HST facilities;
infrastructure;
satisfaction;
revisit intention;
loyalty

Introduction

Wellness tourism demand continues to grow and is significantly driven by the unique integration of medical-oriented services with nature-based tourism experiences (Hanada et al., 2025). Hot spring tourism (HST) has emerged as a prominent segment within this broader context, widely recognized for its strong competitive advantages and potential for sustainable development (Jiang & Ding, 2025; De Luca et al., 2026). The appeal persists, as HST destination visitors are not only motivated by health benefits; they also seek entertainment, relaxation, and overall well-being (Ramos et al., 2025). In addition, the development of HST is increasingly aligned with the UN's 2030 Agenda for Sustainable Development Goals (SDGs) (Khizar et al., 2023). Amidst the rapid growth of this sector and its promising future prospects, academic attention to HST is becoming increasingly relevant and necessary (Clark-Kennedy & Cohen, 2017; Medai et al., 2022). HST has become increasingly popular in many countries (Ding, 2024); Indonesia is no exception, yet empirical research

CORRESPONDING AUTHOR'S CONTACT: Aceng Gima Sugiama gima.sugiama@polban.ac.id
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specifically focused on this tourism segment remains relatively limited (Kusdibyo, 2022; Wang et al., 2021). Apart from its recreational value (Tretiakova et al., 2018), HST is widely recognized as offering broader benefits, such as relaxation, physical fitness maintenance, and health improvement (Rapolienė et al., 2024; Subadra, 2019). These multifaceted values have attracted growing academic interest and highlighted the need for more comprehensive investigation (Medai et al., 2022). One area that has been particularly under-explored in existing research is the evaluation of services from the tourists' perspective, which remains a gap in the HST literature (Clark-Kennedy & Cohen, 2017). Preceding studies have consistently emphasized the importance of adequate facilities and infrastructure in HST, noting both as critical determinants of service quality and long-term tourism sustainability. Although fundamental to tourism development, inadequate provision of facilities and infrastructure remains persistent in many destinations (Mandić et al., 2018). These deficiencies are particularly evident in developing economies, where uneven infrastructure development often poses a significant barrier to tourism growth (Chen et al., 2021; Zielinski et al., 2020). Data from more than 80 HST destinations in Japan suggest that the quality of accommodation facilities is one of the most decisive factors in meeting HST service demands (Medai et al., 2022). To support long-term outcomes, tourism destinations should aim to guarantee that their physical infrastructure and facilities evolve in tandem with their stage of development, during both the initial growth and maturity periods.

Simultaneously, researchers have increasingly focused on tourist behavior from a gender perspective. Stereotypical gender roles and social constructions often lead to unequal experiences, vulnerability, and even disadvantages related to tourism services (Figueroa-Domecq & Segovia-Perez, 2020). The importance of understanding tourists' gender-based perceptions of facilities and infrastructure, as well as their impact on satisfaction, loyalty, and intention to return, is undeniable. However, empirical studies analyzing the causal relationship between these variables remain scarce. Diversified characteristics of HST have been massively explored in various national contexts (Hamzah et al., 2013), including Indonesia. Some focus on tourist loyalty (Kusdibyo, 2022), community empowerment in HST destinations (Subadra, 2019), and the natural chemical composition of hot springs (Ningsih et al., 2021). Nevertheless, limited studies have systematically examined the impact of HST facilities and infrastructure on satisfaction, loyalty, and revisit intention from a gender-based perspective. Bridging this gap is important both for developing academic understanding and for generating practical insights relevant to HST management. For this reason, this study aims to investigate the impact of HST facilities and infrastructure on tourist satisfaction, loyalty, and intention to revisit, whilst also analyzing the causal relationships among these variables through a gender-based analytical lens.

Literature review and hypothesis

HST facilities and infrastructure

HST is an integral form of recreational and health tourism (Liu et al., 2019; Wang et al., 2021). Notwithstanding its increasing relevance, relatively little academic attention has been paid to this tourism segment (Kusdibyo, 2022), particularly with regard to studies examining the role of tourism facilities and infrastructure (Mandić et al., 2018). There is a clear gap in this area, given that facilities and infrastructure are core and dominant components in the provision of HST services (Medai et al., 2022). HST facilities generally consist of main and supporting elements. Key recreational facilities typically include swimming pools, bathing and soaking pools, rinsing areas, changing rooms, accommodation, food and beverage outlets, and sanitation facilities. Supporting facilities, which enhance visitor comfort and service quality, include information centers, gazebos or shelters, parking areas, cleaning services, security, places of worship, and souvenir shops. Collectively, these facilities contribute to the overall service experience and operational efficiency of HST destinations. Tourism infrastructure, on the other hand, refers to the physical and organizational systems that facilitate tourism activities. Physical infrastructure includes roads, electricity networks, water supply systems, airports, and ports (Kanwal et al., 2020), while the non-physical one includes telecommunications networks and the provision of geographic information systems (GIS) infrastructure (Bíl et al., 2012). In the context of urban tourism, infrastructure is generally categorized into accommodation infrastructure, recreational and entertainment infrastructure, tourism service infrastructure, and supporting service infrastructure (Victorovna & Ivanovich, 2019). Proper management of tourism infrastructure is crucial, as it not only ensures quality but also facilitates expansion and long-term development (Mandić et al., 2018).

