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Research Article

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Tourist Engagement Links Perceived Green Tourism Practices with Local Spending Orientation in Hanoi

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Abstract

Sustainable tourism research has shown that visitors respond positively to green practices, but it is less clear whether those practices are associated with where tourism expenditure is directed within host destinations. This study develops a behavioural conversion model in which perceived green tourism practices (GTP) are associated with tourist engagement (TE), which in turn is associated with a local spending orientation (LSO). A cross-sectional survey of 300 adult tourists in Hanoi, Vietnam, was analysed using reliability assessment, principal-axis factor analysis with oblimin rotation, HC3-robust OLS regression and a 5,000-resample bootstrap analysis of the indirect association. GTP was positively associated with TE and LSO. In the joint model, GTP ($B=0.3324$, $p<0.001$) and TE ($B=0.3719$, $p<0.001$) remained significant, while the bootstrapped indirect association was 0.2133 (95% CI [0.1501, 0.2821]). The substantive pattern was reproduced when reported local spending share was used as an economic robustness outcome. The study extends Stimulus-Organism-Response reasoning from evaluative outcomes toward the allocation of visitor demand, positions engagement as a behavioural conversion mechanism, and identifies tourist provider choice as a demand-side antecedent of tourism linkage and leakage. Because the design is cross-sectional and self-reported, all fitted pathways are interpreted as conditional associations rather than causal effects.

Keywords: green tourism practices; tourist engagement; local spending orientation; visitor expenditure; tourism leakage; sustainable tourism; Hanoi

JEL classification: Z32; R11; Q56

1. Introduction

Sustainable tourism research has become increasingly successful at explaining whether visitors recognise green practices and respond with favourable attitudes, satisfaction, loyalty, revisit intention or pro-environmental behaviour (Han et al., 2018; Merli et al., 2019; Kim et al., 2021; Vu et al., 2026). Yet these outcomes do not answer a destination-development

question that is economically distinct: when sustainability becomes salient to tourists, does it also influence where their money goes? Visitor arrivals and gross expenditure can rise while substantial value leaves through external ownership, non-local intermediaries, imported inputs and weak supplier linkages (Meyer, 2007; Lacher and Nepal, 2010; Srhoj and Mikulić, 2025). Positive sentiment toward sustainability is therefore not equivalent to stronger local economic participation.

This unresolved problem reflects a separation between three established literatures. Green-tourism and hospitality studies typically begin with destination or firm practices and end with psychological or marketing outcomes. Tourist-engagement research explains attention, enthusiasm, involvement and interaction but usually evaluates relational outcomes such as loyalty, co-creation or destination image (So et al., 2014, 2016; Hien and Luu, 2026; Zhang et al., 2026). Tourism linkage-leakage research, by contrast, begins after expenditure has reached firms and asks how ownership, procurement and supplier structures determine subsequent retention (Meyer, 2007; Lacher and Nepal, 2010; Srhoj and Mikulić, 2025). What remains under-specified is the behavioural step connecting these literatures: the tourist's decision to direct expenditure toward one provider rather than another.

Tourist engagement offers a theoretically plausible conversion mechanism. An engaged visitor devotes more attention and behavioural effort to the destination, increasing the likelihood of noticing provenance information, interacting with local producers, learning about unfamiliar small providers and moving beyond default platform rankings. These processes can reduce information frictions that otherwise disadvantage locally embedded suppliers. Engagement therefore has the potential to convert sustainability cues from an evaluative response into an economically distributive response.

Adjacent evidence supports components of this mechanism but does not yet integrate them. Sustainability-oriented tourists may spend more overall (Nickerson et al., 2016), but high total expenditure does not reveal who captures it. Mundi (2025) shows experimentally that sustainable-tourism incentives can affect local-business spending, while Trang et al. (2025) document demand for local production and traceability attributes in Vietnam. At the firm level, Srhoj and Mikulić (2025) show that first-round domestic spending can still leak through upstream imports. Together these findings suggest that sustainability, engagement and local spending are connected, but they do not specify a visitor-level mechanism linking them.

This study addresses that theoretical discontinuity using survey data from 300 adult tourists in Hanoi. It distinguishes perceived green tourism practices (GTP), tourist engagement (TE) and local spending orientation (LSO). LSO is defined as a tourist-side orientation toward locally owned services, locally made products, local labour or inputs, a modest local-value premium and the perceived reach of spending. It is not an accounting measure of retained income. Reported local spending share is used as a more concrete economic robustness outcome.

The study makes four contributions. First, it extends Stimulus-Organism-Response (S-O-R) reasoning from conventional attitudinal and relational responses toward a distributive consumption response: where tourists direct expenditure. Second, it develops tourist

engagement as a behavioural conversion mechanism linking sustainability cues to local spending orientation. Third, it refines the mechanism by distinguishing an engagement pathway from a residual GTP-LSO association that is consistent with additional informational or choice-architecture channels without treating the residual path itself as proof of a specific mechanism. Fourth, it provides a demand-side microfoundation for tourism linkage-leakage analysis by identifying tourist provider choice as an antecedent of the supply-side retention processes examined by tourism economics.

The empirical objective is therefore not to claim causal mediation. It is to test whether GTP is associated with TE, whether GTP and TE provide independent explanatory information about LSO, whether the fitted indirect GTP-TE-LSO association is positive, and whether the same pattern is reproduced for reported local spending share. This design produces a mechanism-focused contribution while maintaining a strict boundary between visitor allocation and final local value retention.

The research question is deliberately narrower than whether green tourism causes economic development. It asks whether visitors who perceive stronger sustainable-destination practices report more engagement and a stronger preference for purchasing from locally embedded providers, and whether this structure is also reflected in a separately reported spending-share measure. This distinction is essential: the study investigates the allocation of first-round visitor demand, not the net value ultimately retained after purchases, input sourcing and ownership-related transfers.

2. Theoretical background and hypotheses development

2.1 Local value retention begins with visitor allocation

Tourism expenditure is a necessary input to local development, but its local effect depends on both where expenditure first enters the destination economy and what happens after that entry. Tourism can contribute to regional development, yet the local significance of visitor spending depends on how much value remains after leakage (Faber and Gaubert, 2019; Sandbrook, 2010). Linkage research emphasises connections between tourism and local agriculture, manufacturing, services and community enterprises, whereas leakage research identifies value leaving through imports, external ownership and non-local intermediaries (Meyer, 2007; Lacher and Nepal, 2010; Srhoj and Mikulić, 2025). OECD (2026) similarly places local business participation and local value creation alongside wider sustainability objectives.

This perspective implies a sequence that is often analytically compressed. Before a hotel, restaurant, guide, retailer or attraction can retain or leak value through its supply chain, a tourist must first choose where to spend. That first-round allocation is not equivalent to final retained value, but it is an antecedent of it. A destination cannot retain expenditure that visitors never direct toward locally embedded providers in the first place.

LSO captures a tourist-side preference and behavioural orientation toward that first-round allocation stage. Reported LocalSpendShare records the percentage of trip expenditure respondents believe they direct to locally owned or locally producing providers. Neither

measure can trace upstream imports, external profit flows or induced effects. Their theoretical role is narrower: they capture the behavioural entry point that firm-level and transaction-level studies usually take as given.

A key conceptual distinction follows. Total tourism expenditure describes the size of visitor demand; local spending share describes its first-round distribution across provider types; retained local value further depends on ownership, employment, imports and intermediate purchases. Nickerson et al. (2016) illuminate the first concept, Mundi (2025) offers evidence relevant to the second, and Srhoj and Mikulić (2025) explicitly address downstream leakage. Treating these as interchangeable would create a false inference from visitor attitudes to regional welfare.

2.2 S-O-R and the conversion of sustainability cues into distributive consumption

The S-O-R framework proposes that environmental stimuli influence an internal organism state that subsequently shapes responses (Mehrabian and Russell, 1974). Tourism research has applied this logic to physical, informational and service cues, with green practices or green destination image acting as stimuli; perceived value, attitudes or engagement as organism states; and intentions or behaviours as responses (Vu et al., 2026; Zhang et al., 2026).

The present model changes the nature of the response. GTP represents the stimulus because visible resource-saving systems, waste practices, low-impact mobility, local sourcing, heritage/community support and responsible-tourism communication signal how the destination organises consumption. TE represents the organism state because it captures attention, enthusiasm, involvement and interaction. LSO represents a distributive consumption response because it concerns the orientation of purchasing toward local providers rather than only how the visitor evaluates the destination.

This extension also requires a qualification. Destination practices can alter both psychology and the structure of available choices. Local sourcing, provenance information, community partnerships and low-impact mobility may make local providers more visible, accessible or easier to evaluate even without a large change in engagement. A remaining GTP-LSO association after TE is introduced is therefore consistent with complementary non-engagement channels, but the present cross-sectional model cannot identify those channels directly.

The theoretical combination rests on three distinguishable claims. First, S–O–R supplies the ordering of the measured associations. Second, engagement theory specifies why attentive and interactive visitors may invest effort in searching for and evaluating unfamiliar local suppliers. Third, linkage–leakage research defines why provider choice has economic relevance while showing that purchasing locally is insufficient to prove full local retention. The contribution lies in placing these claims within one visitor-level model; it does not entail that the three literatures have previously tested the same pathway.

