

The Effect of Sanitation Hygiene Information Quality on Digital Maps on Visit Intention to Tourism Villages: An Extended Technology Acceptance Model

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Abstract: Sanitation and hygiene are essential components of sustainable tourism, yet their role as publicly consumed information on digital platforms has received limited scholarly attention. This study examines how the quality of sanitation hygiene information on digital maps influences visit intention to tourism villages through perceived usefulness and information trust, drawing on an extended Technology Acceptance Model. Using survey data from 150 digital map users, the findings indicate that sanitation hygiene information quality positively affects perceived usefulness and trust, which in turn significantly increase visit intention. These results suggest that improving the visibility, accuracy, and credibility of sanitation hygiene information on digital maps represents a cost-effective strategy to support sustainable tourism governance and destination competitiveness.

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Introduction

Environmental sanitation and hygiene are widely recognized as key determinants of sustainable tourism, as they reduce health risks, enhance visitor comfort, and protect local ecosystems. In tourism villages, sanitation facilities such as toilets, handwashing stations, and waste management systems are often used as indicators of destination readiness. However, beyond physical infrastructure, potential visitors increasingly rely on digital maps to assess sanitation and hygiene conditions prior to visiting. Despite this shift, empirical studies rarely conceptualize sanitation hygiene as publicly accessible information on digital maps. From an Environmental Engineering perspective, this study addresses this gap by examining how sanitation hygiene information quality influences visit intention through perceived usefulness and information trust.

Digital maps have become a primary information channel in travel planning, complementing broader online travel information and review ecosystems (Gretzel et al., 2008; Ayeh et al., 2013). Through points of interest (POIs), photos, ratings, and user reviews, digital maps provide rapid cues regarding facility availability, cleanliness, and accessibility. Previous studies show that information quality and source credibility in online travel information influence trust and visit intentions/behaviors (Kim et al., 2017; Dedeoğlu, 2019; Filieri & McLeay, 2014; Wang & Yan,

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2022). Moreover, perceptions of hygiene and safety are closely linked to travel decisions, particularly in the post-pandemic period (Konak, 2022; World Health Organization, 2020).

In practice, many potential visitors rely on reviews and testimonials on digital maps (e.g., Google Maps) as an initial filter before deciding to visit. Commonly sought information includes toilet conditions, availability of clean water, cleanliness of public areas, presence of waste bins, and visual evidence through photos. When reviews are specific, consistent, and up to date, potential visitors tend to feel more confident; conversely, sparse, contradictory, or outdated reviews increase uncertainty and may reduce visit intention. This phenomenon highlights that sanitation hygiene is not only a service issue on-site but also an issue of information availability and quality consumed by the public.

Nevertheless, empirical studies that explicitly position digital map information quality related to sanitation and hygiene as an upstream factor shaping visit intention remain limited particularly from an Environmental Engineering perspective that views sanitation not only as physical infrastructure but also as an issue of information governance. Conceptually, this study offers three contributions: (1) operationalizing sanitation hygiene information quality on digital maps as a measurable construct (based on POIs, reviews, and visual evidence); (2) testing an extended TAM by incorporating trust as a relevant mediator in the public information context; and (3) providing low-cost managerial implications for tourism village managers to enhance competitiveness through improving sanitation hygiene information quality on digital maps.

This study examines a TAM-based mechanism linking sanitation/hygiene information quality on digital maps to visit intention through perceived usefulness and trust.

Research objectives

- a. To examine the effect of sanitation hygiene information quality on digital maps on perceived usefulness.
- b. To examine the effect of sanitation hygiene information quality on digital maps on information trust.
- c. To examine the effects of perceived usefulness and trust on visit intention.
- d. To test the mediating roles of perceived usefulness and trust.

Literature Review and Hypothesis Development

Sanitation and hygiene at tourism destinations

Sanitation and hygiene at tourism destinations include the availability and condition of toilets, access to clean water, handwashing facilities, and waste management systems. Evidence from tourism-village settings indicates that toilet sanitation remains a practical and measurable issue affecting visitor experience (Ruslan et al., 2023). These components reduce perceived health risks, enhance comfort, and strengthen destination image (Konak, 2022; World Health Organization, 2020). In the Indonesian tourism context, hygiene and safety practices are also promoted through CHSE-oriented guidance and standardization initiatives (Kementerian Pariwisata dan Ekonomi Kreatif Republik Indonesia, 2020; Lumanauw & Gupta, 2021; Zainab et al., 2022). From an Environmental Engineering perspective, sanitation is closely related to pollution prevention and public health protection, making it a relevant consideration for environmentally responsible visitation.