While water quality remains essential for spa and hot spring experiences, tourists' interests extend beyond this aspect, requiring managers to also prioritise the provision and maintenance of supporting infrastructure (Dryglas & Smith, 2025; Smith, 2025). Previous research results prove that water quality is closely related to tourist activities (Harilal, 2025). Naturally, tourists form assessments and attitudes towards the adequacy and quality of facilities and infrastructure provided at tourist destinations (Sugiama et al.,

2022). Analyzing tourist assessments of HST facilities and infrastructure is therefore crucial to understanding service performance and formulating effective destination management strategies.

The role of HST facilities and infrastructure

A thriving tourism research field has examined tourist attitudes and experiences, incorporating quantitative analyses of how facilities and infrastructure influence satisfaction and intention to return (Liu et al., 2017; Sugiama et al., 2024), along with studies exploring the causal effects of destination image components on revisit behavior (Asyraff et al., 2024). However, limited attention has been given to the direct causal relationship between the provision of HST facilities and infrastructure and crucial post-visit outcomes, particularly satisfaction, loyalty, and revisit intention, especially from the perspective of tourist evaluation. Earlier studies consistently show that tourist satisfaction plays a crucial role in determining post-visit behavior (Arasli & Baradarani, 2014). Tourist satisfaction reflects tourists' overall evaluation of things they consider beneficial or detrimental during their visit, and this evaluation then shapes their intention to revisit the destination (Harun et al., 2018). Tourism facilities constitute one of the most important attributes of a destination in determining tourist satisfaction and the intention to revisit the destination (Harun et al., 2018; Sugiama et al., 2023). For this reason, destination managers should provide a range of well-managed facilities (Mandić et al., 2018) that meet visitor expectations (Jin et al., 2015), strengthen loyalty, and encourage repeat visits (Lim et al., 2019; Nguyen, 2021). Evidence shows that higher facility quality is associated with stronger tourist loyalty (Robustin et al., 2019). Despite previous research exploring the relationship between tourism facilities and loyalty, studies specifically addressing HST facilities and their impact on satisfaction, loyalty, and revisit intention remain limited. The lack of such studies highlights the need to investigate the causal relationship between these variables in the context of HST. On the basis of the above discussion, the following hypotheses are proposed:

H1: HST facilities have a positive effect on tourist satisfaction
H2: HST facilities have a positive effect on tourist loyalty
H3: HST facilities have a positive effect on revisit intention

Tourism infrastructure serves as a central factor in stimulating tourism demand and enhancing travelers' interest in visiting a destination (Kanwal et al., 2020; Lim et al., 2019). Alongside its economic function, well-developed infrastructure also contributes to achieving sustainable tourism at the destination level (Ouariti & Jebrane, 2020; Shamilla et al., 2022). Available and high-quality infrastructure is a fundamental component of tourism development and requires careful examination. Earlier empirical studies show that infrastructure has a significant influence on tourist satisfaction (Cárdenas-García & Sánchez-Rivero, 2015; Sunandar et al., 2022), simultaneously strengthening loyalty and encouraging the intention to revisit (Lim et al., 2019; Nguyen, 2021; Sugiama et al., 2022). The same dynamics are likely to emerge in the context of HST. Therefore, this study proposes the following hypotheses:

H4: HST infrastructure has a positive effect on tourist satisfaction
H5: HST infrastructure has a positive effect on tourist loyalty
H6: HST infrastructure has a positive effect on revisit intention

Tourist satisfaction, loyalty, and intention to return have long been a major focus in tourism research, including studies focusing on HST (Abou-Shouk et al., 2018; Kusdibyo, 2022). Emphasis on this stems from the widely accepted view that tourist satisfaction is a key indicator of destination performance (Kim, 2018; Liu et al., 2017) and a critical prerequisite for positive post-visit behavior. Happy tourists are more likely to revisit a destination and develop stronger loyalty over time (Abou-Shouk et al., 2018; Lee et al., 2020; Sugiama et al., 2023). A wide range of empirical evidence shows that satisfaction has a direct and significant positive impact on tourist loyalty (Hung et al., 2021) and also plays a crucial role in shaping the intention to revisit (Abou-Shouk et al., 2018; Çevik, 2020; Damanik & Yusuf, 2022). In this case, it acts as the main driver of both loyalty and repeat visits (Kusdibyo, 2022; Leo et al., 2021). Increased satisfaction strengthens tourists' emotional bonds and attitudes toward a destination, which in turn increases the likelihood of their return. Although there is a wealth of literature on this relationship, the causal relationship between satisfaction, loyalty, and intention to return has been under-explored in the specific context of HST. Bridging this gap is essential to understanding how experience evaluation translates into sustained visitor engagement at hot spring destinations. Accordingly, this study proposes the following hypotheses:

