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COGNITIVE, AFFECTIVE, AND NORMATIVE DRIVERS OF PRO-ENVIRONMENTAL INTENTIONS AMONG URBAN FOREST VISITORS – THE IPMA APPROACH

Arnoot Kumsura[1,*], Witwasit Sresteesang[2], and Triyaporn Tongnuch[3]

Abstract

This study investigates the cognitive, affective, and normative drivers of pro-environmental intentions among urban forest visitors, applying the Importance-Performance Map Analysis (IPMA) to identify key dimensions influencing sustainable behaviors. Drawing from existing literature, the research examines how environmental awareness, connectedness to nature, environmental empathy, place attachment, social norms, and moral norms shape pro-environmental intentions. Data were collected from 550 respondents in Bangkok using a self-administered online survey. Structural equation modeling was used to evaluate the relationships among these constructs, and IPMA was employed to assess their relative importance and performance. Results revealed that affective components, particularly place attachment and connectedness to nature, and normative factors like social norms, have a significant impact on pro-environmental intentions. Meanwhile, environmental awareness and moral norms showed limited influence. The findings highlight areas for improvement and provide practical implications for enhancing sustainable behaviors in urban forests.

Keywords: Urban forest; cognition, affection, norms, pro-environmental intentions

1. INTRODUCTION

Urban forests serve as critical spaces for biodiversity conservation, climate regulation, and recreational activities, providing essential ecological and social benefits for urban populations (Pinthong et al., 2024). However, as these green spaces face growing pressure from urban development, pollution, and human activities, understanding the drivers of pro-environmental behaviors among visitors becomes paramount (Berglihn & Gómez-Baggethun, 2021). Fostering sustainable behavior within urban forests not only preserves these natural resources but also enhances visitors' experiences and strengthens their connections to nature, thereby contributing to broader environmental goals (Fakfare & Wattanacharoensil, 2023; Koh et al., 2023; Prasongthan, 2023).

[1,*]Arnoot Kumsura (Corresponding author) is currently working as a lecturer in the Tourism and Cruise Management Department, School of Humanities and Tourism Management, Bangkok University, Thailand. Email: researchbu013@gmail.com

[2]Witwasit Sresteesang is currently working as a Head for the International Competency Development Department, International Center, Bangkok University, Thailand. Email: witwasit.s@bu.ac.th

[3]Triyaporn Tongnuch is a lecturer in the Airline Business Management Department, School of Humanities and Tourism Management, Bangkok University, Thailand. Email: triyaporn.t@bu.ac.th

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Current research on pro-environmental behavior often highlights the importance of understanding individual motivations and intentions, which are shaped by a range of cognitive, affective, and normative factors (Wattanacharoensil et al., 2024). Cognitive drivers, such as environmental awareness and beliefs about the environment, including connectedness to nature, influence how individuals perceive their role and responsibility in conservation efforts (Fakfare et al., 2024a). Affective drivers, such as emotions, attachment, and empathy derived from natural spaces, can significantly impact visitors' connection to urban forests and their willingness to engage in environmentally responsible actions (Fakfare et al., 2024b). Meanwhile, normative drivers, such as social norms and personal moral obligations, play a crucial role in guiding behavior in line with environmental values (Fakfare et al., 2024c). These interconnected drivers are essential for shaping pro-environmental intentions, particularly within the context of urban forests where visitors' actions directly influence the sustainability and health of these green spaces.

While existing studies have explored various factors influencing pro-environmental behaviors in natural settings, there remains a need to specifically examine the urban forest context, where the unique intersection of urbanization, nature-based recreation, and environmental conservation creates complex behavior patterns. (Pinthong et al., 2024). Furthermore, the application of the Importance-Performance Map Analysis (IPMA) provides an innovative approach to understanding these drivers by offering deeper insights into the relative importance of each driver and how they perform in practice (Fakfare, 2021; Fakfare et al., 2024d; Ringle & Sarstedt, 2016). The IPMA approach allows for the identification of critical leverage points for enhancing pro-environmental intentions among urban forest visitors, making it particularly useful for practitioners and policymakers aiming to design interventions that promote sustainable use of these spaces (Fakfare et al., 2023; Fakfare & Manosuthi, 2023).

