

Circular Economy for Climate Adaptation in Hotels: Explaining Managers' Adoption Intentions through Protection Motivation Theory

Fatemeh Taheri-Azad 

PhD Student in Business Management-
Marketing, Faculty of Economics, Management
and Accounting, Yazd University, Yazd, Iran.

**Seyed Mohammad
Tabataba'i-Nasab*** 

Professor of Business Administration, Faculty of
Economics, Management, and Accounting, Yazd
University, Yazd, Iran.

Raymond Rastegar 

Department of tourism, Sport and Hotel
management, Griffith University, QLD, Australia.

Abstract

This study investigates why hotel managers intend to adopt circular economy practices in response to climate-related operational risks. Drawing on Protection Motivation Theory (PMT), it examines how climate risk information, threat appraisal, coping incentives, and coping appraisal are associated with adoption intention. Data were obtained from 166 senior managers of three- to five-star hotels in Tehran, Mashhad, Isfahan, Shiraz, and Tabriz, Iran, and analysed using partial least squares structural equation modelling (PLS-SEM). The results indicate that stronger threat appraisal is associated with more favourable coping appraisal and, in turn, with greater intention to adopt circular practices. The direct association between threat appraisal and adoption intention was positive but did not meet the prespecified significance criterion, whereas a significant indirect association through coping appraisal was observed. Climate risk information showed a positive association with threat appraisal, while perceived coping incentives were not significantly associated with coping appraisal. This pattern suggests that recognising climate-related operational threats alone may be insufficient to strengthen adoption intention unless

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* Corresponding Author: tabatabaenasad@yazd.ac.ir

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managers also view the proposed response as effective, achievable, and manageable within organisational conditions. For practice, the findings suggest value in translating climate information into hotel-relevant decision support and strengthening implementation capability, while indicating a need to distinguish financial, regulatory, and technical forms of support. By bringing circular economy adoption into the climate-adaptation domain, the study demonstrates the relevance of PMT to hotel managers' organisation-referent appraisals and adoption intentions, showing how evaluations of risk and response feasibility are associated with intended adaptive action in a resource-constrained context.

Keywords: Circular economy, Climate risk perception, Protection Motivation Theory, Threat appraisal, Coping appraisal.

مجله انتشار

1. Introduction

Climate hazards, including heatwaves, droughts, and floods, are becoming more frequent and intense, exposing hotels to disruptions that go beyond physical damage (Ivkov et al., 2019). These events can interrupt water and energy supply, increase operating costs, restrict access to essential inputs, destabilise supply chains, and threaten service continuity (Stamou et al., 2026). This is a critical problem because hotels are resource-intensive service organisations whose daily operations depend on reliable access to water, energy, food, materials, and infrastructure-based services (Nam & Yang, 2026). When these flows are disrupted, hotels may struggle to maintain service quality, customer satisfaction, operational efficiency, and economic performance (Kolodiziev et al., 2024). Taken together, these disruptions illustrate that climate risk in the hotel industry is not merely a long-term environmental concern, but an immediate operational problem that threatens hotels' ability to maintain operational resilience under conditions of increasing climate uncertainty.

From this perspective, the central issue is not merely the occurrence of disruption, but hotels' dependence on continuous resource flows that may be constrained or interrupted by climate hazards. This is where the circular economy becomes particularly relevant, as practices such as reuse, recovery, recirculation of resources within hotel operations, and the extension of the useful life of materials and assets enable hotels to meet part of their needs through resources that have already entered the system and whose value and functionality can still be retained (Geissdoerfer et al., 2017; Bocken et al., 2016). As a result, the need to continually replace resources with new inputs is reduced, allowing hotels to sustain some essential operations during disruptions with greater reliance on resources already available within the system. For example, the treatment and reuse of greywater returns a portion of consumed water to the operational cycle and can help meet part of a hotel's water demand during periods of water stress or restriction

(Estelrich et al., 2021; Atanasova et al., 2017). Similarly, recovering waste heat from chiller systems can return thermal energy that would otherwise be discharged to hotel operations and reduce part of the energy demand associated with hot-water provision (Yu et al., 2025). From this perspective, the circular economy can be considered a potential response to climate-related operational risks because it enables hotels to manage essential resources more flexibly during periods of disruption. However, the availability of circular solutions does not necessarily translate into their implementation (Vaculčíková et al., 2025; Bittner et al., 2024). For hotel managers, implementing circular economy practices requires evaluating costs, implementation feasibility, organisational capacity, technical knowledge, service quality, and expected benefits (Bittner et al., 2024; Chan et al., 2020). Therefore, the key question is not only whether circular solutions can be beneficial in addressing climate-related operational risks, but also under what conditions managers become willing to adopt and implement them.

To address this question, Protection Motivation Theory (PMT) provides an appropriate framework, as it explains decisions to respond to a threat on the basis of two distinct appraisals: first, the extent to which the threat is perceived as serious and relevant and, second, the extent to which the available response is evaluated as effective and feasible (Maddux & Rogers, 1983). In the context of circular economy adoption in hotels, this logic suggests that, when confronted with climate risks, managers assess, prior to implementing circular economy practices, the extent to which these practices can effectively reduce or manage such risks and whether their implementation is compatible with the hotel's capacities, resources, and organisational constraints. These appraisals do not occur in isolation; climate risk information helps managers assess risk more accurately by clarifying the significance and consequences of the threat, while coping incentives facilitate the assessment of the feasibility of circular economy practices by reducing implementation-related, financial, and technical uncertainties (Torabi et al., 2026; Hu et al., 2022). Accordingly, explaining the adoption of circular economy practices in hotels requires simultaneous attention to how risk is appraised, how response capability is evaluated, and the

contextual conditions associated with the formation of these two appraisal processes.

Despite this logic, the existing literature still does not provide a clear explanation of the adoption of circular economy practices as a response to climate-related operational risks in hotels. Hospitality research has predominantly examined the circular economy from the perspective of environmental sustainability and the reduction of resource consumption, waste, and other environmental impacts (Gohoungodji & Chembessi, 2026; Motevali et al., 2023; Costa et al., 2024; Bux & Amicarelli, 2023), while its role in adaptation decisions concerning climate-related operational risks has received less attention (Strippoli et al., 2024; Bittner et al., 2024). Moreover, although tourism and climate adaptation studies have demonstrated the importance of threat appraisal and coping appraisal in shaping adaptation responses and intentions (Verkoeyen & Nepal, 2022; Hu et al., 2022; Wang et al., 2021), it remains unclear how these two appraisals relate to one another and to the adoption decision in an organisation-referent decision by hotel managers concerning the adoption of circular economy practices. In addition, climate risk information and coping incentives may be associated with the formation of threat appraisal and coping appraisal (Xu et al., 2026; Fouladi Semnan et al., 2024; Chen et al., 2024), yet the simultaneous role of these factors in hotel managers' decisions to adopt circular economy practices as a response to climate risks remains underexplored. Therefore, the central gap lies not merely in understanding the potential of the circular economy, but in understanding the managerial appraisal process through which climate risk, response capability, and contextual conditions are linked to decisions to adopt circular economy practices.

