

RESEARCH ARTICLE

Nudging toward cleaner trails: A conceptual framework to engage tourists towards responsible waste disposal

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ABSTRACT

Tourism is a significant contributor to economies. However, it also elevates environmental pressure through improper waste disposal. While policymakers often use regulations, penalties, and general awareness campaigns to spur this behavior change, such approaches often achieve only small or ephemeral change in waste-related behavior. To address this void, the contribution of this conceptual paper is extending nudging theory into tourism waste management with a multi-nudge framework designed to inspire proper disposal. Integrating behavioral economics, sustainability studies, and studies on tourism, the framework identifies psychological engagement with sustainability as the key mechanism for how nudges (e.g., enhanced salience, default options, social-norm cues, verbal prompts and contextual changes) shape waste-related behavior. The paper also suggests that destination social responsibility campaigns and tourists' concern with climate change can reinforce the impact of these nudges, and differences between tourists (e.g., domestic versus international travelers, or divergent perceptions of the self) may condition how individuals react to various framing strategies. In this work, we extend nudging theory from the consumption-based to environmental based perspective and introduce psychological engagement as a mediating process with potential to create segmentation-responsive boundary conditions. The framework provides practical recommendations to destination managers and policy makers for low-cost and flexible options for the provision of choice environments that contribute to making the correct disposal process more intuitive and socially sanctioned, as well as enhancing broader practices in destination social responsibility.

ARTICLE HISTORY

Received 26 August 2025
Revised 15 Sept. 2025
Accepted 15 Nov. 2025

SUBJECTS

Sustainable Tourism;
Tourism Management;
Environmental
Management;
Consumer/Tourist
Behavior

KEYWORDS

Nudging theory; responsible waste disposal; sustainable tourism; destination social responsibility; customer engagement

To cite this article: Rasool, A. (2025). Nudging toward cleaner trails: A conceptual framework to engage tourists towards responsible waste disposal. *International Journal of Sustainable Business*, 1(1), 16-30.

https://www.cud.ac.ae/research/journals/international-journal-of-sustainable-business?tab=published_papers

1. Introduction

Tourism offers undeniable economic and sociocultural benefits but also promotes environmental degradation by littering and poor waste practices in common areas of use, like trails, lakeshores, and scenic corridors (Hu et al., 2025). This tension is especially pronounced in Kashmir, an Indian state (Gulmarg, Pahalgam, Sonamarg, Dal Lake), whose sensitive alpine and riparian ecosystems are under increasing visitor pressure, and whose rules, fines, and generic awareness campaigns have yielded limited, non-durable behavior change. Within a context of pressing climate imperatives, there is an urgent call for cost-effective, context-sensitive behavioral interventions that make environmental stewardship intuitive - routine versus effortful and rare (Violos et al., 2025). Behavioral science and nudging, in particular, provide a path to that. Nudge strategies, strategies for deliberately

altering choice architecture which aim to steer behavior without limiting options, have been effective in different domains of sustainability including food and retail, mobility and travel (Gruchmann et al., 2025; Adolfsson et al., 2024). In the context of groceries, multi-level social norm cues and reminders may increase purchases in favour of plant-forward, but their effects vary depending on context and store-level testing is required (Saleem et al., 2025). For instance, message-based nudges enhance preferences and willingness to pay for low carbon destinations in tourism, which is shown to be most effective among the groups reporting higher climate-change perceptions (Song et al., 2024). At the destination level, destination social responsibility (DSR) and climate perceptions drive visitors' pro-sustainable behavior and willingness to sacrifice (Olya et al., 2024) thus indicating the importance of contextualizing nudges in prominent stewardship behaviors.

Despite these advances, three interlocking gaps remain. First, while nudging is well-studied in health, finance, and consumer food systems, where demand-side interventions are increasingly viewed as essential complements to supply-side policy (Grant et al., 2025; Polzin et al., 2023), its systematic application to tourist responsible waste disposal (RWD) is sparse, especially in ecologically fragile destinations. This omission persists even as consumer-side actions are recognized as material levers for environmental impact across domains (e.g., food systems where up to 60% of global GHGs link to household consumption; Stewart et al., 2023). Second, literature typically evaluates single nudges in isolation; we lack an integrated account of how multiple nudge types (social norms, salience, defaults, commitment/pledges, informational/verbal prompts, and option-set context effects) operate together through psychological engagement with sustainability to yield durable RWD. Third, heterogeneity is under-theorized: we have limited understanding of how tourist type (domestic vs. international), cultural orientation/self-construal, and destination-level stewardship signals (e.g., DSR; climate information) moderate nudge effectiveness in the field (Song et al., 2024; Olya et al., 2024; Bharti & Suneja, 2025).

This conceptual paper addresses these gaps by proposing a multi-nudge framework for RWD in tourism. We theorize that targeted nudges, calibrated to place and audience, enhance psychological engagement with sustainability (attention, involvement, internalization), which in turn should improve sorting accuracy, bin use, and litter reduction (Thaler & Sunstein, 2008; Reisch, 2021). We further propose that DSR and climate-change perceptions amplify nudge effects, while tourist heterogeneity (type and self-construal) conditions responsiveness to message framing (user- vs. environmental-benefit) and to context effects in choice sets (Roozen et al., 2021; Bharti & Suneja, 2024; Olya et al., 2024; Song et al., 2024).

