EXPLORING VISITORS' PRO-ENVIRONMENTAL BEHAVIORS AT URBAN FOREST DESTINATIONS

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Abstract

Our theoretical framework was intricately crafted to illuminate the decision-making dynamics of visitors in urban forest destinations. The primary objectives of this study were to scrutinize visitors' pro-environmental behavior (PRB), employing the Theory of Reasoned Action (TRA) as a foundational framework, and extending it by incorporating key factors such as connectedness to nature, biospheric value, environmental empathy, attitude, positive anticipated emotion, moral norms, subjective norms, and natural/local resource conservation intentions, within the unique context of urban forest destinations. Utilizing $GSCA_M$, the framework's measurement quality is affirmed as being adequate. Findings from the structural model and necessary condition analysis (NCA) robustly supported the hypothesized associations within the proposed theoretical framework. Notably, cognitive and affective appraisals, along with moral considerations, emerged as salient in shaping visitor intentions. Furthermore, empirical support was observed for the hypothesized impact of natural resource conservation intentions on determining PRB, providing nuanced insights into the factors influencing pro-environmental actions in urban forest destinations. This comprehensive approach not only enhances theoretical understanding but also offers practical applications for promoting sustainable behaviors in these unique settings.

Keywords: Urban forest; Visitor behavior; Pro-environmental behavior; Theory of Reasoned Action; Visitor Intentions

1. INTRODUCTION

Due to the ongoing process of global urbanization, the number of large cities with populations exceeding one million people is steadily increasing (Fakfare et al., 2020; 2022; Kim et al., 2021; Talawanich & Pongwat, 2024). This growth in urban areas has led to heightened issues, such as noise, traffic congestion, and air pollution, which are emerging as significant sources of urban stress (Berglihn, & Gómez-Baggethun, 2021; Fakfare, 2023; Fakfare & Manosuthi, 2023). However, if urban residents find it increasingly challenging to recover from such stress, it is probable that they will experience a range of long-term health

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issues. In response to these challenges, urban forest destinations have gained recognition for their ability to significantly benefit residents' physical and mental health by relieving stress. These green spaces have become favored locations for those seeking natural beauty, tranquility, and outdoor experiences (Intasen et al., 2017).

However, the growing appeal of urban forest destinations has raised concerns about their environmental sustainability (Koeser et al., 2023). Challenges such as pollution, habitat disturbance, and climate change are among the concerns that require urgent attention (Fakfare & Wattanacharoensil, 2023a; 2023b; Kim et al., 2023; Koh et al., 2023). Sustainable practices play a pivotal role in mitigating these threats, aiming to minimize negative environmental impacts while maximizing the benefits of urban forest tourism for local communities and economies (Koh et al., 2022). Therefore, achieving sustainability in urban forest destinations demands a deeper understanding of what motivates or hinders sustainable behaviors among visitors.

Prior research has made efforts to explore various facets of urban forest destinations. As an illustration, Kim et al. (2021) conducted a study which assessed the economic worth of urban forest parks, concentrating particularly on restorative experiences and environmental consideration. Intasen et al. (2017) conducted an urban forest assessment in Bangkok and piloted the suitability of adapting the i-Tree Eco International software for use in Thailand. Koeser et al. (2023) explored the attitudes of residents in Florida, regarding tree protections, urban development, and incentives for urban forests. These studies serve as valuable reference points for a deeper understanding of the dynamics and potential benefits of urban forest management and conservation. However, there still exists a need for further research to build upon this foundation of knowledge, particularly in terms of visitors' decision-making processes and pro-environmental behaviors. Therefore, this research aims to expand upon the previous studies by conducting an in-depth investigation into the specific factors influencing visitor behavior related to sustainability in urban forest destinations through the lens of the Theory of Reasoned Action (TRA).

The TRA developed by Fishbein and Ajzen (1975), posits that individuals engage in rational, motivation-based decision-making processes. This theory suggests that people assess their attitudes toward a specific behavior and the subjective norms that shape their choices before making informed decisions. In essence, individuals weigh the pros and cons, taking into account their personal beliefs and values, as well as the opinions of their social environment (Fakfare et al., 2023; Wattanacharoensil et al., 2024). Given its effectiveness and precision, the TRA is widely applied across various study fields, including tourism and pro-responsible behavior (Fakfare et al., 2024). In the context of urban forest destinations, the TRA is especially pertinent as it offers a structured framework to comprehend and forecast visitor behavior in relation to sustainability. Recognizing the urgent need to strike a balance between promoting urban forest destinations and preserving these green oases, this research endeavors to uncover the determinants influencing the expression of sustainable visitor behavior. More specifically, the present study was designed to explore the predictors of visitors' pro-environmental behaviors at urban forest destinations with the use of a structural equation modelling (SEM), and single necessary condition analysis (NCA) approach. In particular, the study aims 1) to examine the TRA and its extended factors, including connectedness to nature, biospheric value, environmental empathy, and anticipated feelings, on visitors' pro-environmental behavior and conservation intentions, at urban forest destinations, 2) to identify the necessary conditions based on the TRA and its extended factors, on visitors' pro-environmental behavior and conservation intentions at urban forest destinations.