H7: Tourist satisfaction has a positive effect on tourist loyalty
H8: Tourist satisfaction has a positive effect on revisit intention

Tourist loyalty is generally conceptualized through two main dimensions: attitudinal loyalty and behavioral loyalty. Attitudinal loyalty reflects tourists' emotional attachment to a destination and their willingness to recommend it to others, while behavioral loyalty is usually demonstrated through the intention to revisit the destination (Sodawan & Hsu, 2025). Research studying green tourism destinations found that the influence of tourist loyalty on revisit intentions is amplified by satisfaction (Chen et al., 2026). This perspective is further supported by Saxena et al. (2026), who identified loyalty as the primary determinant of revisit intention. At the core, more satisfied tourists tend to have a stronger intention to revisit destinations they have previously visited. Loyalty is important not only because it has a direct influence on the intention to return; it can also function as an intermediary variable. Previous studies (Nguyen et al. 2025), in line with other evidence (Saxena et al., 2026), indicated that the relationship between satisfaction and revisit intention is partially mediated by loyalty. This means that the effect of satisfaction on the intention to revisit is not solely through a direct pathway; rather, it is transmitted through the development of tourist loyalty. From a practical perspective, the implication is that efforts to increase revisit intention should prioritize strategies that enhance tourist satisfaction in ways that foster long-term loyalty. Based on this argument, the following hypotheses are proposed:

H9: Tourist loyalty has a positive effect on revisit intention
H10: Tourist loyalty positively and significantly mediates the relationship between tourist satisfaction and revisit intention

The moderating role of gender

Gender stereotypes are generally seen as reflections of physical differences, socialization processes, and socially constructed gender roles, all of which contribute to behavioral differences between men and women (Archer, 1996; Eagly, 1987). Research in tourism has therefore increasingly emphasized the importance of adopting a gender-based analytical perspective (Figueroa-Domecq & Segovia-Perez, 2020; Milićević et al., 2021). Existing evidence indicates that genders influence how tourists perceive and respond to tourism attributes. For example, Huang & Veen (2019) reported that tourism services tend to have a stronger influence on attitudes among men, while natural environment attributes are more prominent among women. The differences between genders also cause variations in how tourists evaluate tourism facilities and infrastructure. Despite many facilities being designed to be inclusive, some of them are inherently gender-specific. Research by Cohen et al. (2021) and Wilson et al. (2022) showed that, compared to men, women are much less likely to use park facilities that require muscular strength, so such facilities are used more by male visitors. It shows that preferences for certain types of facilities differ based on gender. Additionally, specific facilities are explicitly designed to meet gender-specific needs, such as restrooms and fitness center services (Carballo et al., 2021; León-Quismondo et al., 2020). Tourism infrastructure, on the other hand, generally serves a more universal function and caters to the needs of all visitors regardless of gender (Small & Rodgers, 2023). Such infrastructure includes transportation networks, communication systems, electricity supply, and water infrastructure. In this regard, tourist destination managers are required to differentiate between facilities that are inclusive of all genders and those that are exclusive or tailored to specific gender-related needs. Both male and female tourists tend to consider facilities as an important factor in satisfaction, but men are more likely to prefer facilities that involve more intensive physical activities (Cohen et al., 2021; Milićević et al., 2021).

Multiple group analysis (MGA) using structural equation modeling (SEM) revealed that compared to males, female tourists exhibit significantly higher sensitivity and attention to the comfort of facilities and infrastructure at tourist destinations (Leong et al., 2024). Other studies also indicated that the availability of infrastructure leads women to report higher levels of satisfaction and loyalty than men (Le et al., 2024; Leong et al., 2024). These findings are consistent with previous research by Melnyk and Osselaer (2012), which concluded that females respond more strongly than males to loyalty initiatives offered by service providers. Despite this, research adopting a gender perspective has not comprehensively examined the causal relationship between facilities and satisfaction, facilities and loyalty, and infrastructure and satisfaction and loyalty, especially in the context of HST. In view of this gap, this study proposes gender as a moderating variable and formulates the following hypotheses:

H11a: The causal relationship between facilities and satisfaction is stronger for female tourists than for male tourists
H11b: The causal relationship between facilities and loyalty is stronger for female tourists than for male tourists

H11c: The causal relationship between infrastructure and loyalty is stronger for female tourists than for male tourists
H11d: The causal relationship between infrastructure and satisfaction is stronger for female tourists than for male tourists

