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What Matters Most to International Leisure Tourists in Saudi Arabia? An Importance–Performance and Segmentation Analysis of Service, Cultural and Technological Attributes

Amr Gamaleldeen[1], Alyaa Afifah Abu Talib[2]

[1] Postgraduate Centre, Management and Science University, Shah Alam, Selangor, Malaysia.
E-mail:wasfyamr.ag@gmail.com

[2] MSU Centre for Environmental, Social & Governance (ESG) and Postgraduate Centre, Management and Science University, Shah Alam, Selangor, Malaysia. E-mail: alyaa_afifah@msu.edu.my

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Abstract - Saudi Arabia is opening rapidly to international leisure tourism, yet destination managers have little evidence on which parts of the visitor experience to improve first. This study identifies which service, cultural and technological attributes matter most for the satisfaction of international leisure tourists, how well the destination performs on them, and whether distinct visitor segments exist. An online survey of 313 eligible international leisure tourists measured 14 attributes. Importance was estimated with relative weights analysis and combined with rescaled performance scores in an importance–performance analysis; segment differences were tested with non-parametric tests, and k-means cluster analysis identified visitor groups. The attributes explained 92.6% of satisfaction. Contactless technologies, digital readiness and artificial intelligence applications were the three most important attributes, and contactless technologies and artificial intelligence applications fell in the "concentrate here" quadrant. Perceptions did not differ by gender, age, nationality, destination or length of stay. Two clusters emerged: a satisfied majority and a dissatisfied minority (23.3%) that rated every attribute low and was over-represented among cultural and heritage visitors. Improving smart services and recovering the globally dissatisfied segment offer the greatest returns for destination managers.

Keywords: Importance–performance analysis, Tourist satisfaction, Smart tourism technology, Service quality, Market segmentation, Saudi Arabia.

1. INTRODUCTION

Saudi Arabia's tourism sector is being rebuilt around international leisure visitors. The tourist e-visa, flagship destinations such as AlUla and the Red Sea, and large investments in infrastructure are intended to diversify an economy whose inbound tourism was historically dominated by pilgrimage (Ali, 2018; Ali & Salameh, 2021; Qurtuby, 2024). As the Kingdom moves from attracting first-time curiosity to building repeat visitation and recommendation, managers need to know which parts of the visitor experience matter most for satisfaction and how well the destination currently delivers them. Resources for service training, cultural programmes and digital systems are finite. Without that knowledge, investment may flow to attributes that visitors already consider adequate while the attributes that actually drive satisfaction are neglected (Ibrahim, 2025).

The question is especially pressing because international leisure tourists differ from the pilgrims around whom Saudi tourism services were originally built. They can choose among many mature destinations, they compare their experience with international service standards, and many come from culturally distant societies with limited prior knowledge of Saudi norms (Alshammari et al., 2023; Memish et al., 2023). Their experience is also increasingly digital. Visas, bookings, payments, entry to heritage sites and destination information are now largely delivered through digital platforms (Raza, 2025; Alzahrani et al., 2025). Satisfaction therefore depends on how people, culture and technology combine in the visitor journey, and managers need evidence on all three.

Research on tourist satisfaction offers many candidate attributes. SERVQUAL-based studies emphasise tangibles, reliability, responsiveness, assurance and empathy (Parasuraman et al., 1988; Kong et al., 2025; Liu et al., 2025). Cultural-adaptation research highlights intercultural communication, inclusiveness and responsible practices (Garrod & Nicholls, 2022; Roodhi et al., 2025; Flego & Tei, 2025). Smart tourism research points to digital infrastructure, artificial intelligence (AI) and contactless services (Pai et al., 2020; Say, 2025; Soliman et al., 2025). Most of these studies test whether attributes are statistically significant. Fewer ask the managerial question of which attributes to fix first, which

requires combining an attribute's importance with the destination's performance on it (Martilla & James, 1977). Tourist populations are also heterogeneous, and average effects may hide segments with very different experiences (Wang et al., 2016; Roodhi et al., 2025).

This study addresses these gaps for international leisure tourists in Saudi Arabia, using a diagnostic rather than hypothesis-testing approach. It addresses three research questions:

RQ1: How important is each service, cultural and technological attribute for optimum tourist satisfaction, and how well does the destination perform on it?

RQ2: Do perceptions and satisfaction differ across visitor segments defined by gender, age, nationality, purpose of visit, destination and length of stay?

RQ3: Can distinct visitor clusters be identified from attribute evaluations, and how do they differ in profile?

The study contributes in three ways. First, it applies importance–performance analysis (IPA) to a set of attributes that spans service quality, cultural adaptability and technology integration, which have rarely been evaluated together in the Saudi context. Second, it uses relative weights to estimate importance. This avoids a known weakness of regression-based IPA: when attributes are highly correlated, their regression coefficients become unstable and can even take the wrong sign (Johnson, 2000; Azzopardi & Nash, 2013). Third, it combines IPA with a person-centred cluster analysis, which shows that dissatisfaction is concentrated in a distinct segment rather than spread evenly across visitors.

2. LITERATURE REVIEW

2.1 Attributes of the International Leisure Tourist Experience

Satisfaction is understood as the outcome of comparing performance with expectations (Oliver, 1980). Optimum satisfaction describes the state in which expectations are exceeded and visitors intend to recommend and return. It covers tangible outcomes (attractions, landscape, value for money), intangible outcomes (destination image, safety, social interaction) and overall evaluations (González et al., 2007; Zeng & Li, 2021; Bagheri et al., 2023). Three attribute domains are relevant to international leisure tourists in Saudi Arabia.

Service quality has been measured with the SERVQUAL dimensions of tangibles, reliability, responsiveness, assurance and empathy (Parasuraman et al., 1988, 1991). The evidence confirms that service quality matters, but the dimensions that matter most differ by setting. Responsiveness and assurance drove leisure satisfaction in ski tourism (Kong et al., 2025), reliability and assurance mattered most in post-pandemic hotels (Al-Kumaim et al., 2023), and some studies find no direct effect once experiential factors are considered (Renganathan et al., 2025). This variability is one reason why attribute priorities must be established locally rather than assumed (Akbaba, 2006; Adhikari et al., 2023).