Our conceptual contributions are fourfold. (1) Theory extension: We extend nudging theory into tourist waste behavior (Roozen et al., 2021; Bharti & Suneja, 2024). (2) Boundary conditions: We integrate DSR and climate perceptions as destination- and individual-level amplifiers, aligning micro-design with macro-stewardship (Olya et al., 2024; Song et al., 2024). (3) Heterogeneity-aware design: We specify segment-by-treatment guidance (e.g., environmental-benefit frames for interdependent/collectivist audiences; user-benefit frames for independent orientations), answering calls to tailor demand-side interventions to audience psychology (Bharti & Suneja, 2024; Reisch, 2021). (4) Practice and policy (conceptual translation): We convert prior insights into trail-side choice-architecture principles (salient bin arrays; descriptive/injunctive norm copy; shaped openings as defaults; light-touch pledges) and suggest how future studies could

empirically test these ideas (e.g., A/B field trials of litter incidence, bin usage, contamination rates).

The remainder of the paper conceptually develops the framework and derives propositions, concluding with a future research agenda to guide empirical validation in subsequent work.

2 Nudging theory as a theoretical background

2.1. Foundations of nudging theory

The concept of nudging, rooted in behavioral economics, emerged as a response to the limitations of classical rational choice theory. Individuals do not always act as utility-maximizing agents; instead, their decisions are shaped by bounded rationality, heuristics, cognitive biases, and contextual cues (Kahneman, 2011). Nudging, as defined by Thaler and Sunstein (2008, p. 6), refers to “any aspect of the choice architecture that alters people’s behavior in a predictable way without forbidding any options or significantly changing their economic incentives.” The central principle is that small, well-designed changes in the decision environment can steer individuals toward more desirable outcomes while maintaining their freedom of choice, a philosophy often described as libertarian paternalism (Sunstein, 2015).

Choice architecture – the design of the environment that drives one’s choice – has established itself as the foundation of nudging theory. A variety of interventions come under this umbrella, such as defaults, reminders, warnings, social norm messaging, and salience-enhancing cues (Hummel & Maedche, 2019; Kallbekken & Sælen, 2013). All of them use decision-making tendencies to make desirable behaviors more intuitive, convenient, and socially endorsed. Color-coded bins, for example, can be used for greater salience in waste disposal where descriptive social norms work by signaling what others typically do if they are to comply (Goldstein et al., 2008). In recent years, the scope of nudging has broadened and has also involved context effects such as the compromise effect and asymmetric dominance, which change the structure of the available options (Bharti & Suneja, 2024). Such mechanisms illustrate the adaptability of nudging to overcome behavioral challenges and the flexibility of nudging in different settings.

2.2. Applications in sustainability

In recent years nudging has become progressively used in sustainability research and policy, especially with the general realization by scholars and policymakers that supply-side approaches alone are not enough for the climate crisis (Creutzig et al., 2023). The Intergovernmental Panel on Climate Change (IPCC, 2018) highlights that this ambitious 1.5°C target will necessitate substantial demand-side changes to consumption patterns, and specifically, mobility, housing, food and tourism. Household consumption is associated with as much as 60 percent of global greenhouse gas emissions, the largest consumption share being in mobility, housing, and food (Ivanova et al., 2016). Given structural barriers to alleviating emissions in mobility and housing, behavioural interventions in food and tourism are considered as potential levers to facilitate change (Ivanova & Büchs, 2022). There is an increasing empirical data demonstrating the possibility of nudging to foster sustainability. Among food systems, food in-store nudges with the use of the social-norm message in the shopping cart/bag has been found to promote fruit and vegetable purchases, but the results demonstrate that the context is important and should be

carefully considered in design (Bauer et al., 2022). Within hotel settings, menu framing and default vegetarian offerings are the type of interventions that can incentivize behaviour in favour of plant-based meals (Saulais et al., 2019). Furthermore, in the fashion sector, nudges show verbal cues can induce better sustainable clothing purchases and purchasing behavior, compared to those seen directly from the consumer's perspective (Roozen et al., 2021). Nudging messages have been demonstrated in the tourism industry to generate preferences for low-carbon destinations and support of carbon offset projects, with effectiveness being influenced by individual attitudes towards climate change (Song et al., 2024). These applications highlight the potential of nudges to alter routine behaviours that, in aggregate, have a significant impact on environmental outcomes (Lehner et al., 2017; Czajkowski et al., 2019). These studies are important for highlighting the fact that the success of nudges relies heavily on context. What does work in one context may not translate well to a different context, due to differences in cultural orientations, consumer motivations and situational cues (Balakrishnan et al., 2025; Reisch et al., 2017). Further, nudges usually succeed best when they are associated with other types of signals of institutional responsibility, such as credible institutional or destination-based sustainability practices (Olya et al., 2024). Therefore, nudging is not a silver bullet, but a value-adding, multi-scale, and flexible approach that can supplement traditional regulatory and informational strategies along sustainability transitions. Basing on previous uses of nudging theory on sustainability, a few investigations have used the framework of nudging to study pro-environmental acts (Hummel & Maedche, 2019; Reisch, 2021). For instance, Bauer et al. (2022) and Saulais et al. (2019) showed that a combination of salience, defaults and social-norm cues significantly enhanced sustainable food and hospitality choices, suggesting the synergy of multi-level nudges in enhancing the choices of consumers. Song et al. (2024) generalized this framework to tourism, providing evidence that nudges using messages enhanced tourists' preferences for low-carbon destinations in particular according to high climate-change concern. Similarly, Roozen et al. (2021) identified verbal prompts as more effective than visual cues for consumers in promoting their purchases of sustainable fashion, demonstrating that communication modality is significant for nudging design. Relatedly, Olya et al. (2024) emphasized that behavioral interventions have greater impact when accompanied by credible destination social responsibility practices, while Bharti and Suneja (2025) cited context effects like compromise and asymmetric dominance as mechanisms that can be instrumental in shaping green choices. Although these studies support the effectiveness of multi-nudge mechanisms as effective for inducing sustainable behaviour, they mostly concentrate on the consumption and travel choice settings. This study adds to the literature by applying nudging theory to an under-explored domain of responsible waste disposal in tourism, by combining multiple nudges with sustainability. In addition, it adds destination social responsibility and climate-change concern as heightened boundary conditions and tourist heterogeneity as a moderating variable, thus widening the explanatory range of prior nudging frameworks to other behavioral and contextual frontiers.

