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# Environmentally responsible behavior and Knowledge-Belief-Norm in the tourism context: The moderating role of types of destinations

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ABSTRACT

In the past decade, Indonesia's Special Region of Yogyakarta has attracted steadily more visitors annually. However, this growth also degrades the quality of the tourism environment and nature's health due to irresponsible behaviors. The region's tourist attractions, including nature-based, cultural heritage sites, and city/urban destinations, are some of the most popular destinations in the country. This work compares the behavior of tourists toward the environment in nature-based, cultural heritage, and urban tourism destinations. This conceptual framework draws from the Knowledge-Belief-Norm to understand domestic tourists' norm-driven, environmentally responsible behavior. A random survey of 346 domestic tourists in Indonesia (nature-based = 118, cultural heritage = 107, and urban = 121) demonstrated that the model explains 30% of the environmentally responsible behavior intention variance. The structural equation model shows the linear relationship between environmental knowledge, new environmental paradigm, awareness of the consequences of their actions, personal responsibility, normative behavior, and environmentally responsible behavior. Biospheric value also was found to contribute to the model. However, differences among groups were validated in the relationship of this study model. The study provides original insight into the development and implication of Knowledge-Belief-Norms in the context of domestic tourism. It established the moderating role of types of destination. It provides a practical insight into reducing the environmental impact of tourists' activities for tourism managers and policymakers when designing effective strategies and campaigns. It also gives direction for future research on the relevant topic.

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## 1. Introduction

Despite the significant contribution of this growth to the economy, the substantial consequences of tourism activity and mobility in the tourism destination and natural areas are often discussed in tourism research. The challenge and strategy to overcome those issues are also discussed in tourist research (Abdullah, Samdin, Teng, & Heng, 2019; Grazzini, Rodrigo, Aiello, & Viglia, 2018; Han, Lee, & Hwang, 2016; Kafyri, Hovardas, & Poirazidis, 2012). The tourism sector is considered one of the sources of various

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environmental problems (Hayati, Adrianto, Krisanti, Pranowo, & Kurniawan, 2020; Wang, Ji, He, Zhang, & Zhang, 2021; Zorpas, Voukkali, & Loizia, 2015). Litter is not the only challenge facing Indonesia's urban cities and coastal marine habitats in the tourism context. Littering causes harm to nature and the marine ecosystem. It also alters tourists' perception of the tourist destination (Krelling, Williams, & Turra, 2017).

Some measures have been addressed to reduce littering in tourism destinations (Arbulu, Lozano, & Rey-Maquieira, 2017; Hoang, Fujiwara, & Pham Phu, 2017). These include adverse economic effects and a reduction in community and animal welfare. Air pollution (Zhang, 2019), water scarcity (Mkono & Hughes, 2020; Yusuf & Purwandani, 2020), resource loss, and littering (Luo, Tang, Jiang, & Su, 2020) are a few more in these discussions. Due to the significant growth in the tourism industry, the natural environment of tourist attractions has been negatively impacted by environmentally irresponsible behavior such as littering. In tourist destinations, litter creates various negative causes on the ecosystem and the local economy of the community, leading to a decrease in attractiveness to future tourists. The tourism industry largely depends on its destination's natural resources and environment. Tourism litter and its impact on these have caused severe challenges worldwide. Indonesia's tourism industry contributed 4.1% of the country's GDP in 2017, and 270.8 million domestic trips were made to tourist destinations in 2018. While the tourist industry contributes to the economy, it simultaneously threatens the environment due to the irresponsible behavior of visitors and excessive tourism. For example, Hu, Zhang, Wang, Yu, and Chu (2019) highlighted that the problem of litter is negatively impacting sustainable tourism development around the world.

Value Belief Norm (VBN) and Norm Activation Theory (NAT) have been used to investigate the antecedents of environmentally responsible behavior intention of tourists. VBN is based on the notion that values are uncontrollable and intangible even though they influence belief. Conversely, beliefs can be altered with knowledge. It is essential to understand the contribution of knowledge in forming norm-driven behavior (Onel & Mukherjee, 2017). For these reasons, this study recommends encouraging a specific environmentally responsible behavior, namely, the prevention of littering. The present work adopted the framework proposed by Ünal, Steg, and Gorsira (2018) Knowledge-Belief-Norm (KBN) in the context of tourism.

This study aims to explain tourists' norm-driven intention to participate in an environmentally responsible manner based on the evidence gathered from domestic tourists in Indonesia. This research aims to provide theoretical and practical insight into said behaviors. Policymakers and community organizers can also benefit from the findings in this work when developing and implementing policies and practical strategies to reduce and prevent littering in tourist destinations.

## 2. Literature review

Environmentally responsible behavior significantly promotes the development of sustainable tourism which is critical for the long-term socio-economic and environmental health of the tourist destination in the long term (Fenitra, Handriana, Gancar, & Usman, 2021b; Fenitra, Handriana, Gancar, Usman, & Hartini, 2021a; Lee & Jan, 2019). Viewing littering through the lens of environmentally responsible behavior in the tourism context is essential to promoting sustainable tourism. Fenitra, Handriana, Gancar, and Usman (2021b) argue that rewarding environmentally responsible behavior and understanding the antecedents are crucial for the sustainable development of tourist destinations. For example, reducing the amount of litter in tourist destinations would increase tourism-generated revenue by up to 32.23%. In addition, encouraging the environmentally responsible behavior of tourists or visitors can also contribute to maintaining the tourist destinations' sustainability. There is insufficient tourism research focusing on specific environmentally responsible behaviors in developing countries like Indonesia. This study will give an insight into environmentally responsible behavior as it applies to Indonesia. The existing research into tourism focusing on environmentally responsible behavior examines behavior in nature-based tourism (Cheng et al., 2022).

There is an evident advantage to behaviorism, which is its ability to describe behavior explicitly and evaluate behavior changes. Laypeople and leaders alike can benefit from the responsible behavioral paradigm in numerous ways. The primary advantage is that leaders can learn for themselves and teach subordinates within their organizations how to become the type of leaders they want (Abbas, Ekowati, & Suhariadi, 2021). According to the World Tourism Organization, responsible tourism is about "creating better environments for people to live in and better places to visit." Responsible tourism necessitates that all stakeholders and tourists accept responsibility and take action to make tourism more environmentally friendly (Fenitra, Abbas, Ekowati, & Suhairidi, 2022). Valuable beliefs are evaluative beliefs that help people understand and relate to the world in which they live. They differ from existential beliefs, which are primarily concerned with concerns of truth or falsity. Values and standards are based on cognitive views of acceptance or disapproval because their cognitive component differs from motives derived from emotions or psychological impulses.

### *2.1. Knowledge-Belief-Norm*

Researchers have used the Value-Belief-Norm and Norm Activation Theory to explain environmentally responsible behavior in the decision-making of convention attendees (Han, 2015). The normative model has gained much attention from social psychologists (Aertsens, Verbeke, Mondelaers, & van Huylenbroeck, 2009), environmentalists (Steg & Nordlund, 2018), and tourism researchers (Lee & Jan, 2017). Some studies also scrutinize environmentally responsible consumption, such as consuming green products and choosing green hotels and restaurants. A previous study pinpointed the critical role that environmental knowledge plays in forming intention behavior through belief and norms and incorporating environmental knowledge into the model (Ünal et al., 2018). Other prior studies were conducted in various settings, including nature-based destinations (Lee & Jan, 2017; Han et al., 2016; Hardiman & Burgin, 2017). The present study used the Knowledge-Belief-Norm (KBN) by Ünal et al. (2018) to explain

a specific environmentally responsible behavior in the tourism context, particularly the prevention of littering. The initial objective of the KBN was to investigate whether values or environmental knowledge improve beliefs. The KBN is developed by extending the value-belief-norm (Stern, 2000). The theory consists of several constructs: biospheric values, environmental knowledge, beliefs, and personal norms. According to authors Ünal et al. (2018) and Onel and Mukherjee (2017), the linear connection between these constructs enhances behavior intention.