Cultural adaptability refers to a destination's capacity to accommodate culturally diverse visitors. Its components are intercultural communication, inclusiveness and openness, and green practices (Viken et al., 2021; Matteucci et al., 2022). In Muslim-majority destinations, successful cultural adjustment raises the satisfaction of Western tourists, whereas maladaptation lowers it (Garrod & Nicholls, 2022). Clear, respectful communication and an inclusive climate are expected to support that adjustment (Atamanchuk, 2021; Roodhi et al., 2025). Green practices signal responsible stewardship, although their visibility to short-stay visitors is uncertain (Cheng & Chen, 2022; Jumadi, 2025).

Technology integration includes digital readiness (efficient systems, accessible online information), AI applications (chatbots, personalised recommendations, problem-solving support) and contactless technologies (digital payment, QR and mobile services). Digital infrastructure was the strongest predictor of visitor satisfaction in Metro Cebu (Say, 2025). Smart technology accessibility (Pai et al., 2020; Zhang et al., 2022), AI engagement (Chiengkul et al., 2025) and contactless services (Hao & Chon, 2021) have all been linked to satisfaction and delight. In Saudi Arabia, digital transformation is a central strand of Vision 2030 tourism policy (Raza, 2025; Alzahrani et al., 2025).

2.2 Importance–Performance Analysis and Visitor Heterogeneity

IPA plots attributes on two axes, importance and performance. The resulting four quadrants indicate whether to "concentrate here" (high importance, low performance), "keep up the good work" (high importance, high performance), treat an attribute as "low priority" (low on both) or consider it "possible overkill" (low importance, high performance) (Martilla & James, 1977). Asking tourists to rate importance directly tends to produce uniformly high ratings, so

importance is often derived statistically from each attribute's relationship with satisfaction (Azzopardi & Nash, 2013). Regression-derived importance is problematic when attributes are strongly inter-correlated, as tourism attributes usually are. Relative weights analysis solves this problem by dividing the explained variance among correlated predictors (Johnson, 2000; Tonidandel & LeBreton, 2011).

Average importance and performance scores can also hide heterogeneity. Tourist responses to technology depend on technology readiness (Wang et al., 2016; Shin et al., 2021; Hao & Chon, 2021), and communication effects differ across cultural subgroups (Roodhi et al., 2025). A destination may therefore serve a satisfied majority well while failing a distinct minority. Identifying such segments, and asking whether observable characteristics such as nationality or trip purpose predict membership, helps managers target recovery efforts.

3. RESEARCH METHODOLOGY

3.1 Sample and Data Collection

The data come from a cross-sectional online survey of inbound international leisure tourists. Respondents were aged 18 or over, did not live in Saudi Arabia, had visited the Kingdom for leisure, recreation or cultural and heritage purposes in the previous 12 months, and had used tourism services during that visit. Visitors travelling only for Hajj or Umrah, business or education were screened out. The questionnaire was distributed through travel-related social media groups and online travel communities between August and September 2026. Of 523 responses, 345 met the eligibility criteria. After removing five straight-lining cases and 27 multivariate outliers (Mahalanobis D^2, $p < .001$), 313 usable responses remained. There were no missing data. The dataset was collected as part of a larger master's research project; a companion paper that tests a structural model of the same constructs has been submitted elsewhere. The present paper addresses different research questions and uses different analyses.

Table 1 presents the respondent profile. The sample was mostly aged 36–45 (49.8%) and slightly more female than male. Most respondents had made cultural or heritage trips (59.7%) and came from France, Germany, the United Kingdom, Poland or the United States.

Table -1: Respondent profile (N = 313)

Characteristic	Category	n	%
Gender	Male	101	32.3
	Female	137	43.8
	Prefer not to say	75	24.0
Age	18–25	6	1.9
	26–35	72	23.0
	36–45	156	49.8
	46–55	63	20.1
	56 or older	16	5.1
Purpose of visit	Leisure, recreation, or entertainment	126	40.3
	Cultural, historical, or heritage tourism	187	59.7
Destination	Riyadh	41	13.1
	Jeddah	105	33.5
	AlUla	63	20.1
	Red Sea region	104	33.2
Length of stay	Less than 3 days	23	7.3
	3–7 days	150	47.9
	8–14 days	115	36.7
	More than 14 days	25	8.0
Nationality	France	93	29.7
	Germany	79	25.2

Characteristic	Category	n	%
	United Kingdom	57	18.2
	Poland	36	11.5
	United States	31	9.9
	Ireland	9	2.9
	Other (Netherlands, Spain, Canada, Croatia, Ghana, unspecified)	8	2.6

3.2 Measures

All attributes were measured with three items each on five-point Likert scales (1 = strongly disagree, 5 = strongly agree). The items were adapted from established scales: SERVQUAL (Parasuraman et al., 1988, 1991; Akbaba, 2006), cultural adaptability (Viken et al., 2021; Fan et al., 2021; Flego & Tei, 2025) and smart tourism technology (Pai et al., 2020; Hao & Chon, 2021; Madurga & Méndez, 2023). Optimum tourist satisfaction was measured with ten items covering tangible satisfaction, intangible satisfaction, and overall satisfaction with its behavioural intentions (González et al., 2007; Zeng & Li, 2021; Bagheri et al., 2023). The instrument was pre-tested with 30 eligible tourists.

All dimensions showed strong internal consistency (Cronbach's α = .880–.910) and convergent validity (composite reliability = .926–.943; AVE = .788–.845; all loadings > .87). The attributes were, however, highly inter-correlated (r = .79–.90), and a single factor accounted for 70% of the item variance. This pattern points to a strong general evaluative tendency, possibly amplified by common method variance (Podsakoff et al., 2003). It motivated the use of relative weights, rather than regression coefficients, to estimate importance.

3.3 Analytical Procedure

Composite scores were computed as item means. *Performance* was expressed as the mean score rescaled to 0–100, using $(M - 1)/4 \times 100$. *Importance* was estimated with relative weights analysis (Johnson, 2000). The eleven service, cultural and technological attributes were used as predictors of the optimum tourist satisfaction composite. Each attribute's raw relative weight gives its share of R^2, and it was also expressed as a percentage of the explained variance. Ninety-five percent confidence intervals were obtained from 5000 bootstrap resamples. The IPA grid was then drawn with the grand means of importance and performance as crosshairs (Azzopardi & Nash, 2013).