Accordingly, drawing on PMT, the present study examines the relationships among climate risk information, threat appraisal, coping incentives, coping appraisal, and hotel managers' intentions to adopt circular economy practices in Iran. This study makes three main contributions to the literature. First, it conceptualises circular economy adoption as a potential response to climate-related operational risks, thereby linking the prevailing view of the circular economy in hospitality, which has largely focused on environmental impacts, to its

role in operational adaptation. Second, drawing on PMT, the study complements its analytical framework by incorporating two contextual factors—climate risk information and coping incentives—and examines the formation of threat appraisal and coping appraisal within the context of managers' decisions to adopt circular economy practices. Third, by focusing on hotels in Iran, the study provides evidence from a relatively underexamined context in which climate pressures, resource constraints, and organisational limitations intersect with managerial decision-making concerning adaptation (Zamanipour et al., 2023; Salehi et al., 2021).

2. Literature review and hypotheses

2.1. *Climate Risk Perception and Protection Motivation*

According to the International Organization for Standardization [ISO] (2018), risk is defined as the “effect of uncertainty on objectives.” Risk perception reflects individuals' attitudes and intuitions toward risk (Slovic, 1987) and influences decision-making (Cho & Lee, 2006). In the context of climate change, such perceptions shape adaptation decisions and responses and are therefore considered important precursors to adaptation strategies and actions (Steg et al., 2011; Slovic, 1987). Within the tourism literature, climate risk perception has been examined among tourists, entrepreneurs, experts, and other stakeholders. These studies emphasise that understanding individuals' reactions to climate change requires consideration of how they interpret climate-related hazards and evaluate possible responses (Scott, 2021; Kaján & Saarinen, 2013). Accordingly, the study investigates hotel managers' perceptions of climate-related risks and how they assess circular economy practices for addressing the resulting operational challenges.

Protection Motivation Theory (PMT) explains responses to perceived risk through two core appraisal processes: threat appraisal and coping appraisal. Threat appraisal refers to individuals' assessment of how serious a threat is and how vulnerable they are to its potential effects, typically represented by perceived severity and perceived vulnerability (Marikyan & Papagiannidis, 2023). In the context of

climate change and tourism, these evaluations concern both the potential consequences of climate-related hazards and the extent to which tourism activities and operations may be affected (Lee & Jan, 2025; Hu et al., 2022). Applied to hotels, threat appraisal therefore reflects managers' judgements about the severity of climate-related disruptions to hotel operations and the vulnerability of their hotels to resulting impacts on essential resources, infrastructure, and business continuity.

Coping appraisal concerns how individuals judge their ability to deal with a perceived threat. In PMT, this evaluation is based on three elements: response efficacy, self-efficacy, and response cost (Marikyan & Papagiannidis, 2023). Response efficacy reflects the belief that a given action can lessen the effects of the threat, whereas self-efficacy concerns confidence in one's ability to perform that action. Response cost, in turn, represents the resources, effort, and implementation barriers associated with carrying it out (Li & Liu, 2024). Tourism studies similarly indicate that responses to climate-related hazards involve more than assessments of severity and vulnerability, as individuals also evaluate their ability to act and the effectiveness of available coping strategies (Lee & Jan, 2025; Bartelet et al., 2023; Imani et al., 2021). In the present study, this logic is applied to hotel managers' organisation-referent appraisals and adoption intentions. Accordingly, response efficacy reflects the extent to which managers perceive circular economy practices as effective in reducing the operational consequences of climate-related hazards; self-efficacy refers to their perceptions of their hotels' capacity to organise and implement these practices; and response cost encompasses the financial, temporal, technical, and organisational requirements associated with implementation. Thus, threat appraisal captures how managers perceive climate risks to their hotels, whereas coping appraisal reflects the extent to which they view circular economy practices as an effective and feasible organisational response.

However, these appraisals do not develop independently of the surrounding context. Within the PMT framework, information drawn

from experience, messages from the surrounding environment, and contextual conditions can influence the formation of both threat and coping appraisals (Xu et al., 2026; Fouladi Semnan et al., 2024). On this basis, the present study considers two categories of antecedent factors. First, climate risk information is considered an antecedent of threat appraisal because access to relevant information can help managers assess the consequences of climate-related hazards and their hotels' vulnerability to them more clearly (Hu et al., 2022). Second, coping incentives are considered external facilitating conditions and support associated with coping appraisal because the presence or absence of support and facilitating conditions for implementing circular economy practices can influence managers' perceptions of the feasibility, effectiveness, and costs of these practices (Chen et al., 2024). These antecedents therefore provide the contextual basis for examining how threat and coping appraisals are formed in managers' evaluations of climate-related risks and potential responses for their hotels.

2.2. Hypotheses

Within PMT, threat appraisal and coping appraisal represent distinct but related judgements that inform responses to risk (Maddux & Rogers, 1983). As perceived threat severity and vulnerability increase, the consequences of inaction become more salient, prompting decision-makers to consider whether the threat can be addressed effectively (Grothmann & Patt, 2005). This consideration directs attention to the viability of the response, including its expected effectiveness, the availability of the capabilities and resources needed for implementation, and the acceptability of its requirements and costs relative to the anticipated consequences of the threat. Hu et al. (2022) conceptualise coping appraisal as an assessment of response capacity following risk appraisal and operationalise it in terms of response efficacy, self-efficacy, and perceived costs. This three-dimensional structure is also emphasised in PMT-based climate-related research (Li & Liu, 2024). Providing empirical support for the relationship between the two appraisals, Lee and Jan (2025) found that both perceived

vulnerability and perceived severity were positively associated with coping appraisal. Applied to the present study, this reasoning suggests that as managers perceive climate-related operational risks as more severe and their hotels as more vulnerable, circular economy practices become more salient as potential responses for reducing dependence on disrupted resource supplies and maintaining operational continuity. Under these conditions, the expected protective value of circular economy practices becomes more consequential relative to the resources and organisational adjustments required for implementation, leading managers to weigh their effectiveness, feasibility, and costs more favourably against the consequences of continued exposure to climate-related risks. Accordingly, stronger threat appraisal is expected to be associated with a more favourable coping appraisal of circular economy practices. The following hypothesis is therefore proposed:

H1. Threat appraisal has a positive effect on hotel managers' coping appraisal.

Within the logic of PMT, coping appraisal becomes particularly relevant when decision-makers move beyond identifying a possible response to evaluating whether it can be effectively implemented. The availability of a response alone is insufficient to generate an intention to act; individuals must believe that the response can produce the desired outcome and that they have the capacity to carry it out under existing conditions. Evidence from tourism and environmental research supports this rationale. Verkoeyen and Nepal (2022) examine coping appraisal as a mechanism underlying adaptation intention among scuba divers, while their earlier study showed that response efficacy and self-efficacy were among the strongest predictors of tourists' intended adaptation to climate-related environmental change (Verkoeyen & Nepal, 2019). Shafiei and Maleksaeidi (2020) likewise demonstrate the importance of perceived capability and response effectiveness in shaping pro-environmental behaviour. Taken together, these studies suggest that coping appraisal helps determine whether a potential

response is regarded as sufficiently effective and feasible to translate concern into action.