Digital map information quality

Information quality generally refers to the degree of completeness, accuracy, timeliness, relevance, and ease of understanding. In information systems research, information quality is also a central dimension of system success, alongside use and user satisfaction (DeLone & McLean, 2003).

In tourism, information quality on social media and online platforms supports destination evaluation and shapes intentions through cognitive and affective mechanisms (Kim et al., 2017; Wang & Yan, 2022; Majeed et al., 2020). In the context of sanitation and hygiene, information quality is reflected in indicators such as: (a) completeness of sanitation-related POIs; (b) coordinate accuracy; (c) timeliness of access/operational status updates; (d) clarity of cleanliness signals in reviews/photos; and (e) consistency across user-generated signals.

Perceived usefulness (PU)

Within TAM, perceived usefulness refers to the belief that a technology enhances task performance (Davis, 1989). Related technology-acceptance work (e.g., UTAUT) likewise highlights performance-related beliefs as key drivers of behavioral intention (Venkatesh et al., 2003). In digital maps, sanitation/hygiene information can increase usefulness by helping users assess destination readiness, plan trips, and reduce uncertainty.

H1: Sanitation hygiene information quality on digital maps has a positive effect on perceived usefulness.

Information trust (TR)

Trust reflects the belief that digital map information is reliable and representative. Information quality and credibility are often antecedents of trust in tourism contexts (Dedeoğlu, 2019; Wang & Yan, 2022; Filieri & McLeay, 2014). For sanitation/hygiene signals, trust is influenced by the authenticity of photos/reviews and the stability of POI information.

H2: Sanitation hygiene information quality on digital maps has a positive effect on information trust.

Visit intention (VD)

Visit intention refers to an individual's strengthened preference and intention to visit a destination, as well as the tendency to choose it over alternatives. This construct is consistent with established behavioral-intention theory, which treats intention as an immediate antecedent of action in planned behavior (Ajzen, 1991). In this study, visit intention is operationalized as intention to visit because the indicators are expressed as intention statements (e.g., "I intend to visit..."). Online information quality, trust, and usefulness have been linked to travel intentions/decisions (Abubakar & Ilkan, 2016; Wang & Yan, 2022; Majeed et al., 2020).

H3: Perceived usefulness has a positive effect on visit intention.

H4: Information trust has a positive effect on visit intention.

Indirect effects (mediation)

In information processing and technology acceptance literature, information quality influences behavioral outcomes through perceived usefulness and trust (Wang & Yan, 2022; Filieri & McLeay, 2014). From a persuasion perspective, high-quality and credible cues can increase message elaboration and strengthen intention formation (Petty & Cacioppo, 1986). Accordingly, the effect of sanitation/hygiene information quality is expected to operate indirectly through these mediators.

H5: Perceived usefulness mediates the relationship between sanitation–hygiene information quality on digital maps and visit intention.

H6: Information trust mediates the relationship between sanitation–hygiene information quality on digital maps and visit intention.

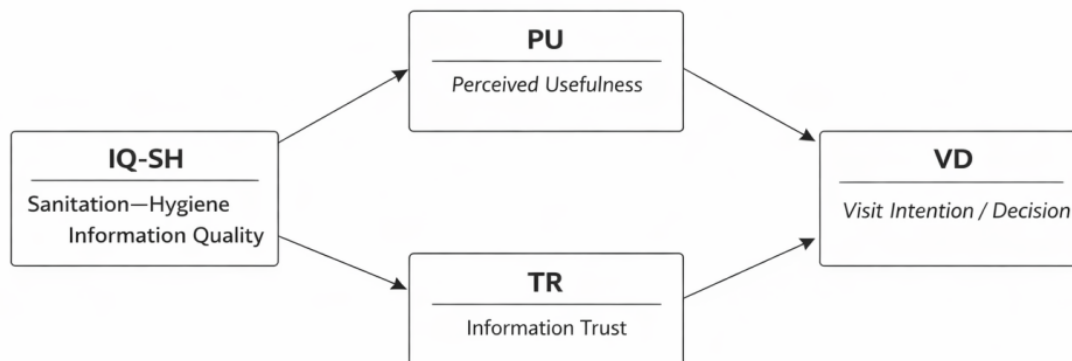


Figure 1. Conceptual research model

Figure 1 presents the conceptual research model, illustrating the hypothesized indirect paths $IQ-SH \rightarrow PU \rightarrow VD$ and $IQ-SH \rightarrow TR \rightarrow VD$, as well as the corresponding direct associations among constructs.