2.3. Relevance for tourism waste behavior

Relevance on tourism waste behaviour. Although nudging has been investigated extensively in a variety of areas of everyday decision making such as food consumption, energy and behavior of travel, and also on mobility choices in general, there is limited research focus on its use for guiding travel waste behavior in tourism sector (Obersteiner

et al., 2021). There exists a clear gap as a result of improper waste disposal is often the most striking and well-known in tourism destinations where sustainable practices are still lacking (Živoder, 2024). In environmentally vulnerable areas, such as Kashmir, rising amount of tourist generated litter and waste, in terms of natural ecosystems are not only disrupting natural environments when disturbed, but also disturb the aesthetic and long-term ecology of a place (Skiniti et al., 2024). Due to easy-to-use, social and non-consequence factors in waste disposal behavior, this area was one where there was evidence of the possible value of the nudging-based interventions (Ceschi et al., 2021). Nudging holds several theoretical benefits for promoting more sustainable waste disposal among visitors. From a more micro dimension, it allows for subtle environmental redesign, so that the environmentally preferable form of disposal is easier to see and adopt (i.e. bin placement, simplified sorting defaults; see Harder et al., 2017). It can also foster descriptive and injunctive social norms by signaling how other visitors behave; that is, help normalize an environment of responsible disposal, as a consequence (Goldstein et al., 2008). Beyond that, nudging theory accounts for differences in tourist characteristics because it recognizes (Yachin et al., 2024), both domestic and international visitors and individuals with other cultural backgrounds, in the particular forms of behavior, to respond to particular kinds of framing can manifest differently to certain strategies of being framed. Research in consumer behavior has indicated that those with collectivist or interdependent orientations tend to be better able to respond to messages that prioritize shared environmental benefits; on the other hand, those with individualist or independent orientations are more susceptible to frames which stress on personal convenience, pride or hygiene (Bharti & Suneja, 2024). Nudges are expected to have more positive impact when incorporated into a destination context of shared environmental responsibility. When tourists perceive the destination as truly concerned with social and environmental responsibility, they are more likely to comply, underlining the extent to which individual behavior reflects institutional cues (Olya et al., 2024). Therefore, nudges for tourism waste management provide an alternative model for an integrated governance strategy that bridges behavioral design with sustainable practices that can be accepted and understood. In this way, the extension of nudging theory into the domain of responsible waste disposal provides a particularly suitable theoretical lens within which to approach one of the most persistent ecological problems in the tourism sector (Pragha & Dhalmahapatra, 2025). In its ability to identify cost-effective, scalable, and psychologically informed interventions, it provides a practical complementary framework for traditional regulatory and pedagogical frameworks in sustainable destination management (Balakrishnan et al., 2025).

3. Conceptual model

Building on the theoretical foundations of nudging and its applications in sustainability and tourism, this section develops a set of conceptual propositions. These propositions are grounded in prior research across consumer behavior, tourism management, and environmental psychology, and are tailored to the context of RWD in ecologically sensitive destinations. By synthesizing insights from studies on social norms, salience, defaults, verbal versus visual prompts, context effects, and destination-level stewardship, we outline how nudges can operate through psychological engagement with sustainability to shape tourist behavior. The propositions that follow offer a structured

framework for understanding the mechanisms, amplifiers, and boundary conditions that influence the effectiveness of nudges in tourism waste management.

3.1. Multi-nudge choice architecture and psychological engagement

RWD in tourism contexts can be significantly improved when multiple nudges operate together to reshape the choice environment (Yi et al., 2025). Drawing on evidence from behavioral economics, we argue that salience cues, descriptive and injunctive norms, simplifying defaults, verbal prompts, and context effects such as compromise and asymmetric dominance jointly enhance psychological engagement with sustainability, which in turn drives responsible behavior (Yachin et al., 2024). Field experiments in consumer and retail settings demonstrate that multi-layered nudges generate reliable behavioral lifts by simultaneously capturing attention, simplifying decisions, and normalizing desirable conduct (Hummel & Maedche, 2019; Song et al., 2024). Within tourism, message-based nudges have increased preferences for low-carbon destinations, particularly among individuals holding stronger climate-change perceptions (Song et al., 2024). Similarly, the form of the nudge matters: verbal cues are often more effective than visual prompts in shaping sustainable fashion choices, suggesting that short, action-oriented text at bin sites may be more persuasive than icons alone (Roozen et al., 2021). Accordingly, we propose the below:

P1: A multi-nudge choice architecture (salience, norms, defaults, verbal prompts, and context effects) will enhance psychological engagement with sustainability, which in turn will increase responsible waste disposal among tourists.

3.2. Salience and frequency of normative prompts

One of the most influential mechanisms shaping human behavior is the salience and frequency of cues embedded in the choice environment. Behavioral research consistently demonstrates that individuals are more likely to comply with pro-environmental actions when reminders of what others typically do (descriptive norms) or should do (injunctive norms) are made highly visible and repeatedly communicated (Goldstein et al., 2008; Kallbekken & Sælen, 2013). Salience enhances attention, making the desired behavior cognitively accessible at the moment of decision, while repetition reinforces the impression that the action is both common and socially endorsed. Importantly, studies in outdoor tourism contexts reveal that increasing the number of norm-based nudges does not necessarily create fatigue or reactance. Instead, frequent exposure can strengthen the internalization of social expectations, provided that the messages are credible and contextually relevant (Olya et al., 2024).