Similar patterns have also been reported in studies of climate-related policies and behavioural responses. Houser et al. (2022) found that perceived response efficacy plays an important role in generating support for climate adaptation policies, whereas Horng et al. (2014) emphasised the contribution of self-efficacy to intentions and behaviours associated with energy conservation and carbon reduction in tourism. By contrast, higher perceived costs may discourage adaptive action, as shown in research on responses to water scarcity (Zobeidi et al., 2022). In the hotel setting, coping appraisal therefore functions as an evaluative mechanism through which managers judge whether circular economy practices constitute a practical response to climate-related operational risks. A more favourable appraisal should consequently increase the likelihood that consideration of these practices develops into an intention to adopt them. Accordingly, the following hypothesis is advanced:

H2. Coping appraisal has a positive effect on hotel managers' intention to adopt circular economy practices.

Threat appraisal may also influence behavioural intention directly by increasing the perceived urgency of protective action. When a threat is judged to be severe and relevant to the decision-maker's circumstances, the potential consequences of inaction become more salient, thereby strengthening motivation to respond. This proposition is consistent with broader PMT evidence showing that perceived severity and vulnerability are associated with stronger protective intentions and behaviours (Floyd et al., 2000). Related environmental research likewise indicates that stronger perceptions of risk can increase support for protective and pro-environmental responses (Bockarjova & Steg, 2014; Stoutenborough et al., 2013). Applied to the hotel context, managers who perceive climate-related disruptions as more severe and their hotels as more vulnerable may therefore develop a stronger intention to adopt circular economy practices as a protective response.

This proposed direct relationship captures the motivational effect of perceived threat on adoption intention, distinct from the indirect pathway through coping appraisal examined subsequently. Accordingly, the following hypothesis is proposed:

H3. Threat appraisal has a positive effect on hotel managers' intention to adopt circular economy practices.

In climate-risk decision-making, recognising a threat does not necessarily lead to the selection of a specific response. Between perceiving the importance of a risk and forming an intention to act lies a cognitive process through which decision-makers evaluate whether and how the threat can be addressed. Grothmann and Patt (2005), in their socio-cognitive model of climate change adaptation, distinguish risk perception from subsequent evaluations of adaptive capacity in explaining adaptation decisions. Similar patterns have been observed across different behavioural contexts. Wang et al. (2019) incorporate threat and coping appraisals in explaining tourists' adaptation intentions to climate-induced changes in destination attractiveness, while Tchetchik et al. (2021) identify both appraisals as drivers of changes in recycling and consumption-reduction behaviours. Research on flood-risk adaptation further demonstrates that perceived adaptation capacity and coping experience contribute to adaptation intentions alongside perceptions of severity and vulnerability (Tasantab et al., 2022). Collectively, these findings suggest that recognising a threat and evaluating the capacity to respond represent distinct but connected stages in the formation of adaptive intentions.

This distinction is particularly relevant to hotel managers' decision-making. A manager may perceive climate-related risks as serious for hotel operations, yet this perception alone does not determine whether circular economy practices will be selected as a response. Rather, moving from perceived threat to a specific adaptive intention requires an evaluation of whether an available response can realistically be undertaken. Related research supports the importance of such efficacy and capacity evaluations in shaping behavioural and adaptation intentions (Rainear & Christensen, 2022; Gebrehiwot & van der Veen, 2021). In the present study, coping appraisal is therefore expected to

provide the cognitive pathway through which the perceived significance of climate-related threats is translated into an intention to adopt circular economy practices. On this basis, the following hypothesis is proposed:

H4. Coping appraisal mediates the positive relationship between threat appraisal and hotel managers' intention to adopt circular economy practices.

Climate risk information becomes particularly important when it reduces uncertainty surrounding a hazard and makes its potential consequences more concrete for decision-makers. Relevant and understandable information can improve how individuals interpret climate-related threats and support more informed risk assessments (Wood et al., 2012). This need for usable information is also evident in managerial contexts. Tribbia and Moser (2008) show that managers require information that is relevant to their specific circumstances when planning for climate change, while Craig (2019) demonstrates that improving business understanding of local weather and climatic conditions can strengthen the capacity to recognise and respond to climate-related risks.

Research on risk perception also shows that access to information influences the way individuals assess potential threats. Brenkert-Smith et al. (2013), for example, reported that information received from experts, non-experts, and social interactions was related to how people judged both the likelihood and possible consequences of wildfire. A similar pattern has been observed in tourism, where Jeuring and Becken (2013) demonstrated the importance of seeking weather-related information for protective decisions during severe weather events. More specifically, Xu et al. (2026), using PMT in the context of flood-risk communication, showed that greater exposure to risk information was associated with stronger threat appraisal. Collectively, this evidence indicates that information serves not only to raise awareness but also to help decision-makers assess the seriousness of a hazard and its relevance to their own or their organisation's circumstances. In the hotel context, access to reliable and relevant climate risk information should therefore enable managers to evaluate climate-related

operational threats more strongly. Accordingly, the following hypothesis is advanced:

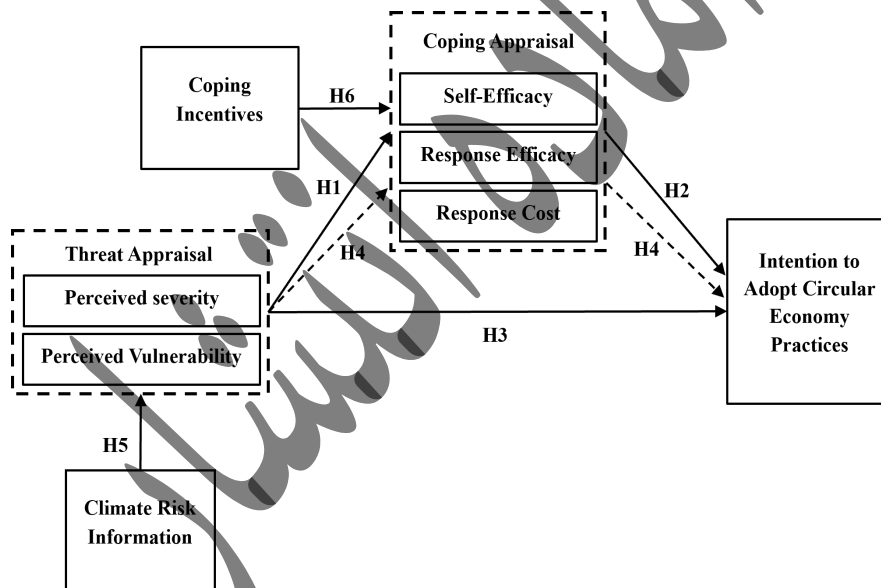
H5. Climate risk information has a positive effect on hotel managers' threat appraisal.

Coping incentives can shape managers' appraisal of their capacity to respond by influencing the conditions under which adaptation takes place. Organisational responses depend not only on internal readiness but also on access to external resources, institutional support, and mechanisms that facilitate implementation. Becken and Hay (2012) emphasise the role of supportive policies and institutions in creating an enabling environment for climate adaptation in tourism. Similarly, Agrawal et al. (2008) highlight the role of local institutions in facilitating adaptation by mediating access to resources and supporting collective responses to climate-related challenges. From this perspective, external support may influence coping appraisal by making potential responses appear more achievable within the practical conditions facing decision-makers.