2. LITERATURE REVIEW

2.1 Theory of Reasoned Actions

Urban forest destinations offer a unique environment for understanding tourists' decision-making processes. Much like the TRA posits that individuals make rational and motivation-based decisions (Fishbein & Ajzen, 1975), tourists considering visits to urban forest destinations weigh their attitudes toward this natural attraction and the subjective norms influencing their choices. They evaluate the pros and cons, considering their personal beliefs and values alongside the opinions of those within their social circles (Han & Kim, 2010). Numerous studies have explored the TRA's predictive power, affirming its effectiveness in forecasting individual behaviors (Sheppard et al., 1988). Given its robustness, the TRA is widely applied in diverse fields, including hospitality and tourism (Fakfare et al., 2024; Ryu & Jang, 2006).

In the destination context, researchers often examine visitors' pro-environmental behaviors, which can be motivated by pro-social or self-interest motives (Han, 2015). Constructs such as attitudes and subjective norms are frequently employed to predict these behaviors. Visitors are more likely to engage in pro-environmental actions when they possess a favorable attitude and feel social pressure (Bamberg et al., 2007). The TRA has been applied to study various tourist behaviors, including decision-making regarding visiting green hotels (Han & Kim, 2010), and intentions to engage in environmentally responsible activities within the business tourism setting (Han, 2014).

In the context of urban forest destinations, an opportunity exists for stakeholders, such as local authorities and tourism agencies, to adopt the TRA as a foundational framework for the development of robust policies and strategies. These measures can promote responsible visitor behavior while discouraging any harmful practices that may adversely affect the urban forest environment. In light of the growing concern for the preservation of urban forests and the need for sustainable destinations, this study proposes a significant extension of the TRA framework. This extension entails the incorporation of constructs, such as connectedness to nature, environmental empathy, biospheric value, moral norms, and positive anticipated emotions. This comprehensive expansion of the TRA framework is expected to provide valuable insights into the factors that influence tourists' pro-environmental behavior and their role in preserving these natural areas.

2.2 The Relationships Among the Constructs Within the TRA and its Extended Variables

As described by Ajzen (1991), the TRA identifies attitude, subjective norms, and behavioral intentions as the key variables. In the context of urban forest destinations, attitude represents an individual's positive or negative evaluation of engaging in activities within urban forest destinations. For instance, it could encompass a person's overall perception of the urban forest experience or their attitude toward specific aspects of visiting such locations. Subjective norms refer to the perceived social pressure that individuals perceive regarding their decisions to behave responsibly at urban forest destinations or not (Wattanacharoensil et al., 2024). These norms can be influenced by various factors, including personal values, social influences, past experiences, and the promotional efforts of tourism agencies. Recent research conducted by Jang and Cho (2022) has demonstrated that attitudes and subjective norms play a pivotal role in shaping behavioral intentions. Kim and Hwang (2020) also found a relationship between subjective norms and moral norms. Drawing from the insights of studies such as Fakfare et al. (2024) and Ryu and Jang (2006), which examined related domains, the following hypotheses can be formulated in the context of urban forest destinations:

H1: Attitude towards visiting urban forest destinations positively influences behavioral intentions in terms of a natural/local resource conservation intention (NI) for urban forest destination visitation.

H2: Subjective norms positively influence NI for urban forest destination visitation.

H3: Subjective norms positively influence moral norms.

Previous literature has identified the relationships among the cognitive, affective and normative factors in influencing tourists' behavioral responses toward sustainable tourism practices (Fakfare et al., 2023). Factors such as connectedness to nature, environmental empathy, and biospheric value have an impact on visitors' cognitive and affective appraisals toward a destination, and moral and subjective norms (Han & Hyun, 2017; Tam, 2013). Connectedness to nature can be described as the degree of emotional involvement and attachment that individuals experience in relation to the natural world, while environmental empathy signifies an innate tendency to understand and share in the emotional experiences of the natural environment (Tam, 2013). Biospheric value refers to how individuals assess situations and decisions by considering their impact on the well-being of ecosystems (Stern & Dietz, 1994). According to Han and Hyun (2017), when tourists have favorable perceptions, such as empathy and a strong emotional connection to nature, it can significantly enhance their attitude and emotions, leading them to be more aware of ethical standards and motivated to engage in eco-friendly behaviors while traveling. Consistent with previous research, connectedness to nature, environmental empathy, and biospheric value, likely play a crucial role in influencing tourists' attitudes and emotions, potentially encouraging them to embrace sustainable practices and appreciate the natural environment within the urban forest setting. Thus, the following hypotheses were proposed. Figure 1 illustrates the research framework for this study.

H4: Connectedness to nature positively influences attitudes toward sustainable destinations

H5: Connectedness to nature positively influences positive anticipated emotions

H6: Environmental empathy positively influences attitudes toward sustainable destinations

H7: Environmental empathy positively influences positive anticipated emotions

H8: Biospheric value positively influences attitudes toward sustainable destinations

H9: Biospheric value positively influences positive anticipated emotions

H10: Attitudes toward sustainable destinations positively influence moral norms

H11: Positive anticipated emotions positively influence moral norms

H12: Moral norms positively influence natural/local resource conservation intentions (NI)

H13: NI positively influences visitor pro-environmental behaviors

Furthermore, recognizing the paramount importance of essential prerequisites in the attainment of desired outcomes and the relatively limited exploration of this concept within the realm of tourism research, one primary objective of this study is to investigate the indispensable conditions that foster the ultimate outcome, which is pro-environmental behavior among visitors engaging with an urban forest destination. This investigation adopts the necessary condition analysis (NCA) methodology, as advocated by Dul (2016), to elucidate the essential factors at play. The central premise of this research posits that the presence of at least one of the identified pertinent factors is imperative for the realization of the desired outcome. Consequently, the following hypothesis is proposed:

H14: At least one identified factor is necessary for the occurrence of pro-environmental behavior

Figure 1 Research Framework
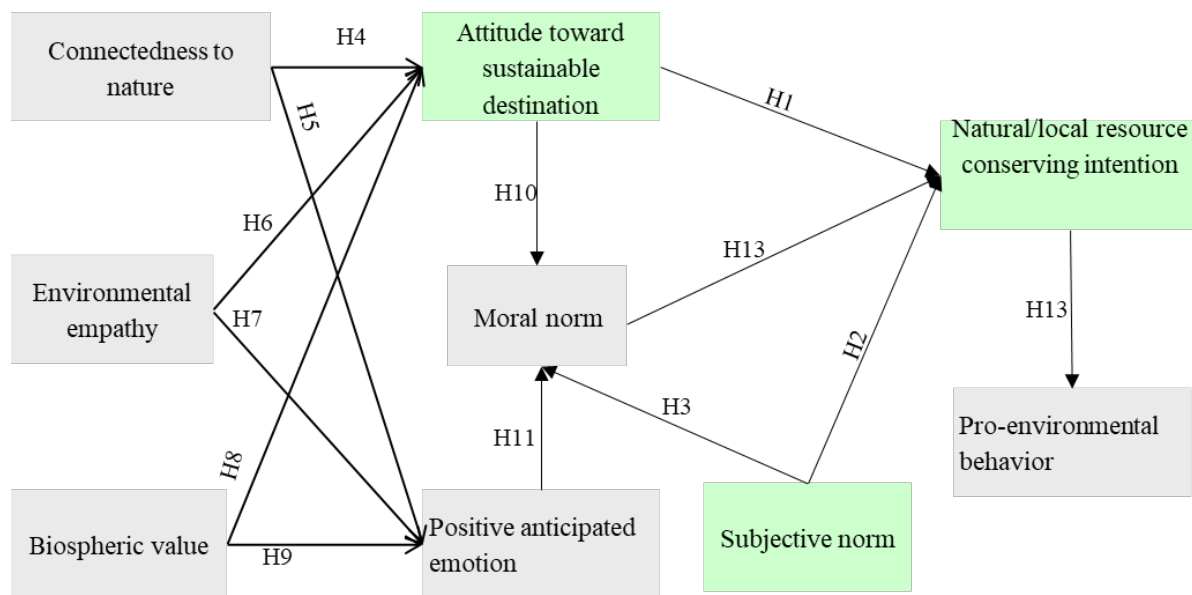
3. METHODOLOGY

3.1 Measurement Development and Data Collection Process

The measurements for the study constructs were adopted from prior research, with all measurements having been repetitively verified in different contexts. The TRA construct measures, including attitudes toward sustainable destinations, subjective norms and natural/local resource conservation intentions, were adopted from Han (2015). Connectedness to nature and environmental empathy were adopted from Tam (2013). Biospheric value was measured using four items based on Luong's (2023) study. Positive anticipated emotions and moral norms were measured based on Han et al. (2019). Finally, pro-environmental behavior was measured using indicators adopted from Han (2015). All measurements were modified to suit the context of urban forest destinations.

Data were collected through a self-administered online survey during the first week of February 2024, with the assistance of research assistants. Participants were given a briefing session to familiarize them with the study's nature and background. Bangkok and the greater metropolitan area was selected as the study location due to the increasing development of urban forest destinations (Intasen et al., 2017). It is important to note that this study specifically focused on individuals with previous experience visiting urban forest destinations. To ensure the inclusion of the appropriate participants, screening questions regarding the purpose and intentions of travel were incorporated. Due to the limited number of tourists meeting these criteria, a convenience sampling approach was utilized to gather data from this specific group of tourists. Only participants who responded yes to the filtering question (i.e., "have you experienced traveling to an urban forest destination in the past 12 months?") were permitted to continue with the survey. As a result, a total sample of 590 responses was obtained. Due to major missing values in 17 responses, data from only 573 respondents were used for further statistical analysis.

Analysis of the respondent profiles revealed that female respondents held a small majority in the study, comprising 55.3% of participants. Male respondents accounted for 39.6% of the sample, while 5.1% of the respondents chose not to disclose their gender. The average

age of the respondents was 19.64 years old. In terms of income, the majority of respondents earned THB15,000-20,000 (90.1%). A total of 88% held bachelor's degree, followed by associate degrees (7%), and high school (5%).

3.3 Analysis Process

To perform a combined analysis of SEM and NCA, this study adhered to the methodology proposed by Richter et al. (2020). In a similar approach to Wattanacharoensil et al.'s (2023; 2024) research, the data were divided into two distinct sets. The training sample encompassed 80% of the data, while the remaining 20% constituted the testing set. Although there were no specific measures in place to evaluate the reliability and validity of the construct measures NCA, the study model was assessed in advance using the criteria established by SEM as outlined by Richter et al. (2020). Component-based SEM was chosen in this study because the linearly combined score resulting from this approach could be utilized in the subsequent analysis (Chumwichan et al., 2023; Leruksa et al., 2023; Rasmidatta, 2023). As mentioned by Hwang et al. (2017), GSCA$_M$ is an approach that deals with both the common and unique aspects of indicators, similar to how factor-based SEM manages measurement errors. Thus, this study opted for GSCA$_M$ as a primary estimator. Once the net-effects and single necessary conditions were determined, the analysis revealed four distinct conditions that had not been previously identified in SEM analysis: necessary but insufficient condition, necessary and sufficient condition, unnecessary but sufficient condition, and unnecessary and insufficient condition.