Empirical evidence supports this claim. For example, Wang et al. (2025) found that increasing the number of norm-nudges along hiking routes not only elevated sustainable behavior but also maintained a positive visitor experience. Tourists perceived the repeated cues as supportive rather than intrusive, suggesting that carefully designed and localized prompts can increase compliance without undermining leisure enjoyment. This has direct implications for fragile ecosystems such as Kashmir, where large visitor numbers amplify the risk of littering and where enforcement-based measures alone have proven insufficient. In such contexts, strategically placing normative prompts at decision points, such as trailheads, scenic viewpoints, or rest stops, ensures repeated visibility and

reinforces the sense that responsible waste disposal is the prevailing social practice (Schmitt, 2016). Therefore, we propose the following:

P2: Increasing the visibility and frequency of norm-based prompts will positively influence responsible waste disposal behavior without triggering reactance among tourists.

3.3. Defaults and simplification in waste management

Defaults and simplification represent some of the most effective nudging mechanisms since they take advantage of individuals' natural tendency to take the path of least resistance when making decisions under cognitive constraints (Dorigoni & Bonini, 2025). In the context of tourism, where tourists are often distracted by hedonic reasons, beauty, and social interactions, making the sustainable option easy is key. If color-coded bins, shaped apertures, and placement are designed in the disposal system, the cognitive burden of making a decision is reduced and the risk of mis-sorting is minimized (Hummel & Maedche, 2019). These defaults support the dual-process theory of decision-making, where intuitive, low-effort cues guide people toward the desired behavior without requiring anyone to consciously work at it (Kahneman, 2011) and do this in fast-paced or attention-scarce scenarios. This is corroborated by consumer and retail contexts of simple mechanisms. Bauer et al. (2022) demonstrate that simplifying choice structures—for example, restructuring products and signaling the “recommended” option—strongly enhances acceptance of sustainable alternatives. In other words, in terms of waste disposal, tourists dispose of litter in a more favorable manner when the recycling bins are made visually and physically easier to access than general waste bins (Sajid et al., 2024). Likewise, hospitality literature has shown that putting environmentally preferable options first or making them the defaults results in greater consumption of pro-sustainable products and behaviors, without the focus on active persuasion (Saulais et al., 2019; Roozen et al., 2021). In ecologically sensitive tourist areas like Kashmir, these methods can be of particular value. For instance, trail-side bins composed of bottle-shaped slots for plastics or leaf icons for biodegradable material not only decrease ambiguity but also ensure an intuitive correspondence between the object and the receptacle (Elsaid & Aghezzaf, 2015). Also, placing recycling bins closer to high-traffic areas while positioning general waste bins slightly further away promotes sorting as physically convenient rather than through the force of law. Those provisions preserve visitor authority while gently guiding the balance toward responsible disposal. As such, we suggest the following action:

P3: Simplifying defaults in bin design (e.g., shaped apertures, color congruence, and strategic placement) will reduce sorting errors and increase responsible waste disposal among tourists.

3.4. Verbal prompts versus visual cues

The medium by which nudges are conveyed plays a central role in whether they work or not. Although visual signs or symbols including icons are frequently used to influence pro-environmental behaviour, recent findings also indicate that oral guidance is generally more effective when promoting sustainable consumption (Lehner et al., 2016). Roozen et al. (2021) found that verbal communication, in contrast to purely visual cues, had an impact on the willingness of consumers to pay for sustainable fashion products. Because verbal prompts deliver specific directions, ambiguity is reduced, and people are engaged cognitively and emotionally. On the other hand, visual stimuli can be more oblique when attention is split or, on the contrary, when different values are perceived

and interpreted at different levels (Mihalic, 2016). Concise and directive verbal prompts can help cut through distractors and prompt immediate compliance in tourism contexts where individuals are involved in pursuits conducive to recreational activities, and may feel cognitive overload due to events in their environment (Warren et al., 2019). For instance, a trail-side sign that declares, “9 out of 10 hikers bin their waste here, thank you for keeping the valley clean”, not only conveys a descriptive social norm but also is a direct behavioral instruction. Verbal prompts have such clear, immediate, and normative appeal that they are particularly well-suited to environments with ephemeral decision-making opportunities, like trails and parks (Rickard et al., 2011). Furthermore, verbal prompts offer flexible framing that can be varied for each audience. The messages would be more appropriate for independent or domestic tourists (for example, if the user-benefit is emphasized such as “Keep your boots clean, use the bin ahead”) or for interdependent or international tourists (for example, “Protect our alpine meadows, dispose responsibly”) (Bharti & Suneja, 2024). Such adaptability calls attention to the strategic benefit of verbal encouragement over static visual signage. In ecologically sensitive destinations like Kashmir where disposal of solid waste has emerged as a major environmental issue (De Feo & Ferrara, 2024), an embedding of context-dependent verbal prompts could create mechanisms where responsible waste practices are more mainstream in ways that reinforce responsibility of destination stewardship and behavior. When used alongside other nudges, such as salience or defaults, verbal directives are likely to exert an additive impact upon compliance. At that point, the claim is made:

P4: Verbal prompts will be more effective than visual cues in increasing responsible waste disposal among tourists.