Values can shape and influence human behavior, beliefs, and norms (Steg & Groot, 2014). Values vary among individuals, meaning they differ and cannot be influenced by any mechanism. In the study related to environmentally responsible behavior, Onel and Mukherjee (2017) highlighted the potential contribution of environmental knowledge in altering norm-driven behavior. Individuals with a low biospheric value and a low level of environmental knowledge would not be aware of the consequences of their actions and activities. Ünal et al. (2018) argue that values and environmental knowledge can play an essential role in forming an individual's environmentally responsible behavior. Similarly, several scholars deduce that environmental values and knowledge combined can best predict belief (Liobikienė et al., 2017; Groening et al.,2018).

### *2.2. Environmentally responsible behavior intention in the tourism context*

Akintunde (2017) claims that environmentally responsible behavior refers to actions and activities in which an individual or group engages or behaviors that they exhibit to mitigate their potentially negative environmental impact. This term also refers to "pro-environmental behavior," "ecological behavior," "sustainable behavior," and "eco-friendly behavior"(Yu et al., 2021). Eco-friendly packaging and consumption, water and energy conservation, and natural habitat conservation are all examples of green or pro-environmental, or responsible behavior (Alonso-Vazquez, Packer, Fairley, & Hughes, 2019; Yu et al., 2021; Kim & Thapa, 2018). Sustainable water and energy consumption (Imran et al., 2014; Çalır Yıldırım and Karaarslan Semiz, 2019), and recycling (Han, Kim, & Kiatkawsin, 2017) all are examples of good environmental behavior (Imran et al., 2014; Yıldırım, 2019; Iaquinto, 2015; Qiang et al., 2019; Passafaro, 2019).

In this context, the intention to practice environmentally responsible behavior (ERBI) defines as one having the desire to personally carry out actions or pursue behaviors that minimize their environmental impact. This particular behavior helps reduce the overall environmental footprint and is essential for sustaining the growth of the tourism industry. It is vital to develop and promote environmentally responsible behavior among tourists to increase sustainable tourism (Zhou et al., 2020). Denley et al. (2020) attempted to identify the internal elements that shape one's environmentally responsible behavior. In past studies, environmentally responsible behavior among tourists is driven by both external and internal factors such as motivation and belief (Fang et al., 2018; Ahmad, Bazmi, & Bukhari, 2014).

### *2.3. Biospheric value and new environmental paradigm*

Biospheric values play a critical role in one's interests, which is the profound interest of an individual in a natural and ecological worldview. Biospheric value forms a new environmental paradigm reflecting current and trending beliefs. Several pieces of empirical evidence from various contexts have supported this relationship. Biospheric values increase an individual's concern for the environment. According to Akintunde's (2017) study, the biospheric value reflects what people care about most and what drives them in life. People with solid environmental values are more likely to incorporate environmental consideration into their decisions and actions. Onel and Mukherjee (2017) found that biospheric value positively affects the new environmental paradigm. In a study related to human behavior and environmental protection, Ünal et al. (2018) demonstrated that biospheric values increase an individual's concern for the environment. Besides, biospheric values improve the new environmental paradigm, according to Ye and Tkaczynski (2017). This work argued that the higher the biospheric value of an individual, the higher their engagement in the new environmental paradigm. The hypothesis is as follows;

**Hypothesis 1.** Biospheric values have a significant positive effect on the new environmental paradigm.

### *2.4. Environmental knowledge and new environmental paradigm*

Having comprehensive knowledge about the environment can be considered an essential factor in shaping an individual's pro-environmental behavior. Knowledge plays a significant role in shaping one's beliefs, attitudes, and behavior. Environmental knowledge refers to the degree of competence an individual has regarding the practice of environmental conservation (Cheng & Wu, 2015). Zhang and En (2010) argued that environmental knowledge increases an individual's concern about the problem of environmental degradation. An individual who has more theoretical or practical knowledge related to the environment will be more concerned about environmental problems such as climate change and pollution. Indeed, environmental knowledge has an indirect (Kitzmuller, 2013) and direct (Liobikien & Poškus, 2019) effect on individuals' intention to engage in pro-environmental behavior. Based on empirical evidence from a survey of 1007 Lithuanians, Liobikien and Poškus (2019) supported that increased environmental knowledge positively influences an ecological worldview or the new environmental paradigm. When individuals acquire enough environmental knowledge, they become more concerned about local and global environmental problems. Ünal et al. (2018) concluded that if an individual's degree of environmental knowledge is high, their concern about

climate change and related environmental issues will be increased. Thus, this study argues that a greater level of environmental knowledge leads to a higher interest in a new environmental paradigm. The hypothesis is as follows;

**Hypothesis 2.** Environmental knowledge has a significant positive effect on the new environmental paradigm.

### 2.5. New environmental paradigm and awareness of consequences

The new environmental paradigm (NEP) was developed by Dunlap et al. (2000) to study the environmental attitude of individuals. The notion of NEP endorses the acceptance of the fact that human beings are part of nature. A human being can exist in harmony with or disturb the balance of nature; its existence outside of and interference with nature will harm the quality and health of nature, according to the authors (Bronfman et al., 2015). Prior research justified a causal relationship between the new environmental paradigm and awareness of its consequences. People with a greater understanding of current environmental issues would also have a greater awareness of the consequences of their actions and behaviors. Campos-Soria et al. (2018), Liobikien and Poškus (2019), and Delaroche (2020) claim that there is a correlation between the two, as well as a positive effect on an individual's awareness regarding the consequences of their actions. A new environmental paradigm can increase a tourist's awareness of the consequences of their actions, according to and Han et al. (2017). The ascription of personal responsibility can be improved by increasing the awareness of a new environmental perspective. The ascription of personal responsibility can be improved by increasing the awareness of tourists of a new environmental paradigm, according to Landon, Woosnam and Boley (2018). Based on the above evidence, it can be concluded that the new eco-friendly tourism paradigm increases a tourist's awareness of the consequences of their actions. The hypothesis is as follows;

**Hypothesis 3.** New environmental paradigm has a significant positive effect on awareness of the consequences.

### 2.6. Awareness of consequences and ascription of responsibility

Awareness of the impact of a person's actions refers to an individual's understanding of what actions they should take to minimize or mitigate the negative cause of their impact and behavior on the environment. It determines the acceptance of an individual of responsibility, which increases personal norms. It is also associated with an ascription of personal responsibility (Ghazali et al., 2019; Landon & Boley, 2018). Bronfman et al. (2015) and Ünal et al. (2018) examine this causal relationship. According to these two researchers, a person's awareness of the consequences of their actions has a positive impact on their ascription of responsibility. Their findings emphasize the positive effect of awareness of responsibility on responsibility. Their findings emphasize the positive effect of a person's awareness of the consequences of their actions on their ascription of responsibility. These findings are supported by Ghazali et al. (2019), asserting that awareness of the consequences positively influences the ascription of their responsibility among two nationalities (Malaysian and Chinese). So, this study indicates that tourists who are more aware of the consequences of their actions can improve their sense of responsibility. Individuals who are aware of the consequences of their behavior and actions develop a stronger sense of responsibility. The hypothesis is as follows;

**Hypothesis 4.** Awareness of the consequences has a significant positive effect on the ascription of responsibility.

### 2.7. Ascription of responsibility and personal norm

A stronger sense of ascription of personal responsibility in any individual evokes feelings of moral obligation. Ascription of responsibility is reflected in assigning responsibility for their behavior or action (Ghazali et al., 2019). Studies emphasize that ascription of responsibility triggers personal norms (Steg and Nordlund, 2018). When a person feels that they did something wrong, their moral obligation to do something to stop or lessen the damage will go up (Ghazali et al., 2019; Yıldırım, 2019). This hypothesis has been supported in pro-environmental related studies. Ünal et al. (2018) revealed that when people acknowledge they can help reduce the negative consequences of their actions, they would feel morally obligated to support that particular behavior. Likewise, Bronfman et al. (2015), followed by Rezvani et al. (2017), assert that a higher ascription of responsibility increases personal norms. Furthermore, recent evidence of conservation behavior in an organization (Ciocirlan, Gregory-Smith, Manika, & Wells, 2020) and tourist behavior (Kiatkawsin et al., 2020) demonstrated that responsibility ascription best predicts personal norms. Therefore, according to our study, a higher ascription of responsibility enhances personal norms. The hypothesis is as follows.