Research method, measurement instruments, and model testing

In line with previous studies that examined similar research contexts and objects (Kusdibyo, 2022; Mi et al., 2019; Shavanddasht & Allan, 2019), this study employed a quantitative research approach. Prior research on HST has used both quantitative and qualitative methods, such as Kusdibyo (2022), who examined tourist motivation, destination image, satisfaction, and loyalty, and Medai et al. (2022), who focused on factors driving tourism demand. These studies differ from the current study in their scope and analytical perspective. This study applied Partial Least Squares Structural Equation Modeling (PLS-SEM) (Hair et al., 2021) to examine the causal relationships between facilities (FAC) and infrastructure (INF) and their effects on satisfaction (SAT), loyalty (LOY), and revisit intention (RIN). The analytical procedure began with Confirmatory Factor Analysis (CFA) to assess construct validity and reliability. Subsequently, PLS-SEM was employed to evaluate the overall suitability and explanatory power of the proposed research model. In the final stage of analysis, multi-group analysis (MGA) was conducted to examine gender-based differences in the structural relationships. All statistical analyses were performed using SmartPLS software (Henseler et al., 2015). This study analyzed data from 367 respondents; the demographic profiles are summarized in Table 1. The results indicate that the majority of respondents were relatively young, with 75% aged under 35 years, and male visitors accounting for 57% of the sample. In terms of place of origin, most respondents came from Tasikmalaya (72%). Regarding educational background, 45% of the respondents had completed high school education, while 47% held a higher education qualification. Monthly expenditure levels, representing 49% of the sample, were predominantly within the range of USD 61.65 to USD 308.26. Overall, the sample profile suggests that visitors to the six HST destinations are largely young tourists, many of whom are students.

Table 1. Respondents' demographics

Sample Size		*n*=367	100%
Age	< 35 years	275	75%
	35 – 45 years	48	13%
	> 45 years	44	12%
Gender	Male	209	57%
	Female	158	43%
Residence	Tasikmalaya City/Regency	264	72%
	Greater Bandung	29	8%
	Garut Regency	15	4%
	Others	59	16%
Education	College	195	53%
	High School	172	47%
Expenses per month	USD 61.65 – 308.26	180	49%
	< USD 61.65	143	39%
	> USD 308.26	44	12%

Results

The results of the factor loading analysis (Table 2), processed using SmartPLS (Henseler et al., 2015), indicate that 38 measurement items exhibit loading values > 0.70. This finding confirms that the manifest variables in the research model satisfy the required standards of validity and reliability, as reflected by the outer loading criteria (Hair et al., 2021). Three items, FAC11, INF1, and INF7, were excluded from further analysis because they did not meet the established validity and reliability thresholds. Further assessment of construct reliability and validity demonstrates that all composite reliability (CR) and average variance extracted (AVE) values exceed the recommended threshold of 0.50, indicating that the retained constructs explain an adequate proportion of variance in their respective indicators (Hair et al., 2021). Additionally, the heterotrait–monotrait (HTMT) ratio analysis yields values below 0.90 for all construct pairs, confirming that discriminant validity is satisfactorily achieved (Hair et al., 2021). The bootstrapping results show that all external load path coefficients are statistically significant, with *p*-values of 0.000 or below the significance level of 0.05. This indicates that each observed variable effectively measures the corresponding latent construct. Overall, validity and reliability assessment results confirm a robust measurement model appropriate for further hypothesis testing (Hair et al., 2021; Henseler et al., 2015). Further reliability testing using Cronbach's alpha (CA) supports the findings. All constructs report CA values > 0.874, exceeding the recommended threshold of 0.70 (Hair et al., 2014). Discriminant validity and cross-loading analyses also reveal that each indicator loads more strongly on the intended construct than on other constructs in the model. These results indicate that the measurement instruments employed in this study demonstrate strong internal consistency and reliability.