Research Method

Research design

This study employed an explanatory quantitative design using a cross-sectional online survey to examine the relationships among sanitation hygiene information quality, perceived usefulness, information trust, and visit intention. A purposive sampling technique was applied to ensure that respondents had recent experience using digital maps for travel planning. Data were analyzed using ordinary least squares regression and mediation analysis, which are appropriate for testing direct and indirect relationships among perception-based constructs within the Technology Acceptance Model framework.

Population, sampling technique, and sample size

Population: General members of the public who use digital maps for travel planning. Sampling technique: *Purposive sampling* with the following inclusion criteria:

- a. having used digital maps (e.g., Google Maps) to search for tourism destinations within the past six months;
- b. having planned or undertaken at least one leisure trip within the past twelve months; and
- c. considering basic facilities (sanitation/hygiene) when planning a visit.

Sample size: $N = 150$ valid responses.

Instrument development and measurement

All items were measured using a five-point Likert scale (1 = strongly disagree; 5 = strongly agree). Measurement items were adapted from prior studies on information quality, trust, and travel intention and contextualized to sanitation–hygiene information on digital maps (Kim et al., 2017; Dedeoğlu, 2019; Filieri & McLeay, 2014; Wang & Yan, 2022).

(A) Sanitation Hygiene Information Quality on Digital Maps (IQ-SH)

- a. IQSH1 Sanitation facilities (e.g., toilets) are easy to find on digital maps.
- b. IQSH2 The location/coordinates of sanitation facilities on digital maps are accurate.
- c. IQSH3 Photos/reviews provide clear signals regarding facility cleanliness.
- d. IQSH4 Access and operational status information is adequately updated.

- e. IQSH5 Signals of waste management/cleanliness of public areas are easy to identify through POIs/reviews.
- f. IQSH6 Ratings and reviews related to cleanliness are consistent and helpful.
- (B) Perceived Usefulness (PU)
 - a. PU1 Sanitation/hygiene information helps me assess the readiness of tourism villages.
 - b. PU2 Such information helps me plan my trip more efficiently.
 - c. PU3 Such information reduces uncertainty regarding comfort during visits.
 - d. PU4 Such information increases my confidence to proceed with visit plans.
- (C) Information Trust (TR)
 - a. TR1 I trust sanitation/hygiene information on digital maps.
 - b. TR2 Photos/reviews represent actual on-site conditions.
 - c. TR3 I trust the accuracy of sanitation facility locations on digital maps.
 - d. TR4 The information is sufficiently consistent for decision-making.
- (D) Visit Intention (VD)
 - a. VD1 Sanitation/hygiene information on digital maps influences my destination choice.
 - b. VD2 I am more likely to visit destinations with clear cleanliness information.
 - c. VD3 I intend to visit destinations whose information I consider trustworthy.
 - d. VD4 I tend to choose destinations with complete basic facility information over alternatives.

Data collection procedure

The questionnaire was distributed online using Google Forms during October–November 2025. Survey links were disseminated via social media and instant messaging platforms (e.g., WhatsApp and Instagram) to potential respondents who met the inclusion criteria. Screening questions were applied prior to the main items.

Duplicate responses were controlled by limiting one response per account/device (according to platform settings) and by checking completeness and response patterns to identify irregular submissions (e.g., identical answers across items or extremely short completion times).

Research ethics: Participation was voluntary. Respondents were provided with a brief explanation of the study purpose, estimated completion time, and assurances of confidentiality and anonymity. Data were used solely for academic purposes and reported in aggregate form.

Control of common method bias (*common method bias*): Single-source survey designs are susceptible to common method bias. To minimize this risk, items were clearly worded and non-leading, item order was partially randomized (where platform features allowed), and respondents were informed that there were no right or wrong answers. Statistically, Harman's single-factor test was applied. The results indicated that a single factor explained 38.6% of the total variance (<50%), suggesting that common method bias was not a major concern.