Because Shapiro–Wilk tests indicated non-normal distributions (all $p < .001$), segment differences were tested non-parametrically. Mann–Whitney U tests were used for two groups and Kruskal–Wallis H tests for three or more, with r and ε^2 as effect sizes. For RQ3, k-means cluster analysis (50 random starts) was run on the 14 dimension scores. Solutions with two to four clusters were compared using the average silhouette coefficient (Rousseeuw, 1987). The resulting clusters were profiled with Mann–Whitney tests on the attributes and chi-square tests with Cramér's V on respondent characteristics (Hair et al., 2019). Analyses were run in Python 3 (NumPy, SciPy, scikit-learn and statsmodels).

3.4 Ethical Considerations

Participation was voluntary and anonymous, and informed consent was obtained on the first page of the survey. No identifying information was collected. [Insert institutional ethics approval details.]

4. RESULTS

4.1 Attribute Performance

Table 2 reports attribute performance. Scores were uniformly moderate to high (M = 3.66–3.79), and about two-thirds of respondents agreed with each statement. Digital readiness performed best (M = 3.79; performance = 69.8), followed by tangibles and green practices (both M = 3.72). Empathy (M = 3.66) and inclusiveness and openness (M = 3.68) performed worst. At item level, the weakest statements among otherwise satisfied visitors concerned the visibility of waste management and sustainability efforts (D2), the maintenance of physical infrastructure (C2), and whether the experience exceeded expectations (F8). The performance range was narrow (66.5–69.8), so differences in importance, rather than in performance, drive most of the prioritisation that follows.

Table -2: Performance of experience attributes and satisfaction dimensions

Attribute	Mean	SD	Performance (0–100)	% agree	α
Service quality					
Tangibles	3.72	1.20	68.1	66.8	.891
Reliability	3.70	1.17	67.5	64.7	.885
Responsiveness	3.70	1.21	67.6	64.5	.889
Assurance	3.71	1.17	67.8	66.0	.892
Empathy	3.66	1.19	66.5	63.7	.906
Cultural adaptability					
Green practices	3.72	1.21	68.0	67.0	.900
Intercultural communication	3.71	1.17	67.8	64.7	.893
Inclusiveness and openness	3.68	1.18	67.0	64.3	.895
Technology integration					
Digital readiness	3.79	1.23	69.8	68.8	.908
AI applications	3.69	1.16	67.3	63.9	.880
Contactless technologies	3.69	1.18	67.4	65.8	.896
Optimum tourist satisfaction					
Tangible satisfaction	3.75	1.22	68.8	67.0	.908
Intangible satisfaction	3.73	1.18	68.1	66.0	.891
Overall satisfaction	3.68	1.13	67.0	65.5	.910

Note: % agree = average share of respondents answering 4 or 5 across the dimension's items. α = Cronbach's alpha.

4.2 Importance and the Importance–Performance Grid

The eleven attributes together explained 92.6% of the variance in optimum tourist satisfaction (Table 3). All attributes were strongly correlated with satisfaction (r = .822–.929), but their relative contributions differed. The three technology attributes ranked first to third: contactless technologies (12.9%), digital readiness (12.5%) and AI applications (12.1%). Together they accounted for 37.5% of the explained variance, and the lower bounds of their bootstrap confidence intervals exceeded the upper bounds of every service and cultural attribute except reliability, whose interval overlapped slightly. Reliability (8.9%) and inclusiveness and openness (8.4%) were the most important service and cultural attributes. Assurance, tangibles and responsiveness contributed least. At construct level, technology integration accounted for 41.9% of explained variance, and service quality (29.1%) and cultural adaptability (29.1%) contributed almost equally.

Figure 1 plots the IPA grid. Digital readiness fell in the "keep up the good work" quadrant, being both highly important and the best-performing attribute. *Contactless technologies* and *AI applications* fell in the "concentrate here" quadrant: they are among the most important attributes, but their performance is below average. Reliability, inclusiveness and openness, empathy and responsiveness were "low priority" on the strict crosshair rule. Reliability and inclusiveness, however, lay close to the importance line. Tangibles, assurance, green practices and intercultural communication fell in the "possible overkill" quadrant, where performance is above average relative to their contribution to satisfaction.

Table -3: Importance–performance analysis of eleven experience attributes

Attribute	Domain	r	RW	RW %	95% CI (RW)	Rank	Perf.	IPA quadrant
Contactless technologies	Technology integration	.920	.120	12.9	[.100, .143]	1	67.4	Concentrate here
Digital readiness	Technology integration	.929	.116	12.5	[.096, .140]	2	69.8	Keep up the good work

Attribute	Domain	r	RW	RW %	95% CI (RW)	Rank	Perf.	IPA quadrant
AI applications	Technology integration	.911	.112	12.1	[.093, .133]	3	67.3	Concentrate here
Reliability	Service quality	.854	.082	8.9	[.071, .095]	4	67.5	Low priority
Inclusiveness and openness	Cultural adaptability	.868	.078	8.4	[.068, .088]	5	67.0	Low priority
Intercultural communication	Cultural adaptability	.836	.073	7.9	[.061, .085]	6	67.8	Possible overkill
Empathy	Service quality	.832	.072	7.7	[.061, .083]	7	66.5	Low priority
Green practices	Cultural adaptability	.836	.071	7.7	[.061, .082]	8	68.0	Possible overkill
Responsiveness	Service quality	.833	.069	7.4	[.059, .079]	9	67.6	Low priority
Tangibles	Service quality	.822	.068	7.3	[.055, .083]	10	68.1	Possible overkill
Assurance	Service quality	.822	.066	7.2	[.056, .077]	11	67.8	Possible overkill

Note: r = bivariate correlation with optimum tourist satisfaction (all $p < .001$). RW = relative weight (Johnson, 2000); raw weights sum to $R^2 = .926$. Confidence intervals from 5000 bootstrap resamples. Perf. = performance rescaled to 0–100. Crosshairs: mean importance = 9.09%; mean performance = 67.7.