This logic is also evident in tourism and hospitality research. McLennan et al. (2016) show that sustainability programmes based on collaborative clusters can provide tourism businesses with opportunities for learning, knowledge sharing, and access to external expertise and support. Becken and Dolnicar (2016) further demonstrate that accommodation and food-service businesses value practical forms of support, including grants and subsidies, consultancy, funding advice, technology demonstrations, and inter-firm cooperation, when implementing resource-efficiency measures. In the context of climate adaptation, Wong et al. (2012) likewise show that public-private partnerships can help mobilise resources and institutional support for adaptation in tourism. Together, these findings suggest that external support can alter the practical conditions under which managers evaluate their ability to act by easing resource and implementation constraints. Accordingly, when hotel managers perceive coping incentives as accessible and useful, circular economy practices should appear more feasible as responses to climate-related operational risks. On this basis, the following hypothesis is proposed:

H6. Coping incentives have a positive effect on hotel managers' coping appraisal.

Taken together, the hypotheses depict circular economy adoption as a staged decision process in which contextual conditions shape different points of managerial appraisal. Climate risk information informs managers' assessment of the threats facing their hotels, whereas coping incentives influence the conditions under which potential responses are evaluated. Coping appraisal then provides the cognitive link through which perceived climate-related threats are translated into adoption intention. Figure 1 integrates these relationships into the proposed conceptual model.



Note: H4 captures the mediated relationship between threat appraisal and adoption intention via coping appraisal.

Figure 1. Proposed Conceptual Model

3. Methodology

3.1. Study context, sampling, and data collection

The study focused on hotel managers in Tehran, Mashhad, Isfahan, Shiraz, and Tabriz. These cities were selected because they are major

tourist-receiving cities in Iran and provide geographical coverage across varied climatic contexts. Ghorbanpour et al. (2026) identify these five cities as major tourist-receiving cities in Iran, while Afsari et al. (2024) document substantial variation in their climatic conditions and projected patterns of dry days and very heavy precipitation. Their inclusion broadened the geographical coverage of the study and reduced reliance on the conditions of a single destination; however, city-level climatic differences were not modelled in the analysis.

The target population comprised managers of licensed three- to five-star hotels. These hotels were selected because their relatively resource-intensive and operationally complex activities make decisions concerning energy, water, materials, operational efficiency, and environmental practices particularly relevant to managerial decision-making. Restricting the study to these hotel categories also provided a more comparable organisational setting for examining circular economy adoption. Previous sustainability research has similarly focused on three- to five-star hotels because these establishments are more likely to engage with sustainability initiatives (Mtebe et al., 2026). An initial list of potentially eligible properties was compiled from Iran Hotel Online and subsequently verified against official records from the JANA tourism-facilities system and the relevant provincial tourism authorities. One- and two-star hotels, hotel apartments, guesthouses, traditional accommodation establishments, duplicate listings, and other ineligible properties were excluded. The final sampling frame comprised 249 hotels: 77 in Tehran, 88 in Mashhad, 31 in Isfahan, 35 in Shiraz, and 18 in Tabriz.

Given the manageable size of the sampling frame, a census-based approach was adopted at the hotel level, with one knowledgeable senior manager invited from each of the 249 eligible hotels. Eligible respondents included general managers, operations managers, engineering or facilities managers, and other senior managers involved in resource use, operational investment, environmental practices, or operational decision-making. Senior managers were targeted because the study constructs—including perceived organisational capacity,

response costs, coping incentives, and adoption intention—require informed knowledge of both hotel operations and organisational decision-making. Only one respondent was recruited from each hotel so that no hotel contributed more than one response, thereby avoiding non-independence among responses from the same property.

Sample adequacy was assessed before model estimation using G*Power. The calculation was based on the most demanding endogenous equation in the proposed model, which contained two predictors. Assuming a medium effect size ($f^2 = 0.15$), $\alpha = .05$, and statistical power of .95, the minimum required sample size was 107. The final sample of 166 exceeded this requirement. A complementary sensitivity analysis showed that, with 166 observations and two predictors, the smallest effect detectable with 95% power at $\alpha = .05$ was approximately $f^2 = 0.095$. Thus, the available sample provided high statistical power for effects of this magnitude or larger, while very small effects should be interpreted more cautiously.

Data were collected between June and August 2026. Access to potential respondents was facilitated through relevant provincial hotel associations and direct contact with hotel management offices across the five cities. These access channels were used solely to facilitate contact with appropriate senior managers and were not involved in completing the questionnaire or accessing individual responses. After respondent eligibility was confirmed, the questionnaire was provided directly to one knowledgeable senior manager from each hotel, primarily through an electronic survey link and, where preferred, in printed form. Of the 178 returned questionnaires, 85 were completed electronically and 93 were returned in printed form. Possible differences associated with questionnaire delivery mode were examined by comparing responses from the electronic and paper-based surveys across the main study constructs. Independent-samples t-tests showed no statistically significant differences between the two groups (all $p > .05$). Participation was entirely voluntary, and respondents were informed that their individual answers would remain confidential and would be analysed only at the aggregate level.

Of the 249 questionnaires distributed, 178 were returned, yielding an initial response rate of 71.5%. Following data screening, 12

questionnaires were excluded because of substantial missing data, highly repetitive response patterns, or incomplete responses to the main measurement constructs. Substantial missing data was defined as more than 10% of the measurement items being unanswered, while highly repetitive response patterns were identified when the same response category was selected for at least 90% of the Likert-scale items; questionnaires with incomplete responses to one or more of the main measurement constructs were also excluded. This resulted in 166 usable questionnaires, corresponding to an effective response rate of 66.7%. The final sample comprised 51 respondents from Tehran, 58 from Mashhad, 21 from Isfahan, 24 from Shiraz, and 12 from Tabriz. This distribution closely reflected the geographical composition of the sampling frame, limiting disproportionate representation from any single study location.

3.2. Questionnaire development and measurement

The survey instrument was organised into two main sections. The first section comprised two parts. The first provided respondents with a brief explanation of circular economy practices, their relevance to hotel operations, and hotel-specific examples to establish a common understanding of the concept before they completed the study measures. The explanation stated that: *“Circular economy practices refer to practices that seek to keep resources, materials, and their value in use within hotel operations through reuse, recovery, recirculation, and the extension of the useful life of materials and assets, thereby reducing dependence on new resource inputs. In the hotel context, such practices may include, for example, the reuse of treated greywater, the recovery and reuse of waste heat, the reuse or recovery of materials, and the extension of the useful life of equipment, furnishings, and other hotel assets. By retaining resources within hotel operations for longer, these practices can help reduce reliance on external resource inputs and support the continuity of operations when resource availability is constrained.”* The examples were provided to clarify the scope and operational relevance of the concept rather than to represent separate practice-specific measures. The second part of the first section collected background information about the respondents and their hotels,

including hotel category, managerial role, years of industry experience, educational attainment, age, and gender.