**Hypothesis 5.** Ascription of responsibility has a significant positive effect on Personal Norm.

### 2.8. Personal norm and environmentally responsible behavior intention

Sia and Jose (2019) argued that this variable is one driving factor of norm-driven pro-environmental behavior. Personal norm is defined as "the extent to which one feels morally obliged to perform a certain action" (Schwartz, 1970). Previous research

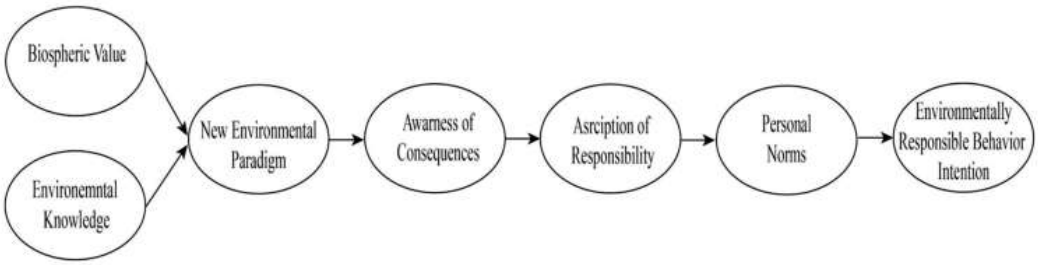


**Fig. 1.** Conceptual framework of Knowledge-Belief-Norm Theory (Ünal et al., 2018).

illustrates that a higher sense of personal moral norm can lead a person to participate and engage in environmentally friendly behavior. A study of the behavior of tourists has found that personal norms predict environmentally responsible behavior intentions in both groups. It includes resource conservation (Luo et al., 2020) and green consumption (Han, 2020), and recycling (Han et al., 2017). Han et al. (2016) conducted a comparison study of Korean and Chinese groups. Han's results are consistent with Ghazali et al. (2019), who conducted a study related to pro-environmental behavior. The finding explains that when people feel that they are morally obliged to recycle because it is the right thing to do, they are intended to act accordingly. They asserted that personal norms positively influence particular pro-environmental behavior, including recycling and utility saving; Malaysian and Chinese respondents validated this relationship. Furthermore, Ünal et al. (2018) emphasize that an individual's intention to engage in eco-friendly action increases when they strongly feel obliged. This argument implies that personal norms lead to planned environmentally conscious conduct. Therefore, this study suggested that personal norms improve environmentally responsible intention behavior. The hypothesis is as follows;

**Hypothesis 6.** Personal norms have a significant positive effect on environmentally responsible behavior intention.

### *2.9. Different types of tourism destinations*

Indonesia has various tourist destinations, including nature-based, urban, and cultural heritage destinations. Littering is considered a source of environmental challenges, particularly in tourism destinations (Hayati et al., 2020). Environmental challenges are associated with environmental problems in any type of tourist destination. The tourist's behavior is driven by various motives that manifest them to behave and interact according to their travel purpose, the characteristic, and the attribute of the destination. e.g., (Akgün, Senturk, Keskin, & Onal, 2020; Beeharry, Bekaroo, Bokhoree, Phillips, & Jory, 2017; Dinda & Ghosh, 2021; Hu et al., 2019b; Lee, Olya, Ahmad, Kim, & Oh, 2021; Li et al., 2021). Tackling this issue is difficult because of the nature and characteristics of the tourist or visitors. It is essential to understand the driving factors of tourists to engage in environmentally responsible behavior in the context of nature-based, urban tourism, and cultural heritage tourism.

First, a nature-based tourism destination refers to promoting ecological conservation to attract visitors and tourists (Gaffar, Tjahjono, Abdullah, & Sukmayadi, 2021). A nature-based destination can be defined as a destination with natural features and characteristics, including beaches, mountains, national parks, and forests. Visitors intentionally or unintentionally may harm the biosphere and environment (Wolf, Croft, & Green, 2019). This type of tourism destination allows tourists to interact closely with the natural environment and have experience and understanding of the natural world. This particular destination type provides tourists or visitors with an experience of interacting and connecting with nature and a sizable bio-diverse ecosystem, including beaches and forests (Lee & Jan 2015). Secondly, Silberberg (1995) defines that "cultural tourism is visited by persons from outside the host community motivated wholly or in part by interest in the historical, artistic, scientific, or lifestyle or heritage offerings of a community, region, group, or institution". In other words, cultural tourists mainly visit tourist destinations to visit heritage inherited from the ancient generation. It is either an intangible or tangible cultural heritage (Moric, Pekovic, Janinovic, Perovic, & Griesbeck, 2021). This destination attracts tourists and visitors who seek to participate in cultural activity and acquire cultural knowledge about a particular object, place, or event (Flew & Kirkwood, 2021). Finally, Urban tourism is vital for economic development, and urban tourism destinations include botanical and urban parks (Zhang, Moyle, & Jin, 2018; Zhao et al., 2018). Although there is an increasing interest in studying urban or city tourism destinations (Griffin & Hayllar, 2009; Miller, Merrilees, & Coghlan, 2014; Rogerson, 2013), attention to understanding the tourist's environmentally responsible behavior is insufficient. As Carballo and León (2018) argued, tourists visiting different destinations would behave since they are engaged and experienced in different activities. They were followed by Gao, Zou, Morrison, and Wu (2021), asserting that an individual's behavior is contextual and situational. In addition, Wang et al. (2021) recommended that it is crucial to distinguish the behavior among tourists in nature-based destinations and cultural tourism. Likewise, Krapez, Hughes, and Newsome (2021) outlined the importance of natural features rather than urban setting in the subject of tourism and nature conservation. Therefore, this study aims to fill this gap by examining the moderating role of type of tourism destinations in shaping tourists' behavior. (See Fig. 1.)

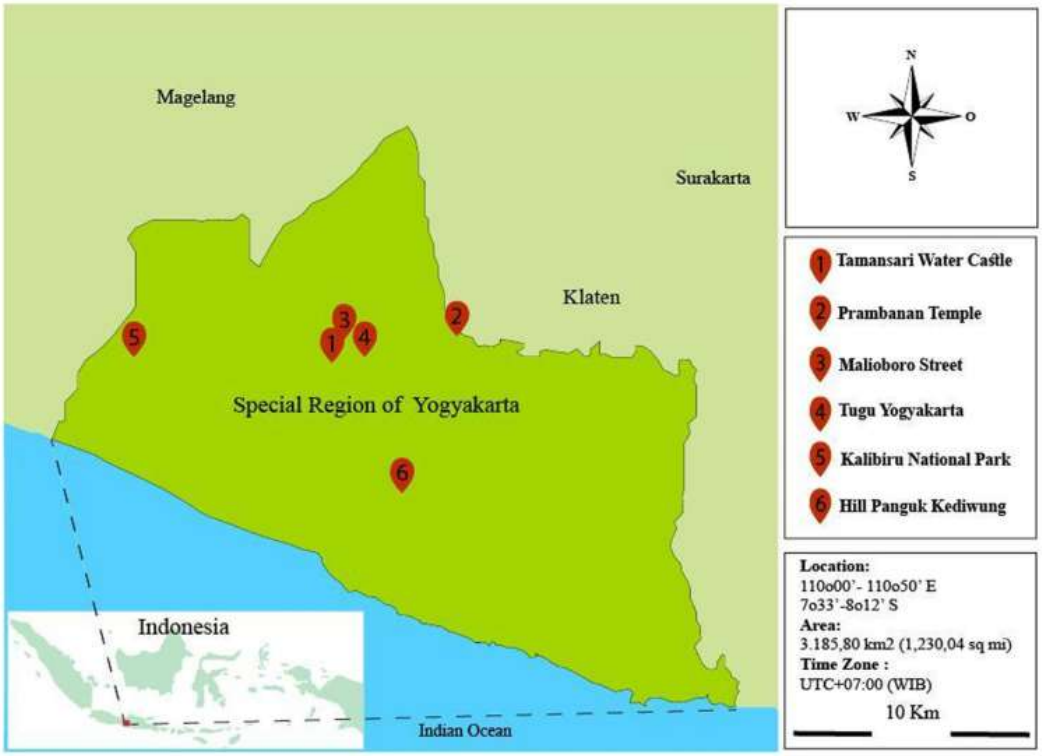


**Fig. 2.** Map of the study area.

## 3. Materials and methods

### *3.1. Study area*

The Special Region of Yogyakarta, Java Island, Indonesia, was selected as the research area (Fig. 2). The Special Region Yogyakarta owns several tourism destinations, including cultural heritage tourism, nature-based tourism, and urban tourism. Because of its popularity with its unique culture, Yogyakarta is also one of Indonesia's most visited tourist destinations. In the Special Region of Yogyakarta, domestic tourism is a very profitable market and helps boost the local economy (Antara & Sumarniasih, 2017). The Special Region of Yogyakarta office reported that the region hosted 7.858.137 domestic tourists in 2017 and increased to 18.588.562 in 2020.