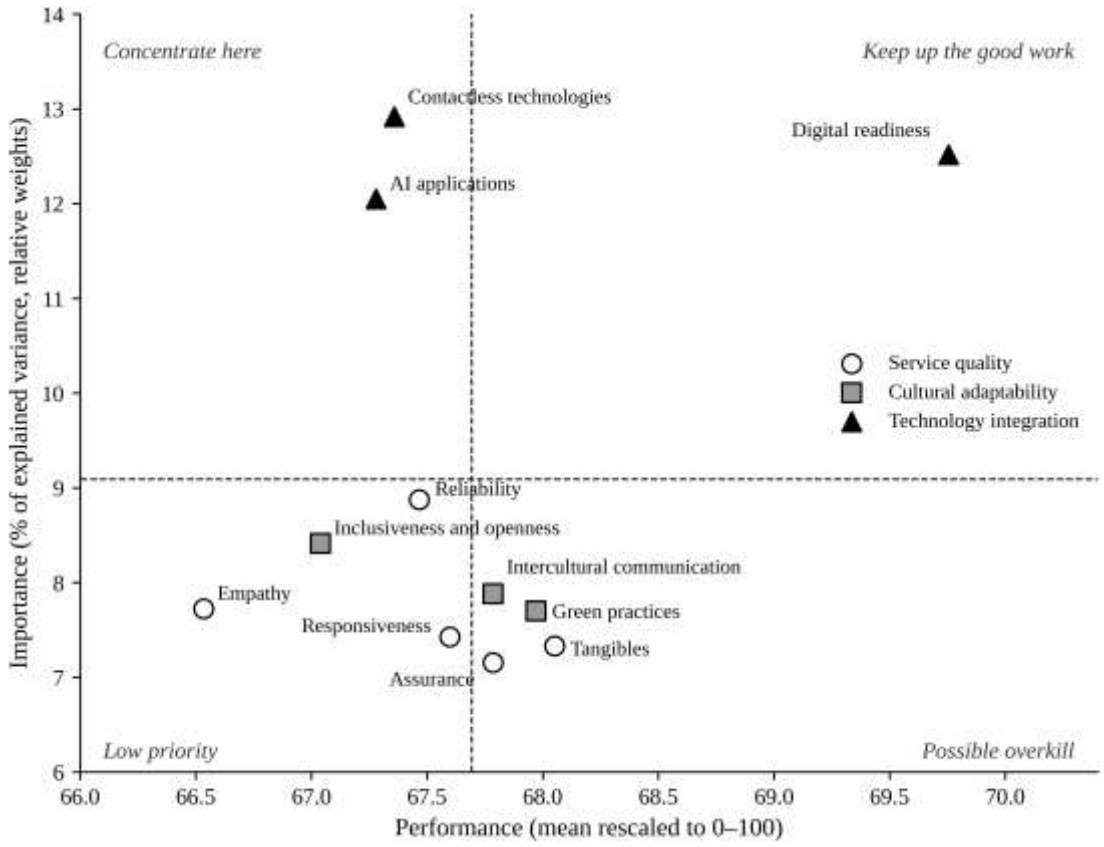


Fig -1: Importance–performance grid. Importance = share of explained variance in optimum tourist satisfaction (relative weights); performance = mean rescaled to 0–100. Dashed lines mark the grand means

4.3 Differences across Visitor Segments

Perceptions and satisfaction were remarkably homogeneous across segments (Table 4). No construct differed significantly by gender, age, nationality, destination or length of stay (all $p > .05$). The only near-significant difference was by purpose of visit. Leisure and recreation visitors reported slightly higher satisfaction ($M = 3.87$) than cultural and heritage visitors ($M = 3.61$; $U = 13{,}302$, $p = .052$, $r = .11$). Effect sizes were negligible throughout. Observable visitor characteristics therefore explain very little of the variation in how the destination is experienced.

Table -4: Differences in construct scores across visitor segments

Segment	Test	Service quality	Cultural adaptability	Technology integration	Satisfaction
Gender	H	0.94 (.625)	1.20 (.549)	0.37 (.832)	0.61 (.736)
Age	H	3.51 (.477)	2.35 (.672)	7.38 (.117)	8.62 (.071)
Nationality	H	4.96 (.420)	2.79 (.732)	2.08 (.838)	5.54 (.354)
Purpose of visit	U	13112.50 (.090)	12543.50 (.330)	12705.50 (.238)	13302.00 (.052)
Destination	H	1.60 (.660)	0.63 (.889)	1.44 (.697)	0.16 (.983)
Length of stay	H	1.02 (.796)	0.34 (.952)	0.63 (.889)	0.75 (.862)

Note: Cells show the test statistic (p value). U = Mann–Whitney U (two groups); H = Kruskal–Wallis H (three or more groups). Nationality groups: France, Germany, United Kingdom, Poland, United States and other. All effect sizes were negligible ($\varepsilon^2 \leq .015$; $r \leq .11$).

4.4 Visitor Clusters

The two-cluster solution had the highest average silhouette coefficient (.726, compared with .648 for three and .287 for four clusters), which indicates a strong structure (Rousseeuw, 1987). The clusters were a *satisfied* majority ($n = 240$; 76.7%) and a *dissatisfied* minority ($n = 73$; 23.3%). As Fig. 2 shows, the two profiles are almost parallel. The dissatisfied cluster rated every attribute low ($M = 1.70$–1.87), and the satisfied cluster rated every attribute high ($M = 4.25$–4.39). All differences were significant (Mann–Whitney $p < .001$). Satisfaction followed the same pattern ($M = 1.88$ vs. 4.27). Dissatisfaction was therefore not attribute-specific: dissatisfied visitors rejected the experience as a whole.

Table 5 profiles the clusters. Membership was unrelated to gender, age, nationality, destination or length of stay. It was, however, related to purpose of visit (continuity-corrected $\chi^2(1) = 4.62$, $p = .032$, $V = .12$): 27.8% of cultural and heritage visitors were dissatisfied, compared with 16.7% of leisure and recreation visitors. Descriptively, visitors aged 46–55 (34.9% dissatisfied) and very short stays (under 3 days, 30.4%) were also over-represented, but these differences were not significant.