4. RESULTS

4.1 Measurement and Structural Model Assessments

In this study, GSCA$_M$ was employed to assess the measurement model, with findings presented in Table 1. Internal consistency was ensured by confirming that common reliability estimates, such as Dijkstra-Henselers rho_A, exceeded the threshold of 0.7. Convergent validity was established as all loadings and the average variance extracted (AVE) values exceeded 0.5. Discriminant validity of the measures was further assessed using the advanced heterotrait-monotrait ratio of correlations (HTMT2), and the results indicated that all measures were below the recommended cutoff of 0.85, thus confirming discriminant validity. To assess collinearity, the variance inflation factor (VIF) was examined. No significant issues were identified since all VIF scores remained generally below 5 (Hair et al., 2011). Moreover, fit measures indicated an acceptable fit to the data (SRMR = 0.059, GFI = 0.98). Therefore, it was concluded that the measurement model was both valid and reliable.

Table 2 presents the findings of the structural model, indicating that the hypothesized relationships generally had an influence on the desired outcomes. Moral norms (MN) were affected by social norms and positive anticipated emotions (PAE), thus H3 and H11 were supported. PAE was found to be influenced by connectedness to nature (CN) and biospheric value, thus supporting H5 and H9. It was also found that attitudes toward sustainable destinations were influenced by biospheric value, but not CN or environmental empathy (EE), thus H8 was supported. As expected, MN exerts a significant influence on natural/local resource conservation intentions, which in turn affect the pro-environmental behavior of visitors, thus supporting H12 and H13.

Table 1 Measurement Model Assessment

Construct	Indicator	AVE	Rho A	$\widehat{w}_i$	$CI_{\widehat{w}_i}$(L/U)		$\widehat{\lambda}_i$	$CI_{\widehat{\lambda}_i}$	
CN	I think of the natural world as a community to which I belong.			0.091	0.071	0.117	0.339	0.262	0.442
	When I think of my life, I imagine myself to be part of a large cyclical process of living.			0.199	0.188	0.210	0.743	0.701	0.785
	I often feel a kinship with animals and plants.			0.203	0.187	0.216	0.757	0.702	0.814
	I feel as though I belong to the Earth as equally as it belongs to me.	0.53	0.88	0.207	0.193	0.224	0.77	0.728	0.82
	I often feel part of the web of life.			0.218	0.203	0.231	0.812	0.759	0.853
	I feel that all inhabitants of Earth, human, and nonhuman, share a common 'life force'			0.217	0.203	0.228	0.81	0.766	0.854
	Like a tree can be part of the forest, I feel embedded within the broader natural world.			0.204	0.191	0.217	0.759	0.711	0.81
EE	I feel happy when I see other people enjoy the environment without harming living things.			0.241	0.229	0.255	0.795	0.742	0.838
	I put myself in the place of living things when they are mistreated.			0.259	0.249	0.274	0.855	0.822	0.891
	When I see animals that are happy in their environment, I feel happy.	0.66	0.90	0.258	0.242	0.271	0.853	0.805	0.89
	I imagine how I would feel if I were the suffering animals and plants.			0.260	0.248	0.273	0.859	0.829	0.894
	I get involved with the feelings of the suffering animals and plants			0.208	0.193	0.223	0.688	0.623	0.749
BV	I think that the most important thing in visiting an urban forest destination in a sustainable manner could be …	0.64	0.88						
	Preventing pollution, conserving natural resources			0.238	0.218	0.257	0.615	0.553	0.686
	Respecting the earth, harmony with other species			0.337	0.316	0.352	0.871	0.848	0.895

Table 1 (Continued)

Construct	Indicator	AVE	Rho A	$\hat{w}_i$	$CI_{\hat{w}_i}$(L/U)		$\hat{\lambda}_i$	$CI_{\hat{\lambda}_i}$	
	Unity with nature, becoming one with nature			0.331	0.313	0.345	0.856	0.807	0.892
	Protecting the environment, preserving nature			0.328	0.313	0.340	0.846	0.814	0.885
AT	To me, visiting an urban forest destination in an environmentally responsible manner is…								
	Unattractive ↔ Attractive	0.65	0.85	0.342	0.318	0.370	0.679	0.628	0.752
	Foolish ↔ Wise			0.466	0.427	0.476	0.926	0.859	0.925
	Harmful ↔ Beneficial			0.411	0.403	0.450	0.817	0.802	0.882
PAE	If I go on an urban forest destination trip…..								
	I will be excited.	0.64	0.84	0.348	0.321	0.378	0.664	0.605	0.728
	I will be happy.			0.436	0.407	0.461	0.833	0.791	0.881
	I will be satisfied.			0.460	0.429	0.485	0.882	0.836	0.929
MN	I feel an obligation to behave in a pro-environmental way while visiting an urban forest destination.			0.367	0.345	0.386	0.738	0.683	0.788
	Regardless of what other people do, because of my own values/principles, I feel that I should act in environmentally friendly ways while visiting an urban forest destination.	0.67	0.85	0.426	0.413	0.454	0.86	0.841	0.938
	I feel that it is important to make urban forest destinations sustainable, reducing the harm to the host community and wider environment.			0.426	0.392	0.439	0.852	0.805	0.877
SN	Most people who are important to me will ( ) that I go to visit an urban forest in an environmentally responsible manner.	0.73	0.88						
	Approve			0.393	0.371	0.410	0.855	0.829	0.9
	Understand			0.405	0.383	0.418	0.881	0.847	0.912