### *3.2. Questionnaire survey design*

The questionnaires used in this study consist of two parts. The first comprises the demographic information of respondents and the second part consist of the variable measure. Questionnaires were designed based on self-reported behavior measurement employing 5 Likert scales varying from 1 "strongly disagree," 2 "disagree," 3 "neutral," 4 "agree," to 5" strongly agree." Table 2 shows the items adopted in this study. All the items and statements used to measure and evaluate constructs were borrowed from prior studies and adjusted accordingly to the research objective. This work follows guidance on item selection by Maloney, Grawitch, and Barber (2011) to reduce the survey length. This work implies validated scales to provide a credible foundation, allowing for a clear comparison of prior results. The accurate items were adjusted to fits with the objective and subject of the present research. Environmentally responsible behavior items of tourists were borrowed from (Ajzen, 1991; Wang et al., 2021), while environmental knowledge was conceptualized using items borrowed from (Liobikien & Poškus, 2019). The biospheric value was measured with items adapted from (Han et al., 2017). A new environmental paradigm was conceptualized with items adapted from (Ciocirlan et al., 2020; Hawcroft & Milfont, 2010). The three items employed to measure the NEP met the internal validity criteria and best represented each NEP facet (Hawcroft & Milfont, 2010). Awareness of consequences and the ascription of responsibility were measured using items borrowed from (Ghazali et al., 2019). The personal norm was measured with items adapted from (Bronfman et al., 2015).

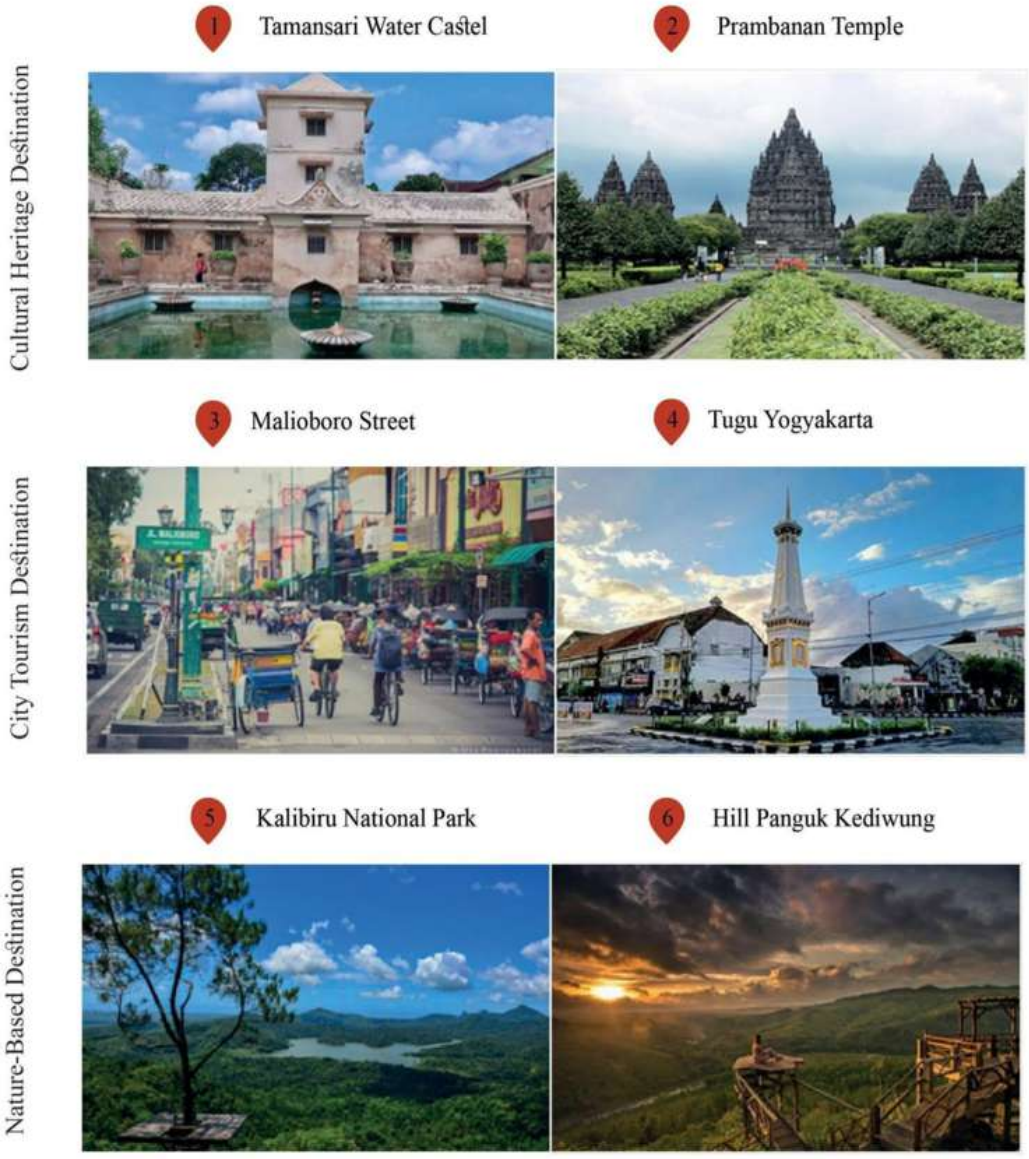


**Fig. 3.** Study sites.

### 3.3. Sampling method and data collection

The survey was carried out between January to February 2021. Six locations in the Special Region Yogyakarta, Indonesia, were chosen to collect the data, namely Malioboro Street and Tugu Yogyakarta for Urban Tourism, Tamansari Water Castle, Prambanan Temple Cultural Heritage Tourism, and Kalibiru National Park and Hill Pangku Kediwung for Nature-Based tourism (Fig. 3).

The researchers collected the data; the survey questionnaires were distributed to the domestic tourists during their visits to the study sites. In Indonesia's context, domestic tourists are initially referred to as "Indonesians who travel away from home for any time to visit tourism objects within Indonesia" (Gunawan, 1996). According to the world organization of tourism, a domestic tourist is anyone residing in a country who travels outside the usual environment for a period not exceeding 12 months.

Participants of the study were chosen randomly and asked if they could allocate 10 to 15 min to fill the questionnaires with the assistance of the researchers/ surveyors. A total of 500 questionnaires were distributed, and 452 were returned. After evaluating the questionnaires, 346 completed and usable data were used for further statistical processes.