Table 2. Measurement model assessment results

Construct	CA	CR	AVE	OL*	Mean	SD
Facility (FAC): *Mean*=3.35; *Std. Dev.*=0.195	0.922	0.934	0.587			
• FAC1: The physical quality of the swimming pool is well-maintained.				0.729	3.24	0.947
• FAC2: The quality of the HST soaking pools is well-maintained.				0.787	3.13	0.932
• FAC3: The shower and changing room facilities are excellent.				0.759	3.36	0.869
• FAC4: Food and beverage facilities are provided with good quality.				0.741	3.33	0.931
• FAC5: Clean and hygienic toilets are available.				0.804	3.17	0.897
• FAC6: Gazebos and shelters are available as needed.				0.784	3.09	0.923
• FAC7: Parking fac. are available in accordance with visitors' needs.				0.744	3.60	0.911
• FAC8: Places of worship are available & of good quality.				0.789	3.43	0.906
• FAC9: Accommodation fac. are available according to visitors' needs.				0.759	3.64	0.913
• FAC10: Souvenir shops are available in accordance with visitors' needs.				0.760	3.51	0.966
Infrastructure (INF): *Mean*=3.14*; Std. Dev.*=0.263	0.874	0.908	0.665			
• INF2: Transportation infrastructure is of good quality.				0.790	3.60	0.950
• INF3: The telecommunications network is well-maintained.				0.819	3.01	1.179
• INF4: Electricity and water networks are available & of good quality.				0.844	3.00	1.091
• INF5: New infrastructure development is carried out as needed.				0.801	3.30	1.093
• INF6: Sanitation and security infrastructure are adequately provided.				0.823	2.85	1.144
Satisfaction (SAT): *Mean*=4.07*; Std. Dev.*=0.115	0.913	0.930	0.657			
• SAT1: HST attractions are very interesting to visit.				0.713	4.19	0.815
• SAT2: The atmosphere at the HST destination can be enjoyed well.				0.791	4.13	0.778
• SAT3: The atmosphere at the HST destination is very pleasant.				0.828	4.24	0.727
• SAT4: HST services meet my expectations.				0.842	3.89	0.791
• SAT5: Visiting this HST destination was a very good decision.				0.854	4.14	0.748
• SAT6: The physical facilities and infrastructure are satisfactory.				0.776	4.96	0.832
• SAT7: The HST services I received are very satisfactory.				0.858	4.02	0.762
Revisit Intention (RIN): *Mean*=3.87*; Std. Dev.*=0.125	0.939	0.950	0.732			
• RIN1: I have a strong intention to visit this HST dest. in the future.				0.838	3.95	0.878
• RIN2: Visiting this HST dest. will be useful for future visits.				0.833	3.95	0.977
• RIN3: I intend to visit this HST destination again.				0.861	3.94	0.902
• RIN4: I am willing to use my free time to revisit this destination.				0.842	3.96	0.842
• RIN5: I am willing to spend more on future visits.				0.840	3.92	0.788
• RIN6: I feel a strong emotional connection with this HST dest.				0.896	3.87	0.866
• RIN7: HST services encourage me to return in the future.				0.881	3.85	0.895
Loyalty (LOY): *Mean*=3.78*; Std. Dev.*=0.241	0.922	0.937	0.680			
• LOY1: I am willing to say positive things about this HST destination.				0.971	4.05	0.721
• LOY2: I intend to recommend this HST dest. to friends and relatives.				0.812	4.03	0.762
• LOY3: I prioritize this HST destination for future visits.				0.839	3.72	0.967
• LOY4: I feel proud and happy to talk about this destination with others.				0.870	3.86	0.841
• LOY5: I would revisit this destination even if costs increase.				0.808	3.46	0.977
• LOY6: I prefer this HST destination over other bathing tourism options.				0.824	3.47	1.037
• LOY7: Compared with other places, I feel proud to talk about this HST destination.				0.826	3.85	0.861

*Note: *Significant at P<0.01; CA=Cronbach Alpha; CR=Composite Reliability; AV=Average Variance Extracted; OL=Outer Loadings; SD=Standard Deviation*

Structural model testing

Structural model test results (Henseler et al., 2015) indicate an acceptable model fit, as reflected by an SRMR value of 0.065 < 0.100 and an NFI of 0.801. These values suggest that the proposed research model is suitable for analysis (Tenenhaus et al., 2005). Furthermore, R^2 shows that satisfaction is explained by 32.9% (0.329) of the variance, revisit intention by 76.2% (0.762), and loyalty by 63.4% (0.634) of their respective predictor variables. Table 3 shows the results of hypothesis testing, including direct, indirect, and total effects. The provision of facilities has a significant positive effect on satisfaction (β = 0.572, *T-value* > 1.96), loyalty (β = 0.289, *T-value* > 1.96), thereby supporting *H1* and *H2*. In contrast, facility does not affect revisit intention (β = -0.023, *T-value* < 1.96), also infrastructure on satisfaction (β = 0.003, *T-value* < 1.96), and on revisit intention (β = 0.051, *T-value* < 1.96); these findings indicate that *H3*, *H4*, and *H6* are rejected. However, *H5* is accepted because it has β = 0.109, and the *T-value* > 1.96. In addition, satisfaction has a significant positive effect on loyalty (β = 0.525, *T-value* > 1.96) and revisit intention (β = 0.287, *T-value* > 1.96), thereby supporting *H7* and *H8*. The results for *H9* also indicate that the hypothesis is supported (β = 0.632, *T-value* > 1.96). Moreover, the specific indirect effect tested under *H10* is significant (β = 0.332, *T-value* > 1.96), indicating that this hypothesis is also accepted.