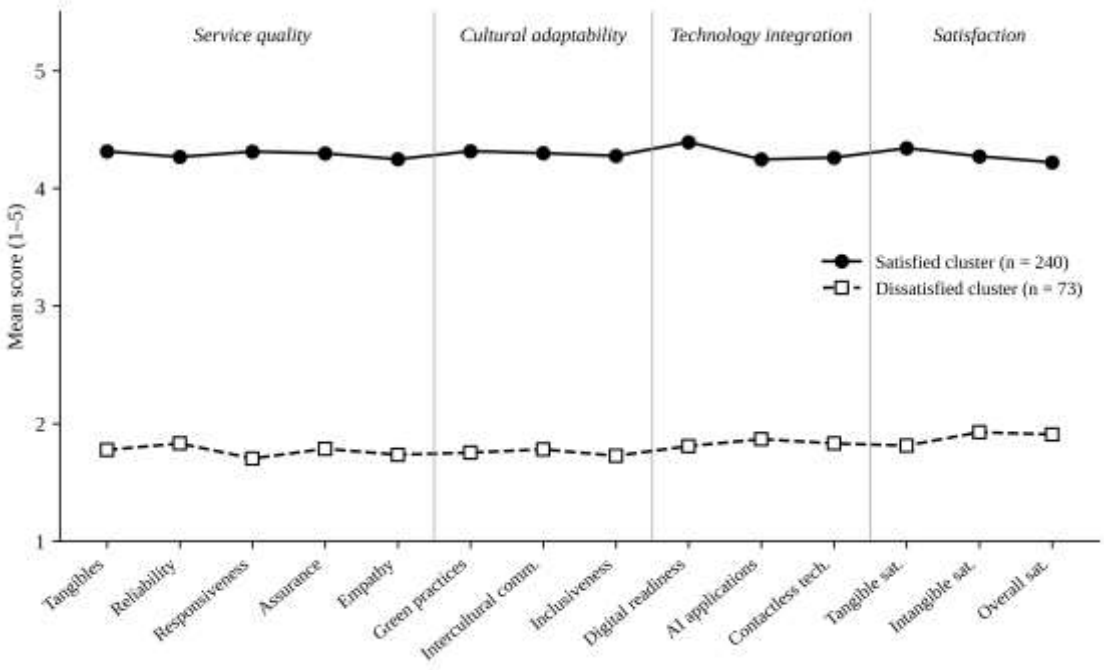


Fig -2: Attribute and satisfaction profiles of the two visitor clusters (mean scores on a 1–5 scale)

Table -5: Profile of the dissatisfied and satisfied clusters

Variable	Category	Dissatisfied n (%)	Satisfied n (%)	% dissatisfied	Test
Gender	Male	24 (32.9)	77 (32.1)	23.8	$\chi^2(2) = 0.34$, $p = .845$, $V = .03$
	Female	30 (41.1)	107 (44.6)	21.9	
	Prefer not to say	19 (26.0)	56 (23.3)	25.3	
Age	18–25	2 (2.7)	4 (1.7)	33.3	$\chi^2(4) = 6.55$, $p = .162$, $V = .14$
	26–35	15 (20.5)	57 (23.8)	20.8	
	36–45	31 (42.5)	125 (52.1)	19.9	
	46–55	22 (30.1)	41 (17.1)	34.9	
	56 or older	3 (4.1)	13 (5.4)	18.8	
Nationality	France	24 (32.9)	69 (28.8)	25.8	$\chi^2(5) = 6.05$, $p = .301$, $V = .14$
	Germany	14 (19.2)	65 (27.1)	17.7	
	United Kingdom	14 (19.2)	43 (17.9)	24.6	
	Poland	11 (15.1)	25 (10.4)	30.6	
	United States	4 (5.5)	27 (11.2)	12.9	
	Other	6 (8.2)	11 (4.6)	35.3	
Purpose of visit	Leisure, recreation, or entertainment	21 (28.8)	105 (43.8)	16.7	$\chi^2(1) = 4.62$, $p = .032$, $V = .12$
	Cultural, historical, or heritage tourism	52 (71.2)	135 (56.2)	27.8	
Destination	Riyadh	9 (12.3)	32 (13.3)	22.0	$\chi^2(3) = 0.72$, $p = .870$, $V = .05$
	Jeddah	24 (32.9)	81 (33.8)	22.9	
	AlUla	13 (17.8)	50 (20.8)	20.6	
	Red Sea region	27 (37.0)	77 (32.1)	26.0	

Variable	Category	Dissatisfied n (%)	Satisfied n (%)	% dissatisfied	Test
Length of stay	Less than 3 days	7 (9.6)	16 (6.7)	30.4	$\chi^2(3) = 2.78$, $p = .426$, $V = .09$
	3–7 days	29 (39.7)	121 (50.4)	19.3	
	8–14 days	30 (41.1)	85 (35.4)	26.1	
	More than 14 days	7 (9.6)	18 (7.5)	28.0	

Note: Column percentages in parentheses. % dissatisfied = row share of each category falling in the dissatisfied cluster. V = Cramér's V. For the 2 × 2 table (purpose of visit), χ^2 is continuity-corrected; the uncorrected Pearson $\chi^2(1)$ is 5.22, $p = .022$.

5. DISCUSSION

5.1 Technology as the Leading Satisfaction Lever

The clearest result is the weight of technology. Contactless technologies, digital readiness and AI applications together accounted for 37.5% of the explained variance in satisfaction. Three attributes thus contributed almost as much as the five SERVQUAL dimensions combined (38.5%). This agrees with Say (2025), who found digital infrastructure to be the strongest predictor of visitor satisfaction, and with evidence that smart tourism accessibility (Pai et al., 2020; Zhang et al., 2022), AI engagement (Chiengkul et al., 2025; Ali et al., 2025) and contactless services (Hao & Chon, 2021; Soliman et al., 2025) improve visitor outcomes. It also reflects the Saudi context, where e-visas, national tourism platforms, cashless payment and app-based access to AlUla and the Red Sea projects place digital systems at the centre of the visitor journey (Raza, 2025). In such a setting, the digital layer is not an add-on to the experience; it is part of the experience.

The IPA adds a practical point that significance tests alone would miss. Digital readiness is both highly important and well delivered, which confirms that investment in basic digital infrastructure has paid off. Contactless technologies and AI applications, however, are equally important but perform below average, so they offer the largest potential satisfaction gains. At item level, visitors rated efficient digital systems (E1) and digital platforms that enhanced the trip (E3) most highly. The accessibility of online information (E2), personalised recommendations (E5) and technology-supported problem solving (E6) were rated lower. The digital backbone therefore appears to be in place, while information provision and the "smart" layer that personalises and resolves the visit lag behind (Ma, 2024; Samala et al., 2020).

5.2 Service Quality and Cultural Attributes

Among the service and cultural attributes, reliability and inclusiveness and openness contributed most. This is consistent with the view that in an emerging destination, dependable delivery and a sense of being welcome are the service and cultural conditions most likely to exceed international visitors' expectations (Al-Kumaim et al., 2023; Garrod & Nicholls, 2022; Flego & Tei, 2025). Their position just below the importance crosshair should not be read as irrelevance. Relative weights distribute shared variance, and every attribute correlated above .80 with satisfaction. The lower weights of tangibles, assurance and responsiveness are consistent with the "hygiene factor" interpretation (Kong et al., 2025): once modern facilities and courteous, competent staff meet a baseline, further gains add little to satisfaction. The "possible overkill" classification of tangibles, assurance, green practices and intercultural communication should likewise be read as "maintain" rather than "cut", because performance differences between attributes were small. Green practices performed above average but contributed little, and their weakest item concerned visibility (D2). This supports the argument that sustainability contributes to satisfaction only when visitors can see and experience it (Cheng & Chen, 2022; Jumadi, 2025).