Data were analyzed and processed with the help of AMOS Graphic 22 and SPSS 26. First, the demographic characteristics of the sample were analyzed using SPSS. Second, this study followed the two steps that Anderson and Gerbing (1988) recommended in

**Table 1**
The demographic characteristics of the sample.

| Demographic | Full sample | | Nature-based | | Cultural heritage | | Urban |
|---|---|---|---|---|---|---|---|
| | *n* | % | *n* | % | *n* | % | *n* |
| *Gender* | | | | | | | |
| Female | 201 | 58.1 | 71 | 60.2 | 59 | 55.1 | 71 |
| Male | 145 | 41.9 | 47 | 39.8 | 48 | 44.9 | 50 |
| *Age (years old)* | | | | | | | |
| 18–25 | 174 | 50.3 | 59 | 50.0 | 59 | 55.1 | 56 |
| 26–35 | 126 | 36.4 | 47 | 39.8 | 33 | 30.8 | 46 |
| 36–45 | 37 | 10.7 | 11 | 9.3 | 13 | 12.1 | 13 |
| 46–60 | 7 | 2.0 | 1 | 0.8 | 1 | 0.9 | 6 |
| 60< | 2 | 0.6 | 59 | 50.0 | 1 | 0.9 | 0 |
| *Education level* | | | | | | | |
| High school | 59 | 17.1 | 17 | 14.4 | 19 | 17.8 | 23 |
| Diploma | 40 | 11.6 | 13 | 11.0 | 11 | 10.3 | 16 |
| Bachelor degree | 188 | 54.3 | 68 | 57.6 | 64 | 59.8 | 56 |
| Postgraduate degree | 54 | 15.6 | 19 | 16.1 | 11 | 10.3 | 24 |
| Doctorate degree | 5 | 1.4 | 1 | 0.8 | 2 | 1.9 | 2 |
| *Employment* | | | | | | | |
| Student | 126 | 36.4 | 37 | 31.4 | 48 | 44.9 | 41 |
| Government | 18 | 5.2 | 6 | 5.1 | 4 | 3.7 | 8 |
| Private sector | 70 | 20.2 | 32 | 27.1 | 17 | 15.9 | 21 |
| Self-employer | 32 | 9.2 | 12 | 10.2 | 10 | 9.3 | 10 |
| Other | 100 | 28.9 | 31 | 26.2 | 28 | 26.2 | 41 |
| *Travel companion* | | | | | | | |
| Solo | 140 | 40.5 | 45 | 38.1 | 43 | 40.2 | 52 |
| Group | 158 | 45.7 | 62 | 52.5 | 55 | 51.4 | 41 |
| Family and friends | 48 | 13.9 | 11 | 9.3 | 9 | 8.4 | 28 |
| *Types of tourism destination* | | | | | | | |
| Nature-based | 118 | 34.1 | | | | | |
| Cultural heritage | 107 | 30.9 | | | | | |
| City/Urban | 121 | 35.0 | | | | | |
| *Total* | 346 | 100 | 118 | | 107 | | 121 |

*Note:* n = number, % = percentage.

analyzing the data. The first step is evaluating the measurement using confirmatory factor analysis (CFA). The second step is the assessment of the structural model. Multi-group structural equation modeling analysis (SEM) was further analyzed to compare the group's differences.

## 4. Results and analysis

### 4.1. Sample demographic description

Table 1 describes the demographic characteristics of the respondents. The respondents of this study consist of 346 individuals (nature-based = 118, cultural heritage = 107, and city/urban =121), who visited the Special Region of Yogyakarta for tourist or Leisure purposes. Female respondents were dominated in this study which consisted of 58.1% (nature-based = 60.2%, cultural heritage = 55.1%, and city/urban =58.7%), of the sample and male respondents were 44.5% (nature-based = 39.8, cultural heritage = 44.9%, and city/urban = 41.3%). The majority 50.3% (nature-based = 50%, cultural heritage = 55.1%, and city/urban = 46.3%) of the respondents were aged between 18 and 25 years old followed by 26–35 years old 36.4% (nature-based = 39.8%, cultural heritage = 30.8%, and city/urban = 38%), 36–45 years old representing 10.7% (nature-based = 9.3%, cultural heritage = 12.1%, and city/urban =10.7%) of the sample. Most of the respondents were well educated; 54.3% (nature-based = 57.6%, cultural heritage = 59.8%, and city/urban 64.3%) have a bachelor degree, 15.6% (nature-based = 16.1%, cultural heritage = 10.3%, and city/urban =19.8%) are master degree holder, 17.1% (nature-based = 14.4%, cultural heritage = 17.8%, and city/urban = 19%) finished secondary school, 11.6% (nature-based = 11%, cultural heritage = 10.3%, and city/urban = 13.2%) have diploma, and 1.4% (nature-based = 0.8%, cultural heritage = 1.9%, and city/urban = 1.7%) have Ph.D. The characteristics of the sample also show that 40.5% (nature-based = 38.1%, cultural heritage = 40.2%, and city/urban = 43%) of the respondents were traveling alone, 45.7% (nature-based = 52.5%, cultural heritage = 51.4%, and city/urban = 33.9%) were traveling with groups, and 13.9% (nature-based = 9.3%, cultural heritage = 8.4%, and city/urban = 23.1%) were traveling with friends or family members. The 35% ($n$ = 121) respondents who visit the Special Region of Yogyakarta visit the city, 34.1% ($n$ = 118) visit nature including beaches, mountains, and 30.9% ($n$ = 107) of the respondents who visit the Special Region of Yogyakarta visited Temples (Cultural heritage destination).

**Table 2**
Confirmatory factor analysis: The result of convergent validity and reliability (full sample).

| Items and sources | Total sample ($n$ = 346) | | | |
|---|---|---|---|---|
| | Loading factor | Composite reliability | Average variance extracted | Cronbach's alpha |
| *Biospheric value (BV)* (Han et al., 2017) | | 0.6 | 0.561 | 0.694 |
| $BV_1$: "I am a person who values unity with nature and harmonizing with nature." | 0.707 | | | |
| $BV_2$: "I am a person who values preventing pollution and conserving natural resources." | 0.789 | | | |
| *Environmental knowledge (EV)* (Liobikien & Poškus, 2019) | | 0.759 | 0.693 | 0.793 |
| $EK_1$: "Preventing littering can help eliminate the unpleasant smell of litter and reduce the spread of harmful organisms." | 0.834 | | | |
| $EK_2$: "I know that excessive litter will damage the tourism destination environments." | 0.832 | | | |
| *New environmental paradigm (NEP)* (Ciocirlan et al., 2020; Hawcroft & Milfont, 2010) | | 0.703 | 0.577 | 0.603 |
| $NEP_1$: "We are approaching the limit of the number of people that the earth can support." | 0.784 | | | |
| $NEP_2$: "Humans are severely abusing the environment." | 0.739 | | | |
| $NEP_3$: "The balance of nature is very delicate and easily upset." | 0.756 | | | |
| *Awareness of consequences (AC)* (Ghazali et al., 2019) | | 0.671 | 0.551 | 0.754 |
| $AC_1$: "Tourists' litter can generate huge negative environmental impacts in the tourism destination." | 0.787 | | | |
| $AC_2$: "Tourists can cause environmental deteriorations of the destination due to the littering." | 0.731 | | | |
| $AC_3$: "Tourists can cause pollution, climate change, and exhaustion of natural resources because of a litter of the tourists." | 0.708 | | | |
| *Ascription of responsibility (AR)* (Ghazali et al., 2019) | | 0.781 | 0.647 | 0.826 |
| $AR_1$: "I am responsible for the impacts of litter on the environment as a tourist." | 0.832 | | | |
| $AR_2$: "I am responsible for the impacts of litter on the environment." | 0.863 | | | |
| $AR_3$: "I am responsible for minimizing the impacts of litter on the environment as a tourist." | 0.711 | | | |
| *Personal norm (PN)* (Bronfman et al., 2015). | | 0.767 | 0.647 | 0.828 |
| $PN_1$: "I feel I am obligated to do my part to reduce the impact of litter on the environment as a tourist." | 0.766 | | | |
| $PN_2$: "People like me should minimize the impact of litter on the environment when traveling." | 0.779 | | | |
| $PN_3$: "As a tourist, I feel morally obligated to reduce litter to minimize my environmental impact." | 0.778 | | | |
| $PN_4$: "I would feel guilty if I were not able to dispose of litter properly when traveling." | 0.735 | | | |
| *Environmentally responsible behavior intention (ERBI)* (Ajzen, 1991; Wang et al., 2021) | | 0.860 | 0.689 | 0.879 |
| $ERBI_1$: "I plan to engage in preventing littering when traveling in the future." | 0.856 | | | |
| $ERBI_2$: "I will properly dispose of the littering when traveling in the future." | 0.869 | | | |
| $ERBI_3$: "I will make an effort to reduce littering when traveling in the future." | 0.932 | | | |
| $ERBI_4$: "I probably dispose of my litter properly when traveling." | 0.634 | | | |