The second section contained the measurement items for the constructs included in the research model. The items were drawn from previously validated instruments in the PMT and climate-adaptation literature and were adapted to fit the present study context. Perceived severity, perceived vulnerability, response efficacy, self-efficacy, and response cost were measured primarily using items informed by Lee and Jan (2025) and Li and Liu (2024), whereas measures of climate risk information, coping incentives, and adoption intention were based mainly on Hu et al. (2022). The source items were contextualised to capture hotel managers' assessments of climate-related operational risks and their evaluations of circular economy practices as potential adaptive responses. The questionnaire was first prepared in English and subsequently translated into Persian, followed by an independent back-translation to assess conceptual and semantic consistency. The Persian version was also reviewed by academic experts and hotel practitioners to evaluate its clarity, relevance, and suitability for the study setting. Finally, the instrument was pretested with 25 hotel managers who were not included in the main sample. Feedback from the pretest resulted only in minor wording adjustments, with the underlying meaning of the constructs remaining unchanged.

All measurement items were assessed on a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. Because greater response cost corresponds to a less favourable coping appraisal, the response-cost scores were reversed before constructing the higher-order coping appraisal measure (1→5, 2→4, 3→3, 4→2, 5→1). After recoding, higher values indicated lower perceived implementation costs and a more favourable coping appraisal. Table 1 reports the final set of measurement items.

Table 1. Measurement Items and Reflective Measurement Model Results

Construct	Code	Items	Outer loading
Perceived Severity (Cronbach's α : 0.828, rho_A: 0.828, CR: 0.897, AVE: 0.745)	PS1	Climate-related hazards could have serious consequences for my hotel's operations.	0.863
	PS2	Disruptions to essential resources and infrastructure caused by climate-related hazards could seriously affect my hotel's operations.	0.877
	PS3	Climate-related hazards could seriously disrupt my hotel's service continuity.	0.849
Perceived Vulnerability (Cronbach's α : 0.805, rho_A: 0.807, CR: 0.885, AVE: 0.720)	PV1	My hotel is susceptible to operational disruptions caused by climate-related hazards.	0.833
	PV2	My hotel is vulnerable to interruptions in essential resources and infrastructure resulting from climate-related hazards.	0.877
	PV3	Climate-related hazards are likely to affect key areas of my hotel's operations.	0.834
Self-Efficacy (Cronbach's α : 0.814, rho_A: 0.814, CR: 0.890, AVE: 0.729)	SE1	My hotel is capable of implementing circular economy practices.	0.865
	SE2	My hotel has the managerial capability needed to organise the implementation of circular economy practices.	0.854
	SE3	My hotel has the technical capability needed to carry out circular economy practices in its operations.	0.842
Response Efficacy (Cronbach's α : 0.810, rho_A: 0.812, CR: 0.888, AVE: 0.725)	RE1	Circular economy practices can reduce the operational impacts of climate-related hazards on my hotel.	0.848
	RE2	Circular economy practices can reduce my hotel's dependence on external resource inputs during climate-related disruptions.	0.870
	RE3	Circular economy practices can help my hotel maintain operational continuity when facing climate-related resource disruptions.	0.836

Construct	Code	Items	Outer loading
Response Cost (Cronbach's α : 0.780, rho_A: 0.784, CR: 0.872, AVE: 0.695)		Implementing circular economy	0.852
	RC1	practices would require substantial financial investment from my hotel.	
	RC2	Implementing circular economy practices would require considerable time and effort from my hotel.	0.857
Climate Risk Information (Cronbach's α : 0.820, rho_A: 0.821, CR: 0.893, AVE: 0.735)		Implementing circular economy practices would require substantial changes to my hotel's existing systems and processes.	0.790
	CRI1	I have sufficient information about climate-related risks that may affect my hotel.	0.858
	CRI2	I can obtain timely information about climate-related risks relevant to my hotel's operations.	0.866
Coping Incentives (Cronbach's α : 0.838, rho_A: 0.921, CR: 0.898, AVE: 0.746)		I can obtain reliable information about the potential operational consequences of climate-related risks for my hotel.	0.848
	CI1	Government policies and programmes provide support for hotels seeking to implement circular economy practices in response to climate-related risks.	0.902
	CI2	Financial incentives or funding opportunities are available to support hotels in implementing circular economy practices in response to climate-related risks.	0.854
Intention to Adopt Circular Economy Practices		Relevant tourism and industry organisations provide practical or technical support for hotels implementing circular economy practices in response to climate-related risks.	0.835
	INT1	I intend to adopt circular economy practices in my hotel as a response to climate-related operational risks.	0.903

Construct	Code Items	Outer loading
(Cronbach's α : 0.804, rho_A: 0.826, CR: 0.884, AVE: 0.718)	INT2 I plan to implement circular economy practices in my hotel to better manage climate-related operational risks.	0.827
	INT3 I will make an effort to incorporate circular economy practices into future operational decisions aimed at managing climate-related risks.	0.809

3.3. Common Method and Non-response Bias

Before estimating the PLS-SEM model, the data were examined for possible common method and non-response bias. Common method bias was first evaluated in SPSS 29 using Harman's single-factor procedure with the complete set of measurement items. The leading unrotated factor explained 31.6% of the variance, suggesting that the responses were not dominated by a single general factor. Because this diagnostic alone provides limited evidence, an additional full-collinearity check was performed using the latent scores of the five focal constructs. Each construct was, in turn, regressed on the other constructs. The resulting VIFs ranged from 1.031 to 1.693 (Table 2), remaining well below the 3.3 benchmark suggested by Kock (2015). These results provided no indication that common method bias materially distorted the estimated model relationships.

Possible non-response bias was examined through a temporal comparison of respondents. Completed questionnaires were ordered by the date of receipt, after which the earliest one-third and latest one-third of respondents were compared. Independent-samples *t*-tests identified no statistically significant differences in the main study constructs between these groups (all $p > .05$). Selected respondent characteristics also showed no meaningful variation between the two groups. Taken together, these diagnostic checks provided no substantive evidence that either common method or non-response bias posed a major concern for the final sample used in the PLS-SEM analysis.

Table 2. Full-Collinearity VIF Assessment

Construct	Full-collinearity VIF
Climate Risk Information	1.652
Coping Incentives	1.031
Threat Appraisal	1.693
Coping Appraisal	1.463
Intention to Adopt Circular Economy Practices	1.343

3.4. Data analysis

Prior to model estimation, the measurement structure was specified according to the conceptual role of each item set. Perceived severity and perceived vulnerability were treated as reflective lower-order dimensions that jointly form threat appraisal because they capture distinct but complementary aspects of threat evaluation: the seriousness of climate-related operational consequences and the hotel's susceptibility to those consequences. Similarly, response efficacy, self-efficacy, and response cost were treated as reflective lower-order dimensions that jointly form coping appraisal by capturing, respectively, the expected effectiveness of circular economy practices, the hotel's capability to implement them, and the resources and organisational effort required for implementation. Because these dimensions are non-interchangeable and each contributes distinct information to the broader appraisal, threat appraisal and coping appraisal were specified as formative higher-order constructs. By contrast, climate risk information, coping incentives, and intention to adopt circular economy practices were retained as first-order reflective constructs because their item sets represented manifestations of a single underlying perception rather than distinct dimensions requiring aggregation. In particular, coping incentives captured managers' overall perception of the availability of external implementation support, with governmental, financial, and practical or technical support treated as expressions of this broader support environment. Accordingly, its relationship with coping appraisal represents the association with overall perceived external support rather than the separate effects of individual support mechanisms.