Table 1. Theoretical streams, established evidence and the unresolved research gap

Literature stream	What prior research chiefly explains	Unresolved point addressed here
Green tourism / hospitality	Green practices, evaluation, satisfaction and pro-environmental responses (Han et al., 2018; Merli et al., 2019; Kim et al., 2021).	Whether perceived practices relate to first-round spending allocation, not only favourable attitudes.
Tourist engagement / co-creation	Attention, involvement and participation as precursors of relational outcomes (So et al., 2014, 2016; Hien & Luu, 2026; Zhang et al., 2026).	Whether engagement is associated with choosing local providers and products.
Tourism linkages / leakage	Ownership, supplier networks, procurement and domestic/import leakage (Meyer, 2007; Lacher & Nepal, 2010; Srhoj & Mikulić, 2025).	A tourist-level antecedent to the allocation that precedes downstream retention.
Spending and provenance	Total spending segments, locally made products and incentive effects (Nickerson et al., 2016; Trang et al., 2025; Mundi, 2025).	An integrated GTP–TE–LSO specification with a distinct self-reported spending-share outcome.

Note. The table maps different outcome levels and avoids treating an association with local spending as evidence of an increase in net local income. Source: Author's synthesis of the cited literature.

2.3 Perceived green tourism practices and tourist engagement

Engagement requires salience. Visitors cannot devote attention, enthusiasm or behavioural effort to sustainability practices that remain invisible or unintelligible. Observable resource-saving systems, recycling facilities, low-impact transport, local-product information and community-linked activities can become experiential touchpoints that tourists notice, interpret, discuss and join.

This reasoning is consistent with green-hospitality evidence showing that water conservation, waste reduction and environmental commitment affect perceived value, participation, satisfaction and loyalty (Han et al., 2018; Merli et al., 2019). Kim et al. (2021) further show heterogeneity in pro-environmental responses to green accommodation practices, while recent S-O-R evidence confirms that visible green practices can activate internal visitor states (Vu et al., 2026). Engagement theory adds a more active implication: when sustainability is embedded in the experience rather than communicated as an abstract claim, it should attract attention and interaction (So et al., 2014, 2016; Zhang et al., 2026).

H1. Perceived green tourism practices are positively associated with tourist engagement.

2.4 Perceived green tourism practices and local spending orientation

Green tourism practices may influence locally oriented purchasing because they change both meaning and information. Local sourcing, heritage-based products, community partnerships and provenance communication make the local economic dimension of responsible tourism more visible. They can also reduce the search cost of distinguishing locally embedded options from standardised or externally owned alternatives.

Existing evidence supports components of this proposition. Sustainability-oriented tourists can be a higher-spending segment (Nickerson et al., 2016), although total spending does not identify who captures the expenditure. Mundi (2025) shows more directly that a sustainability intervention can increase local-business spending, and Trang et al. (2025) demonstrate willingness to pay for local production and traceability attributes in Vietnam. These studies imply that sustainability signals, provenance and expenditure allocation can be connected even though the integrated destination-level pathway has not been tested.

H2. Perceived green tourism practices are positively associated with local spending orientation.

2.5 Tourist engagement and local spending orientation

Engaged tourists devote more cognitive and behavioural effort to the destination. Attention increases the probability that provenance and ownership information is noticed; interaction exposes visitors to local guides, producers and neighbourhood businesses; involvement encourages exploration beyond familiar brands and platform defaults; and enthusiasm may increase willingness to try distinctive local products. These processes can reduce information frictions that disproportionately disadvantage small or unfamiliar local providers.

This argument extends engagement and value co-creation research from relational value toward distributive consumption. Sustainable-tourism studies show that interaction, knowledge sharing and participation help generate attitudes, co-creation and destination image (Hien and Luu, 2026; Zhang et al., 2026; Dang and Nguyen, 2026; Tran, 2026). The present model proposes that the same processes can affect the first-round destination of tourist expenditure.

H3. Tourist engagement is positively associated with local spending orientation after perceived green tourism practices are taken into account.

2.6 Indirect association and complementary channels

Combining the preceding arguments yields an indirect pathway in which perceived green practices are associated with stronger engagement, which is in turn associated with a stronger orientation toward local spending. This pathway captures behavioural conversion: sustainability cues become economically actionable because they stimulate attention, interaction and learning that can shape provider choice.

The direct GTP-LSO association need not disappear when engagement is included. Green practices may simultaneously alter the choice architecture by making local products more

available, local providers more visible and purchasing more convenient. A positive indirect association alongside a remaining direct association would therefore be consistent with complementary engagement and non-engagement pathways. Because the data are cross-sectional, the hypothesis is stated as an indirect association rather than a causal mediation effect.

H4. The indirect association between perceived green tourism practices and local spending orientation through tourist engagement is positive.

2.7 Construct boundaries, alternative explanations and the contribution claim

LSO represents an expressed propensity and behavioural orientation to allocate spending to local providers, not an observed causal transaction process. It differs from destination loyalty because visitors could favour the destination while making most purchases from non-local chains. It also differs from altruistic environmental concern because an environmentally engaged tourist may nonetheless select suppliers on convenience or price. Likewise, tourist engagement is not assumed to be synonymous with knowledge of local ownership: interest and interaction can plausibly enable local discovery, but the survey does not directly record information-search sequences or verified procurement decisions (So et al., 2014, 2016; Meyer, 2007).

The GTP scale includes local sourcing and community/heritage support alongside environmentally oriented practices. This provides substantive breadth but also creates a risk of conceptual proximity to the LSO construct. The empirical analysis therefore checks the same paths with a deliberately narrower GTP indicator composed only of resource saving, waste reduction, low-impact mobility and responsible-tourism communication. A surviving association is informative for scale robustness; it does not eliminate endogeneity, reverse causation or common-source measurement.

A plausible rival account is that tourists with pre-existing localist preferences selectively notice green messages, rather than being moved by those messages. Another is that income, length of stay, prior familiarity and cultural knowledge jointly influence perceptions, engagement and spending. The controls provide a limited assessment of measured compositional differences, but no cross-sectional specification can exclude unobserved preferences. Accordingly, H1–H4 concern conditional and indirect statistical associations, not experimentally identified causal effects.

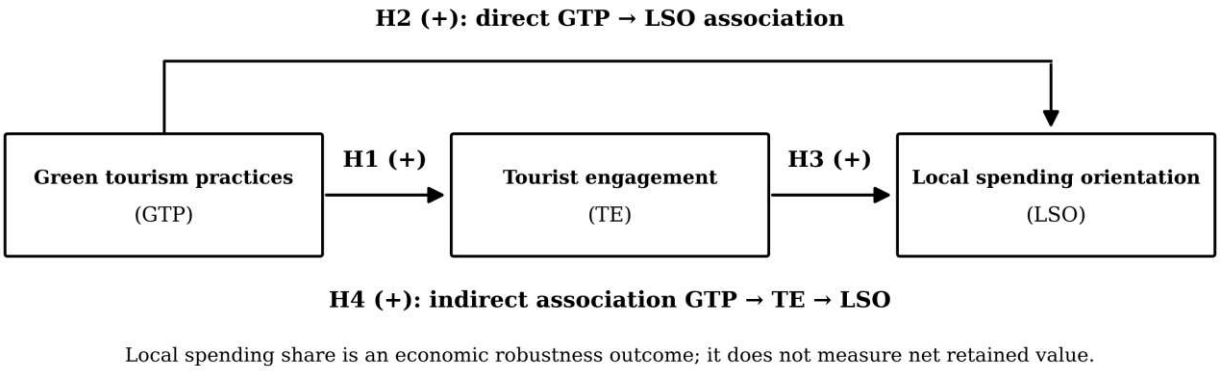


Figure 1. Conceptual model and hypotheses (H1–H4).

Note. H1–H3 are hypothesised direct associations; H4 denotes the modelled GTP → TE → LSO indirect association. Source: Author's conceptual development based on the cited theoretical and empirical studies.

3. Methodology

3.1 Study design, fieldwork and participant recruitment

This empirical study employed a cross-sectional survey of adult tourists in Hanoi between 15 March and 30 June 2026. The calendar window lasted 108 days; data collection was paused on 30 April–2 May to avoid atypical holiday-related crowding, yielding a planned 105 active fieldwork days (15 weeks). Fieldwork covered shoulder-season and early summer visitor periods. The individual tourist, rather than the travel party or business, was the unit of analysis. The final analytic data comprised 300 cases, with 16 focal seven-point indicators per respondent (18.75 cases per indicator).

A mixed-channel recruitment strategy combined online circulation and offline visitor intercepts. The online questionnaire was advertised through Hanoi-focused travel Facebook groups (including Du lịch Hà Nội and Hanoi Travel Tips), Zalo tourism communities, and TripAdvisor/Vietnam travel discussion forums. Trained research assistants also approached visitors at Hoan Kiem Lake, the Old Quarter, the Temple of Literature, the Ho Chi Minh Mausoleum and West Lake. At these sites, prospective participants completed the survey on a tablet or scanned a QR code to access it independently. The self-administered Google Forms questionnaire and tablet-based interface used the same item order and seven-point response scales; the fieldwork report describes mandatory-response logic. Reported median completion time was 8.5 minutes (interquartile range, 6.2–11.8 minutes).