Considering this, this study aims to bridge the research gap by investigating the cognitive, affective, and normative drivers that shape pro-environmental intentions among urban forest visitors. By applying the IPMA approach, this research further provides a comprehensive analysis of how these drivers interact and their relative significance in fostering environmentally responsible behaviors. In sum, the research seeks to: (1) explore the role of cognitive, affective, and normative factors in shaping pro-environmental intentions among urban forest visitors, and (2) employ the IPMA approach to identify key areas for intervention to enhance these intentions. Through this exploration, the study aims to support efforts in promoting sustainable behaviors that can help maintain the ecological integrity and recreational value of urban forests.

2. LITERATURE REVIEW

2.1 Urban Forests as Green Spaces

Urban forests, as integral components of urban green spaces, play a significant role in enhancing environmental quality and improving residents' well-being in metropolitan areas. These forests include a variety of natural and planted tree-dominated spaces within urban environments, such as parks, street trees, and forest reserves, contributing to ecosystem services that benefit city dwellers. Urban forests provide diverse benefits, from regulating local climates and reducing air pollution to enhancing urban biodiversity and offering opportunities for recreation and nature-based experiences (Mundher et al., 2022). As green spaces, urban forests are vital for fostering connections between residents and nature, especially in densely populated and developed areas. They act as places for relaxation, social interaction, physical activities, and education, thereby improving mental and physical health outcomes (Pinthong et al., 2024). Moreover, access to urban forests is linked to increased environmental awareness

and stewardship behaviors among visitors, as exposure to these green spaces helps cultivate appreciation for nature and encourages pro-environmental actions. This connection between urban dwellers and green spaces is crucial for urban sustainability, as it promotes a sense of responsibility and care for these areas, ultimately contributing to broader conservation goals (Intasen et al., 2017).

However, urban forests face numerous challenges due to urbanization, such as habitat fragmentation, pollution, and increased visitor use, which can lead to resource degradation and conflict over land use. Recognizing the role of urban forests as both ecological assets and social spaces highlights the need for fostering sustainable behaviors among their visitors (Pinthong et al., 2024). Encouraging pro-environmental intentions within these green spaces not only supports the conservation of their biodiversity and ecosystem services but also aligns with the broader goals of urban sustainability and resilience. Therefore, exploring the cognitive, affective, and normative drivers that influence visitors' behaviors is essential for developing targeted interventions to ensure these green spaces are used responsibly and conserved for future generations.

2.2 Influence of Cognitive Drivers on Pro-Environmental Intentions

Cognitive drivers, particularly environmental awareness, have a profound influence on shaping pro-environmental intentions among urban forest visitors. Environmental awareness encompasses both the understanding of environmental issues and the knowledge of the impact of human activities on ecosystems, along with their broader consequences (Fakfare et al., 2024c). This cognitive understanding helps individuals grasp the significance of sustainable behaviors and the need for conservation, laying the foundation for a personal commitment to environmentally friendly actions.

A heightened awareness leads individuals to better understand the value and vulnerability of urban forests, helping them perceive these spaces as not just recreational areas but also crucial components of urban ecosystems. When visitors are aware of the environmental benefits provided by urban forests—such as climate regulation, habitat for biodiversity, and social well-being—they are more likely to see the importance of conservation efforts (Han, 2015). This heightened perception translates into a sense of environmental responsibility, prompting behaviors like reducing waste, preserving natural habitats, and supporting conservation initiatives.

Additionally, environmental awareness enables individuals to recognize their own potential impact on urban forests. Visitors who are more knowledgeable about environmental issues are often more conscious of how their actions, such as littering or disturbing wildlife, can negatively affect these green spaces (Fakfare, P., & Wattanacharoensil, 2024). This consciousness fosters a behavioral shift toward more sustainable practices and encourages a deeper commitment to pro-environmental intentions, ultimately influencing actions like supporting policies that protect urban green spaces, participating in environmental education programs, and adopting behaviors that align with sustainable urban forest management. Given this, we propose the following hypothesis:

H1: Cognitive drivers (i.e., environmental awareness) positively influence visitors' pro-environmental intentions

2.3 Influence of Affective Drivers on Pro-Environmental Intentions

Affective drivers, such as connectedness to nature, environmental empathy, and place attachment, play a significant role in shaping pro-environmental intentions among urban forest visitors. These emotional factors influence how individuals relate to and care for the

environment, which in turn drives behaviors that support sustainable use and conservation of urban green spaces. Connectedness to nature is characterized by the emotional bond and sense of belonging that individuals feel toward the natural world. This emotional connection fosters a deep appreciation for the environment and motivates behaviors that align with its preservation (Mayer & Frantz, 2004). Visitors who feel connected to nature often develop a sense of responsibility and care for urban forests, leading to pro-environmental actions like reducing waste, respecting wildlife, and supporting conservation efforts.