Given this measurement structure, PLS-SEM in SmartPLS 3 was selected to estimate the measurement and structural models and to test

the proposed hypotheses. This approach was appropriate because it is well suited to explanatory models that incorporate formative higher-order constructs and allows the lower-order components and their relationships with the corresponding higher-order constructs to be estimated within the overall model. Before estimation, the data were standardised to zero mean and unit variance. The PLS algorithm employed the path-weighting procedure, with starting weights of 1.0 and a maximum of 300 iterations.

The higher-order constructs were estimated using a disjoint two-stage procedure. During Stage 1, the reflective lower-order constructs were assessed in terms of indicator reliability, Cronbach's alpha, rho_A, composite reliability, AVE, and HTMT. Their latent scores were then used as components of the corresponding higher-order constructs in Stage 2. VIF statistics and outer weights were subsequently examined to assess the empirical adequacy of the formative specification rather than to determine its conceptual appropriateness. Assessment of the structural relationships relied on 5,000 bootstrap samples. Statistical significance was evaluated at the 5% level using two-tailed tests and 95% bias-corrected bootstrap confidence intervals. The proposed paths were assessed using β coefficients, t statistics, p values, and their corresponding confidence intervals. The model's explanatory and predictive performance was further evaluated using R^2 , f^2 , and Q^2 . Mediation was examined by estimating the specific indirect effect of threat appraisal on intention to adopt circular economy practices through coping appraisal, with mediation supported when the corresponding 95% bias-corrected bootstrap confidence interval did not include zero. As an additional robustness check, potentially influential observations were examined using Cook's distance for the regression equations corresponding to the endogenous constructs.

4. Results

4.1. Respondent profile

The respondent profile indicates that the survey captured managers with substantial involvement in hotel operations and organisational decision-

making. More than half of the respondents held general or operations management positions, and a similar proportion had more than 10 years of industry experience, supporting their ability to assess both operational climate risks and the organisational feasibility of circular economy practices. The sample also covered three-, four-, and five-star hotels, with representation concentrated in three- and four-star properties. Most respondents held university qualifications and were in the mid-career age groups. Detailed respondent and hotel characteristics are reported in Table 3.

Table 3. Respondent and Hotel Characteristics

Characteristic	Category	Frequency	Percentage (%)
Hotel classification	3-star	73	44.0
	4-star	61	36.7
	5-star	32	19.3
Managerial position	General manager	45	27.1
	Operations manager	52	31.3
	Engineering/Facilities manager	31	18.7
	Other senior manager	38	22.9
Industry experience	< 5 years	24	14.5
	5–10 years	55	33.1
	11–15 years	51	30.7
	> 15 years	36	21.7
Education	Diploma/Associate degree	22	13.3
	Bachelor's degree	78	47.0
	Master's degree	58	34.9
	Doctorate	8	4.8
Age	≤ 34 years	27	16.3
	35–44 years	65	39.2
	45–54 years	53	31.9
	≥ 55 years	21	12.7
Gender	Male	111	66.9
	Female	55	33.1

Note: N = 166. Percentages may not total 100% because of rounding.

4.2. Measurement model assessment

The reflective measurement results in Table 1 showed item loadings between 0.790 and 0.903, with every indicator remaining above the 0.70 criterion. Reliability was also supported across the constructs, as Cronbach's alpha ranged from 0.780 to 0.838, rho_A from 0.784 to 0.921, and composite reliability from 0.872 to 0.898. AVE values fell between 0.695 and 0.746 and therefore remained above the 0.50 benchmark, supporting convergent validity (Hair et al., 2016). No indicators were removed, and the complete set of items was carried forward to the subsequent analyses.

Table 4. HTMT Assessment of Discriminant Validity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1)	0.132							
(2)	0.228	0.078						
(3)	0.668	0.071	0.330					
(4)	0.624	0.077	0.312	0.654				
(5)	0.390	0.134	0.455	0.343	0.237			
(6)	0.367	0.110	0.551	0.342	0.420	0.644		
(7)	0.336	0.098	0.446	0.361	0.263	0.688	0.669	
(8)								

Note: (1): Climate Risk Information, (2): Coping Incentives, (3): Intention to Adopt Circular Economy Practices, (4): Perceived Vulnerability, (5): Perceived Severity; (6): Response Cost, (7): Response Efficacy, (8): Self-Efficacy.

As shown in Table 4, HTMT values ranged from 0.071 to 0.688, with all values below the 0.85 criterion (Henseler et al., 2015). The highest value, observed between Response Cost and Self-Efficacy (0.688), remained comfortably below this threshold, supporting discriminant validity among the reflective lower-order constructs.

4.3. Higher-order construct assessment

Table 5 reports the assessment of the higher-order constructs. VIF statistics varied between 1.400 and 1.624, remaining well within acceptable limits and indicating that collinearity was not a concern among the lower-order components (Hair et al., 2016). Each component showed a statistically significant outer weight ($p < .001$). For threat appraisal, perceived severity and perceived vulnerability contributed almost equally, with weights of 0.566 and 0.576, respectively. A similarly balanced pattern was observed for coping appraisal, where self-efficacy, response efficacy, and reverse-coded response cost produced weights between 0.393 and 0.411. Given the conceptually specified formative structure described in Section 3.4, the acceptable VIF values and significant outer weights indicate that the lower-order components contributed adequately to their respective higher-order constructs (Becker et al., 2012).

Table 5. Evaluation of Formative Higher-Order Constructs

Higher-order construct	Lower-order component	Outer weight	t-value	p-value	VIF
Threat Appraisal	Perceived Severity	0.566	36.207	< .001	1.400
	Perceived Vulnerability	0.576	41.930	< .001	1.400
Coping Appraisal	Self-Efficacy	0.403	26.901	< .001	1.624
	Response Efficacy	0.411	28.704	< .001	1.572
	Response Cost*	0.393	28.188	< .001	1.549

Note: Response Cost was reverse-scored before estimating the higher-order Coping Appraisal construct.

4.4. Structural model and hypothesis testing

The structural model accounted for 36.6% of the variation in threat appraisal ($R^2 = 0.366$), 14.1% in coping appraisal ($R^2 = 0.141$), and 22.6% in intention to adopt circular economy practices ($R^2 = 0.226$). Predictive relevance was supported by positive Q^2 statistics for all three endogenous constructs: 0.266 for threat appraisal, 0.084 for coping appraisal, and 0.148 for adoption intention. The effect-size results further showed that climate risk information exerted a large effect on threat appraisal ($f^2 = 0.576$), whereas the effect of coping appraisal on

adoption intention was moderate ($f^2 = 0.205$). The effect of threat appraisal on coping appraisal ($f^2 = 0.149$) was close to the conventional medium benchmark, while its effect on adoption intention was small ($f^2 = 0.024$). Coping incentives produced only a negligible effect on coping appraisal ($f^2 = 0.009$) (Hair et al., 2016; Cohen, 1988). Relative to the sensitivity threshold of approximately $f^2 = 0.095$, the observed effects for H1, H2, and H5 were above the level detectable with 95% power, whereas the very small effects for H3 and H6 fell below this threshold and should therefore be interpreted more cautiously.