Reliability and validity procedures

To ensure measurement quality prior to hypothesis testing, this study evaluated reliability and validity at the construct level and checked key OLS assumptions.

- a. Internal reliability: Cronbach's alpha was computed for each construct (recommended threshold ≥ 0.70). Item performance was examined using corrected item total correlations and *alpha if item deleted* to identify items that could weaken internal consistency.
- b. Construct validity (convergent EFA): Exploratory Factor Analysis (EFA) was used to verify that items loaded on their intended constructs. Adequacy criteria included $KMO \geq 0.60$ and Bartlett's

test $p < 0.05$. Items were expected to exhibit primary factor loadings ≥ 0.50 with minimal cross-loadings.

- c. Discriminant validity: Discriminant separation among constructs was assessed using (i) cross-loading patterns in EFA (preferably < 0.30 on non-target constructs) and (ii) inter-construct correlations that were not excessively high (e.g., $r < 0.85$).
- d. Multicollinearity (OLS/mediation models): Variance Inflation Factor (VIF) and tolerance were examined to ensure predictors were not excessively collinear; the models were interpreted only after no major multicollinearity concerns were indicated.
- e. OLS regression assumptions: Residual diagnostics (e.g., P–P plots and residual-versus-fitted plots) were inspected to assess approximate normality and homoscedasticity. Independence was considered as appropriate for the model setting. The results were interpreted after no major assumption violations were indicated.
- f. Control variables (robustness check): Age, gender, and travel frequency (past 12 months) were included as control variables in the visit intention model to strengthen robustness and reduce the risk of omitted-variable bias.

Data analysis techniques

All data analyses were conducted using IBM SPSS Statistics version 27. Direct (hypothesized) effects were tested using OLS linear regression and are reported as standardized β coefficients. Mediation analyses were performed using PROCESS Macro (Model 4) with *bootstrapping* (5,000 resamples; 95% confidence intervals); indirect effects are reported as unstandardized estimates from PROCESS, consistent with its bootstrap output.

Result and Discussion

This section presents descriptive statistics, measurement quality assessment, and hypothesis testing results for direct and mediating effects.

Respondent profile (descriptive statistics)

A total of 150 valid responses were obtained from general users of digital maps for travel planning. Respondent characteristics are summarized in Table 1.

Table 1. Respondent Profile (N = 150)

Variable	Category	n	%
Gender	Male	72	48.0
	Female	77	51.3
	Other	1	0.7
Age group	17–25	64	42.7
	26–35	52	34.7
	36–45	26	17.3
	46+	8	5.3
Digital map use frequency	Daily	83	55.3
	Weekly	54	36.0
	Monthly	13	8.7
Travel frequency (past 12 months)	1–2 trips	69	46.0
	3–5 trips	58	38.7
	≥ 6 trips	23	15.3

Descriptive statistics of constructs

Mean values and standard deviations (scale 1–5) are presented in Table 2.

Table 2. Descriptive Statistics of Study Constructs (N = 150)

Construct	Code	Mean	SD
Sanitation–Hygiene Information Quality	IQ-SH	3.96	0.62
Perceived Usefulness	PU	4.05	0.59
Information Trust	TR	3.88	0.65
Visit Intention	VD	4.01	0.61

Note: Construct scores were computed as the mean of their respective items using a five-point Likert scale (1 = strongly disagree; 5 = strongly agree). Mean and standard deviation were generated in IBM SPSS Statistics 27 (N = 150).

Measurement quality (reliability and validity)

All constructs demonstrated good internal reliability, with Cronbach’s alpha values ranging from 0.87 to 0.91, indicating satisfactory internal consistency. Exploratory Factor Analysis (EFA) supported construct validity, with KMO = 0.89 and Bartlett’s test significant ($p < 0.001$). A rotated solution was inspected to verify clean measurement: items were retained when their primary loading met the minimum criterion (≥ 0.50) and cross-loadings on non-target factors remained low (< 0.30). In this study, primary factor loadings ranged from 0.74 to 0.86 on their intended constructs, while cross-loadings were relatively low (< 0.30), indicating adequate discriminant separation among constructs.