Environmental empathy refers to the capacity to emotionally understand and respond to the experiences of the natural world. It involves feelings of compassion and concern for environmental issues, enhancing the likelihood of engaging in behaviors that protect and conserve urban forests (Tam, 2013). Visitors with high levels of environmental empathy are more sensitive to the negative impacts of human activities on green spaces, thereby increasing their intentions to behave responsibly and support sustainable practices within these environments.

For place attachment, the concept describes the emotional bond that individuals develop with specific locations, such as urban forests. This attachment can emerge from repeated positive experiences, memories, and social connections within these natural spaces (Ramkissoon et al., 2013). A strong attachment to urban forests increases visitors' desire to protect and maintain these areas, as they perceive the well-being of the place as closely tied to their own well-being. This emotional investment encourages pro-environmental intentions, leading to active involvement in conservation activities and adherence to sustainable behaviors. In sum, affective drivers like connectedness to nature, environmental empathy, and place attachment contribute to visitors' pro-environmental intentions by fostering an emotional commitment to urban forests. These emotional connections strengthen visitors' desire to act in environmentally responsible ways and support the preservation and sustainable use of green spaces. In the current research context, we propose the following hypothesis:

H2: Affective drivers (i.e., connectedness to nature, environmental empathy, place attachment) positively influence visitors' pro-environmental intentions

2.3 Influence of Normative Drivers on Pro-Environmental Intentions

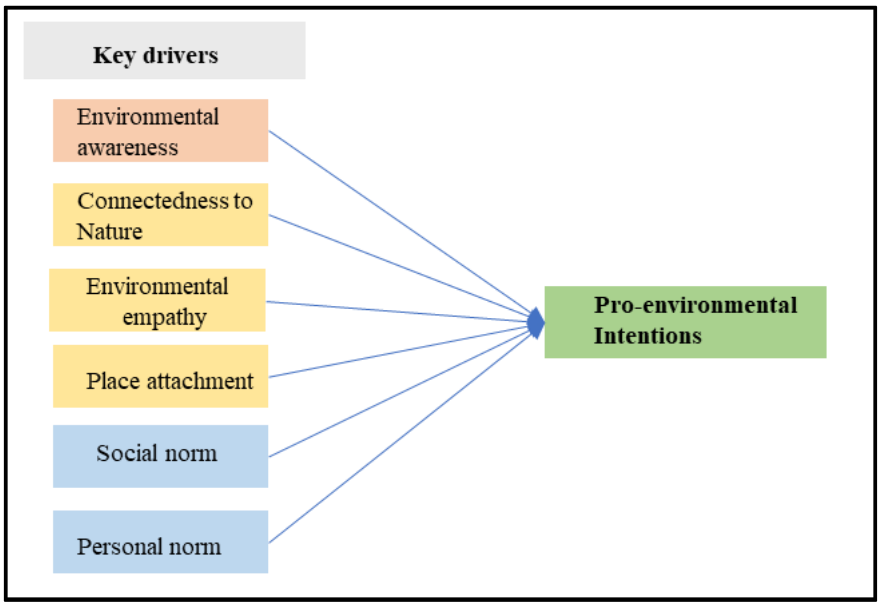
Normative drivers, such as moral norms and social norms, significantly impact pro-environmental intentions among urban forest visitors. These drivers are rooted in individuals' perceptions of moral obligations and social expectations, influencing their decision-making and behavioral patterns in green spaces. Moral norms, so called personal norms reflect an individual's internalized sense of responsibility and moral obligation to act in an environmentally friendly way (Schwartz, 1977). When individuals believe that protecting and conserving the environment is the "right" thing to do, they are more likely to develop strong pro-environmental intentions. Within urban forests, visitors with high personal norms tend to engage in sustainable behaviors, such as reducing waste, avoiding harm to flora and fauna, and supporting conservation activities, driven by their sense of personal duty and ethical beliefs (Harland et al., 1999).