### 4.2. Confirmatory factor analysis

Confirmatory factor analysis (CFA) evaluated 21 indicators and seven latent variables. Also, to evaluate the general fit and appropriateness of the data. The goodness of fit statistic for CFA suggested a good fit ($\chi^2$/df = 1.807, Goodness of Fit (GFI) = 0.913, PGFI = 0.640, Incremental Fit Index (IFI) = 0.915, Tucker Lewis Index (TLI) = 0.9, Comparative Fit Index (CFI) = 0.913, Root Mean Square Error of Approximation (RMSEA) = 0.034), the indices value meet the minimum requirement suggested by MacCallum and Hong (1997), and Awang (2012). Furthermore, when loading factors is more significant than 0.5, the internal consistency of the measurements can be evaluated (Hair Jr., Black, Babin, & Anderson, 2010). Composite reliability, which is to imply the criteria proposed by Nunnally and Bernstein (1994), suggests that the CR value must exceed 0.6. The average extracted variance (AVE) should be more significant than 50% (0.5) for a superior construct (Fornell & Larcker, 1981). The internal reliability was evaluated with Cronbach's alpha value above 0.6 (Churchill Jr., 1979; Haryanto, Gunawan, Fenitra, & Abbas, 2022). Table 2 shows that all the CR values of all constructs were above 0.6, all the AVE were above 0.5, and Cronbach's alpha exceeded 0.6 (Loewenthal, 2004; Nuringsih & Puspitowati, 2017). The total sample Table. 2 shows that all items' reliability and internal consistency were adequate.

Discriminant validity was evaluated with the squared roots of average variance extracted (AVE) and the correlation between variables. This study adopted the criterion of Fornell and Larcker (1981). It proposed that AVE's squared roots be higher than the correlation value between variables. Table 3 shows that the correlations between a variable and another variable were smaller than the squared roots of AVE (Fornell & Larcker, 1981). The result explains no discriminant validity found in the ascription of the responsibility, personal norm, environmentally responsible behavior intention, awareness of the consequences, and biospheric value.

### 4.3. Structural model

The structural model before moderating effect was first analyzed and later the Multi-group SEM was used to compare the differences between groups. A structural model is used to examine the relationship between variables (Hair Jr. et al., 2010). The statistic model fit of the structural model is as follow ($\chi^2$/df = 1.870, GFI = 0.824, PGFI = 0.680, IFI = 0.876, TLI = 0.858, CFI =

**Table 3**
Construct correlations (discriminant validity).

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Environmentally responsible behavior intention | *0.830* | | | | | | |
| Personal norm | 0.545 | *0.805* | | | | | |
| Ascription of responsibility | 0.38 | 0.667 | *0.805* | | | | |
| Awareness of the consequences | 0.221 | 0.283 | 0.33 | *0.743* | | | |
| New environmental paradigm | 0.349 | 0.616 | 0.474 | 0.618 | *0.760* | | |
| Environmental knowledge | 0.397 | 0.684 | 0.524 | 0.308 | 0.618 | *0.833* | |
| Biospheric value | 0.285 | 0.584 | 0.595 | 0.189 | 0.504 | 0.671 | *0.749* |

*Note:* Italic numbers indicate the correlation between constructing lower than the squared roots of the average variance extracted (Fornell & Larcker, 1981).

0.873, RMSEA = 0.031) indicating good fit based on criteria cut of Ramkissoon, Weiler, and Smith (2012) describes the regression analysis before comparing groups. The result indicated that the biospheric value does not have an effect on new environmental paradigm ($\beta = 0.210$, $t = 1.588$, $p = 0.112$), environmental knowledge have a significant positive effect on new environmental paradigm ($\beta = 0.438$, $t = 4.049$, $p < \langle 0.001$), new environmental paradigm have a significant positive effect on new environmental paradigm ($\beta = 0.722$, $t = 5.692$, $p < 0.001$,) with $R^2$ (0.44), awareness of the consequences have a significant positive effect on ascription of the responsibility ($\beta = 0.0.271$, $t = 4.589$, $p < 0.001$), with $R^2 = 0.40$, ascription of the responsibility have a significant positive effect on personal norm ($\beta = 0.463$, $t = 9.524$, $p < 0.001$), with $R^2$ (0.14), and personal norm have a significant positive effect on environmentally responsible behavior intention ($\beta = 0.685$, $t = 8.208$, $p < 0.001$), with $R^2$ (0.30). This study shows a weak $R^2$ which can be improved for future research Hair, Ringle, and Sarstedt (2011) (See Table 4).

### 4.4. Multi-group structural equation model analysis

Another contribution of this work was to establish the moderating role of the type of tourist. Samples were divided into three groups, namely nature-based tourism ($n = 118$), cultural heritage tourism ($n = 107$), and urban tourism ($n = 121$). This study uses Multi-group SEM to compare the difference between groups. The $\chi^2$ comparison between the unconstrained model, e.g., ($\chi^2 = 907.97$; $\Delta df = 412$) and the full constrained model, e.g., ($\chi^2 = 912.119$; df = 413) were noted. These indices suggested that the three groups are different at the model level with a different level ($\Delta\chi^2 = 9.1499$, $\Delta df = 1$) $p < 0.001$, which means that the Type of tourism destination variable moderates the relationship between the model. Thus, this study established the moderating role of the tourism destination type. (see Table 5)

*Path 1*: The multi-group structural equation model analysis demonstrated that relationship between biospheric value and new environmental paradigm among nature-based tourism ($\beta = 0.438$, $t = 1.132$, $p = 0.101$), cultural heritage tourism ($\beta = 0.066$, $t = 0.451$, $p = 0.652$), urban tourism ($\beta = 0.315$, $t = 1.060$, $p = 0.289$) was not significant. The ($\Delta\chi^2 = 0.622$) explained that there are no statistical differences among three groups. *Path 2:* The link between environmental knowledge and new environmental paradigm; Nature-based tourism ($\beta = 0.304$, $t = 1.966$, $p < 0.05$), Cultural heritage tourism ($\beta = 0.556$, $t = 3.016$, $p < 0.01$) was significant. Whereas, in urban tourism destinations ($\beta = 9.375$, $t = 1.513$, $p = 0.130$), the relationship between environmental knowledge and new environmental paradigm was not significant. The multi-group structural equation analysis demonstrated that there are differences between the three groups with $\Delta\chi^2 = 14.216$ and $p < 0.001$. Thu, this result explained that the moderating role of type of destination was confirm in this path. *Path 3:* The link between new environmental paradigm and awareness of the consequences between Nature-based tourism ($\beta = 0.583$, $t = 2.907$, $p < 0.01$), Cultural heritage tourism ($\beta = 0.66$, $t = 3.142$, $p \leq 0.01$), and urban tourism ($\beta = 0.0.850$, $t = 3.493$, $p < 0.001$) was significant. Thus, the multi-group analysis demonstrated that there are no statistical differences among the groups, the $\Delta\chi^2 = 0.755$, shows that the type of destination did not moderate the link between new environmental paradigm and awareness of the consequences. *Path 4*: The relationship between awareness of the consequences and ascription of the responsibility in Nature-based tourism ($\beta = 0.107$, $t = 1.334$, $p = 0.182$) was not significant. Whereas, Cultural heritage tourism ($\beta = 0.747$, $t = 3.495$, $p < 0.001$), and Urban tourism ($\beta = 0.238$, $t = 2.084$, $p < 0.01$) was significant. The moderating role of type of destination in this path was confirm with $\Delta\chi^2 = 9.675$ and $p < 0.001$. *Path 5:* The link between ascription of the responsibility and personal norm was confirmed in nature-based

**Table 4**
Structural model before a moderator.

| Paths | $\beta$ | S.E. | $t$ | $R^2$ | Conclusion |
|---|---|---|---|---|---|
| Biospheric value ➔ New environmental paradigm | 0.210 | 0.132 | 1.588 | 0.20 | Not supported |
| Environmental knowledge ➔ New environmental paradigm | 0.435 | 0.107 | 4.049*** | | Supported |
| New environmental paradigm ➔ Awareness of the consequences | 0.722 | 0.127 | 5.692*** | 0.44 | Supported |
| Awareness of consequence ➔ Ascription of responsibility | 0.271 | 0.059 | 4.589*** | 0.40 | Supported |
| Ascription of responsibility ➔ Personal norm | 0.463 | 0.049 | 9.524*** | 0.14 | Supported |
| Personal norm ➔ Environmentally responsible behavior intention | 0.685 | 0.083 | 8.208*** | 0.30 | Supported |

*Note:* ***$p < 0.001$; S.E. = standard error; $R^2$ = R-squared, $\beta$ = coefficient. $t$ = $t$-value; $p$ = $p$-value.