5.3 Homogeneous Segments, Polarised Visitors

Two findings about heterogeneity stand out. First, observable characteristics mattered little. Satisfaction did not vary by gender, age, nationality, destination or length of stay, and only purpose of visit showed a small effect. This contrasts with studies that report cross-cultural and technology-readiness differences in tourist evaluations (Wang et al., 2016; Shin et al., 2021; Roodhi et al., 2025). A likely reason is that this sample was drawn mainly from culturally similar Western European and North American markets. Second, the visitor population was nevertheless polarised. Almost a

quarter of visitors formed a distinct segment that rated *every* attribute poorly. Global dissatisfaction of this kind suggests that expectations were violated at the level of the whole trip rather than through isolated service failures. Possible causes include a mismatch between expectations and the realities of a conservative host culture, perceptions of restriction, or poor value for money (Garrod & Nicholls, 2022; Memish et al., 2023; Ali & Salameh, 2021). The over-representation of cultural and heritage visitors in this segment is noteworthy. These visitors may arrive with higher expectations of authentic cultural access and interaction and be more sensitive to perceived gaps between the promise of heritage destinations and the experience delivered (Sasongko et al., 2025; Nian et al., 2024).

5.4 Theoretical Implications

The findings have three implications for theory. First, they extend expectancy–disconfirmation reasoning (Oliver, 1980) to the attribute level in an emerging destination. The attributes that contribute most to satisfaction are not those on which the destination performs worst, but those whose performance is most variable across visitors and most closely tied to the overall judgement of the trip. In a digitally mediated destination, technology attributes fit this description. The results therefore support treating smart tourism technology as a core dimension of destination quality, alongside the traditional SERVQUAL attributes, rather than as a peripheral facilitator (Zhang et al., 2025; Say, 2025).

Second, the results refine the debate about which SERVQUAL dimensions matter. Previous studies report different "winning" dimensions in different settings: responsiveness and assurance in ski tourism (Kong et al., 2025), reliability and assurance in hotels (Al-Kumaim et al., 2023), and physical evidence in community tourism (Anggani et al., 2025). The present study suggests that part of this inconsistency is methodological. When dimensions are highly inter-correlated, as they were here, regression coefficients are unstable, and small differences in sample or model can change which dimension appears significant. Relative weights offer a more stable basis for comparing dimensions across studies, and they show that differences in importance among SERVQUAL dimensions are modest compared with the gap between service and technology attributes (Johnson, 2000; Tonidandel & LeBreton, 2011).

Third, the cluster results call into question the variable-centred assumption, common in satisfaction research, that one set of attribute effects applies to all visitors. The data were better described by two qualitatively different groups than by a single continuum. For the dissatisfied group, no individual attribute stood out as the cause: everything was rated poorly. This pattern is consistent with a halo or "global evaluation" process, in which an overall negative impression of the destination colours judgements of every attribute (Renganathan et al., 2025). It suggests that research on emerging destinations should combine variable-centred models with person-centred methods such as cluster or latent class analysis, and should investigate what triggers global rejection among a minority of visitors (Roodhi et al., 2025).

5.5 Managerial Implications

The results suggest five priorities for Saudi tourism authorities and operators. First, contactless technology coverage should be upgraded so that digital payment, QR-based entry and mobile check-in work reliably and universally at attractions, hotels and transport nodes. Second, the AI layer should be improved through personalised itinerary and recommendation tools and multilingual AI assistants that solve problems rather than only supply information, with a clear route to human staff (Samala et al., 2020). Third, reliability and a sense of welcome should be protected as service-level standards, because these are the service and cultural attributes that contribute most to satisfaction. Fourth, sustainability should be made visible through interpretation and on-site signals. Fifth, and most importantly, a recovery strategy for the dissatisfied segment is needed. Because this segment cannot be identified from demographic data, it should be detected behaviourally through post-visit feedback, complaint analytics and AI-based sentiment monitoring (Alzahrani et al., 2025), with particular attention to heritage-focused itineraries. Converting part of this quarter of visitors is likely to raise average satisfaction and recommendation more than further investment in attributes that satisfied visitors already rate highly.

5.6 Limitations and Future Research

Several limitations apply. The attributes were very highly inter-correlated and a single factor explained most of the item variance, which suggests a general evaluative tendency or common method bias. Relative weights mitigate, but do not remove, this problem. Importance was derived statistically rather than stated by respondents, and the narrow performance range makes the crosshair placement sensitive. Convenience sampling through online communities produced a mainly Western sample, which limits generalisation to Asian, Gulf and other markets. The cross-sectional

design cannot establish causality. Future studies should combine derived and stated importance, add open-ended questions to explain global dissatisfaction, sample more diverse source markets, and track satisfaction over time as Saudi destinations mature.

6. CONCLUSION

This study provides a diagnostic map of what matters most to international leisure tourists in Saudi Arabia. Technology attributes carry the most weight; contactless technologies and AI applications are the priority areas for improvement; and reliability and inclusiveness are the most important service and cultural foundations. Visitor evaluations barely differ by demographic or trip characteristics. Instead, they split into a satisfied majority and a globally dissatisfied minority, concentrated among cultural and heritage visitors. For a destination seeking loyalty and recommendation under Vision 2030, closing the smart-technology performance gap and recovering the dissatisfied segment are the two most promising routes to higher satisfaction.