Social norms pertain to the perceived behaviors and expectations of others within a social context. When individuals observe that others around them act responsibly toward the environment, or when there is a societal expectation to do so, they are more inclined to follow suit (Fakfare et al., 2024e). In the setting of urban forests, social norms may include practices such as respecting wildlife, keeping the space clean, and supporting green policies. The influence of social norms is particularly strong when individuals seek social approval or wish to conform to the behaviors of their peer groups or communities, thereby enhancing their pro-environmental intentions. The interaction of personal and social norms contributes to a stronger commitment to environmentally responsible behaviors among urban forest visitors. When both

personal moral obligations and societal expectations are aligned toward sustainable practices, individuals are more motivated to engage in behaviors that support the conservation and protection of green spaces. Considering the abovementioned aspect, we propose the following hypothesis. Figure 1 illustrates the conceptual model.

H3: Normative drivers (i.e., social norm and moral norm) positively influence visitors' pro-environmental intentions

Figure 1 The Conceptual Model



3. METHODOLOGY

3.1 Measurement Items and Data Gathering Process

The study constructs, including in the cognitive, affective, and normative model, were measured using scales derived from previous research, each of which has been consistently validated across various contexts. Specifically, environmental awareness was assessed using the scales proposed by Han (2015). The measures for connectedness to nature and environmental empathy were sourced from Tam (2013). Items from Ramkissoon et al. (2013) were utilized to evaluate place attachment. Lastly, indicators for pro-environmental intentions were adapted from Wu et al. (2021). All measurement items were tailored to align with the context of urban forest destinations. They were also submitted to a panel of expert to review before incorporating into a survey questionnaire.

Data collection was carried out through a self-administered online survey in early 2024, supported by research assistants. Before participation, respondents attended a briefing to understand the study's context and objectives. The survey targeted individuals in Bangkok and its surrounding metropolitan areas, given the rising development of urban forest destinations there. This research specifically aimed at participants with prior experiences visiting urban forest locations. To identify suitable respondents, screening questions were included regarding their travel purposes and intentions. Given the limited number of tourists fitting this profile, convenience sampling was employed to recruit participants. Only those who answered "yes" to the filter question (i.e., "Have you visited an urban forest destination in the past 12 months?")

were allowed to proceed with the survey. This process resulted in a final sample size of 550 respondents for subsequent statistical analysis.

In terms of respondent demographics, females slightly outnumbered males, making up 55.5% of the participants, while males comprised 39.5%. Additionally, 5.1% of the respondents preferred not to disclose their gender. The average age of participants was 19.68 years. Regarding income, a significant majority (90.0%) earned between THB 15,000 and 20,000. In terms of education, 87.8% held a bachelor's degree, followed by 6.7% with an associate degree, and 5.3% who had completed high school.

4. ANALYTICAL PROCEDURES AND RESEARCH FINDINGS

4.1 Measurement Model Assessment

In evaluating the composite-based structural equation modeling (SEM), the consistent Partial Least Squares (PLS) estimator was selected as suitable (Henseler, 2021; Pongwat & Talawanich, 2024; Talawanich & Pongwat, 2024). This approach is particularly advantageous when the research aims to focus on prediction rather than model validation (Fakfare & Sangpikul, 2022; Leruksa et al., 2023; Sathatip, 2024; Sathatip et al., 2024; Subongkod & Hongsakul, 2024; Wattanawaraporn & Manosudhtikul, 2024). Consequently, the PLSc estimator was utilized in the current study. Following the guidelines provided by Benitez et al. (2020), the measurement model was analyzed from both behavioral and design perspectives. Specifically, the composite model represents design constructs, while the factor-based model reflects behavioral constructs. In this research, the cognitive, affective, and normative variables—including environmental awareness, connectedness to nature, environmental empathy, place attachment, social norm, and personal norm—were considered design concepts, aligning with the composite model. In contrast, pro-environmental intentions were regarded as behavioral constructs, consistent with the factor-based model.

For assessing the convergent validity of a factor model (Table 1), standardized loadings and Average Variance Extracted (AVE) should both be above 0.5 (Fakfare & Lee, 2019). Construct reliability was evaluated using Dijkstra–Henseler's rho, with a recommended threshold of 0.7 or higher (Henseler, 2021). As indicated in Table 1, the construct for pro-environmental intentions fulfills the requirements for both reliability and validity (Pinthong et al., 2024). Regarding the composite model, the weight estimates for the cognitive, affective, and normative model dimensions are generally positive, as seen in Table 1. Furthermore, collinearity does not pose a significant issue, as the Variance Inflation Factor (VIF) values are mostly below 5. Therefore, the composite models are deemed to be well-constructed.