Table 3. SEM results: direct, indirect, and total effects

Relationship (hypothesis)	Direct effect		Indirect effect		Total effect		Hypothesis
	β	*t-value***	*β*	*T-value*	*β*	*T-value*	
Direct effects:							
H1: Facility → Satisfaction	0.572	9.915**	-	-	0.572	9.915**	Supported
H2: Facility → Loyalty	0.289	4.816**	0.300	7.306*	0.589	11.137*	Supported
H3: Facility → Rev. int.	*-0.023*	*0.508**-ns*	0.536	11.084**	0.513	8.856**	*Unsupported*
H4: Infrastrcture → Satisfaction	*0.002*	*0.030*-ns*	-	-	*0.002*	*0.030**	*Unsupported*
H5: Infrastrcture → Loyalty	0.109	2.347*	*0.001*	*0.030*-ns*	0.110	1.851*	Supported
H6: Infrastrcture → Rev. int.	*0.051*	*1.307**-ns*	*0.070*	*0.030*-ns*	0.121	1.944**	*Unsupported*
H7: Satisfaction → Loyalty	0.525	11.823*	-	-	0.525	11.823*	Supported
H8: Satisfaction → Rev. int.	0.287	5.410**	-	-	0.618	14.723*	Supported
H9: Loyalty → Rev. intention	0.632	12.226*	-	-	0.632	12.226*	Supported
Specific indirect effects:							
H10: Satisfaction → Loyalty → Rev. intention	-	-	0.332	7.920*	-	-	Supported

*Note: *Significant at p<0.01; **Significant at p <0.05; Sp=supported; Us=unsupported; ns=not significant; Rev. int.=revisit intention.*

Following previous researchers (Lu et al., 2021; Suhartanto et al., 2024), a multigroup analysis (MGA) was conducted to examine differences in the relationships between variables based on gender. The significance

level was assessed using bootstrapping across data groups, and a two-tailed test was applied to evaluate *H11a, H11b, H11c*, and *H11d*. The results are presented in Table 4. Both male and female respondents consider HST facilities to have a significant positive effect on satisfaction (*β_male* = 0.642, *p_value* = 0.000*; β_female* = 0.492, *p_value* = 0.000), with a *β_difference* of 0.150, (*β_male* > *β_female*), thereby unsupported for *H11a*. A similar pattern is observed for the effect of facilities on loyalty (*β_male* = 0.383, *p_value = 0.000* < 0.05*; β_female* = 0.192, *p_value* = 0.015 < 0.05), with a *β_difference* of 0.191 (*β_male* > *β_female*), thereby unsupporting *H11b*. The results for *H11c* are supported, suggesting that infrastructure has a significant positive effect on loyalty for both gender groups (*β_male* = 0.024, *p_value* < 0.05*; β_female* = 0.207, *p_value* < 0.05), with a *β_difference* of 0.183 (*β_female* > *β_male*), supporting *H11c*. Furthermore, *H11d* is also accepted (*β_female* > *β_male*), for male respondents, as the path coefficient is negative and statistically insignificant (*β_male* = -0.123, *p_value* > 0.05), with *Sig*. level = 0.05. However, for female respondents, infrastructure demonstrates a significant positive effect on satisfaction when treated as a moderating variable (*β_female* = 0.172, *p_value* < 0.05), indicating support for *H11d* within this group. Overall, these findings reveal a clear gender-based difference in the relationship between infrastructure and satisfaction, as reflected by a coefficient difference of $\beta = -0.050$ between male and female respondents.

Table 4. Differences in relationships between variables based on gender

Relationship	*β Male*	*p-value Male*	*β Female*	*p-value Female*	*β Diff.*	*β complete*	*p-value complete*	Hypothesis Spd/*Usd*
H11a: Facility → Satis.	0.642	0.000*	0.492	0.000*	0.150	0.572	0.000*	*Unsupported*
H11b: Facility → Loyalty	0.383	0.000*	0.192	0.014**	0.191	0.289	0.000*	*Unsupported*
H11c: Infra. → Loyalty	*0.024*	*0.360***	0.207	0.001**	0.183	0.109	0.009**	Supported
H11d: Infra. → Satis.	*-0.123*	*0.073***	0.173	0.036**	0.050	*0.002*^{ns}	*0.487***	Supported

*Note: β Dif.= β Difference; *Significant at p<0.01; **Significant at p <0.05; Sp=supported; Us=unsupported; ns=not significant; Satis.=satisfaction; Infra.=insfrastructure.*