3.5. Destination social responsibility and climate-change concern as potential moderators

Nudges’ effect on responsible waste disposal cannot come down to the direct action/micro design alone. Their success is strongly dependent on the wider institutional and environmental aspects in which tourists encounter them (Jopp et al., 2015). Two contextual influences on nudge effectiveness stand out as crucial, namely: perceived destination social responsibility (DSR) and tourists’ climate change concern (Olya et al., 2024). DSR indicates the travelers’ degree of commitment the governing bodies of destinations and associated stakeholders have in environmental protection, social welfare, and wider sustainability (Agapito et al., 2023). When visitors witness actions of stewardship in concrete form (cleanliness in the premises, an employee sorting refuse, recycling facilities, or transparent communication about garbage-handling procedures), they are more likely to perceive such behaviours as endorsing values as those of the destination (Olya et al., 2024). This institutional credibility lends more persuasive force to nudges by casting personal action as part of a common and significant environmental quest. Similarly, climate change concern is a reinforcing factor. Previous studies found that more conscious and worried tourists are usually more likely to choose low-carbon tourism and also respond more appropriately to messages related to sustainability (Song et al., 2024). For this group, nudges are likely to be not just surface-level cues, but chances to align with their environmental values. On the other hand, with relative indifference to climate, nudges may find it difficult to make a dent unless they rely on established sustainability actions at the destination level that build trust and credibility (Gamma et

al., 2020). In ecologically sensitive places such as Kashmir, this is a central tension between nudges and wider institutional signals. A simple descriptive norm cue (e.g., “Most hikers use this bin”) is most effective combined with strong indicators of destination stewardship (e.g., well-preserved trails, marked waste pathways and links between waste management and local climate-related risks, such as melting glaciers or declining pasture) (Sunstein et al., 2019). Together, those signals generate a reinforcing dynamic where tourists see their waste behavior congruent with both institutional and broader environmental responsibility. With this premise, we suggest on these grounds:

P5: Perceived destination social responsibility and higher levels of climate-change concern will strengthen the positive influence of nudges on responsible waste disposal.

3.6. Context effects and tourist heterogeneity as potential moderators

In addition to traditional nudging mechanisms such as salience and defaults, context effects – specifically the compromise effect and asymmetric dominance – provide robust mechanisms for shaping choices and steering behavior (Agapito et al., 2023). These effects operate by changing the relative attractiveness of different available choices rather than altering the characteristics of any single choice. The compromise effect increases preference for a chosen option that is between two extremes, while asymmetric dominance increases preference for a targeted option that is clearly superior to a less optimal decoy. These kinds of mechanisms have been well-studied in consumer behaviour and have increasingly found applications in sustainability-driven decisions (Bharti & Suneja, 2024). Research to date shows that the effectiveness of these effects is contingent on how benefits are presented (Hardeman et al., 2017). When couched in the language of user-benefits (e.g., convenience, personal cleanliness, pride), compromise structures are more likely to succeed (Gamma et al., 2020). However, for benefits framed as environmental advantages - e.g., saving fragile alpine ecosystems or lowering carbon footprints - asymmetric dominance structures tend to be more persuasive (Bharti & Suneja, 2024). This aligning of the framing guarantees that the architecture of choice is congruent with the mode of motivation of the tourist. At the same time, tourist heterogeneity is also relevant. According to self-construal theory, an independent orientation (mostly domestic tourists) concentrates on the self-benefited, while a user-benefit orientation is stronger for the independent person (Mody et al., 2014). As opposed, that group of travellers (who tend to be international or collectivist) is more likely to be responsive to an environmental-benefit frame that stresses the need for collective responsibility and long-term ecological health (Bharti & Suneja, 2024). For instance, a home-based tourist who visits Kashmir might be further swayed by a word for task like “Keep your boots and trails clean- use the bin ahead” - especially where this phrase is framed as a ‘decision-making compromise’. It is evident that users’ psychological needs are shaped not by economic demands alone but also by interdependency of convenience. On the other hand, an international visitor can be more responsive to “Protect our alpine meadows – dispose responsibly” framed with a structural asymmetry based dominance effect. With the inclusion of context effects with audience heterogeneity, the destination managers can adapt nudging interventions to target different strata of tourists such that they are as effective as possible, although preventing them from becoming general

solutions (Povilionis et al., 2025). This suggests the significance of segmentation and context matching in shaping choice architectures for responsible waste management.

P6: User-benefit frames combined with compromise structures will be more effective for independent/domestic tourists, while environmental-benefit frames combined with asymmetric dominance structures will be more effective for interdependent/international tourists.

4. Discussion and implications

This research introduces nudging as a critical behavioral intervention for inducing RWD in ecologically sensitive tourist destinations. By combining ideas from behavioral economics, sustainability work, and tourism, the research enriches theoretical knowledge and practical use of nudging techniques in tourism contexts. Together, these propositions extend nudging theory from the conventional domain of health, retail, and food systems toward an understudied area of tourist waste behaviors - particularly in fragile destination settings.

4.1. Theoretical implications

The first contribution of this study is to extend nudging theory in the tourism waste management context. In the literature, nudges have been widely applied to consumer food systems, retail, and energy conservation (Bauer et al., 2022; Reisch, 2021), though they have had limited systematic application to RWD in tourism. By building a multi-nudge framework to incorporate salience, defaults, social norms, verbal prompts, and context effects, this study reveals how nudges can alter behavior through psychological engagement with sustainability (Song et al., 2024). Second, the framework proposes boundary conditions that moderate the effectiveness of nudges (Gamma et al., 2019). As we propose that DSR and climate-change concern enhance the nudge effect, this study links micro-level behavioral interventions with larger institutional and individual levels of influence (Olya et al., 2024). This integration locates nudging within wider governance frameworks, suggesting that nudges succeed with the support of credible sustainability practices. Third, this study contributes to heterogeneity-aware theorization by acknowledging that tourists are not homogeneous (Mody et al., 2014). It suggests that domestic tourists might be more influenced by user-benefit frames, while international tourists might be more motivated by environmental-benefit frames (Bharti & Suneja, 2024). This segmentation perspective optimizes theoretical accuracy by matching nudging strategies to motivational orientations and cultural distinctions. Last but not least, the model emphasizes the communication modality as a factor in promoting sustainable behavior. Although there is evidence from sustainable fashion that verbal prompts are more effective than visual nudges alone (Roozen et al., 2021), this paper expands on this observation to a tourism context in which visitor attention is frequently divided and decision windows are brief. Therefore, the design considerations of clarity and directive tone regarding nudging become a very important concept to be taken into consideration (Hardeman et al., 2017).