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REFERENCES

Adhikari, Y., Wagley, M. P., & Dahal, N. (2023). Developing the Contextualized SERVQUAL Instrument for Measuring the Service Quality of Nepali Resorts: An Application of the Modified Delphi Technique. *SAGE Open*, *13*(3). https://doi.org/10.1177/21582440231195952

Akbaba, A. (2006). Measuring service quality in the hotel industry: A study in a business hotel in Turkey. *International Journal of Hospitality Management*, *25*(2), 170–192. https://doi.org/10.1016/j.ijhm.2005.08.006

Al-Kumaim, N. H., Samer, M., Hassan, S. H., Shabbir, M. S., Mohammed, F., & Al-shami, S. A. (2023). New demands by hotel customers post COVID-19 era. *Foresight*, *27*(1). https://doi.org/10.1108/fs-05-2023-0082

Ali, A. (2018). Travel and tourism: growth potentials and contribution to the GDP of Saudi Arabia. *Problems and Perspectives in Management*, *16*(1), 417–427. https://doi.org/10.21511/ppm.16(1).2018.39

Ali, A., & A. Salameh, A. (2021). Role of travel and tourism sector in the attainment of Vision 2030 in Saudi Arabia: An analytical study. *Problems and Perspectives in Management*, *19*(2), 276–290. https://doi.org/10.21511/ppm.19(2).2021.23

Ali, M., Khan, T. I., & Şener, İ. (2025). *Transforming hospitality: the dynamics of AI integration, customer satisfaction, and organizational readiness in enhancing firm performance*. Journal of Hospitality and Tourism Technology. https://doi.org/10.1108/jhtt-04-2024-0261

Alshammari, B. A., South, R. B., & Raleigh, K. (2023). *Saudi Arabia outbound tourism: an analysis of trends and destinations*. Journal of Policy Research in Tourism, Leisure and Events, 1–23. https://doi.org/10.1080/19407963.2023.2243960

Alzahrani, A., Alshehri, A., Alamri, M., & Alqithami, S. (2025). AI-Driven Innovations in Tourism: Developing a Hybrid Framework for the Saudi Tourism Sector. *AI*, *6*(1), 7. https://doi.org/10.3390/ai6010007

Anggani, M. F., Maemunah, I., & Saepudin, P. (2025). An exploration of service quality in relation to tourist satisfaction at Lebakmuncang Tourism Village. *Journal of Sustainable Tourism and Entrepreneurship*, *7*(1), 79–93. https://doi.org/10.35912/joste.v7i1.3201

Atamanchuk, Z. A. (2021). The International Tourism Development as a Way to Formation of Cross-Cultural Tolerance. *Business Inform*, *1*(516), 58–64. https://doi.org/10.32983/2222-4459-2021-1-58-64

Azzopardi, E., & Nash, R. (2013). A critical evaluation of importance–performance analysis. *Tourism Management*, *35*, 222–233. https://doi.org/10.1016/j.tourman.2012.07.007

Bagheri, F., Guerreiro, M., Pinto, P., & Ghaderi, Z. (2023). From Tourist Experience to Satisfaction and Loyalty: Exploring the Role of a Sense of Well-Being. *Journal of Travel Research*, *63*(8). https://doi.org/10.1177/00472875231201509

Cheng, Z., & Chen, X. (2022). The Effect of Tourism Experience on Tourists' Environmentally Responsible Behavior at Cultural Heritage Sites: The Mediating Role of Cultural Attachment. *Sustainability*, *14*(1), 565. https://doi.org/10.3390/su14010565

Chiengkul, W., Kumjorn, P., Tantipanichkul, T., & Suphan, K. (2025). *Engaging with AI in tourism: a key to enhancing smart experiences and emotional bonds*. Asia-Pacific Journal of Business Administration. https://doi.org/10.1108/apjba-09-2024-0488

Fan, D. X. F., Tsaur, S.-H., Lin, J.-H., Chang, T.-Y., & Tsai, Y.-R. (2021). Tourist Intercultural Competence: A Multidimensional Measurement and Its Impact on Tourist Active Participation and Memorable Cultural Experiences. *Journal of Travel Research*, *61*(2), 004728752098237. https://doi.org/10.1177/0047287520982372

Flego, C., & Tei, A. (2025). *Boosting accessibility and inclusiveness in tourism and cultural heritage sites: benchmarking best-practices*. Journal of Cultural Heritage Management and Sustainable Development. https://doi.org/10.1108/jchmsd-11-2023-0193

Garrod, B., & Nicholls, S. (2022). British tourists' adjustment to cultural expectations in Muslim-majority countries. *Tourism Management*, *91*, 104500. https://doi.org/10.1016/j.tourman.2022.104500

González, M. E. A., Comesaña, L. R., & Brea, J. A. F. (2007). Assessing tourist behavioral intentions through perceived service quality and customer satisfaction. *Journal of Business Research*, *60*(2), 153–160. https://doi.org/10.1016/j.jbusres.2006.10.014

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate Data Analysis* (8th ed.). Cengage Learning Emea. https://eli.johogo.com/Class/CCU/SEM/_Multivariate%20Data%20Analysis_Hair.pdf

Hao, F., & Chon, K. (2021). Are you ready for a contactless future? A multi-group analysis of experience, delight, customer equity, and trust based on the Technology Readiness Index 2.0. *Journal of Travel & Tourism Marketing*, *38*(9), 900–916. https://doi.org/10.1080/10548408.2021.1997878

Ibrahim, A. O. (2025). Assessing Saudi Arabia's Tourism Infrastructure and Facilities: Challenges and Opportunities for Sustainable Tourism Development. *BIMA JOURNAL of SCIENCE and TECHNOLOGY GOMBE*, *9*(1A), 195–211. https://doi.org/10.64290/bima.v9i1a.899

Johnson, J. W. (2000). A heuristic method for estimating the relative weight of predictor variables in multiple regression. *Multivariate Behavioral Research*, *35*(1), 1–19. https://doi.org/10.1207/S15327906MBR3501_1

Jumadi. (2025). Integrating Tourist Satisfaction and Environmental Stewardship for Sustainable Management of Cultural Destinations. *Journal of Hunan University Natural Sciences*, *52*(8). https://doi.org/10.55463/issn.1674-2974.52.8.1

Kong, L., Yu, C., & Chen, C. (2025). The influence of ski tourism service quality on tourists' leisure satisfaction and loyalty: The moderating role of novelty seeking. *Acta Psychologica*, *261*, 105819. https://doi.org/10.1016/j.actpsy.2025.105819

Liu, J., Kuai, X., & Wang, P. (2025). Research on the tourism service quality evaluation of Gongbei Lingnan community under the perspective of SERVQUAL theory. *Frontiers in Sustainable Cities*, *6*. https://doi.org/10.3389/frsc.2024.1502234

Ma, S. (2024). Enhancing Tourists' Satisfaction: Leveraging Artificial Intelligence in the Tourism Sector. *Pacific International Journal*, *7*(3), 89–98. https://doi.org/10.55014/pij.v7i3.624