Threat appraisal was associated with higher coping appraisal ($\beta = 0.359$, $t = 5.611$, $p < .001$, 95% CI [0.227, 0.480]), providing support for H1. Higher coping appraisal was likewise associated with stronger intention to adopt circular economy practices ($\beta = 0.423$, $t = 6.000$, $p < .001$, 95% CI [0.275, 0.555]); thus, H2 was supported. The direct association between threat appraisal and adoption intention was positive but did not meet the prespecified significance criterion ($\beta = 0.144$, $t = 1.963$, $p = .050$, 95% CI [-0.000, 0.288]); accordingly, H3 was not supported.

For the indirect pathway, threat appraisal was related to adoption intention through coping appraisal ($\beta = 0.152$, $t = 3.971$, $p < .001$, 95% CI [0.081, 0.228]), supporting H4. Climate risk information also showed a significant positive relationship with threat appraisal ($\beta = 0.605$, $t = 12.299$, $p < .001$, 95% CI [0.499, 0.693]), consistent with H5. No statistically significant relationship emerged between coping incentives and coping appraisal ($\beta = 0.090$, $t = 0.973$, $p = .331$, 95% CI [-0.130, 0.239]); consequently, H6 was not supported. Overall, four of the six hypothesised relationships received empirical support. The robustness check further indicated that no observation had sufficient influence to alter the substantive interpretation of the structural relationships.

Table 6. Structural Model Results and Hypothesis Testing

Hypothesis	Relationship	β	t -value	p -value	95% CI	f^2	Decision
H1	Threat Appraisal → Coping Appraisal	0.359	5.611	< .001	[0.227, 0.480]	0.149	Supported

Hypothesis	Relationship	β	<i>t</i> -value	<i>p</i> -value	95% CI	<i>f</i> ²	Decision
H2	Coping Appraisal → Intention to Adopt Circular Economy Practices	0.423	6.000	< .001	[0.275, 0.555]	0.205	Supported
H3	Threat Appraisal → Intention to Adopt Circular Economy Practices	0.144	1.963	.050	[-0.000, 0.288]	0.024	Not supported
H4	Threat Appraisal → Coping Appraisal → Intention to Adopt Circular Economy Practices	0.152	3.971	< .001	[0.081, 0.228]	—	Supported
H5	Climate Risk Information → Threat Appraisal	0.605	12.299	< .001	[0.499, 0.693]	0.576	Supported
H6	Coping Incentives → Coping Appraisal	0.090	0.973	.331	[-0.130, 0.239]	0.009	Not supported

5. Discussion

5.1. Theoretical implications

The results indicate that hotel managers' adoption intentions are associated with the way they assess both climate-related threats and their capacity to respond to them. Consistent with H1 and H2, stronger threat appraisal was associated with more favourable coping appraisal, while more favourable coping appraisal was associated with greater intention to adopt circular economy practices. The higher-order construct results add further detail to this pattern. At the construct level, perceived severity and perceived vulnerability contributed at similar levels to threat appraisal, whereas response efficacy, self-efficacy, and response cost showed broadly comparable contributions to coping appraisal. These findings indicate that managers' appraisals of climate-related operational risk involve more than simply recognising the presence of a threat or judging a single aspect of organisational

capability. Instead, their evaluations appear to combine assessments of the importance of the threat with several considerations concerning the feasibility of the proposed response. Together, these relationships identify an important set of appraisal processes associated with adoption intention, while also suggesting that managers' decisions are likely to reflect additional organisational and contextual considerations beyond those captured in the present model. Viewed from a PMT perspective, the findings support the relevance of the theory for examining organisation-level evaluations made by hotel managers when forming adoption intentions (Hu et al., 2022; Maddux & Rogers, 1983).

More importantly, H3 was not supported, as the direct association between threat appraisal and adoption intention was positive but did not meet the prespecified significance criterion. This pattern points to a weak and uncertain direct relationship rather than a clearly absent one. Support for H4, however, indicates a significant indirect association between threat appraisal and adoption intention through coping appraisal. Previous climate-adaptation research has shown that threat and coping evaluations are both relevant to adaptive intentions (Verkoeyen & Nepal, 2022; Tasantab et al., 2022; Wang et al., 2019). The present findings add to this literature by suggesting that, in the context of circular economy adoption, perceiving climate-related operational risk as important may not be sufficient, on its own, to distinguish stronger adoption intentions. Rather, the findings point to the additional relevance of how managers evaluate the proposed response itself—whether it is considered effective, achievable, and compatible with perceived implementation requirements. The extent to which threat appraisal is reflected directly in adoption intention may therefore vary with organisational conditions that shape a hotel's capacity to act. Hotels with greater financial, technical, and managerial resources may be better able to convert heightened risk perceptions into intended action, whereas more resource-constrained properties may depend more strongly on favourable evaluations of feasibility and capability before such intentions emerge. This interpretation is consistent with evidence from Tehran hotels showing that high initial implementation costs can constrain environmental management and

that organisational characteristics such as hotel size and ownership are associated with environmental commitment (Ziaee & Ranjbar Motalegh, 2013). Coping appraisal may therefore be understood as one important evaluative link between climate-risk recognition and the formation of a specific managerial adoption intention. From a PMT perspective, this pattern draws attention to the joint relevance of threat recognition and response evaluation in understanding organisation-referent adoption intentions, without reducing such decisions to either appraisal alone.

The antecedent results provide a further refinement to this pattern of associations. Supporting H5, climate risk information was positively associated with threat appraisal, reinforcing previous evidence that relevant information helps decision-makers interpret the significance of climate-related hazards (Xu et al., 2026; Hu et al., 2022). However, H6 was not supported: coping incentives were not significantly associated with coping appraisal, despite previous tourism research emphasising the importance of institutional support, funding, and external assistance in facilitating adaptation and resource-efficiency initiatives (Becken & Dolnicar, 2016; Becken & Hay, 2012; Wong et al., 2012). This contrast suggests that the two contextual factors examined here are related differently to managers' appraisal processes. Climate risk information appears particularly relevant to how managers assess operational threats, whereas the general availability of external support showed little relationship with their evaluation of whether a circular response is effective, feasible, or costly. The role of coping incentives may therefore depend on how directly and concretely such support is reflected in the implementation conditions perceived by managers, rather than merely on its perceived availability.

Taken together, the findings clarify the relevance of PMT for examining managers' organisation-referent climate-adaptation appraisals by distinguishing between risk interpretation, response evaluation, and adoption intention. Climate risk information is associated with the way managers interpret operational threats; threat appraisal is associated with coping appraisal; and coping appraisal is associated with adoption intention regarding circular economy practices. At the same time, the non-significant role of coping

incentives indicates that the general availability of external support, as perceived by managers, was not closely related to their coping appraisal in this study. Rather than suggesting that adoption intention is captured by a single appraisal pathway, the overall pattern points to the interplay between perceived climate risk, evaluations of response viability, and the broader organisational and contextual conditions surrounding managerial decisions. The study therefore contributes a manager-centred, organisation-referent interpretation of PMT by identifying a set of appraisal relationships relevant to circular economy adoption intention in hotels, while recognising that these intentions are likely to reflect additional influences beyond those captured in the present model. This provides a useful theoretical lens for understanding managerial climate-risk appraisal and circular economy adoption intentions in the hospitality context.