Table 1 (Continued)

Construct	Indicator	AVE	Rho A	$\hat{w}_i$	$CI_{\hat{w}_i}$(L/U)		$\hat{\lambda}_i$	$CI_{\hat{\lambda}_i}$	
	Recommend			0.376	0.364	0.392	0.818	0.786	0.863
PRB	I consistently use environmentally friendly or recyclable materials when taking a trip.	0.57	0.84	0.339	0.309	0.354	0.775	0.706	0.836
	I choose public transportation as my mode of travel when visiting an urban forest destination.			0.294	0.268	0.317	0.676	0.617	0.748
	I frequently encounter and explore sustainable infrastructure and facilities during my visits to urban forest destinations.			0.350	0.329	0.377	0.807	0.772	0.854
	I actively engage in environmental conservation practices and actions during my trips due to the conducive conditions present.			0.334	0.301	0.358	0.765	0.692	0.823
NI	I would try to protect local resources as much as I could, that is I would voluntarily stop visiting a famous spot if it needed to recover from environmental damage.	0.70	0.90	0.304	0.287	0.321	0.847	0.822	0.872
	I would try to save water and electricity, reduce waste, and recycle empty bottles while I am visiting an urban forest destination.			0.294	0.282	0.311	0.823	0.773	0.886
	I intend to behave in a way that will not harm plants and animals while I am visiting an urban forest destination.			0.294	0.278	0.307	0.825	0.776	0.88
SRMR = 0.059	I don't intend to collect flora and fauna specimens without permission while I am visiting an urban forest destination.			0.304	0.283	0.316	0.849	0.819	0.889

Note. $\hat{w}_i$ = estimated weights, $CI_{\hat{w}_i}$ = 95% Confidence interval of estimated weights, $\hat{\lambda}_i$ = estimated loadings, $CI_{\hat{\lambda}_i}$ = 95% Confidence interval of estimated loadings, rho_A = Dijkstra-Henselers_rho_A, AVE = Average Variance Extracted, CN = connectedness to nature, EE = environmental empathy, BV = biospheric value, AT = attitude toward sustainable tourism, PAE = positive anticipated feelings, MN = moral norm, SN = subjective norm, PRB = pro-environmental behavior, NI = Natural/local resource conserving intention

Table 2 SEM Analysis

	Estimate	**SE**	**95%CI**	
H1: AT→NI	0.053	0.069	-0.087	0.201
H2: SN→NI	-0.047	0.063	-0.169	0.078
H3: SN→MN	0.2d66	0.087	0.107	0.412
H4: CN→AT	0.046	0.054	-0.044	0.155
H5: CN→PAE	0.646	0.051	0.554	0.758
H6: EE→AT	0.134	0.089	-0.009	0.329
H7: EE→PAE	0.045	0.07	-0.105	0.185
H8: BV→AT	0.464	0.111	0.219	0.675
H9: BV→PAE	0.306	0.088	0.112	0.466
H10: AT→MN	0.049	0.087	-0.146	0.199
H11: PAE→MN	0.571	0.048	0.461	0.656
H12: MN→NI	0.933	0.032	0.845	0.966
H13: NI→PRB	0.614	0.033	0.539	0.671

Note. CN = connectedness to nature, EE = environmental empathy, BV = biospheric value, AT = attitude toward sustainable tourism, PAE = positive anticipated feelings, MN = moral norms, SN = subjective norms, PRB = pro-environmental behavior, NI = Natural/local resource conservation intentions, R-square: AT = 0.38, MN = 0.63, PAE = 0.84, NI = 0.87, PRB = 0.45

4.2 NCA Results

The combined scores resulting from the GSCA$_M$-SEM were linearly integrated and utilized in the NCA model. To ensure a comprehensive outcome, our NCA procedures closely adhered to the guidelines proposed by Dul (2016), a methodology recurrently applied in tourism and recreation research, as evident in studies by Meeprom et al. (2023), Satitsamitpong et al. (2024), and Wattanacharoensil et al. (2024). For a holistic understanding of visitors' pro-environmental behavior during their visits to urban forest destinations, the NCA model incorporated eight key constructs. These constructs, namely connectedness to nature, biospheric value, environmental empathy, attitudes, positive anticipated emotions, moral norms, subjective norms, and natural/local resource conservation intentions, were analyzed to determine their roles as essential conditions influencing travel intentions with regard to animal ethics as the desired outcome. Table 3 displays tabular representations of the ceiling lines for all identified necessary relationships. As shown in Table 3, all determinants exert a significant necessity effect size estimates (d > 0.1, p < 0.01) (Dul, 2016; Wattanacharoensil et al., 2024). Thus, all identified necessary determinants were considered necessary in kind for the occurrence of pro-environmental behavior, fully supporting H14. Figure 2 illustrates the NCA plots. We further discuss the results in the implication section.