Table 1 Measurement Model Evaluation

Construct	Indicator	AVE	Rho A	$\widehat{w}_i$	$\widehat{\lambda}_i$
EA	EA1: The tourism industry causes pollution, climate change, and exhaustion of natural resources.	N/A	N/A	0.527	0.926
	EA2: The tourism industry may have a huge environmental impact on the atmosphere and the wider environment.			0.302	0.86
	EA3: The tourism industry causes environmental deterioration (e.g. excessive water use and waste generation).			0.292	0.862
CN	CN1: I think of the natural world as a community to which I belong.	N/A	N/A	0.358	0.872

Table 1 (Continued)

Construct	Indicator	AVE	Rho A	$\widehat{w}_i$	$\widehat{\lambda}_i$
	CN2: When I think of my life, I imagine myself to be part of a large cyclical process of living.			0.351	0.873
	CN3: I often feel a kinship with animals and plants			0.133	0.748
	CN4: I feel as though I belong to the Earth as equally as it belongs to me.			0.139	0.774
	CN5: I often feel part of the web of life.			-0.006	0.711
	CN6: I feel that all inhabitants of Earth, human, and nonhuman, share a common 'life force'			0.111	0.728
	CN7: Like a tree can be part of forest, I feel embedded within the broader natural world.			0.135	0.723
EE	EE1: I feel happy when I see other people enjoy the environment without harming living things.	N/A	N/A	0.177	0.79
	EE2: I put myself in the place of living things when they are mistreated.			0.263	0.851
	EE3: When I see animals that are happy in their environment, I feel happy.			0.063	0.792
	EE4: I imagine how I would feel if I were the suffering animals and plants.			0.279	0.839
	EE5: I get involved with the feelings of the suffering animals and plants.			0.4	0.881
ATH	ATH1: I would long for this place if I moved elsewhere			0.613	0.926
	ATH2: Even continuous visiting here does not feel boring			0.491	0.882
SN	Most people who are important to me will (……) that I go visit an urban forest in an environmentally responsible manner.	N/A	N/A	0.288	0.881
	…Approve				
	…Understand			0.447	0.93
	…Recommend			0.372	0.889
MN	MN1: I feel an obligation to behave in a pro-environmental way while visiting an urban forest destination.	N/A	N/A	0.407	0.914
	MN2: 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.			0.375	0.919
	MN3: I feel that it is important to make urban forest destinations sustainable, reducing the harm to the host community and wider environment.			0.312	0.908
IN	IN1: I intend to engage in resource and energy conservation practices during my visit to the urban forest destination (e.g., minimizing water use).	0.628	0.916	0.155	0.76
	IN2: I intend to participate in recycling efforts while visiting the urban forest destination (e.g., using designated recycling bins for bottles and cans).			0.161	0.826

Table 1 (Continued)

Construct	Indicator	AVE	Rho A	$\widehat{w}_i$	$\widehat{\lambda}_i$
	IN3: I intend to properly sort and dispose of my garbage in accordance with environmental guidelines during my visit to the urban forest destination.			0.168	0.828
	IN4: I intend to use eco-friendly, non-plastic materials (e.g., reusable shopping bags) during my visit to the urban forest destination.			0.157	0.781
	IN5: I am willing to remind others to adopt environmentally friendly behaviors and practices while exploring the urban forest destination..			0.158	0.808
	IN6: I am willing to seek out environmental information about the urban forest destination through TV, printed materials, or online sources to enhance my understanding of its ecology and conservation efforts.			0.161	0.816
	IN7: I am willing to contribute financially to support environmental conservation efforts related to the urban forest destination.			0.149	0.767
SRMR = 0.043	IN8: I am willing to volunteer my time and expertise to participate in projects and initiatives that contribute to the preservation and enhancement of the urban forest environment			0.153	0.748

Note. $\widehat{w}_i$ = estimated weights, $\widehat{\lambda}_i$ = estimated loadings, rho_A = Dijkstra-Henselers_rho_A, AVE = Average Variance Extracted, EA = Environmental awareness, CN = connectedness to nature, EE = environmental empathy, ATH = place attachment, SN = social norm, MN = moral norm, IN = pro-environmental intentions