Table 3. Reliability and Validity Summary (N = 150)

Construct	Code	Items (k)	Cronbach’s α	Loading range	Notes
Sanitation Hygiene Information Quality	IQ-SH	6	0.91	0.74–0.86	EFA; cross-loadings < 0.30
Perceived Usefulness	PU	4	0.88	0.74–0.86	EFA; cross-loadings < 0.30
Information Trust	TR	4	0.87	0.74–0.86	EFA; cross-loadings < 0.30
Visit Intention	VD	4	0.89	0.74–0.86	EFA; cross-loadings < 0.30
Overall EFA adequacy					KMO = 0.89; Bartlett’s $p < 0.001$

Note: Cronbach’s α values were obtained from SPSS Reliability Analysis, while loading ranges were summarized from the rotated EFA solution. The same cut-offs were applied across constructs (primary loading ≥ 0.50 ; cross-loading < 0.30) (N = 150).

Detailed item loadings from the rotated factor matrix are available upon request to support transparency and replication, while the main-text results report loading ranges and discriminant evidence.

Hypothesis testing (direct effects)

OLS regression results (standardized coefficients) indicate that sanitation–hygiene information quality has a positive and significant effect on perceived usefulness ($\beta = 0.58$; $p < 0.001$) and information trust ($\beta = 0.52$; $p < 0.001$), supporting H1 and H2. Furthermore, perceived usefulness ($\beta = 0.39$; $p < 0.001$) and information trust ($\beta = 0.28$; $p = 0.001$) positively and significantly affect visit intention, supporting H3 and H4.

Prior to interpreting the OLS estimates, key model diagnostics were inspected. Multicollinearity was not indicated based on VIF/tolerance checks, and residual plots suggested no major violations of normality or homoscedasticity assumptions. Overall, the diagnostic evidence supports the adequacy of the OLS models for hypothesis testing.

Table 4. OLS Regression Results (OLS; standardized β coefficients)

Model / Path	β	t	p-value	R ²	Decision
Model 1: IQ-SH → PU (H1)	0.58	8.66	<0.001	0.34	Supported
Model 2: IQ-SH → TR (H2)	0.52	7.41	<0.001	0.27	Supported
Model 3: PU → VD (H3)	0.39	4.64	<0.001	0.37	Supported
Model 3: TR → VD (H4)	0.28	3.33	0.001	0.37	Supported

Note: Table 4 reports standardized β from OLS regression models estimated in IBM SPSS Statistics 27 (N = 150). For Model 3, PU and TR are entered simultaneously to predict VD; R² refers to the combined model. Age, gender, and travel frequency (past 12 months) were included as control variables in the mediation model (PROCESS Model 4); for brevity, control coefficients are not tabulated here and are available upon request.

Mediation testing

Bootstrapping mediation analyses confirmed significant indirect effects of sanitation–hygiene information quality on visit intention through perceived usefulness (indirect effect = 0.23; 95% CI: 0.14-0.34) and through information trust (indirect effect = 0.15; 95% CI: 0.06–0.25), supporting H5 and H6. The mediation model included age, gender, and travel frequency (past 12 months) as control variables.

Table 5. Bootstrapped Indirect Effects (PROCESS Model 4; 5,000 Resamples)

Indirect path	Effect	BootSE	95% CI (LL)	95% CI (UL)	Decision
IQ-SH → PU → VD	0.23	0.05	0.14	0.34	Significant (CI excludes 0)
IQ-SH → TR → VD	0.15	0.04	0.06	0.25	Significant (CI excludes 0)

Note: Indirect effects are unstandardized estimates from PROCESS Macro (Model 4), computed using 5,000 bootstrap resamples and 95% confidence intervals. An indirect effect is considered significant when the bootstrap CI does not include zero (N = 150).

4.6 Results summary

The results show that sanitation hygiene information quality on digital maps has a positive and significant effect on perceived usefulness and information trust. In addition, both perceived usefulness and information trust significantly influence visit intention.

Consistent with this recommendation and based on the coefficients in Tables 4-5, sanitation hygiene information quality on digital maps significantly predicts perceived usefulness ($\beta = 0.58$; $p < 0.001$) and information trust ($\beta = 0.52$; $p < 0.001$). Both perceived usefulness ($\beta = 0.39$; $p < 0.001$) and information trust ($\beta = 0.28$; $p = 0.001$) significantly predict tourism-village visit intention. Bootstrapped mediation confirms significant indirect effects through perceived usefulness (effect = 0.23; 95% CI: 0.14–0.34) and through information trust (effect = 0.15; 95% CI: 0.06-0.25), supporting the proposed model.