4.2. Practical and policy implications

This paper gives a number of potential implications for destination managers, policymakers, and tourism operators. First, destinations should adopt multi-layered choice

architecture for nodes around waste disposal places, from trailheads, scenic viewpoints, rest areas, to food stalls (Sunstein et al., 2019). This entails the prioritization of bins, color-coded and shaped apertures, repeated normative input and verbal messaging through this design. Micro-level designs like these make responsible waste disposal natural, socially approved, and even encouraged rather than a hassle (Hummel & Maedche, 2019; Sajid et al., 2024). More importantly, these low-cost interventions can be integrated in resource-limited locations, such as Kashmir, where existing signage, recycling bins and communication boards can be adapted for local context.

Second, message framing, followed by audience segmentation, plays a vital role. For this reason, campaigns that are more focused on convenience and cleanliness are more likely to be effective for domestic or independent tourists, especially when positioned as compromise options that can make sustainable options appear more balanced and accessible. For travelers, international or interdependent tourism in particular, a focus on environmental protection, the sense of communal responsibility and community well-being, supported by asymmetric dominance structures, may generate stronger compliance (Mody et al., 2014; Bharti & Suneja, 2025). This nuanced approach is indicative of a policymaking with sensitivity to diversity, as it precludes homogeneous communication, which improves behavioral effectiveness in multicultural tourist situations.

Third, we should embed nudges in a larger context of destination social responsibility. Tourists are more likely to internalize behavioral indicators if they expect the destination to have an authentic interest in sustainability (Olya et al., 2024). Real life approaches might include visible cleanliness, staff involvement in waste disposal and transparent instructions about how the collected waste is handled. By making linkages between micro-level and destination-wide interventions, policymakers can increase compliance and trust.

Fourth, the framework indicates that modality of communication is important for success (Hardeman et al., 2017). Verbal cues like “Most hikers bin it here, thank you for keeping the valley clean” can be more helpful than icons or images, in grabbing the attention of people and offering up clarity. It means that signage must emphasize explicit, directive, and context-specific messages instead of the visual cues only (Povilionis et al., 2025).

Finally, nudging is recognized by this work as a useful complement to the governance process, not as a substitute for regulation. Enforcement methods (e.g., fines, bans) can discourage disadherence, but nudges provide scalable, non-coercive ways to normalize more sustainable practices. For fragile ecosystems like Kashmir, where enforcement resources may be limited, nudges give an economic, and psychologically sensitive policy lever. This framework is comparable to broader sustainability agendas such as India’s Swachh Bharat Mission and Responsible Tourism India 2030 in that it adds an affordable behavioral layer to support the longer-term sustainability objectives of waste management (Newell & Carter, 2024). Nudge-based design principles can be embedded in the tourism code of conduct, the local bylaws, and awareness campaigns to ensure sustainability and institutional coherence.

4.3. Limitations and future research directions

Whereas this conceptual framework provides theoretical and practical contributions, it points to further empirical exploration. Since this study is conceptual in nature, it does not include empirical validation. It allows theoretical depth but not

generalizability of the relationships in the context until they are tested. Thus, future research studies should implement and evaluate the framework through the use of experimental tools to establish its robustness in different tourism settings. Field tests in fragile tourism environments in the future that would determine the relative and additive performance of various nudge types and waste disposal behaviour are warranted (Sunstein et al., 2019). Performance indicators such as bin usage rates, contamination levels, and litter counts can be hard evidence of its influence.

Second, we need longitudinal research to determine whether nudges cause lasting behavior change beyond the moment of choice. The addition of nudge features like reflective pledges or post-visit promises may elongate behavioral consequences over time (Jopp et al., 2015).

The third suggestion is cross-cultural studies, comparing destinations in collectivist vs individualist contexts, to clarify the way in which cultural orientation moderates the impact of message framing and context effects (Bharti & Suneja, 2024). Such comparative work would enhance the generalizability of the framework.

Finally, the ethical implications of nudging in tourism also need to be examined. Although nudges respect choice autonomy, concerns persist concerning transparency, consent, and potential manipulation (Reisch, 2021). Exploring how tourists feel about nudges, whether they are supportive or intrusive, would enhance theory and practice alike.

5. Conclusion

In conclusion, this study contributes to an original theoretical framework by extending nudging theory beyond traditional consumption and policy contexts to the relatively untapped behavioral area of responsible waste disposal in tourism. It introduces an extensive multi-nudge paradigm in which multiple mechanisms, contextual amplifiers, and tourist heterogeneity are combined to demonstrate how behavioral interventions could have an impact on sustainability at fragile destinations. It shows that making responsible waste disposal feasible is not through force but well-articulated choice environments where sustainable practices are straightforward, easy, and in line with social norms. It introduces psychological engagement with sustainability as an emerging mechanism for mediating the process and heterogeneity-aware segmentation as a boundary condition, advancing theorizing of how nudges act in different cultural and motivational contexts.

For policymakers and destination managers, the framework makes concrete recommendations for tackling one of the most challenging ecological issues in tourism. It opens new avenues for theory-building and empirical validation and offers a clear pathway for nudging as one of the cornerstones of sustainable tourism governance.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

AI disclosure statement

Generative AI tools were used only for language editing and formatting. All research content and findings were developed by the author.