The sample was non-probability convenience-based, with quotas used to manage observable composition rather than to achieve probabilistic representativeness. Recruitment targets were 75% domestic and 25% international visitors, and 60% first-time and 40% repeat visitors. The final data contained 24.3% international visitors and 42.0% repeat visitors, close to those targets. These proportions should be understood as design targets supplied by the research

team, not as proof that the realised sample represents Hanoi's tourist population. The authors did not apply population weights or calculate design-based population margins of error.

Eligibility was evaluated using four initial items. Respondents were asked (1) “Are you 18 years of age or older?”, (2) “Are you currently visiting Hanoi as a tourist (not a resident)?”, (3) “Have you used at least one paid tourism service (accommodation, tour, attraction ticket, or guided activity) during this trip?”, and (4) the instructional attention-check item, “Please select ‘Strongly agree’ for this statement.” Those failing the substantive eligibility requirements did not proceed to the principal questionnaire. The attention-check was subsequently also used in the response-quality audit. The final sample therefore describes adult non-resident visitors with paid tourism-service experience during the focal trip.

The fieldwork disposition record reports that 812 potential participants were approached offline or encountered the link online; 385 began the instrument and submitted at least a partial response, equivalent to 47.4% of that combined exposure denominator. Because an online link view is not the same as a unique eligible invitation, this figure is labelled an initial participation proportion rather than a standard survey response rate. The initial 385 records were screened sequentially: 12 suspected duplicate submissions were removed, leaving 373; eight records with more than 10% missing answers were removed, leaving 365; 32 failed the attention check, leaving 333; 18 showed identical responding over at least 15 consecutive focal items, leaving 315; and 15 finished in under three minutes, leaving 300. The final retained proportion among the 385 submitted records was 77.9%, while the final-case proportion relative to 812 approached or link-exposed individuals was 36.9%. These figures describe the study's recorded recruitment process; they are not estimates of the population response propensity. One procedural detail must be reconciled against the original uncleaned export: eight incomplete submissions were reportedly screened out even though mandatory-item completion logic was described for the survey interfaces. The available de-identified survey data does not establish how those incomplete records arose.

Participants were offered channel-specific, modest incentives. Online respondents were eligible for a draw for five vouchers worth VND 200,000 each; offline participants were offered a small Hanoi-themed postcard or hand fan. Incentives did not depend on the positivity, negativity or content of survey answers. The analysis dataset contains no email addresses or telephone numbers. Any contact details used to administer the draw must be managed as administrative data and kept distinct from the de-identified research dataset; the de-identification of the analytic file does not, by itself, establish that the original collection was fully anonymous.

Duplicate and response-quality controls were reportedly applied before preparation of the de-identified file. The online channel used the Google Forms “Limit to 1 response” account setting, while administrators compared submission timing, available lottery-contact information and suspiciously matching response profiles. In the supplied fieldwork description, IP comparison is additionally listed as a duplicate-control layer; however, standard Google Forms does not itself provide respondent IP addresses, so such a procedure would

require separately configured technical logs. Exact agreement across all 16 substantive indicators within a 30-second interval was treated as a review flag, not as conclusive evidence of an identical person. The team reports removing 12 duplicates and retaining the earliest complete eligible submission.

Additional quality screening used an instructed-response item, detection of long straight-line answer sequences (15 or more successive identical responses), a threshold of less than three minutes, reverse-coding consistency checks, and a multivariate Mahalanobis-distance screen at $p < .001$. The supplied disposition counts attribute 32 removals to failed attention checks, 18 to straight-lining and 15 to unusually rapid completion; the distance screen reportedly triggered no further deletions. The study administration summary mentions two reverse-scored items, but their exact item identifiers and pre-recoding values are not retained in the provided analytic survey data. Accordingly, the published coefficients are reproduced from the retained 16 analysis-scale items without applying a second, undocumented reversal.

The full disposition sequence was 812 approached or link-exposed → 385 initial records → 373 after duplicates → 365 after incomplete records → 333 after the attention check → 315 after straight-lining → 300 after the time screen. The supplied de-identified dataset has 300 unique respondent identifiers, no missing values in the recorded analysis variables and no duplicate IDs, which can be verified directly. The 812-to-300 recruitment figures, response durations, IP/contact matching and deletion reasons come from the fieldwork account provided by the author rather than columns in the final survey data; preserving the original uncleaned export and screening audit log is important for external reproducibility.

Table 2. Recruitment protocol, response screening and analytic sample disposition

Element	Documented procedure or figure
Fieldwork window	15 March–30 June 2026; paused 30 April–2 May (105 active days; 15 weeks)
Recruitment channels	Travel Facebook and Zalo groups, TripAdvisor/Vietnam forums; intercepts at five major Hanoi visitor sites
Questionnaire mode	Self-administered Google Forms and identical tablet/QR interface; seven-point scales
Sampling and quotas	Convenience sampling with target domestic/international = 75/25 and first-time/repeat = 60/40
Eligibility checks	Age ≥18, visitor/non-resident status, ≥1 paid tourism service, instructed-response check
Initial exposure and records	812 approached or link-exposed; 385 initial records (47.4% of exposure denominator)
Duplicate exclusions	12 removed using administrative/pattern/timing evidence; 373 remaining
Incomplete responses	8 removed for >10% missing answers; 365 remaining
Attention-check failures	32 removed; 333 remaining

Long straight-line patterns	18 removed (≥15 consecutive answers identical); 315 remaining
Unusually short duration	15 removed (<3 minutes); 300 remaining
Final usable sample	300 cases; 77.9% of 385 initial records; 36.9% of 812 exposures
Incentives	Online lottery: five vouchers of VND 200,000; offline: souvenir postcard or hand fan
Other quality checks	Reverse-coding consistency review and Mahalanobis distance at $p < .001$; no further removals reported

Note. The disposition counts and operational procedures reflect the author's survey fieldwork records. The final 300 complete, uniquely identified analytic records were cross-checked against the survey dataset. "Participation proportion" (385/812) and "final-case proportion" (300/812) use a heterogeneous offline-approach/online-link-exposure denominator, not a conventional probability-based response rate. Google Forms does not automatically export respondent IP addresses; any use of IP matching requires separate records. Source: Author's calculations based on the author's survey data (n = 300).

3.2 Constructs, item provenance and operationalisation

Each of the three focal variables is the arithmetic mean of its survey items, with higher values indicating greater agreement. GTP uses six items; TE uses five; and the third five-item outcome is labelled local spending orientation (LSO). The original variable codes for this outcome are named LEVC1–LEVC5 and LEVC_mean. The label was harmonised to LSO in the manuscript without changing any underlying responses or reassigning indicators. This naming decision is substantive rather than cosmetic: the indicators concern first-round locally oriented spending, not an accounting measure of value captured after leakage.

The constructs were informed by relevant literature rather than transcribed as exact validated scales. Han et al. (2018), Merli et al. (2019) and Kim et al. (2021) inform the scope of perceived green practices; So et al. (2014, 2016) ground the engagement domains; and Meyer (2007), Nickerson et al. (2016), Trang et al. (2025) and Srhoj and Mikulić (2025) motivate the locally oriented spending domains. Table 3 identifies the operational content and its conceptual provenance. Because the supplied material contains domain labels rather than exact respondent-facing question text, the manuscript does not falsely present these as verbatim scale items.

Table 3. Measurement indicators, conceptual domains and source provenance

Indicator	Measured domain	Conceptual sources
GTP1	Resource saving	Han et al. (2018); Merli et al. (2019)
GTP2	Waste reduction	Han et al. (2018); Merli et al. (2019)
GTP3	Low-impact mobility	Kim et al. (2021); Han et al. (2018)
GTP4	Local sourcing	Merli et al. (2019); Meyer (2007)
GTP5	Heritage and community support	Meyer (2007); Lacher and Nepal (2010)

GTP6	Responsible-tourism communication	Kim et al. (2021); Merli et al. (2019)
TE1	Interest	So et al. (2014, 2016)
TE2	Attention	So et al. (2014, 2016)
TE3	Enthusiasm	So et al. (2014, 2016)
TE4	Involvement	So et al. (2014, 2016)
TE5	Active interaction	So et al. (2014, 2016)
LSO1[1]	Locally owned services	Meyer (2007); Lacher and Nepal (2010)
LSO2[1]	Locally produced goods	Trang et al. (2025); Nickerson et al. (2016)
LSO3[1]	Local labour and inputs	Meyer (2007); Srhoj and Mikulić (2025)
LSO4[1]	Willingness to pay a modest local premium	Trang et al. (2025); Nickerson et al. (2016)
LSO5[1]	Perceived reach of local spending	Meyer (2007); Srhoj and Mikulić (2025)

Note. Domains are concise operational descriptions, not verbatim published or respondent-facing wording. [1]Columns LSO1–LSO5 are labelled LEVC1–LEVC5 in the original survey dataset, with values unchanged. All scale responses are 1–7. Source: Author's survey instrument and the original studies cited in the measurement table.