Madurga, M.-Á. G., & Méndez, A.-J. G. (2023). Artificial intelligence in the tourism industry: An overview of reviews. *Administrative Sciences*, *13*(8), 172. https://doi.org/10.3390/admsci13080172

Martilla, J. A., & James, J. C. (1977). Importance-performance analysis. *Journal of Marketing*, *41*(1), 77–79. https://doi.org/10.1177/002224297704100112

Matteucci, X., Koens, K., Calvi, L., & Moretti, S. (2022). Envisioning the futures of cultural tourism. *Futures*, *142*, 103013. https://doi.org/10.1016/j.futures.2022.103013

Memish, Z. A., Memish, T., & Kattan, R. F. (2023). *Travel and tourism to the Kingdom of Saudi Arabia: what are the health risks? Journal of Travel Medicine*. https://doi.org/10.1093/jtm/taad145

Nian, S., Chen, M., Yan, J., Du, Y., & Su, X. (2024). Tourist Crowding versus Service Quality: Impacting Mechanism of Tourist Satisfaction in World Natural Heritage Sites from the Mountain Sanqingshan National Park, China. *Sustainability*, *16*(18), 8268. https://doi.org/10.3390/su16188268

Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of Marketing Research*, *17*(4), 460–469. https://doi.org/10.1177/002224378001700405

Pai, C.-K., Liu, Y., Kang, S., & Dai, A. (2020). The Role of Perceived Smart Tourism Technology Experience for Tourist Satisfaction, Happiness and Revisit Intention. *Sustainability*, *12*(16), 6592. https://doi.org/10.3390/su12166592

Parasuraman, A. P., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing*, *64*(1).

Parasuraman, A., Berry, L., & Zeithaml, V. (1991). Refinement and reassessment of the SERVQUAL scale. *Journal of Retailing*, *67*(4), 420–450.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879–903. https://doi.org/10.1037/0021-9010.88.5.879

Qurtuby, S. A. (2024). The Development and Innovation of Religious, Secular, and Archaeological Tourism in Saudi Arabia. *The Journal for Interdisciplinary Middle Eastern Studies*, *10*(1), 33–69. https://doi.org/10.26351/jimes/10-1/2

Raza, A. (2025). Digital Transformation and Vision 2030: A Pathway to Sustainable Tourism in Saudi Arabia. *International Journal of Human Research and Social Science Studies*, *02*(07). https://doi.org/10.55677/ijhrsss/05-2025-vol02i7

Renganathan, S. A., Othman, H., & Mohi, Z. B. (2025). Hospitality service quality and tourist satisfaction: a comprehensive review of empirical evidence and theoretical insights. *Lex Localis - Journal of Local Self-Government*, *23*(S6), 5826–5832. https://doi.org/10.52152/ctv63w10

Roodhi, M. N., Dakwah, M. M., & Baehaqi, B. (2025). Intercultural Communication And Co-Creation In Tourist Satisfaction: Asian–European Perspectives In Mandalika, Lombok. *INJECT (Interdisciplinary Journal of Communication)*, *10*(1), 89–114. https://doi.org/10.18326/inject.v10i1.4365

Rousseeuw, P. J. (1987). Silhouettes: A graphical aid to the interpretation and validation of cluster analysis. *Journal of Computational and Applied Mathematics*, *20*, 53–65. https://doi.org/10.1016/0377-0427(87)90125-7

Samala, N., Katkam, B. S., Bellamkonda, R. S., & Rodriguez, R. V. (2020). *Impact of AI and robotics in the tourism sector: a critical insight*. Journal of Tourism Futures, https://www.emerald.com/insight/content/doi/10.1108/JTF-07-2019-0065/full/html

Sasongko, G., Kameo, D. D., Siwi, V. N., Wahyudi, Y., & Huruta, A. D. (2025). The Effect of Service Quality and Heritage Tourism on Tourist Loyalty: The Case of Borobudur Temple. *Heritage*, *8*(2), 77. https://doi.org/10.3390/heritage8020077

Say, J. M. (2025). Smart Tourism Readiness and Visitor Satisfaction: A Study on Digital Infrastructure, Sustainability, and Service Innovation. *Psychology and Education: A Multidisciplinary Journal*, *46*(3), 374–382. https://doi.org/10.70838/pemj.460310

Shin, H., Jeong, M., & Cho, M. (2021). The impact of smart tourism technology and domestic travelers' technology readiness on their satisfaction and behavioral intention: A c ross-country comparison. *International Journal of Tourism Research*, *23*(5), 726–742. https://doi.org/10.1002/jtr.2437

Soliman, M., Buaniew, A., Hassama, A., Assalihee, M., & Adel, R. (2025). Investigating the role of smart hotel technologies in enhancing guest experiences and sustainable tourism in Thailand. *Discover Sustainability*, *6*(1). https://doi.org/10.1007/s43621-025-01954-8

Tonidandel, S., & LeBreton, J. M. (2011). Relative importance analysis: A useful supplement to regression analysis. *Journal of Business and Psychology*, *26*(1), 1–9. https://doi.org/10.1007/s10869-010-9204-3

Viken, A., Höckert, E., & Grimwood, B. S. R. (2021). Cultural sensitivity: Engaging Difference in Tourism. *Annals of Tourism Research*, *89*(1), 103223. https://doi.org/10.1016/j.annals.2021.103223

Wang, Y., So, K. K. F., & Sparks, B. A. (2016). Technology Readiness and Customer Satisfaction with Travel Technologies: A Cross-Country Investigation. *Journal of Travel Research*, *56*(5), 563–577. https://doi.org/10.1177/0047287516657891

Zeng, L., & Li, R. Y. M. (2021). Tourist Satisfaction, Willingness to Revisit and Recommend, and Mountain Kangyang Tourism Spots Sustainability: A Structural Equation Modelling Approach. *Sustainability*, *13*(19), 10620. https://doi.org/10.3390/su131910620

Zhang, A., Zhang, B., & Zhu, Y. (2025). *Determinants of Technology Adoption in Tourism: Insights from a Systematic Literature Review*. Sage Open, 15(4). https://doi.org/10.1177/21582440251388798

Zhang, Y., Sotiriadis, M., & Shen, S. (2022). Investigating the Impact of Smart Tourism Technologies on Tourists' Experiences. *Sustainability*, *14*(5), 3048. https://doi.org/10.3390/su14053048