Table 3 Single Necessary Condition Analysis

33 Outcome PRB	**CE-FDH (d)**	**p-value**	**Triggered level** Antecedent/Outcome	**Necessary?**
CN	0.386	0.00	7.6% / 0%	In kind
EE	0.302	0.00	4.0% / 30%	In kind
BV	0.287	0.00	2.3% / 10%	In kind
AT	0.389	0.00	4.6% / 60%	In kind

Table 3 (Continued)

34 Outcome PRB	CE-FDH (d)	p-value	Triggered level Antecedent/Outcome	Necessary?
PAE	0.255	0.00	4.1% / 30%	In kind
MN	0.230	0.00	5.4% / 20%	In kind
SN	0.150	0.00	7.4% / 50%	In kind
NI	0.276	0.00	2.4% / 40%	In kind

Note. CE-FDH = Ceiling Envelopment with Free Disposal Hull, CR-FDH = Ceiling Regression with Free Disposal Hull, CN = connectedness to nature, EE = environmental empathy, BV = biospheric value, AT = attitude toward sustainable tourism, PAE = positive anticipated feelings, MN = moral norms, SN = subjective norms, PRB = pro-environmental behavior, NI = Natural/local resource conservation intentions
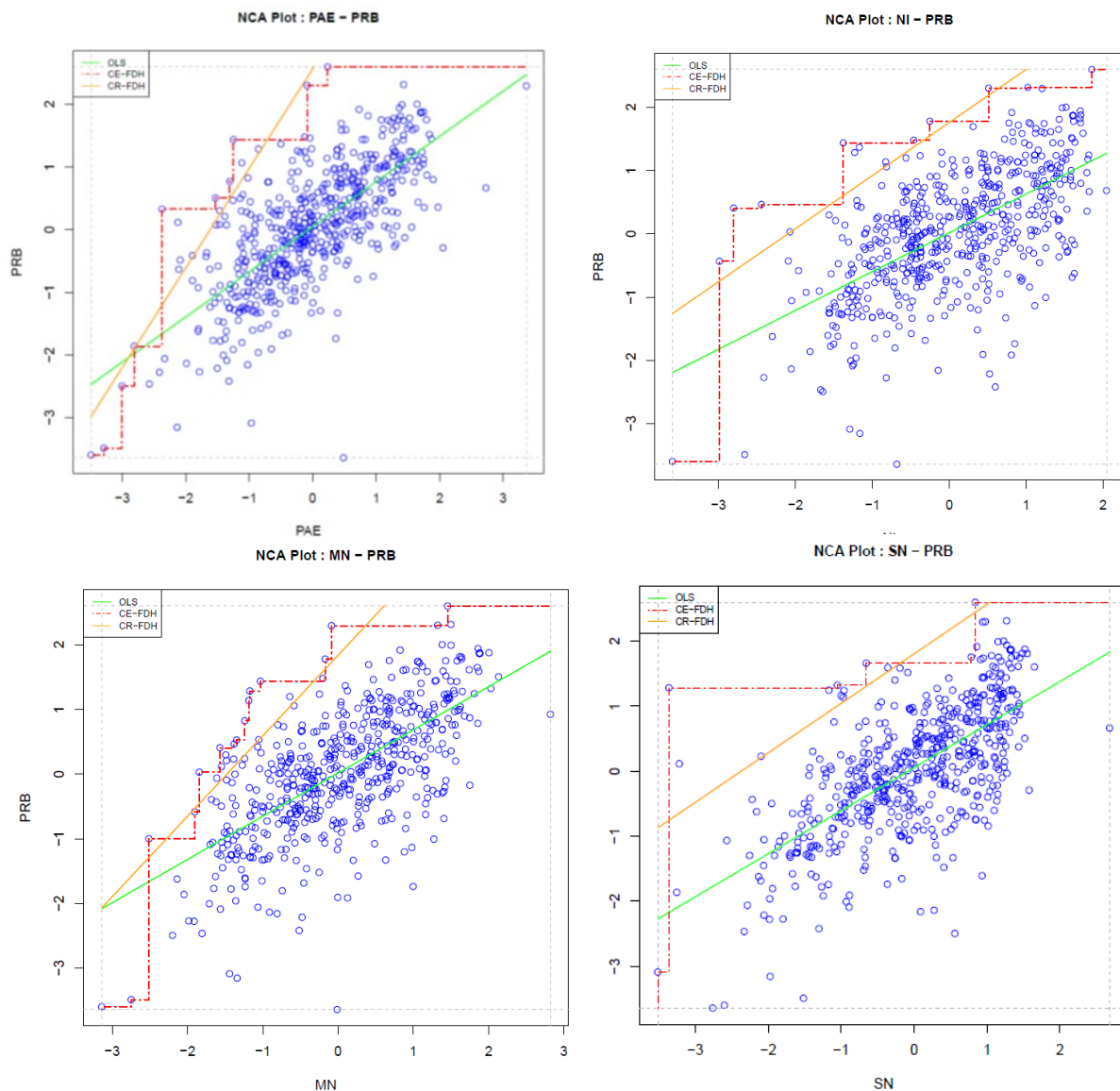
Figure 2 NCA Plots
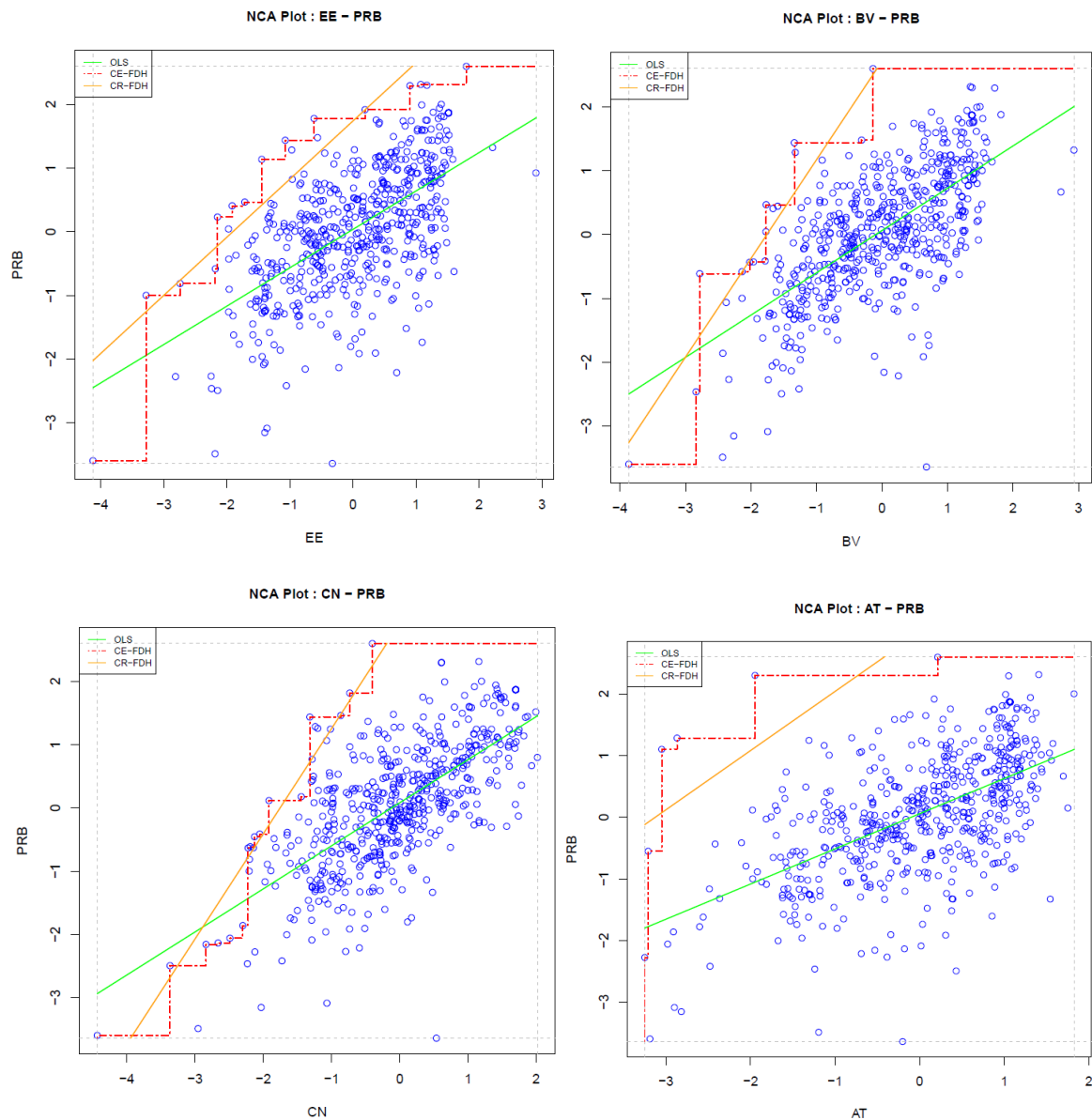
Figure 2 (Continued)