LocalSpendShare_pct is the self-reported percentage of trip expenditure allocated to locally owned or locally producing providers. It serves as an economic allocation robustness measure, not a destination income multiplier. LocalSpend_VND and total trip expenditure are recorded separately; the former is used only in a secondary log-local-expenditure sensitivity specification. The base controls are age, an indicator coded 1 for male and 0 otherwise, education as recorded in its original numeric categories, international visitor status, repeat visitation and nights in Hanoi. Four participants in the third gender category are included in the non-male reference group, consistent with the submitted models. Education is left as its recorded numeric category because a separate category codebook was not provided.

3.3 Statistical strategy and regression specifications

Measurement quality was assessed through Cronbach's alpha, the Kaiser–Meyer–Olkin statistic and Bartlett's test, followed by principal-axis factor analysis (PAF) with direct oblimin rotation. The oblique solution respects theoretical correlations among dimensions. Construct correlations describe bivariate associations; heteroscedasticity-consistent HC3 robust standard errors accompany ordinary least squares (OLS) models. Variance-inflation factors were used to screen the fitted regressions for collinearity. An exploratory single-factor diagnostic is presented only as a weak descriptive check, not as proof that common-method bias is absent (Podsakoff et al., 2003).

The regressions follow the conditional-association version of Hayes's (2022) PROCESS Model 4. Let X = GTP, M = TE, Y = LSO and C denote the six controls. With a and b defined in the mediator and joint-outcome equations, the fitted indirect association is a × b. Hypothesis H4 uses a 5,000-resample nonparametric percentile bootstrap (seed 20260226); an interval excluding zero indicates an indirect statistical association. The research design does not identify a causal mediated effect.

(1) $\mathbf{TE_i = \alpha_0 + aGTP_i + \gamma' C_i + \varepsilon_i}$

(2) $\mathbf{LSO_i = \beta_0 + c'GTP_i + bTE_i + \delta' C_i + u_i}$

(3) $\mathbf{LSO_i = \theta_0 + cGTP_i + \kappa' C_i + v_i}$

(4) $\mathbf{LocalSpendShare_i = \lambda_0 + \lambda_1 GTP_i + \lambda_2 TE_i + \eta' C_i + \xi_i}$

The same outcomes were re-estimated with party size and monthly income added, and a secondary regression used log reported local expenditure while controlling for log total trip expenditure. To examine whether the broad GTP operationalisation artificially exaggerates conceptual proximity to LSO, the four-item environmental/communication version of GTP (GTP1, GTP2, GTP3 and GTP6) was analysed with the unchanged controls. Cross-sectional data, convenience-type selection and self-reported constructs constrain generalisation and causal claims.

3.4 Data verification, documentation and ethics

The final analytic file was independently re-read; focal mean-score columns were audited against their 16 underlying item responses, and the supplied composite-score columns were retained for the reported models to reproduce the original regression specification. The survey dataset comprises 300 observations, 31 recorded variables and 300 distinct IDs and no missing analysis values. Re-estimated HC3 regressions reproduce the supplied four-decimal coefficients (differences are attributable to reporting precision). A 5,000-resample bootstrap with the documented random seed also reproduces the fitted indirect association and percentile confidence interval. The report's upstream exclusion and paradata counts are method disclosures from the research team and cannot be recalculated from this post-cleaning file alone. Likewise, because the survey dataset does not show original response keys or item reversal labels, a second reverse-scoring operation would not be statistically justified.

Ethical approval was obtained before fieldwork from the Economic Research Ethics Council, Banking Academy of Vietnam (Decision No. 4228/QĐ-HVNH, 26 February 2026), with approval granted by Associate Professor Dr Pham Thi Hoang Anh. Research procedures followed the approved protocol and applicable principles of voluntary participation, informed consent and confidentiality. Adult participants provided informed consent before the survey. The analysis file was de-identified. Because account-based response controls and prize-draw contact verification may have been used during recruitment, the study appropriately describes its data-handling safeguards as confidentiality and subsequent de-identification, rather than claiming absolute anonymity throughout collection. The full declaration appears under the separate heading "Ethical Approval and accordance".

4. Empirical results

4.1 Sample profile, reliability and discriminant diagnostics

The study includes 300 respondents (155 male, 141 female and four in another/prefer-not-to-say category), with a mean age of 33.36 years (SD = 9.21). International tourists comprised 24.3% and repeat visitors 42.0%; mean party size was 2.72 and mean duration 2.95 nights. Average total reported trip expenditure was approximately VND 4.02 million, and reported local spending averaged 57.65% of the total. These are descriptions of the realised non-probability sample, not population-wide estimates.

Table 4. Sample composition and survey-variable descriptives

Indicator	Value	Indicator	Value
Respondents	300	International visitors	73 (24.3%)
Male respondents	155 (51.7%)	Repeat visitors	126 (42.0%)
Female respondents	141 (47.0%)	Age, mean (SD)	33.36 (9.21)
Other / prefer not to say	4 (1.3%)	Party size, mean	2.72
Nights in Hanoi, mean	2.95	Trip spending, mean	VND 4.02 million
GTP, mean (SD)	4.443 (0.950)	TE, mean (SD)	4.425 (0.960)
LSO, mean (SD)	4.439 (0.960)	Local spending share, mean (SD)	57.652% (13.987)

Source: Author's calculations based on the author's survey data (n = 300).

Internal consistency was high for GTP (alpha=0.896), TE (alpha=0.882) and LSO (alpha=0.883). KMO was 0.939 and Bartlett's test was significant (chi-square(120)=2,722.17, $p<0.001$), indicating that the correlation structure was suitable for factor analysis. Principal-axis factor analysis with oblimin rotation reproduced the intended three-factor pattern, with primary pattern coefficients ranging from 0.582 to 0.877. The first unrotated component explained 47.09% of the variance; this figure is reported only as a limited common-method diagnostic.

At the construct level, GTP correlated with TE at r=0.558 and with LSO at r=0.545, while TE correlated with LSO at r=0.540. LocalSpendShare correlated with GTP (r=0.564), TE (r=0.529) and LSO (r=0.685), all $p<0.001$. The maximum VIF in the main LSO model was 1.57, providing no indication of problematic linear multicollinearity among the model predictors.

An item-level heterotrait–monotrait (HTMT) association ratio was additionally computed from the original 16 item responses, yielding 0.628 for GTP–TE, 0.612 for GTP–LSO and 0.613 for TE–LSO. Each lies below commonly used screening thresholds, which offers complementary evidence against extreme empirical redundancy. HTMT is a correlational

diagnostic rather than a substitute for confirmatory factor analysis, content-validity evidence or an experimentally identified distinction. The GTP local-sourcing items remain a theoretical limitation even when the empirical constructs are distinguishable.

Table 5. Measurement quality and relationships among constructs

Construct	Items	Mean (SD)	Cronbach α	Primary PAF loading
GTP	6	4.443 (0.950)	0.896	0.649–0.807
TE	5	4.425 (0.960)	0.882	0.582–0.877
LSO	5	4.439 (0.960)	0.883	0.694–0.851

Note. n = 300; KMO = 0.939; Bartlett $\chi^2(120) = 2{,}722.17$, $p < .001$. Principal-axis factor analysis with direct oblimin rotation. Source: Author's calculations based on the author's survey data (n = 300).

Table 6. Pearson correlations and item-based HTMT diagnostics

Construct	GTP	TE	LSO	Local share
GTP	1	0.558***	0.545***	0.564***
TE	0.558***	1	0.540***	0.529***
LSO	0.545***	0.540***	1	0.685***
Local share	0.564***	0.529***	0.685***	1
HTMT: GTP–TE	0.628	—	—	—
HTMT: GTP–LSO	0.612	—	—	—
HTMT: TE–LSO	0.613	—	—	—

*Note. n = 300; *** p < .001, two-sided. HTMT entries are shown separately below the correlation rows and were recalculated from the 16 raw-item columns. Source: Author's calculations based on the author's survey data (n = 300).*

4.2 Tests of H1–H4 and fitted regression equations

H1 was supported. GTP was positively associated with TE (B=0.5735, HC3 SE=0.0489, standardized beta=0.568, p<0.001), and the controlled model explained 32.6% of TE variance.

H2 was supported. In the total-association model, GTP was positively associated with LSO (B=0.5457, HC3 SE=0.0468, standardized beta=0.540, p<0.001; R-squared=0.338). After TE entered the model, the GTP coefficient remained positive (B=0.3324, HC3 SE=0.0508, standardized beta=0.329, p<0.001).

H3 was supported because TE remained positively associated with LSO after GTP and the control variables were included (B=0.3719, HC3 SE=0.0498, standardized beta=0.372, p<0.001). The joint LSO model explained 43.1% of the variance. Thus, GTP and TE each contributed unique statistical information about LSO in the fitted model.

H4 was supported as a statistical indirect association. The bootstrapped GTP -> TE -> LSO estimate was 0.2133 (boot SE=0.0338), with a 95% bootstrap confidence interval from 0.1501

to 0.2821. The direct GTP coefficient remained significant after TE was entered. The indirect component was approximately 39.1% of the total fitted GTP-LSO association; this proportion is reported descriptively and is not interpreted as a causal decomposition.