4.2 Structural Model Evaluation

Data analysis was performed using SmartPLS 4.0. As illustrated by the path coefficients in Table 2, certain dimensions of the cognitive, affective, and normative variables significantly and positively influenced pro-environmental intentions (IN) among visitors to urban forest sites. Specifically, connectedness to nature (CN), environmental empathy (EE), place attachment (ATH), and social norm (SN) demonstrated significant effects on IN. However, environmental awareness (EA) and moral norm (MN) did not show a significant impact on IN. While Hypotheses 2 and 3 were fully and partially confirmed, Hypothesis 1 was not supported Additionally, the model's in-sample predictive power was evaluated to determine effect size, with the findings indicating that the effect sizes were within acceptable limits (Benitez et al., 2020).

Table 2 Path Analysis Using SEM

Hypotheses	Estimate	p-values
H1: EA → IN	0.064	0.113
H2a: CN → IN	**0.135**	**0.002**
H2b: EE → IN	**0.099**	**0.097**
H2c: ATH → IN	**0.303**	**0.001**
H3a: SN→ IN	**0.229**	**0.001**
H3b: MN → IN	0.096	0.118

Note. EA = Environmental awareness, CN = connectedness to nature, EE = environmental empathy, ATH = place attachment, SN = social norm, MN = moral norm, IN = pro-environmental intentions

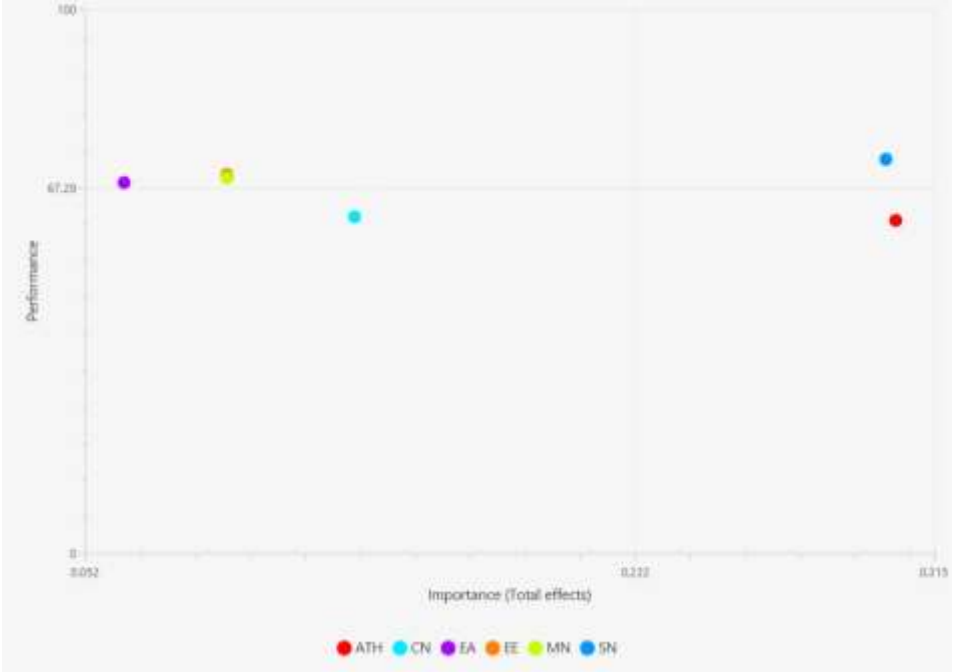
4.3 IPMA Results

The Importance-Performance Map Analysis (IPMA) quadrants are traditionally formed by plotting the average scores of importance and performance, where importance is represented on the x-axis and performance on the y-axis (Fakfare & Manosuthi, 2023). This research evaluates the impact and performance of cognitive, affective and normative dimensions on IN in the context of urban forest sites. A vertical line, indicating the mean importance level of 0.166 across the six cognitive, affective and normative model components, was drawn on the x-axis. Similarly, a horizontal line marking the average performance level of 67.286 across six components was positioned on the y-axis. The IPMA was analyzed at the construct level to provide practical insights for practitioners aiming to enhance pro-environmental intentions when attending urban forest sites. Table 3 and Figure 1 displays the IPMA results for IN, with the emergent quadrants identified as follows. The IPMA results are further discussed in the next section.