Discussion

The findings of this study extend the Technology Acceptance Model by demonstrating that sanitation hygiene information quality serves as an important informational stimulus that enhances perceived usefulness and information trust. Consistent with prior tourism and information systems research, high-quality and credible sanitation hygiene information reduces uncertainty and strengthens confidence in travel decision-making. These results highlight the strategic role of digital maps in tourism governance, particularly in shaping environmentally responsible visitation behavior. Interpreting the main mechanism (extended TAM)

From a theory-testing perspective, the results support an extended TAM mechanism in which high-quality sanitation hygiene information improves (i) performance-related beliefs (usefulness) and (ii) credibility-related beliefs (trust). These two beliefs then translate into stronger behavioral intention to visit. In other words, sanitation hygiene cues on digital maps are not merely descriptive information; they function as decision-relevant signals that help users plan trips more efficiently and reduce uncertainty about comfort and safety at the destination.

Why usefulness and trust matter in sanitation hygiene information

The significant IQ-SH → PU relationship indicates that sanitation hygiene information quality is interpreted by users as practically helpful for travel planning (e.g., assessing readiness and reducing uncertainty). The significant IQ-SH → TR relationship indicates that clearer and more consistent sanitation hygiene cues increase confidence that the information reflects real conditions. Together, these findings imply that improving sanitation hygiene information quality can simultaneously strengthen utility (planning value) and credibility (believability), which is particularly important for information types that are closely linked to perceived health risk and comfort.

Positioning the findings in an Environmental Engineering perspective

From an Environmental Engineering perspective, sanitation is commonly treated as physical infrastructure and service performance (toilets, water access, waste management, cleanliness maintenance). This study adds that sanitation hygiene also operates as a public information-governance issue: the same physical conditions must be translated into visible, accurate, and credible digital information so they can be evaluated by potential visitors before travel. Therefore, digital-map information becomes a practical extension of environmental health governance at tourism destinations.

Practical implications for tourism-village managers and local stakeholders

The findings suggest a feasible and low-cost intervention pathway: improving the visibility, accuracy, timeliness, and credibility cues of sanitation hygiene information on digital maps. Practical actions include (1) maintaining complete and correctly categorized sanitation-related POIs, (2) ensuring coordinate accuracy and access/operational updates, and (3) encouraging authentic photos and reviews that provide clear cleanliness signals. These efforts can reduce information uncertainty and strengthen confidence among potential visitors, complementing on-site sanitation improvements.

Contextualizing the sample characteristics

The respondent profile indicates a predominance of active digital-map users (91.3% use digital maps daily/weekly), which is appropriate for evaluating how map-based information supports travel planning. In addition, 54.0% of respondents reported making ≥ 3 trips in the past 12 months, suggesting sufficient travel experience to evaluate destination information, including sanitation hygiene cues.

Conclusion

This study concludes that sanitation hygiene information quality on digital maps plays a significant role in shaping visit intention to tourism villages through perceived usefulness and information trust. By conceptualizing sanitation and hygiene as both physical infrastructure and publicly consumed digital information, this research contributes to tourism, environmental governance, and technology acceptance literature. Practically, improving the accuracy, visibility, and credibility of sanitation hygiene information on digital maps offers a cost-effective strategy to enhance destination competitiveness and promote sustainable tourism development.

Recommendation

- a. Standardize sanitation-related POIs: Ensure that toilets, handwashing points, clean water access, and waste bins are properly categorized and accurately located on digital maps.
- b. Improve data quality and timeliness: Regularly update operational status, access information, and facility availability.
- c. Strengthen credibility signals: Encourage authentic photos and reviews and respond consistently to cleanliness-related feedback.
- d. Integrate sanitation programs with digital visibility: Align routine sanitation and waste management activities with periodic digital information updates, consistent with Indonesian environmental health governance and tourism-standardization directions (Peraturan Pemerintah Republik Indonesia, 2014; Kementerian Kesehatan Republik Indonesia, 2023; Kementerian Pariwisata dan Ekonomi Kreatif Republik Indonesia, 2021).
- e. Enhance community capacity: Train local managers to maintain facilities and their digital representations, aligning improvements with relevant sanitation and hygiene standards and guidance (Kementerian Kesehatan Republik Indonesia, 2014; Asosiasi Toilet Indonesia, 2021; Badan Standardisasi Nasional, 2008).

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