The final models were independently verified using the supplied composite-score columns, after cross-checking them against item-level averages. H1 yielded a = 0.5735 (HC3 SE = 0.0489); H2 yielded c = 0.5457 in the total-association model and c′ = 0.3324 after TE entered; H3 yielded b = 0.3719. Their product was a × b = 0.2133, with a reproduced bootstrap percentile interval [0.1501, 0.2821]. The fitted decomposition c ≈ c′ + ab holds up to numerical rounding. Adding engagement increased explained LSO variance from $R^2 = 0.338$ to 0.431, a descriptive gain of approximately 0.093; this does not establish causal mediation.

Table 7. Complete hypothesis assessment: every proposed path H1–H4

Hypothesis / path	Coefficient or indirect estimate	Uncertainty and test	Inference
H1: GTP → TE	B = 0.5735; β = 0.568	HC3 SE = 0.0489; p < .001	Supported; R^2 = 0.326
H2: GTP → LSO (total)	B = 0.5457; β = 0.540	HC3 SE = 0.0468; p < .001	Supported; R^2 = 0.338
H2: GTP → LSO | TE (direct)	B = 0.3324; β = 0.329	HC3 SE = 0.0508; p < .001	Positive; joint R^2 = 0.431
H3: TE → LSO | GTP	B = 0.3719; β = 0.372	HC3 SE = 0.0498; p < .001	Supported; joint R^2 = 0.431
H4: GTP → TE → LSO	a × b = 0.2133	Boot SE = 0.0338; 95% CI [0.1501, 0.2821]	Supported as an indirect association

Note. β denotes standardised coefficient; B denotes unstandardised coefficient. HC3 heteroscedasticity-robust SEs are used for individual paths; the percentile bootstrap (5,000 resamples, seed 20260226) evaluates H4. The indirect association is not causal. Source: Author's calculations based on the author's survey data (n = 300).

Table 8. Full covariate-adjusted OLS coefficients with HC3 standard errors

Predictor	Model 1: TE	Model 2: LSO total	Model 3: LSO joint
Constant	1.5725*** (0.3353)	1.9769*** (0.3433)	1.3921*** (0.3362)
GTP	0.5735*** (0.0489)	0.5457*** (0.0468)	0.3324*** (0.0508)
TE	—	—	0.3719*** (0.0498)
Age	0.0090 (0.0053)	-0.0068 (0.0052)	-0.0101* (0.0051)
Male	-0.0934 (0.0937)	-0.0139 (0.0940)	0.0208 (0.0869)
Education	-0.0041 (0.0626)	0.0531 (0.0532)	0.0546 (0.0522)
International visitor	0.1450 (0.1340)	-0.4131*** (0.1239)	-0.4671*** (0.1172)
Repeat visitor	-0.0116 (0.0962)	0.2224* (0.0939)	0.2267** (0.0859)

Nights in Hanoi	0.0119 (0.0370)	0.0433 (0.0348)	0.0389 (0.0326)
R^2	0.326	0.338	0.431
Adjusted R^2	0.310	0.322	0.415

*Note. n = 300. Cells are B (HC3 SE), *** p < .001, ** p < .01, * p < .05. Male = 1 for coded male. Model 1 tests H1, Model 2 tests H2 (total), Model 3 contains the direct H2 and H3 paths. Source: Author's calculations based on the author's survey data (n = 300).*

Substituting the estimated coefficients into the models gives the following fitted equations. The error terms are omitted from these prediction equations, while all six pre-specified controls are retained exactly as estimated:

$\widehat{TE}$ = 1.5725 + 0.5735(GTP) + 0.0090(Age) − 0.0934(Male) − 0.0041(Education) + 0.1450(International) − 0.0117(Repeat) + 0.0119(Nights).

$\widehat{LSO}$ = 1.9768 + 0.5457(GTP) − 0.0068(Age) − 0.0140(Male) + 0.0531(Education) − 0.4131(International) + 0.2223(Repeat) + 0.0433(Nights).

$\widehat{LSO}$ = 1.3920 + 0.3324(GTP) + 0.3719(TE) − 0.0101(Age) + 0.0208(Male) + 0.0546(Education) − 0.4670(International) + 0.2267(Repeat) + 0.0389(Nights).

For example, holding other regressors fixed, a one-point difference in GTP corresponds to an estimated 0.5735-point difference in TE. In the joint equation, a one-point higher TE corresponds to a 0.3719-point higher LSO at the same measured GTP and controls; this is conditional association, not evidence that a behavioural intervention would move LSO by exactly that amount.

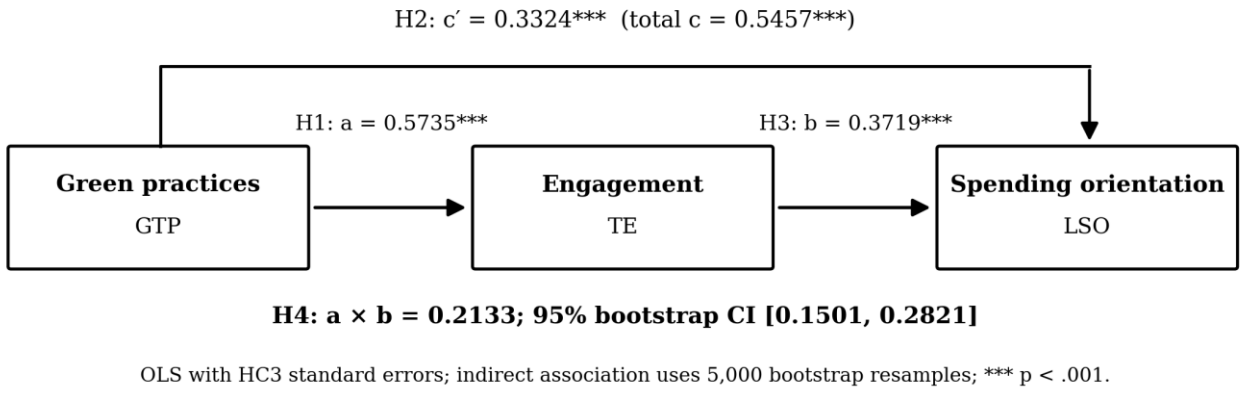


Figure 2. Empirically fitted model with all four hypotheses and verified estimates.

Note. H2 is shown as both its total (c) and TE-adjusted direct (c') association; H4 is computed as a × b. Coefficients are unstandardised. Source: Author's calculations based on the author's survey data (n = 300).

4.3 Economic outcome robustness and observed local-spending pattern

The principal robustness specification replaced LSO with LocalSpendShare. A one-point increase in GTP was associated with 5.6047 additional percentage points of reported local

spending (HC3 SE=0.8281, standardized beta=0.381, p<0.001), while TE was associated with 4.6198 additional percentage points (HC3 SE=0.7672, standardized beta=0.317, p<0.001). The model explained 39.5% of the variance. Adding party size and monthly income changed the focal coefficients only modestly.

In the secondary log-local-expenditure model, GTP (B=0.1078) and TE (B=0.0813) remained positive, both p<0.001, after trip-spending controls were included. The R-squared of 0.942 is not treated as evidence that the behavioural model itself explains nearly all local spending because total trip expenditure is a close determinant of the amount available to be spent locally. The relevant inference is the persistence and direction of the focal coefficients, not the absolute model fit.

Table 9. Economic robustness models: local-spending allocation and expenditure

Outcome / specification	GTP: B (HC3 SE)	TE: B (HC3 SE)	R^2
Local spending share (%)	5.6047 (0.8281)	4.6198 (0.7672)	0.3953
Local share + income, party size	5.6652 (0.8333)	4.5959 (0.7619)	0.4054
Log local expenditure + trip spending	0.1078 (0.0162)	0.0813 (0.0147)	0.9417

Note. Base models control for age, male, education, international status, repeat visitation and nights in Hanoi; model 2 additionally includes income and party size; model 3 also includes log total trip expenditure. All focal predictors p < .001. Log-local-spending R^2 is driven in part by the mechanical relationship with total spending and is not a causal effect size. Source: Author's calculations based on the author's survey data (n = 300).

The estimated percentage-share equation, including all six controls, is:

LocalSpendShare (%) = 12.2102 + 5.6047(GTP) + 4.6198(TE) − 0.0609(Age) − 1.2082(Male) + 0.4542(Education) − 2.6259(International) + 1.0531(Repeat) + 0.5650(Nights).

The dependent variable is measured in percentage points. Thus, conditional on measured TE and controls, a one-point difference in GTP corresponds to about 5.60 percentage points of reported local spending share. This is an association in a self-reported fraction, not an audited transfer of 5.60% more cash to local suppliers.

Table 10. Descriptive local spending share across GTP quartiles

Quartile	n	Observed GTP range	Mean share (%)	95% confidence interval
Q1	93	1.667–3.833	47.53	[45.06, 50.00]
Q2	72	4.000–4.500	57.52	[54.41, 60.64]
Q3	72	4.667–5.167	62.16	[59.70, 64.63]
Q4	63	5.333–6.833	67.58	[64.76, 70.40]

Note. GTP-score ties yield unequal group sizes. Error intervals are t-based 95% confidence intervals around group means, not adjusted model confidence intervals. Source: Author's calculations based on the author's survey data (n = 300).