**Table 5**
Multi-groups SEM result.

| Paths | | Nature-based ($n = 118$) | | | | Cultural heritage ($n = 107$) | | | | Urban ($n = 121$) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $\beta$ | SE | $t$ | $R^2$ | $\beta$ | SE | $t$ | $R^2$ | $\beta$ | SE | $t$ | $R^2$ |
| 1 | BV→NEP | 0.438 | 0.267 | 1.639 | 0.19 | 0.066 | 0.146 | 0.451 | 0.12 | 0.315 | 0.297 | 1.060 | 0.24 |
| 2 | EK→NEP | 0.304 | 0.155 | 1.966 (*) | | 0.556 | 0.184 | 3.016 (**) | | 0.375 | 0.248 | 1.513 | |
| 3 | NEP→AC | 0.583 | 0.201 | 2.907 (**) | 0.66 | 0.747 | 0.238 | 3.142 (**) | 0.09 | 0.850 | 0.243 | 3.493 (**) | 0.60 |
| 4 | AC→AR | 0.107 | 0.080 | 1.334 | 0.41 | 0.749 | 0.214 | 3.495 (***) | 0.27 | 0.238 | 0.084 | 2.840 (**) | 0.41 |
| 5 | AR→PN | 0.355 | 0.070 | 5.047 (***) | 0.12 | 0.664 | 0.110 | 6.027 (***) | 0.15 | 0.453 | 0.081 | 5.609 (***) | 0.10 |
| 6 | PN→ERBI | 0.628 | 0.120 | 5.239 (***) | 0.13 | 0.563 | 0.145 | 3.880 (***) | 0.50 | 0.745 | 0.160 | 4.657 (***) | 0.31 |

*Note:* *p < 0.05; **p < 0.01; ***p < 0.001; S.E. = Standard error; $R^2$ = R-squared; $\beta$ = coefficient; $t$ = $t$-value; $p$ = $p$-value; n = number, $\beta$ = coefficient; SE = standard error; S = supported, SN = not supported, AR = ascription of responsibility; PN = personal norms; ERBI = environmentally responsible behavior intention; AC = awareness of consequences; NEP = new environmental paradigm; EK = environmental knowledge; BV = biospheric value.

tourism ($\beta = 0.355$, $t = 5.047$, $p < 0.001$), Cultural heritage tourism ($\beta = 0.664$, $t = 6.027$, $p < 0.001$), and Urban tourism ($\beta = 0.453$, $t = 5.609$, $p < 0.01$). The multi-group structural analysis shows that that there is no statistical difference between three groups. *Path 6:* The link between ascription of the responsibility and personal norm was confirmed in nature-based tourism ($\beta = 0.355$, $t = 5.047$, $p < 0.001$), Cultural heritage tourism ($\beta = 0.664$, $t = 6.027$, $p < 0.001$), and Urban tourism ($\beta = 0.453$, $t = 5.609$, $p < 0.01$). The multi-group structural analysis shows that that there is no statistical difference between three groups. *Path 7:* The link between personal norm and environmentally responsible behavior intention was validated in nature-based ($\beta = 0.628$, $t = 5.239$, $p < 0.001$), Cultural heritage tourism ($\beta = 0563$, $t = 3.880$, $p < 0.001$), and Urban tourism ($\beta = 0.745$, $t = 44.657$, $p < 0.01$). The results show that there is no statistical difference between three groups.

## 5. Discussion and findings

The formation of norm-driven environmentally responsible behavior drawing from the theory of Knowledge Belief-Norms was modeled for investigation and the link between environmental knowledge, biospheric value, new environmental paradigm, awareness of consequences, the ascription of responsibility, personal norm, and specific environmentally responsible behavior intention was systematically investigated using sample consisting of 346 domestic tourists in Indonesia. Besides, the behavior of tourists visiting three types of destinations, namely nature-based, cultural heritage, and urban tourism destinations, were compared via multi-group structural equation modeling. Our findings broaden the knowledge and understanding of environmentally responsible behavior, particularly on litter prevention in domestic tourism. This work advanced the development and established application of the Knowledge-Belief-Norm Theory in tourism research, mainly environmentally responsible behavior. This study helped us understand that awareness and knowledge have no boundaries. It might be used in local and international tourist situations because everyone must act responsibly nowadays.

*Hypothesis 1* identified that biospheric value positively affected the new environmental paradigm. This finding is in contradiction with previous study findings (Onel & Mukherjee, 2017; Ye & Tkaczynski, 2017; Ünal et al., 2018). These studies suggest that solid biosphere values enhance tourists' concerns about the new environmental problem. The present empirical evidence explained that based on the present sample of the study, the biospheric value does not determine individuals' beliefs. As a result, the influence of biosphere value on the new environmental paradigm was not supported. Besides, this relationship was neither validated in nature-based, city, nor cultural heritage. Therefore, in the context of domestic tourism in Indonesia, tourists' degree of biospheric value does not play a significant role in influencing or improving the concern of individuals about the trending environmental problem. *Hypothesis 2* indicated the positive influence of environmental knowledge on the new environmental paradigm. Our findings validated the linear relationship between environmental knowledge and the new environmental paradigm. This result is consistent with the findings of Onel and Mukherjee (2017), Ye and Tkaczynski (2017), and Ünal et al. (2018). They assert that when an individual has sufficient knowledge about how the natural ecosystem work will have a more substantial concern about the potential problem that might upset the balance of the ecosystem. However, this relationship varies among tourists in nature-based, cultural heritage, and Urban tourism destinations. In both nature-based and cultural heritage tourism destinations, tourists consider environmental knowledge as the driving factor that increases their concern about the environmental problem. It was confirmed in both nature-based and cultural heritage tourism destinations that a higher degree of environmental knowledge increases tourists' concern about the environmental problem.

In contrast, the importance of environmental knowledge in the new environmental paradigm was not validated in urban tourism destinations. Consequently, this study found that when visitors visit nature or cultural heritage, their knowledge of the environment may expand, confirming their comprehension of the present environmental issues. This phenomenon might be because of the rules, or the destination attributes might regulate the environmental knowledge (Gao et al., 2021). *Hypothesis 3* validates the prior findings of several studies. Campos-Soria et al. (2018), Liobikienė and Poškus (2019), Delaroche (2020), Denley et al.

(2020), Kiatkawsin and Han et al. (2017), and Onel and Mukherjee (2017) suggested that higher new environmental paradigm increase awareness of consequences. Our findings affirm that domestic tourists who have a more severe concern about the trending environmental issues are aware of the negative environmental consequences of their actions.

The multi-group structural equation demonstrated that there is no difference between groups. However, the influence of the new environmental paradigm on awareness of consequences among tourists in urban tourism destinations was more decisive. *Hypothesis 4* illustrated that awareness of consequences enhances the ascription of responsibility, which aligns with the past studies of Denley et al. (2020), and Onel and Mukherjee (2017). However, our findings revealed that this relationship is distinct between groups. The result of multi-group SEM demonstrated a significant difference between the sample in nature-based, cultural heritage, and urban tourism destinations. The influence of awareness of the consequence on the ascription of responsibility was consistent and positive in cultural heritage and urban tourism destinations. In contrast, this relationship was not supported in nature-based tourism destinations.