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References

- Adolfsson, J. S., Hansen, A., & Wethal, U. (2024). *Between Distributed Agency and Choice Architecture: Comparing Nudge and Practice Theoretical Approaches to Changing Consumption*. In *Consumers and Consumption in Comparison* (pp. 189-213). Emerald Publishing Limited.
- Agapito, D., Kronenburg, R., & Pinto, P. (2023). A review on destination social responsibility: towards a research agenda. *Current Issues in Tourism*, 26(4), 554-572.
- Balakrishnan, J., Al-Ahmadi, M. S., Baabdullah, A. M., Al-Busaidi, A. S., & Dwivedi, Y. K. (2025). Examining Digital Nudges to Influence Pro-Environmental Behavior. *Journal of Computer Information Systems*, 1-17.
- Bauer, J. M., Aarestrup, S. C., Hansen, P. G., & Reisch, L. A. (2022). Nudging more sustainable grocery purchases: Behavioural innovations in a supermarket setting. *Technological Forecasting and Social Change*, 179, 121605.
- Bharti, M., & Suneja, V. (2025). Nudging green product adoption: leveraging context effects to ease trade-offs in online green buying. *Journal of Consumer Marketing*.
- Ceschi, A., Sartori, R., Dickert, S., Scalco, A., Tur, E. M., Tommasi, F., & Delfini, K. (2021). Testing a norm-based policy for waste management: An agent-based modeling simulation on nudging recycling behavior. *Journal of Environmental Management*, 294, 112938.
- Creutzig, F., Hilaire, J., Nemet, G., Müller-Hansen, F., & Minx, J. C. (2023). Technological innovation enables low cost climate change mitigation. *Energy Research & Social Science*, 105, 103276.
- Czajkowski, M., Zagórska, K., & Hanley, N. (2019). Social norm nudging and preferences for household recycling. *Resource and Energy Economics*, 58, 101110.
- De Feo, G., & Ferrara, C. (2024). Advancing communication in solid waste management: leveraging life cycle thinking for environmental sustainability. *Environmental Technology Reviews*, 13(1), 441-460.
- Dorigoni, A., & Bonini, N. (2025). The gentle push based on a “nudging approach”: from personal well-being to collective sustainability. *Mind & Society*, 1-22.
- Elsaid, S., & Aghezzaf, E. H. (2015). A framework for sustainable waste management: challenges and opportunities. *Management Research Review*, 38(10), 1086-1097.
- Gamma, K., Mai, R., & Looock, M. (2020). The double-edged sword of ethical nudges: Does inducing hypocrisy help or hinder the adoption of pro-environmental behaviors?. *Journal of Business Ethics*, 161(2), 351-373.
- Goldstein, N. J., Cialdini, R. B., & Griskevicius, V. (2008). A room with a viewpoint: Using social norms to motivate environmental conservation in hotels. *Journal of Consumer Research*, 35(3), 472-482.
- Grant, K., Hollywood, L., Simmons, G., Bucher, T., & Burns, A. (2025). Nudging and food shopping: A review of technological interventions within the grocery environment. *Critical Reviews in Food Science and Nutrition*, 1-18.
- Gruchmann, T., Maugeri, G., & Wagner, R. (2025). Do you feel guilty? A consumer-centric perspective on green nudging in last-mile deliveries. *International Journal of Physical Distribution & Logistics Management*, 55(5), 540-566.
- Hardeman, G., Font, X., & Nawijn, J. (2017). The power of persuasive communication to influence sustainable holiday choices: Appealing to self-benefits and norms. *Tourism Management*, 59, 484-493.
- Harder, R., Dombi, M., & Peters, G. M. (2017). Perspectives on quantifying and influencing household metabolism. *Journal of Environmental Planning and Management*, 60(2), 178-203.
- Hu, H., Xue, L., & Guo, Y. (2025). Tourism, acceleration, and deceleration: towards a conceptual framework. *Current*