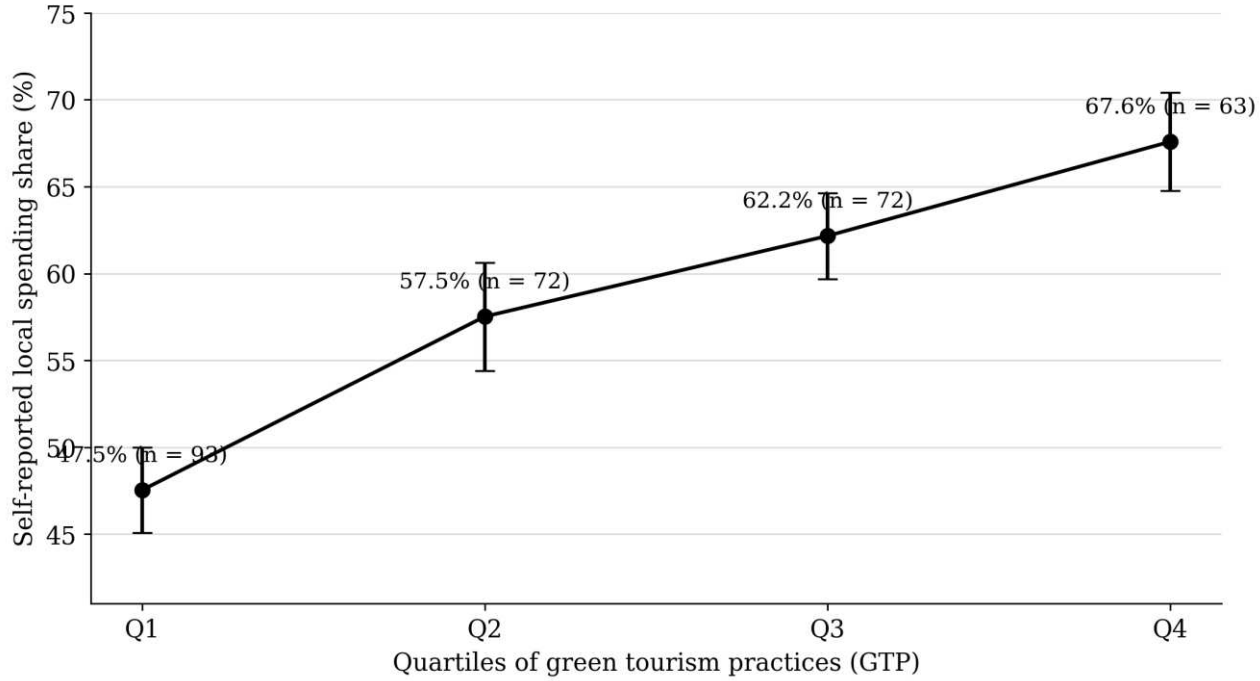


Figure 3. Local spending share by quartile of perceived green tourism practices.

Note. Error bars show unadjusted 95% confidence intervals. The monotonic pattern is descriptive and does not substitute for regression tests. Source: Author's calculations based on the author's survey data (n = 300).

4.4 Conceptual-overlap sensitivity analysis

To examine whether the inclusion of local sourcing (GTP4) and community/heritage support (GTP5) accounts for the observed associations, GTP was recalculated using only environmental/resource-related items GTP1, GTP2, GTP3 and GTP6. With the unchanged TE and six controls, the narrower GTP coefficient remained positive in the LSO model (B = 0.2845, HC3 SE = 0.0493, p < .001); the TE coefficient was B = 0.3955 (HC3 SE = 0.0497, p < .001), R^2 = 0.417. The corresponding local-spending-share model also yielded positive estimates for narrower GTP (B = 4.6379, HC3 SE = 0.8067, p < .001) and TE (B = 5.1038, HC3 SE = 0.7642, p < .001), R^2 = 0.371.

Table 11. Sensitivity to removing locally embedded GTP indicators

Outcome	Four-item GTP: B (SE)	TE: B (SE)	Model R^2
LSO	0.2845 (0.0493)	0.3955 (0.0497)	0.417
Local spending share (%)	4.6379 (0.8067)	5.1038 (0.7642)	0.371

Note. The GTP subscale uses GTP1, GTP2, GTP3 and GTP6 only. HC3 robust errors; all focal p < .001. Both models retain the six baseline controls. These analyses are newly re-estimated from the original item responses and are exploratory. Source: Author's calculations based on the author's survey data (n = 300).

The results weaken the simplest interpretation that only the inclusion of local-economic content in the GTP score generates the pattern, because associations remain after those two indicators are excluded. They do not, however, settle discriminant validity or direction of influence: the alternative four-item score is not a separately validated scale and respondent-specific pro-local preferences could still drive both perceptions and reported purchases.

5. Discussion and theoretical contributions

5.1 From green evaluation to spending allocation

The study begins from a different endpoint than much green-tourism research. The positive GTP-TE association is consistent with evidence that visible environmental practices activate favourable psychological responses (Han et al., 2018; Merli et al., 2019; Vu et al., 2026). The theoretical extension is that the fitted process does not stop at appraisal, loyalty or pro-environmental intention. GTP and TE are also associated with a local spending orientation and, critically, with respondents' reported share of expenditure directed to local providers.

This shift matters because sustainable-tourism benefits cannot be inferred from positive visitor sentiment alone. A tourist can value a green experience while purchasing through externally owned platforms or firms with weak local linkages. By moving the response from evaluation toward allocation, the study broadens S-O-R from a psychology-of-response framework toward a framework that can also speak to the distribution of visitor demand. The response remains behavioural rather than macroeconomic, but it lies closer to the point at which destination-development consequences begin.

Relative to the green-hospitality findings of Han et al. (2018) and Merli et al. (2019), which chiefly establish favourable guest reactions, the present result moves the endpoint to a locally oriented supplier-allocation construct. This is a theoretical shift in the dependent variable, not a claim that earlier studies were wrong or that this single destination sample demonstrates general economic growth. OECD (2026) offers a destination-policy rationale for measuring distributed benefits but cannot validate the micro-mechanism on its own.

5.2 Tourist engagement as a behavioural conversion mechanism

The most important mechanism result is that TE remains positively associated with LSO after GTP is controlled (standardized beta=0.372) and that the bootstrapped indirect GTP-TE-LSO association is positive. Engagement research has traditionally explained stronger consumer-brand relationships, participation or co-creation (So et al., 2014, 2016; Hien and Luu, 2026; Zhang et al., 2026). The current findings give engagement an additional distributive interpretation: it may help determine which providers receive the first round of visitor expenditure.

The mechanism is economically plausible because engagement changes information acquisition and search behaviour. Attention increases exposure to ownership and provenance information; interaction introduces tourists to local guides, producers and neighbourhood businesses; involvement encourages exploration beyond default choices; and enthusiasm can reduce reluctance to try unfamiliar local options. These processes do not guarantee local purchasing, but they make locally embedded consumption more actionable.

Importantly, the LocalSpendShare robustness result reduces dependence on the psychometric LSO construct by reproducing the same substantive pattern for a more concrete allocation measure. This triangulation strengthens the argument that the fitted mechanism concerns spending orientation rather than only a newly labelled attitudinal scale.

The increment in explanatory information when TE enters the controlled LSO regression (about 9.3 percentage points in R^2) suggests that engagement cannot be reduced to a proxy for perceiving more green practices. The indirect association is consistent with an attention–discovery–provider-choice account. What is new compared with So et al. (2014, 2016) is not the measurement of engagement itself; it is the proposed distributive response to which engagement is connected. Because information search and provider transactions were not observed directly, the proposed conversion sequence remains a mechanism hypothesis that future behavioural designs should adjudicate.

5.3 A demand-side microfoundation for tourism linkage and leakage

Linkage and leakage studies explain how ownership, procurement and supplier relationships determine the amount of tourism revenue retained locally (Meyer, 2007; Lacher and Nepal, 2010; Srhoj and Mikulić, 2025). The present study identifies the tourist's first-round provider allocation as an antecedent of those supply-side processes. A destination cannot retain value through local supply chains unless some tourist demand first reaches locally embedded providers.

This contribution is intentionally bounded. LocalSpendShare is not a destination multiplier and cannot identify upstream imports, profits remitted elsewhere or induced effects. The present model therefore adds to rather than substitutes for supply-chain analysis. It specifies a demand-side microfoundation that can later be linked to ownership, labour and procurement data to estimate actual retained value.

Meyer (2007) and Lacher and Nepal (2010) emphasise strengthening local supplier linkages after tourism activity develops. Srhoj and Mikulić (2025) caution that even domestic first-round transactions can embody imported inputs. The present model supplies an earlier behavioural input into that chain: which provider types the tourist reports choosing. Consequently, local spending share is meaningful but incomplete; it is a micro-allocation indicator rather than a calculation of local value added, profits retained or tourism multiplier effects.

5.4 Complementary engagement and non-engagement pathways

The persistence of a positive GTP coefficient after TE enters the LSO model is theoretically informative but must be interpreted cautiously. The result shows that engagement does not statistically exhaust the GTP-LSO association. It does not, by itself, identify a structural mechanism.