Table 3 Emergent Quadrants

Quadrant 2: Termed "Possible Overkills," this area comprises dimensions with high performance but low importance, suggesting some dimensions may be receiving more focus than necessary.	Quadrant 1: Labeled "Keep Up the Good Work," this quadrant includes dimensions that show both high importance and strong performance, indicating key strengths in including IN.
Quadrant 3: Referred to as "Low Priority," this quadrant consists of dimensions that have both low importance and performance, implying these aspects are not immediately critical for IN.	Quadrant 4: Known as "Focus Here," it contains dimension that are of high importance but have low performance, highlighting areas that need improvement to enhance IN.

Figure 1 IPMA Findings



5. DISCUSSION AND IMPLICATIONS

This study enhances the understanding of how the cognitive, affective, and normative dimensions contribute to visitors' pro-environmental intentions by drawing on existing literature within the tourism and destination field. The findings are rooted in the cognitive, affective, and normative model (Wattanacharoensil et al., 2024). The research first validated all cognitive, affective, and normative constructs in the context of urban forest sites, framing these as a multidimensional concept that encompasses different facets of visitors' psychological perceptions. The comprehensive framework was supported by incorporating key components identified through a thorough review of tourism literature and expert panel evaluations. The study emphasizes the significance of six specific cognitive, affective, and normative dimensions and their predictive power concerning pro-environmental intentions. While prior research has acknowledged the relevance of these concepts (Fakfare et al., 2024b), the structural relationships among these constructs had not been explored within the urban forest site setting. This research provides an expanded perspective by examining how cognitive, affective, and normative dimensions shape visitor perceptions in urban forest destinations, thereby contributing to a more nuanced understanding of the framework in this area.

Overall, the empirical analysis of the relationships among the identified study variables within the cognitive, affective, and normative model and pro-environmental intentions supported the proposed research hypothesis. First, the results indicated that environmental awareness (EA) did not significantly influence pro-environmental intentions (IN). One possible reason why visitors may not perceive EA as impactful is that awareness alone may not be sufficient to drive behavior change (Wattanacharoensil et al., 2024). While visitors might recognize environmental issues, the lack of an emotional or personal connection to the consequences may diminish the perceived urgency or responsibility to act. Additionally, in the context of urban forest destinations, visitors might prioritize experiential enjoyment over awareness-driven behavior, viewing their visit as a leisure activity rather than an opportunity to engage in environmental action. EA, being more informational and cognitive in nature, may not evoke the necessary affective or social motivations required to translate awareness into intention.

Conversely, emotional variables such as connectedness to nature (CN), environmental empathy (EE), and place attachment (ATH) demonstrated a stronger influence on pro-environmental intentions. The structural model analysis in Table 2 shows that CN ($b = 0.135$, $p = 0.002$) and ATH ($b = 0.303$, $p = 0.001$) have significant positive effects on IN, indicating that a stronger emotional connection to nature and a sense of place attachment can significantly motivate pro-environmental behavior. Although EE also shows a positive influence on IN ($b = 0.099$), its p-value (0.097) indicates that this relationship is not as strong as those of CN and ATH. These findings align with Fakfare et al. (2024e), who found that emotional connections to both natural settings and places play a crucial role in fostering pro-environmental behaviors, particularly when visitors develop a sense of belonging or empathy toward their environment. Such emotional factors can often be more influential than mere cognitive awareness, as they directly tap into individuals' values and experiences within the context of nature.

Moreover, social norm (SN) also significantly influences pro-environmental intentions ($b = 0.229$, $p = 0.001$), reinforcing the role of social context and peer influence in shaping environmental behaviors. However, moral norm (MN) did not significantly predict IN ($b= 0.096$, $p = 0.118$), suggesting that while personal moral beliefs play a role, they may not be as immediately impactful as emotional connections or social influences in this setting. Overall, these findings highlight the greater effectiveness of affective and social dimensions over mere

environmental awareness in promoting pro-environmental intentions among visitors to urban forest destinations.