5.2. Practical implications

The findings provide potential practical implications for hotel managers, tourism authorities, and industry organisations seeking to incorporate circular economy practices into climate adaptation. First, the strong association between climate risk information and threat appraisal indicates that climate information may support managers' interpretation of climate-related operational risks when it is presented in forms relevant to hotel operations. Tourism authorities and hotel associations could consider developing locally relevant risk briefs, seasonal alerts, climate-impact maps, and digital tools that clarify how climate hazards may affect hotel operations. The emphasis should be on information that helps managers understand how and where disruptions may occur and what they may mean for day-to-day decision-making, rather than on general climate awareness alone. This is consistent with Mahon et al. (2021), who show that tourism decision-makers benefit from climate information tailored to their specific planning and operational needs.

Second, the positive but non-significant direct association between threat appraisal and adoption intention, together with the significant indirect association through coping appraisal, suggests that recognising climate risk alone may not be sufficient to distinguish stronger adoption

intentions unless managers also consider the effectiveness and feasibility of a potential response. From a practical perspective, circular economy initiatives may therefore benefit from being considered alongside their expected operational value and their feasibility under existing organisational conditions. Practical training, clear implementation guidance, access to relevant expertise, and examples of workable applications may support managers' evaluations of whether proposed practices are effective, feasible within the hotel's capabilities, and proportionate to the resources required. This is particularly relevant because hospitality research identifies limited education, insufficient knowledge of actionable circular interventions, and implementation barriers as important constraints on circular economy adoption (Bittner et al., 2024).

The non-significant relationship between coping incentives and coping appraisal should be interpreted cautiously. In this sample, the perceived availability of general external support was not significantly associated with managers' coping appraisal; however, this finding does not imply that financial, regulatory, or technical support is ineffective. The result may partly reflect the broad way in which coping incentives were measured, combining different forms of support within a single construct, as well as the cross-sectional nature of the data. Further research could examine whether and under what conditions specific forms of financial, regulatory, and technical support are associated with managers' evaluations of the feasibility and effectiveness of circular economy practices. From a practical perspective, future support mechanisms may benefit from being considered in relation to specific implementation barriers faced by hotels and evaluated for their relevance to different organisational contexts. For example, financial assistance could be linked to clearly defined investments, while technical support could include hotel-specific assessments, implementation advice, technology demonstrations, and access to relevant expertise. This is consistent with Becken and Dolnicar (2016), who show that accommodation and food-service businesses value practical forms of support, including grants, funding advice, consultancy, technology demonstrations, and cooperation when implementing resource-efficiency measures.

Taken together, the findings suggest potential value in considering climate communication and circular economy support as connected elements of hotel adaptation. Risk information may help managers recognise where action may be needed, while capability development and implementation support may assist them in evaluating which responses are realistically achievable. Coordinated initiatives involving tourism authorities, hotel associations, climate-service providers, and industry partners could therefore explore combining climate-risk information with circular economy training, operational assessments, and demonstration projects. Such an approach could complement general awareness and incentive-based measures with practical decision support that may assist hotel managers in evaluating feasible circular responses to climate-related operational risks. Such coordination is consistent with the broader need for stronger integration between tourism research, climate science, and climate-change policy and practice (Rastegar et al., 2026; Becken et al., 2020).

5.3. Limitations and directions for future research

First, the study relied on cross-sectional self-report data from a single senior manager at each hotel. Although the diagnostic tests did not indicate substantial common method or non-response bias, residual common method bias cannot be entirely ruled out because all focal constructs were measured from the same respondent using the same survey instrument. Future research could strengthen the assessment of this issue through multi-source or temporally separated data collection and by incorporating a theoretically unrelated marker variable into the survey design. The findings also capture managers' perceptions and intentions at only one point in time and therefore do not establish whether adoption intentions translate into actual implementation. Likewise, the indirect relationship through coping appraisal represents statistical mediation rather than confirmed temporal or causal ordering. Longitudinal and multi-wave research could examine how these appraisals and intentions evolve over time and whether they are reflected in implemented circular practices and subsequent operational outcomes.

Second, although the study covered three- to five-star hotels across five Iranian cities with different climatic conditions, city-level variation and relevant organisational characteristics were not explicitly modelled. Factors such as hotel size, years of operation, chain affiliation, and ownership structure may also be associated with managers' adoption intentions. In addition, circular economy adoption was examined at an overall rather than a practice-specific level, so potential differences across water, energy, materials, and waste-related practices were not assessed. Future research could therefore test the model across cities, hotel categories, and specific circular practices using multi-group or comparative analyses, while incorporating relevant organisational controls and location-specific climate indicators.

Third, threat appraisal and coping appraisal were modelled as higher-order constructs that integrate their theoretically distinct lower-order dimensions. While this specification allowed the broader appraisal processes to be examined, it did not estimate the separate structural relationships of perceived severity, perceived vulnerability, self-efficacy, response efficacy, and response cost. Future research could examine these dimensions individually to determine whether they differ in their relationships with subsequent appraisals and adoption intention. Similarly, coping incentives were examined as an overall perception of external support rather than as separate financial, governmental, and technical support mechanisms. Future studies could develop multi-item measures for these specific forms of support and examine their relationships with coping appraisal separately.

Finally, threat appraisal was based on managers' perceived severity and vulnerability rather than hotel-specific objective indicators of climate exposure. Future research could combine perceptual measures with local climate data, documented disruptions, or hotel-level exposure indicators to distinguish perceived from actual climate risk. Incorporating additional organisational conditions may also help explain the remaining variation in coping appraisal and adoption intention.

5.4. Conclusion

This study shows that hotel managers' willingness to consider circular economy practices as climate-adaptation responses is associated with more than recognising climate-related operational risks. What appears to matter is whether those risks are accompanied by favourable evaluations of responses that managers regard as workable within their organisational conditions. Consistent with this pattern, the direct association between threat appraisal and adoption intention was positive but did not meet the prespecified significance criterion, whereas a significant indirect association through coping appraisal was observed. The findings therefore draw attention to the role of appraisal processes in understanding how perceived climate risk is associated with circular economy adoption intention. At the same time, the perceived availability of general external support was not significantly associated with coping appraisal in this sample, suggesting that the role of different forms of support requires more differentiated examination. Overall, the study brings managers' climate-adaptation appraisals and circular economy adoption intentions together within an organisation-referent perspective, providing a basis for understanding how managers differ in their willingness to consider circular responses under the organisational conditions they perceive in the face of climate uncertainty.

Conflict of Interest

The authors declare that they have no conflicts of interest.

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ORCID

-  <https://orcid.org/0000-0002-4089-565X>
-  <https://orcid.org/0000-0002-0611-9999>
-  <https://orcid.org/0000-0002-5794-2096>

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