Discussion and theoretical implications

First, despite the fact that tourism facilities and infrastructure have been extensively studied in previous research, there is a lack of comprehensive explanations of these latent variables through constructs as presented in this study. For a more in-depth academic characterization and theoretical understanding, a solid multidimensional construct that can be systematically integrated into the conceptual framework is required to clearly define and operationalize each latent variable. Developing a construct that meets validity requirements and theoretical propositions is crucial for directing research based on a rigorous scientific framework (Baghaei & Tabatabaee Yazdi, 2016). In this regard, the present study introduces a distinctive construct design. It adopts a broader and more detailed construct, thereby complementing existing research on tourism facilities, particularly the findings of Achmad et al. (2023) and Sugiama et al. (2024). *Second*, the model fit results confirm that facilities and infrastructure function as significant predictor variables in enhancing tourist satisfaction, loyalty, and revisit intention. This provides empirical verification that reinforces previous studies addressing the causal relationships between facilities and satisfaction, revisit intention, and loyalty (Çevik, 2020; Sugiama et al., 2024), as well as infrastructure and satisfaction, revisit intention, and loyalty (Farhadi & Khoshkhoo, 2022; Sugiama et al., 2022). From a theoretical perspective, this study not only corroborates earlier findings but also extends the causal model by contextualizing the influence of facilities and infrastructure on satisfaction, loyalty, and revisit intention within HST settings from the tourists' perception standpoint. *Third*, the findings demonstrate that the availability of facilities aligned with tourists' needs directly enhances satisfaction and loyalty, but these facilities do not affect revisit intention. HST facilities are shown to play a crucial role in significantly increasing tourist satisfaction, supporting prior research by Ćulić et al. (2021) and Sugiama et al. (2024), which emphasized that destinations offering adequate facilities tend to generate higher satisfaction levels. The centrality of facilities in tourism destinations underscores their role as a fundamental requirement for tourists, forming the basis upon which satisfaction can be achieved. This research shows that the facilities at HSTs do not encourage tourists to return. This indicates that the six HSTs studied are still managed conventionally, with very limited facilities. This evidence also supports previous research on facilities at spiritual destinations in Vietnam (Nguyen-Viet & Nguyen My, 2026) and at geothermal tourist sites in Indonesia (Suhud et al., 2023).

Fourth, the results concerning the influence of HST infrastructure on tourist satisfaction yield unexpected evidence. Contrary to many previous studies, infrastructure provision does not exert a significant effect on satisfaction in this context. This finding diverges from earlier research suggesting that tourism infrastructure significantly enhances tourist satisfaction (Farhadi & Khoshkhoo, 2022; Sugiama et al., 2022). Despite being widely recognized as a determinant of accessibility and comfort (Nguyen, 2021; Shamilla et al., 2022; Sugiama et al., 2022), infrastructure alone does not always correlate with higher satisfaction. Other factors, such as authentic experiences, emotional attachment, cultural richness, and service quality, may exert a more dominant influence on tourists' evaluations of their travel experiences (Zhou et al., 2025). This insight opens avenues for future research to further investigate the infrastructure–satisfaction relationship using

moderating variables such as tourists' emotions and destination culture from a perceptual perspective. However, the results also show that well-developed infrastructure, reflected in transportation networks, telecommunications, electricity supply, and sustainable infrastructure development, significantly increases loyalty and intention to return. This positive causal relationship provides additional empirical support for prior studies (Sugiama et al., 2023, 2024). From a theoretical perspective, current research differs from previous models that primarily associate facilities and infrastructure with destination attractiveness (Farhadi & Khoshkhoo, 2022; Mandić et al., 2018) or analyze their impact on satisfaction and intention to return separately (Sugiama et al., 2024). Instead, the present model offers a more comprehensive explanation by simultaneously integrating the causal influence of HST facilities and infrastructure on satisfaction, loyalty, and revisit intention. *Fifth*, this study strongly supports that satisfaction increases loyalty and strengthens the intention to revisit HST destinations. This finding reinforces previous research by Saxena et al. (2026) and confirms the satisfaction–revisit intention relationship reported by Chen et al. (2026). On the basis of specific indirect effects, tourist satisfaction does not have a direct effect on revisit intention; it operates through loyalty. This indicates that not only does loyalty directly encourage the intention to revisit, but it also functions as a mediating variable between satisfaction and the intention to revisit. These results are consistent with and reinforce previous empirical findings (Nguyen et al., 2025; Saxena et al., 2026).

Finally, a gender-based multi-group analysis shows that male and female tourists alike perceive HST facilities as significantly improving satisfaction and directly promoting loyalty. The influence of facility availability is slightly stronger for male tourists than for female tourists, a finding that contradicts previous evidence reported by Leong et al (2024). That means, both male and female tourists consider HST facilities to be a direct contributor to satisfaction and subsequent loyalty, although this relationship is more pronounced among male tourists. In a similar vein, access to infrastructure positively influences loyalty for both genders. However, a striking difference emerges regarding satisfaction: while male tourists do not perceive access to infrastructure as significantly enhancing their satisfaction, female tourists report a significant positive effect. Theoretically, the findings confirm that regardless of the magnitude and significance of the effect across gender groups, the provision of tourism facilities and infrastructure remains a fundamental requirement for all tourists, as emphasized in previous studies (Farhadi & Khoshkhoo, 2022). Earlier studies have explored tourists' perceptions from a gender perspective (Carballo et al., 2021; Hamdy et al., 2023; Huang & Veen, 2019). The inclusion of gender as a moderating variable, as conducted in this study, further expands the literature by elucidating the causal complexity between facilities, infrastructure, satisfaction, loyalty, and revisit intention. Theoretically, the study broadens the understanding of the importance of considering gender differences when evaluating the provision of tourism facilities and infrastructure. Many facilities are generic and inclusive for both men and women, but some are exclusive and designed to meet specific gender needs. Infrastructure, on the other hand, generally functions as a universal and inclusive component for all tourists, regardless of gender.