*Hypothesis 5* results show the positive influence of responsibility ascription on personal norms. It explains that individuals who have a stronger sense of responsibility for their actions would develop a high level of moral obligation to minimize the negative result of their actions. In this study, a case example can be taken as preventing littering. These findings are similar to Onel and Mukherjee (2017), and Ünal et al. (2018), who affirm that ascription of responsibility has a significant favorable impact on the personal norm. Also, the comparison between nature-based, cultural heritage, and urban tourism destinations emphasizes no significant differences between groups. Thus, this concluded that the Type of tourism destination does not moderate this relationship. Tourist conduct is positively related to ascribed responsibility on personal norms. It is practicable to encourage responsible behavior attributions in tourism by teaching tour guides. There should be an increased emphasis on responsible conduct following the covid-19 pandemic. Personal norms are like habits that cannot be broken, and tourism is expected to reopen. Expanding people's awareness of healthy behavior such as environmental hygiene and avoiding littering in a public places could be prevented, which might benefit tourism.

*Hypothesis 6* results demonstrated that environmentally responsible behavior intention is precisely intended to prevent littering determined by personal norms. Our findings are consistent with several studies (Doran & Larsen, 2016; Ciocirlan et al., 2020; Hu et al., 2019). Besides, the multi-group structural equation model shows no significant differences between the three groups. In other words, the Type of destination's moderating role was not validated in the path between ascription of responsibility and personal norms. Littering occurs for two reasons, which are both critical. Insufficient knowledge of the dangers of poor environmental hygiene can be worsened by littering. Individuals usually do not receive it applicable until they witness that this could be hazardous for their health. Because people tend to lose interest in not highlighting things, tourists who are not expected to clean up after themselves will eventually forget about the importance of doing so. The covid-19 information awareness on health risks and dangerous effects that might endanger human health could be shaped to implement the aspiration of responsible behavior among travelers. Beliefs are more significant than objective standards or the culture of the tourist destination in human behavior. As a result, tourism destinations should deploy more responsible behavior demonstrations in advertisements or streamers, including environmental data. Philanthropists and celebrities, for example, might be deployed as well-known social identity agents to instil responsible behavior teaching using these information dissemination channels. These aspirations for responsible conduct might have a miraculous effect on the work that can be done to mold responsible behavior in tourists. When visitors can comprehend health-related knowledge, they will fully embrace it. New norms might benefit this study after remodeling tourism openness in domestic and foreign visiting sites by encouraging tourists to embrace socially responsible behavior.

When tourists are provided knowledge about the environment, their concern about the environmental problem will improve and enhance expectations in urban tourism destinations. This leads to a strong awareness of their behavior. Besides, increasing their awareness about the negative environmental impact of littering through the campaign would increase their accountability to prevent the harmful impact of their action. Consequently, these would trigger tourists to attribute action to reduce the potential negative impact of their behavior. Furthermore, this study confirmed that tourists behave differently according to which type of destination they visit. The statistical evidence shows that the significant difference between groups is found in the relationship between awareness of the consequences and ascription of responsibility and environmental knowledge and the new environmental paradigm. In addition, specific environmentally responsible behavior intentions like preventing littering are determined by personal norms. This construct has a substantial and immediate influence on one's behavior; thus, it is necessary to strengthen the personal norm of tourists through moralization approaches. The results highlighted the differences between tourists in nature-based, cultural heritage, and urban tourism destinations. Therefore, tourism destination managers and authorities should pay attention to the determinants that influence normative tourist environmentally responsible behavior when designing a campaign specifically in littering prevention. The message and information should be addressed appropriately to their essential consideration. Education and moral approach should be taken into consideration when designing intervention strategies.

## 6. Conclusion

In general, the applicability of Knowledge-Belief-Norm (KBN) is still lacking. This work contributes to the advancement and development of the theory in the tourism context. The current study validated the framework's effectiveness in explaining tourist environmentally responsible behavior. This work also tested the moderating role of destination types, that is, nature-based, cultural heritage, and urban tourism destinations. It gives insight into environmentally responsible behavior in Indonesian domestic tourism. The present findings also validate the causal relationship between environmental knowledge, belief, personal norm, and

environmentally responsible behavior intention. It also outlines how behavior in different destinations varies, particularly in the link between (environmental knowledge new environmental paradigm) and (the ascription of consequences of personal norms). Ascription of responsibility is crucial in determining norm-driven environmentally responsible behavior, specifically reducing littering which can be studied to further extend this knowledge. It has a strong influence on the personal norm; therefore, tourism destination managers should consider these factors when addressing the littering problem.

### 6.1. Implication

Besides the theoretical implication and insight, the result contributes to practitioners, including tourism destination managers, policymakers, and the government. This result may be a means of planning and formulating an effective campaign and strategy for promoting sustainable tourism and ecologically responsible conduct in tourism locations. This argument is valid since the negative repercussions of tourist activities have attracted much attention in research. Environmental education and campaigns play a crucial role in reducing the environmental footprint of domestic tourists. These instruments can increase the concern and awareness of visitors about environmental problems caused by littering. In addition, this study also guides destination managers of these Types of destinations to address a suitable campaign message and regulation according to the Type of destination. Litter prevention intervention for tourists visiting tourist destinations would be a better way to increase their environmental awareness and consciousness. Practitioners should consider appropriate policies, strategies, and activities that increase the tourists' environmental knowledge, belief, and norms. Practitioners should recognize and enforce the most crucial factors that improve tourists' environmentally responsible behavior.

### 6.2. Limitations

Despite the maximum contribution of this work, there are a few limitations acknowledged. First, this study focused on domestic tourism in Indonesia. However, tone & Nyaupane (2018) state that domestic and international tourists are different. The behavior might vary across different countries and cultural backgrounds. Thus, the result cannot be realized for international tourists. Second, the current study only examined the causal relationship between endogenous and exogenous latent variables. However, understanding both the direct and indirect effect of each exogenous variable on environmentally responsible behavior intention is crucial. This work calls for future research to examine the indirect and direct effects between variables. Third, this research used cross-sectional data that might not fully cover the causality in the relationship between variables. Fourth, this study only explained tourists' intended environmentally responsible behavior and overlooked its influence on actual behavior. Thus, this work failed to address the intention-behavior gap. Fifth, another limitation is the measurements and measures used; each construct was measured with only a few indicators. The research used self-report; respondents' responses might have been overestimated. Finally, due to the empirical nature of this study and the sample size constraints associated with demographic limitations, the findings cannot be considered valid in terms of generalizability.

### 6.3. Agenda for future research

The above limitation provides future research an opportunity to replicate, validate, and expand the model to different settings and countries. There are several recommendations for future endeavors. Future research is encouraged to replicate this model, extend the sample size, and use a larger sample across different demographics to validate the present findings. Additional research is suggested to compare international and domestic tourists. According to the researchers, future research may shed light on how norm-driven behavior develops over time. This current study uses a convenience sampling method when collecting data which lacks generalizability. Thus, future studies should use different techniques. Future research should also consider qualitative and experimental approaches to support and deepen this quantitative result to deepen the understanding of norm-driven, environmentally responsible behavior. Since the intended behavior is not always translated to actual behavior (Laeheem, 2020; Han et al., 2017). Thus, the future agenda recommended extending the model and examining tourists' actual environmentally responsible behavior through a longitudinal study. Finally, this work uses a cross-sectional design, though a longitudinal study should be conducted to reveal how the length of stay of visitors influences their behavior (i.e., Malone et al., 2019).

## Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## CRediT authorship contribution statement

**Rakotoarisoa Maminirina Fenitra:** Conceptualization, Methodology, Writing – original draft, Writing – review & editing, Visualization. **Gancar Candra Premananto:** Supervision, Writing – review & editing, Visualization, Validation. **Rakotoarisoa Maminiaina Heritiana Sedera:** Investigation, Formal analysis, Data curation. **Ansar Abbas:** Investigation, Formal analysis, Data curation. **Nisful Laila:** Resources, Writing – review & editing.

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