Furthermore, the findings from the Importance-Performance Matrix Analysis (IPMA) offer valuable insights for destination managers and forest park rangers in developing targeted strategies. Dimensions in Quadrant 1, which exhibit both high performance and high importance, are identified as key strengths contributing to pro-environmental intentions (IN). Within this context, social norm emerges as a particularly influential dimension, consistently regarded by visitors as highly important. This suggests that social norm is a key driver of IN and should be given priority in environmental planning. By focusing on social norms, food practitioners can leverage this dimension to foster pro-environmental behavior more effectively. Since social norms play a pivotal role in shaping visitor attitudes and behaviors, emphasizing community standards, peer influence, and collective action can reinforce sustainable practices. Targeted campaigns or educational programs that highlight social norms around environmental responsibility can encourage visitors to align their behavior with pro-environmental expectations, ultimately strengthening efforts to promote sustainable actions in urban forest destinations.

Quadrant 2 includes dimensions that, despite showing high performance, are perceived as less important by visitors (Fakfare, 2021). In this study, environmental awareness (EA), environmental empathy (EE), and moral norm (MN) fall into this category, indicating they are well-developed but not deemed critical drivers by visitors. This finding aligns with the SEM results, where both EA and MN were found to have non-significant effects on pro-environmental intentions (IN). While destination managers and forest park rangers may dedicate substantial efforts to improving these aspects, their impact on visitors' intentions toward pro-environmental behavior is limited due to their perceived lower importance. According to strategic norms, a balanced approach is advised, meaning that resources should be allocated proportionately to these dimensions without overemphasis, as their influence on visitors' decision-making is not as substantial. For instance, rather than heavily focusing on campaigns to raise environmental awareness alone, managers could instead integrate subtle messages on environmental empathy and moral norms into broader visitor experiences, like interpretive tours or interactive exhibits. This approach ensures that these aspects are not entirely neglected but also prevents them from diverting resources away from more influential factors, such as social norms, which have a stronger impact on driving pro-environmental behavior within the food truck and urban forest context.

Quadrant 3 includes one affective dimension that urban forest visitors perceive as both least important and poorest-performing: connectedness to nature (CN). This dimension is considered to be both unnecessary and lacking in effectiveness, suggesting that visitors do not find it significantly influential in their experience or pro-environmental intentions. Given this perception, connectedness to nature may not be a priority for immediate improvement, as its low importance and performance indicate it does not play a critical role in shaping visitors' behaviors or satisfaction within the urban forest setting. However, managers should carefully monitor this dimension to understand whether its perceived low importance is context-specific or could change with shifts in visitor preferences or broader environmental attitudes.

Quadrant 4 includes one emotional dimension—place attachment—which is deemed highly important by visitors but currently exhibits poor performance. From a practical perspective, dimensions within this quadrant should be prioritized, as they are key to enhancing consumer enjoyment. The IPMA results show that visitors assign significant importance to place attachment, suggesting that it plays a pivotal role in shaping their experience and connection with the destination. However, the low performance of this dimension highlights a clear need for improvement. Therefore, destination managers and forest park rangers should focus on strengthening place attachment by developing initiatives that foster a deeper

connection to the location. For instance, they could introduce programs that tell the story of the area, engage visitors in local traditions, or provide activities that help visitors form personal memories linked to the place. By improving visitors' sense of place attachment, managers can enhance enjoyment and encourage repeat visits, while also promoting stronger pro-environmental intentions.

6. LIMITATION AND FUTURE STUDIES

This study has several limitations that provide opportunities for future research. Firstly, the data collection relied on a self-administered online survey, which may introduce biases related to self-reporting and the specific online platforms used for recruitment. Future studies could employ mixed-method approaches, including qualitative interviews or observational research, to capture a broader range of visitor experiences and validate the findings across different contexts. Secondly, the sample was drawn specifically from Bangkok and its surrounding metropolitan areas, which may limit the generalizability of the results to other urban forest destinations with different demographic or cultural contexts (Prawira et al., 2023). Future research could expand the geographical scope to include a wider range of urban green spaces in diverse regions or countries, allowing for cross-cultural comparisons and deeper insights into how cognitive, affective, and normative drivers vary across different visitor populations (Aroonsrimorakot et al., 2022; Batool et al., 2023; Napontun et al., 2023; Siali & Ramayah, 2023). Additionally, the study's measurement model was designed for urban forest visitors; however, these constructs may manifest differently in other nature-based settings, such as rural forests, national parks, or coastal reserves (Rungroueng & Monpanthong, 2023). Future research should explore the applicability of the cognitive, affective, and normative model in varied natural contexts to identify whether similar patterns emerge or if different drivers of pro-environmental intentions are more influential in those environments.

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