Conclusions, limitations, and future research

This study concludes that tourist satisfaction and strong loyalty to HST destinations are greatly influenced by the quality and adequacy of the facilities provided. Additionally, tourist loyalty and revisit intention are also influenced by how well the supporting infrastructure is developed and maintained. The provision of HST facilities and inadequate basic infrastructure causes tourists to be dissatisfied and disloyal, and does not encourage tourists to revisit. Higher levels of satisfaction increase tourist loyalty, which in turn strengthens their desire to return. However, the results also show that providing infrastructure for tourists does not always lead to increased satisfaction. Other factors likely play a more dominant role in shaping tourist satisfaction during their visits, including authentic experiences, emotional engagement, cultural richness, and service quality. These elements appear to have a stronger influence on the way tourists perceive and evaluate their travel experiences. From a gender perspective, the influence of facility availability is slightly stronger for male tourists than for female tourists, and access to infrastructure positively influences loyalty for both genders. Despite the fact that many HST facilities are generic and inclusive for both men and women, some facilities are exclusive and designed to meet specific gender needs. Conversely, most tourism infrastructure functions as a universal and inclusive component that can be used by all tourists, regardless of gender. Despite contributing to expanding the understanding of the relationship between facilities, infrastructure, satisfaction, loyalty, and intention to return, several limitations exist. *First*, the study is based on a relatively limited population in six HST destinations in West Java, Indonesia, consisting mostly of young visitors. Given that HST destinations are often associated with relaxation and health tourism (Rapolienė et al., 2024; Subadra, 2019), it is recommended that future studies apply the same research model and latent variables to older visitor groups, especially those over 45 years of age, to capture potentially different perceptions and behavior patterns. *Second*, further research could develop this model by including primary and supporting

facilities as predictor variables related to outcomes, including perceived benefits, usage behavior, and quality of life. Such an approach would enable researchers to explore the broader impacts of HST tourism beyond satisfaction and loyalty. This line of research can be adapted from this study and enriched with insights from previous research, including Chieh-Lu (2020).

The findings of this study offer several important managerial implications, particularly for service management stakeholders. *First*, for HST managers, close attention must be given to both the quality and completeness of core and supporting facilities. Main facilities, such as bathing and soaking pools, rinsing areas, changing rooms, accommodation, food and beverage services, and toilets, are central to visitors' experiences. Based on tourists' assessments at the studied sites, improvements in terms of facilities' physical condition, cleanliness, and overall management are urgently required. Likewise, supporting facilities, including information centres, gazebos, shelters, parking areas, sanitation services, security, places of worship, and souvenir shops, also need to be enhanced to better meet tourists' expectations. From the perspective of local governments and supporting industries, maintaining and improving tourism's basic infrastructure remains essential. This includes ensuring the quality of transportation networks, electricity and water supply systems, as well as strengthening soft infrastructure such as telecommunications networks, geographical information systems, and the provision of reliable internet access, particularly free Wi-Fi services for tourists. Such infrastructure support is fundamental to ensuring accessibility, comfort, and convenience during visits. *Second*, HST managers should prioritize efforts to enhance tourist satisfaction through continuous improvement of facilities. The findings indicate that once tourists reach a high level of satisfaction, their intention to revisit strengthens, which subsequently fosters loyalty. Ensuring satisfaction and cultivating loyalty are therefore critical to supporting, and even securing, the long-term sustainability of HST destinations.

Third, although this study primarily focuses on recreational facilities and only indirectly addresses HST services as part of relaxation and health tourism, the results highlight the importance of strengthening facilities that support health and relaxation functions. Given the well-documented therapeutic benefits of hot spring water for relaxation and health (Rapolienė et al., 2024; Subadra, 2019), managers are encouraged to further develop and integrate health-oriented service facilities to better align with visitors' motivations and expectations. *Finally*, the findings reveal notable differences between male and female tourists in their assessments of how facilities influence satisfaction and loyalty. This suggests that HST managers need to carefully distinguish between exclusive and inclusive facility provision. Exclusive facilities, such as soaking pools, bathing pools, changing rooms, toilets, prayer rooms, and areas for storing personal belongings, should be designed and managed separately for men and women to accommodate gender-specific needs. In contrast, other facilities, including information centres, gazebos, shelters, parking areas, and food and beverage spaces, should be designed as inclusive environments that can be comfortably used by all visitors. Thoughtful differentiation between exclusive and inclusive facilities can enhance comfort, satisfaction, and overall visitor experience.

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