- Hummel, D., & Maedche, A. (2019). How effective is nudging? A quantitative review on the effect sizes and limits of empirical nudging studies. *Journal of Behavioral and Experimental Economics*, 80, 47-58.
- Ivanova, D., & Büchs, M. (2022). Implications of shrinking household sizes for meeting the 1.5 C climate targets. *Ecological Economics*, 202, 107590.
- Ivanova, D., Stadler, K., Steen-Olsen, K., Wood, R., Vita, G., Tukker, A., & Hertwich, E. G. (2016). Environmental impact assessment of household consumption. *Journal of Industrial Ecology*, 20(3), 526-536.
- Jopp, R., Mair, J., DeLacy, T., & Fluker, M. (2015). Climate change adaptation: Destination management and the green tourist. *Tourism Planning & Development*, 12(3), 300-320.
- Kahneman, D. (2011). *Thinking, fast and slow*. Macmillan.
- Kallbekken, S., & Sælen, H. (2013). 'Nudging' hotel guests to reduce food waste as a win-win environmental measure. *Economics Letters*, 119(3), 325-327.
- Lehner, M., Mont, O., & Heiskanen, E. (2016). Nudging-A promising tool for sustainable consumption behaviour? *Journal of Cleaner Production*, 134, 166-177.
- Mihalic, T. (2016). Sustainable-responsible tourism discourse-Towards 'responsustable' tourism. *Journal of Cleaner Production*, 111, 461-470.
- Mody, M., Day, J., Sydnor, S., Jaffe, W., & Lehto, X. (2014). The different shades of responsibility: Examining domestic and international travelers' motivations for responsible tourism in India. *Tourism Management Perspectives*, 12, 113-124.
- Newell, P., & Carter, A. (2024). Understanding supply-side climate policies: towards an interdisciplinary framework. *International Environmental Agreements: Politics, Law and Economics*, 24(1), 7-26.
- Obersteiner, G., Gollnow, S., & Eriksson, M. (2021). Carbon footprint reduction potential of waste management strategies in tourism. *Environmental Development*, 39, 100617.
- Olya, H., Ahmad, M. S., Abdulaziz, T. A., Khairy, H. A., Fayyad, S., & Lee, C. K. (2024). Catalyzing green change: The impact of tech-savvy leaders on innovative behaviors. *Corporate Social Responsibility and Environmental Management*, 31(6), 5543-5556.
- Polzin, S. S., Lusk, J. L., & Wahdat, A. Z. (2023). Measuring sustainable consumer food purchasing and behavior. *Appetite*, 180, 106369.
- Povilionis, R., Akbar, M. B., & Tomasella, B. (2025). From objectors to supporters: developing targeted pro-environmental behavioural change interventions. *Current Issues in Tourism*, 1-20.
- Pragha, P., & Dhalmahapatra, K. (2025). Smart technologies as nudges: shaping intentions to embrace sustainable tourism. *Tourism Recreation Research*, 1-19.
- Reisch, L. A., Sunstein, C. R., & Gwozdz, W. (2017). Beyond carrots and sticks: Europeans support health nudges. *Food Policy*, 69, 1-10.
- Reisch, L. A., Sunstein, C. R., Andor, M. A., Doebbe, F. C., Meier, J., & Haddaway, N. R. (2021). Mitigating climate change via food consumption and food waste: A systematic map of behavioral interventions. *Journal of Cleaner Production*, 279, 123717.
- Rickard, L., McComas, K., & Newman, S. (2011). Visitor proficiency profiling and risk communication at a national park. *Environmental Communication*, 5(1), 62-82.
- Roozen, I., Raedts, M., & Meijburg, L. (2021). Do verbal and visual nudges influence consumers' choice for sustainable fashion?. *Journal of Global Fashion Marketing*, 12(4), 327-342.
- Sajid, M., Esfandiari, K., Zakkariya, K. A., Ertz, M., & Surira, M. D. (2024). Trash in the bin, to a cleaner scene we cling: a mixed method approach on tourists' binning behavior at two spiritual destinations. *Asia Pacific Journal of Tourism Research*, 29(12), 1490-1508.
- Saleem, M. A., Hinchcliff, M., Papakosmas, M., Hughes, G., & Heffernan, T. (2025). Norms-Driven Behaviour Change for GHG Reduction: A Meta-Analytic Review of High and Low Involvement Behaviours. *Australasian Marketing Journal*, 14413582251345550.
- Saulais, L., Doyon, M., & Massey, C. (2019). *Promoting More Sustainable Consumer Decisions in Foodservice Settings: Effectiveness of the "Nudges" Approach*. In *Financial Decision-Making in the Foodservice Industry* (pp. 207-236). Apple Academic Press.

- Schmitt, C. R. (2016). Mounting tensions: Materializing strategies and tactics on national park “social trails”. *Environmental Communication*, 10(4), 418-431.
- Skinitis, G., Lilli, M., Skarakis, N., Tournaki, S., Nikolaidis, N., & Tsoutsos, T. (2024). A holistic approach for tourism carrying capacity estimation in sensitive ecological areas. *Environment, Development and Sustainability*, 26(12), 31971-31995.
- Song, H., Wu, H., & Zhang, H. (2024). Can nudging affect tourists’ low-carbon footprint travel choices?. *International Journal of Contemporary Hospitality Management*, 36(5), 1534-1556.
- Stewart, K., Balmford, A., Scheelbeek, P., Doherty, A., & Garnett, E. E. (2023). Changes in greenhouse gas emissions from food supply in the United Kingdom. *Journal of Cleaner Production*, 410, 137273.
- Sunstein, C. R. (2015). The ethics of nudging. *Yale Journal on Regulation*, 32(2), 413.
- Sunstein, C. R., Reisch, L. A., & Kaiser, M. (2019). Trusting nudges? Lessons from an international survey. *Journal of European Public Policy*, 26(10), 1417-1443.
- Thaler, R. H., & Sunstein, C. R. (2009). *Nudge: Improving decisions about health, wealth, and happiness*. Penguin.
- Violos, J., Mamanis, G., Kompatsiaris, I., & Papadopoulos, S. (2025). Cognition and context-aware decision-making systems for a sustainable planet: a survey on recent advancements, applications and open challenges. *Discover Sustainability*, 6(1), 1-43.
- Wang, X., Zhong, L., Wang, Z., & Xia, Q. (2025). Wake up green power: experimental research on how hotel biophilic design nudges green customer citizenship behaviour. *Current Issues in Tourism*, 1-19.
- Warren, C., Becken, S., & Coghlan, A. (2019). *Using persuasive communication to co-create behavioural change-engaging with guests to save resources at tourist accommodation facilities*. In *Marketing for Sustainable Tourism* (pp. 67-86). Routledge.
- Yachin, J. M., Margaryan, L., Lexhagen, M., & Ioannides, D. (2024). Nudge plus in tourism: reflexive behaviours and reflective attitudes. *Journal of Sustainable Tourism*, 1-18.
- Yi, H., Lu, W., Yuan, L., & Bao, Z. (2025). Effects of “green nudges” on renovation waste management: a randomized controlled experiment. *Engineering, Construction and Architectural Management*, 1-23.
- Živoder, S. B. (2024). *Nudging: A Possible Solution for a More Successful Destination Management*. In *Tourism in a VUCA World: Managing the Future of Tourism* (pp. 79-91). Emerald Publishing Limited.