5. DISCUSSION AND IMPLICATIONS

The primary objective of this study was to discern the factors influencing visitors' intentions to conserve natural and local resources, as well as their engagement in pro-environmental behavior (PRB) during visits to urban forest sites. Despite the considerable attention given to this topic by scholars and practitioners, there remains an immediate need to advocate for responsible practices among visitors. In an effort to enhance our comprehension of the motivations driving tourists' endorsement of responsible practices in this specific context, this study introduces eight factors, including connectedness to nature (CN), biospheric value (BV), environmental empathy (EE), attitudes (AT), positive anticipated emotions (PAE), moral norms (MN), subjective norms (SN), and natural/local resource conservation intentions (NI), which could exert both direct and indirect influences on pro-environmental behavior (PRB).

In contrast to earlier studies employing the Theory of Reasoned Action (TRA), where SN and AT were identified as crucial affective factors influencing the intention for responsible practices (e.g., Han, 2015; Ryu & Jang, 2006), this study departs from the prior trend. Our findings indicate that SN strongly influences MN (H3) rather than NI. Additionally, AT was not

found to have a direct significant effect on NI and MN. Instead, NI was affected by MN (H12). This highlights a fresh perspective on the factors influencing responsible practices in the context of urban forest destinations.

Visitors' cognitive appraisal, specifically their AT, was notably influenced by BV according to H8. This suggests that the visitors' cognitive evaluations and perceptions were significantly shaped by their consideration of biospheric values. Similar to Han et al. (2019), this finding underscores the importance of BV in influencing the overall attitude of visitors toward sustainable destinations, indicating a key cognitive factor in their appraisal during their experiences at destinations, although the former study was conducted in a different study context. Furthermore, visitors' affective appraisal, particularly in terms of PAE was influenced by CN (H5) and BV(H9). The results are consistent with the studies conducted by Han et al. (2019) and Mayer and Frantz (2004) given that individuals' affective responses are influenced by their connectedness to nature and consideration of biospheric values. However, EE was not found to have a significant effect on AT (H6) and PAE (H7). The non-significant effect of EE and AT and on PAE is possibly explained by considering the characteristics of the respondents, particularly their age. The study suggests that the majority of respondents are rather young, and their characteristics, prior experiences, attitudes, and values may contribute to the observed non-significant effect. This underscores the importance of considering demographic factors in interpreting results, as different age groups may have varying levels of environmental empathy, potentially influencing its impact on cognitive and affective appraisals.

Moreover, the study revealed that the desired outcome of PRB was influenced by NI (H13). This suggests that visitors' intentions to conserve natural and local resources play a pivotal role in shaping their actual pro-environmental behavior during their visits to urban forest destinations. The positive influence of NI on PRB aligns with the established concept that intentions are strong predictors of subsequent behavior (Fakfare & Wattanacharoensil, 2023b), emphasizing the importance of fostering conservation intentions among visitors to promote sustainable practices.

Regarding research implications, this work contributes to the tourism literature by verifying the underlying factors influencing NI and PRB based on the extended TRA. This not only validates and extends existing theoretical frameworks but also enhances understanding of the cognitive and affective determinants of sustainable behavior in the context of urban forest destinations. Second, by employing NCA, this study successfully verifies the essential prerequisites for pro-environmental behavior. Consequently, the genuine sufficient conditions that robustly predict PRB were identified. This methodological approach not only introduces a new perspective but also establishes a clear demarcation between antecedent variables, enabling the identification of factors that are indispensable (necessary) and those that are truly effective (sufficient) in predicting the PRB outcome. Thus, our innovative analytical method provides a novel lens through which to interpret and understand the intricate relationships among variables, offering a valuable advancement in research methodology. Third, this research makes a significant contribution to the existing body of knowledge on urban forest destinations. It asserts with confidence that the moral norms of an individual (MN) and their cognitive (e.g., AT) and affective appraisal (PAE), emerge as indispensable variables for the manifestation of pro-environmental behavior (PRB). By highlighting the essential role of moral norms and cognitive and affective evaluations in predicting PRB, this study enhances understanding of the specific factors which drive sustainable behavior in the unique context of urban forest destinations.

This research also carries significant practical implications, extending beyond its theoretical contributions, particularly within the context of urban forest destinations. The study underscores the pivotal role of moral norms and conservation intentions in shaping PRB in such environments. Cultivating a strong sense of environmental morality among individuals,

including visitors to urban forests, is imperative. To foster a heightened moral consciousness, it is crucial to integrate environmental values into urban forest programs and studies, targeting diverse age groups. This can be accomplished through educational initiatives that enhance public awareness and disseminate knowledge about the ethical considerations surrounding urban forest visitation. Incorporating discussions on the consequences of unethical acts against these environments further reinforces the importance of moral norms (Wattanacharoensil et al., 2024). A comprehensive strategy should involve educational programs that span various age groups, promoting responsible practices and highlighting the potential harm to both the environment and its inhabitants (Fakfare & Sangpikul, 2022; Meeprom & Fakfare, 2021). By deepening understanding of environmental ethics and instilling a sense of morality, this approach can contribute to the sustainable and respectful enjoyment of urban forest destinations.

Another important implication concerns the results of the NCA. Forest Park managers and destination authorities can consider the NCA results to cultivate PRB. For example, environmental empathy is necessary in kind for the manifestation of PRB. This result implies that concerned stakeholders can leverage the insights from the NCA results to design targeted strategies aimed at cultivating environmental empathy among visitors. The findings also reveal that for PRB to reach 30%, EE must be achieved at 4%. This insight provides a measurable benchmark for stakeholders, indicating that a relatively modest increase in environmental empathy can establish a visitor PRB. The results highlight the interconnectedness of various psychological and attitudinal factors that contribute to fostering a responsible and respectful visitor experience in urban forest destinations.

6. LIMITATION AND FUTURE RESEARCH

Despite the valuable contributions made by this study, it is essential to acknowledge its limitations, thereby highlighting the need for further research. Firstly, caution is warranted when generalizing the findings, as the research exclusively focused on domestic Thai visitors of urban forest destinations. To enhance the robustness and applicability of the theoretical framework established in this study, future research is encouraged, to extend the scope and test validity among visitors from diverse nationalities. Secondly, while this study concentrated on understanding visitors' pro-environmental behaviors, there is an opportunity for future work to delve deeper into how the norm activation model and pro-social behavior constructs lead to various outcomes for specific behavioral responses. For instance, researchers could explore how these constructs influence word-of-mouth intentions, or revisit intentions, providing a more comprehensive understanding of the broader impacts of responsible behavior. Third, the study did not differentiate between various activities visitors attended at the urban forest destinations. To address this gap, future research may investigate tourists' responsible behaviors and decision-making processes when engaging in different forms of outdoor recreation. Utilizing an extended Theory of Reasoned Action (TRA) framework, researchers can explore how factors identified in this study influence visitors' behaviors across a spectrum of urban forest settings. Lastly, this study used $GSCA_M$ as a key estimator. Although this technique is valid and reliable, future research can attempt to use different estimators, such as partial least squares or maximum likelihood to ensure the robustness of the results.

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