A plausible interpretation is that green practices influence local spending through at least two types of process. One is engagement-related: visible practices are associated with attention, involvement and interaction, which are associated with local spending orientation. Another may operate through information and choice architecture: local sourcing displays, provenance information, mobility systems or community partnerships can change the visibility, availability or convenience of local options. Future research should measure these channels directly rather than inferring them from the residual direct path.

The sensitivity model supplies a useful qualification to the complementary-channel interpretation. The principal associations persist when local sourcing and heritage/community support are omitted from the green-practices composite, so the pattern is not solely a mechanical product of those two indicator domains. Nevertheless, because the remaining direct coefficient reflects whatever measured and unmeasured factors are not carried through TE, it should not be labelled a proven "choice architecture effect" without direct measures of visibility, price, quality or local-provider access.

5.5 Boundary conditions and generalisability

The contribution is not novelty by location. Hanoi provides an urban destination setting in which visitors face a dense mix of local firms, chains, platforms and tourism services. The underlying mechanism should be more general: engagement can influence allocation only when local providers are identifiable, accessible and transaction-ready.

The control coefficients generate useful boundary-condition questions. International visitor status is negative in the full LSO model, while repeat visitation is positive. Because these effects were not hypothesised, they are exploratory. Their direction is nevertheless consistent with an information-friction explanation: repeat visitors may know local providers better, while international visitors may face language, payment, ownership-identification or platform-dependence barriers. Future studies should test local knowledge, digital information quality, authenticity, price sensitivity and payment convenience as moderators.

The model therefore suggests a mechanism-boundary-outcome architecture. The mechanism is behavioural conversion through engagement; the outcome is local spending orientation and reported local allocation; and the boundary is the structural opportunity to identify and purchase from locally embedded providers. This architecture integrates S-O-R, engagement theory and tourism linkage-leakage reasoning at a common visitor-decision point.

Differences between international and repeat visitors in the exploratory controls suggest testable boundary conditions rather than confirmatory conclusions. Specifically, local-provider knowledge, language access, digital payment acceptance and trip organisation may

condition whether attention can become action. A future multi-destination study could combine observed mobile search or receipt data with owner-provenance data to test whether improving those frictions narrows group differences and transfers benefits to locally embedded firms.

5.6 What is theoretically new—and what remains unproven

The study's first conceptual contribution is to disentangle three dependent-variable levels frequently conflated in tourism policy discussions: a consumer's local spending orientation, that consumer's reported local share of expenditure and the value ultimately retained in the destination economy. Its second contribution is a mechanism proposition that treats engagement not simply as an antecedent of loyalty or co-creation, but as potentially relevant to the first-round destination of tourist demand. Its third contribution is to place that proposition within a bounded S–O–R interpretation that allows direct and indirect associations while expressly resisting causal language. The observed consistency between attitudinal and reported monetary-allocation outcomes makes this combination empirically informative.

The literature cannot be characterised as having ignored spending entirely: Nickerson et al. (2016) study higher-spending sustainable tourists, Trang et al. (2025) examine locally produced goods and provenance, and Mundi (2025) demonstrates a financial-incentive relationship with local purchasing. The narrower contribution here is an integrated, visitor-level GTP–TE–LSO statistical pathway complemented by a local-share robustness indicator and a test that reduces overlap in the green-practices composite. Such claims are more defensible than declaring the first demonstration that green tourism supports local economies.

6. Policy and managerial implications

6.1 Evidence-based measurement of local value creation

Destination authorities and tourism observatories should supplement environmentally oriented indicators with spending-allocation indicators that can be traced to clearly defined provider categories. A green-certified destination may attract approving visitors without a proportional improvement in local commercial participation. A useful dashboard would separate survey-based local-spending orientation, reported local-spending share, the proportion of transactions made with verified local providers and supplier-level local purchasing. The indicators should be reported separately rather than combined into a single sustainability score, since each reflects a different stage of the economic process. Supplier ownership and procurement data would ultimately be required to estimate local retention in the sense used by Meyer (2007) and Srhoj and Mikulić (2025).

6.2 Converting sustainability information into credible local discovery

Tourism marketers and destination management organisations should design green communication as a transaction-relevant information system, not merely as a reputational campaign. Multilingual descriptions of local ownership, verifiable provenance labels, maps of neighbourhood businesses, short purchasing itineraries and clear online booking and payment

instructions can reduce the search costs faced by visitors. Trustworthiness is essential: externally owned firms should not be presented as locally owned on the basis of decorative heritage imagery, and suppliers should be given transparent eligibility criteria. The objective is to make environmentally responsible demand compatible with informed and frictionless local supplier choice.

6.3 Engagement experiences linked to actual purchase opportunities

Tourism operators can build engagement through producer-led demonstrations, community guide encounters, heritage workshops and carefully designed low-impact neighbourhood experiences, but management should evaluate whether these activities increase credible local-provider discovery and transactions rather than merely attendance or social-media reach. A testable operational funnel begins with exposure to a sustainability cue, continues through interest and interaction, and ends with a verified purchase or a documented decision not to purchase. This would allow managers to identify whether the bottleneck lies in message comprehension, consumer trust, product availability, price, language or payment convenience. Properly designed field experiments would also generate stronger causal evidence than the survey analysed here.

6.4 Supplier capability, inclusion and leakage reduction

A demand-side initiative will have limited distributive benefit if local firms are not discoverable, cannot meet reliability or quality requirements or are excluded from accommodation and tour procurement. Chambers, tourism associations, hotels and local government can develop validated supplier directories, low-cost digital payments, multilingual menus, quality assurance programmes and matchmaking between anchor firms and community enterprises. Supplier capacity building should include responsible input sourcing and transparent employment practices. This responds to the economic fact that an apparently local purchase may still leak value upstream through imports or ownership-related transfers; management therefore needs to connect demand conversion to firm-level linkages rather than assuming that one local transaction is the final development outcome.

6.5 Targeted accessibility and transparent evaluation

Policies should be designed and evaluated for tourists with different levels of local knowledge. International visitors may need information on legitimate local ownership and accepted payment methods, whereas first-time domestic tourists may require simpler neighbourhood discovery routes. Targeted services are justified as hypotheses derived from exploratory differences, not as established subgroup effects. Pilots should establish baselines and compare verified spending distributions across comparable groups or experimentally assigned information treatments, with consent-based data sharing, privacy safeguards and an explicit accounting boundary between first-round local spending and ultimate local value retained.

7. Limitations and future research

Several limitations define the boundary of the findings. First, the cross-sectional design does not establish temporal or causal ordering. Although PROCESS identifies a statistically non-zero indirect association, it cannot show that GTP caused TE or that TE subsequently caused local spending orientation. Reverse and reciprocal relationships are plausible. Longitudinal designs, field experiments and randomised information or choice-architecture interventions are needed to identify direction and causal mechanisms.

Second, the focal constructs and local spending share are self-reported. Common-source measurement can inflate associations through consistency motives, recall processes or response style. The exploratory three-factor pattern and moderate construct correlations are encouraging, but the one-factor diagnostic cannot rule out common-method bias. Future work should combine visitor surveys with receipts, transaction records, booking data or experimentally varied sustainability/provenance information.

Third, there is conceptual adjacency between GTP and local spending because the GTP bundle includes local sourcing and heritage/community support. The factor analysis separates the constructs empirically in this sample, but empirical separation does not eliminate conceptual overlap. Future scale development should distinguish a narrower environmental-practice measure from a broader sustainable-destination-practice measure.

Fourth, LocalSpendShare measures where respondents believe the first round of expenditure goes; it is not a measure of net retained value. A locally owned restaurant can purchase imported inputs, and a non-local firm can create local employment and procurement. Upstream leakage, ownership income and induced effects require firm-level and supply-chain evidence.

Fifth, the realised sample describes surveyed visitors in Hanoi during March–June 2026 and is not a probability estimate of the full visitor population. Replication across seasons, destinations and tourism types is needed. Potential moderators include environmental concern, green trust, authenticity, price sensitivity, local knowledge, trip purpose, digital information quality and perceived payment convenience.

Finally, the log-local-expenditure robustness model is strongly influenced by total trip expenditure, which is mechanically related to the amount available for local spending. Future studies should pre-register a clearer hierarchy of economic outcomes: local spending share for allocation, absolute local spending for scale, and supplier-adjusted retained value for destination impact.

Although the author has now supplied the sample-disposition and fieldwork protocol, the raw screening log, session timing exports, prize-draw administration records and any IP metadata are not included in the de-identified analytical file. As a result, those recruitment and deletion counts could not be independently re-audited from the 300 retained rows. The link-exposure denominator combines online views with offline approaches and should not be interpreted as a standard survey response rate. Also, the reference to two reverse-worded items requires cross-checking against the actual questionnaire coding key, because only post-processing item

values were made available. These are reporting and replicability boundaries, not grounds to alter the regression estimates or invent additional observations.

The scale items were conceptually adapted and the file labels for the outcome differ from the final manuscript label. Although Cronbach's alpha, PAF and exploratory HTMT results are reassuring, future studies should publish exact item wording, translation/back-translation evidence where relevant and confirmatory factor analyses on a fresh sample. The narrower GTP sensitivity test helps address overlap but does not replace an independent validation of narrowly environmental practice perceptions versus broader local-community sustainability.

8. Conclusion

This study argues that the next step in sustainable-tourism research is not simply to demonstrate that visitors like or notice green practices, but to explain when those practices become economically consequential for host destinations. In the Hanoi sample, perceived green tourism practices are positively associated with tourist engagement and with a local spending orientation. Engagement contributes explanatory information beyond green practices, the fitted indirect association is positive, and the same substantive pattern appears for respondents' reported local spending share.

The theoretical implication is a shift from evaluation to allocation. Tourist engagement can be understood as a behavioural conversion mechanism through which sustainability cues stimulate search, interaction, provenance learning and trust - processes associated with where tourists direct expenditure. The remaining GTP association indicates that engagement does not statistically exhaust the relationship and motivates direct measurement of complementary informational and choice-architecture channels.

The study therefore offers a demand-side microfoundation for local value retention while maintaining a strict boundary around what the data establish. It does not estimate a destination multiplier and does not establish causal mediation. Its contribution is to connect tourist psychology with the economic geography of consumption and to show why sustainability, tourist engagement and local supply capability should be studied as a linked system.

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Author contributions (CRediT)

Thanh Binh Nguyen: Conceptualization; Methodology; Investigation; Data curation; Formal analysis; Visualization; Writing – original draft; Writing – review and editing; Project administration.

Statements and declarations

Ethical Approval and accordance

The research protocol involving adult tourist survey participants was approved before data collection by the Economic Research Ethics Council, Banking Academy of Vietnam (Decision No. 4228/QĐ-HVNH, dated 26 February 2026). The approval was granted by Associate Professor Dr Pham Thi Hoang Anh. The research was conducted in accordance with the protocol approved by the named ethics council and the principles of voluntary participation, prior informed consent, privacy protection and confidentiality, consistent with the relevant ethical principles of the Declaration of Helsinki as applicable to minimal-risk social-science survey research. Participants were eligible only if aged 18 years or older, were informed about the voluntary nature of their participation, and provided informed consent before completing the questionnaire. The analysis used a de-identified dataset; separately collected administrative information for prize-draw verification was not included in the analysis file.

***Informed consent to participate*.** Participation was voluntary; informed consent was obtained before survey completion. The analytical data were de-identified.

Consent for publication. Not applicable; the article contains no identifiable participant information, images or videos.

***Competing interests*.** The author declares no competing interests.

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***Data availability*.** De-identified survey data may be made available by the corresponding author on reasonable request, subject to institutional and ethical restrictions.

References

Dang, T.-D., & Nguyen, M.-T. (2026). AI-driven analysis of tourist value co-creation practices in green tourism ecosystems: A case study of Mekong Delta tours. *Consumer Behavior in Tourism and Hospitality, 21*(3), 353–369. https://doi.org/10.1108/CBTH-08-2024-0276

Faber, B., & Gaubert, C. (2019). Tourism and economic development: Evidence from Mexico's coastline. *American Economic Review, 109*(6), 2245–2293. https://doi.org/10.1257/aer.20161434

Han, H., Lee, J. S., Trang, H. L. T., & Kim, W. (2018). Water conservation and waste reduction management for increasing guest loyalty and green hotel practices. *International Journal of Hospitality Management, 75*, 58–66. https://doi.org/10.1016/j.ijhm.2018.03.012

Hayes, A. F. (2022). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (3rd ed.). Guilford Press.

Hien, N. N., & Luu, D. X. (2026). The impact of sustainable tourism experiential value on customer value co-creation behavior. *Tourism and Hospitality Research* (advance online publication). https://doi.org/10.1177/14673584261415611

Kim, A., Kim, K. P., & Nguyen, T. H. D. (2021). The green accommodation management practices: The role of environmentally responsible tourist markets in understanding tourists' pro-environmental behaviour. *Sustainability, 13*(4), 2326. https://doi.org/10.3390/su13042326

Lacher, R. G., & Nepal, S. K. (2010). From leakages to linkages: Local-level strategies for capturing tourism revenue in Northern Thailand. *Tourism Geographies, 12*(1), 77–99. https://doi.org/10.1080/14616680903493654

Mehrabian, A., & Russell, J. A. (1974). *An approach to environmental psychology*. MIT Press.

Merli, R., Preziosi, M., Acampora, A., & Ali, F. (2019). Why should hotels go green? Insights from guests experience in green hotels. *International Journal of Hospitality Management, 81*, 169–179. https://doi.org/10.1016/j.ijhm.2019.04.022

Meyer, D. (2007). Pro-poor tourism: From leakages to linkages. A conceptual framework for creating linkages between the accommodation sector and poor neighbouring communities. *Current Issues in Tourism, 10*(6), 558–583. https://doi.org/10.2167/cit313.0

Mundi, H. S. (2025). Financial incentives and tourist motivation: Understanding drivers of sustainable tourism. *Tourism Management Perspectives, 58*, 101403. https://doi.org/10.1016/j.tmp.2025.101403

Nickerson, N. P., Jorgenson, J., & Boley, B. B. (2016). Are sustainable tourists a higher spending market? *Tourism Management, 54*, 170–177. https://doi.org/10.1016/j.tourman.2015.11.009

OECD. (2026). *OECD tourism trends and policies 2026*. OECD Publishing. https://doi.org/10.1787/3fd3cd75-en

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

Sandbrook, C. G. (2010). Putting leakage in its place: The significance of retained tourism revenue in the local context in rural Uganda. *Journal of International Development, 22*(1), 124–136. https://doi.org/10.1002/jid.1507

So, K. K. F., King, C., & Sparks, B. (2014). Customer engagement with tourism brands: Scale development and validation. *Journal of Hospitality & Tourism Research, 38*(3), 304–329. https://doi.org/10.1177/1096348012451456

So, K. K. F., King, C., Sparks, B. A., & Wang, Y. (2016). The role of customer engagement in building consumer loyalty to tourism brands. *Journal of Travel Research, 55*(1), 64–78. https://doi.org/10.1177/0047287514541008

Srhoj, S., & Mikulić, J. (2025). The hidden geography of tourism firm spending: Tracking economic leakages with firm-to-firm transactions. *Annals of Tourism Research, 112*, 103933. https://doi.org/10.1016/j.annals.2025.103933

Tran, T. (2026). Co-creation for sustainable tourism: A conceptual framework and pathways to the United Nations Sustainable Development Goals. *Sustainable Development, 34*(3), 3845–3864. https://doi.org/10.1002/sd.70565

Trang, N. T., Kopp, S. W., & Tu, V. H. (2025). Sustainable development of local livelihoods in Vietnam: A demand-driven approach through One Commune, One Product. *Sustainable Development, 33*(1), 270–286. https://doi.org/10.1002/sd.3118

Vu, T. D., Vu, P. T., & Ngo, T. S. (2026). Green practices in the hospitality industry: Driving sustainable behavior and revisit intention. *SAGE Open, 16*(3). https://doi.org/10.1177/21582440261488103

Zhang, Y., Rehman, A. U., Nawal, A., Ullah, I., & Azman, N. B. (2026). From experience to image: How ecotourism experiences shape destination image through tourist engagement and value co-creation. *Acta Psychologica, 263*, 106292. https://doi.org/10.1016/j.actpsy.2026.106292

Appendix A. Item-level exploratory factor evidence

The pattern coefficients below are reproduced from the submitted principal-axis factor analysis; they are reported as factor-pattern coefficients rather than confirmatory measurement loadings. The original data contain the underlying response items, and the factor signs were oriented to give positive primary coefficients.

Table A1. Principal-axis factor pattern: 16 item indicators

Item	Operational domain	GTP	TE	LSO	h^2
GTP1	Resource saving	0.807	0.005	0.014	0.670
GTP2	Waste reduction	0.786	−0.044	0.003	0.581
GTP3	Low-impact mobility	0.753	0.036	−0.006	0.593
GTP4	Local sourcing	0.787	−0.043	0.044	0.623
GTP5	Community support	0.649	0.030	0.058	0.496
GTP6	Responsible communication	0.773	0.068	−0.071	0.599
TE1	Interest	−0.050	0.877	−0.022	0.699
TE2	Attention	−0.026	0.782	0.027	0.612
TE3	Enthusiasm	0.024	0.742	−0.009	0.565

TE4	Involvement	0.074	0.741	0.011	0.629
TE5	Interaction	0.127	0.582	0.101	0.534
LSO1	Locally owned services	0.028	−0.049	0.851	0.706
LSO2	Local products	−0.015	−0.018	0.832	0.662
LSO3	Local labour / inputs	−0.023	0.082	0.695	0.534
LSO4	Local-value premium	−0.027	0.060	0.754	0.598
LSO5	Local spending reach	0.054	0.003	0.694	0.531

Note. Principal-axis factor analysis with oblimin rotation; h^2 = communality. KMO = 0.939; Bartlett $\chi^2(120) = 2{,}722.17$, $p < .001$. Source: Author's survey data (n = 300); principal-axis factor analysis.