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INFLUENCE OF ENVIRONMENTAL ATTITUDES IN IRANIAN ECOTOURIST BEHAVIOUR

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ABSTRACT

This study investigates the effects of environmental attitudes on pro-environmental behavior. A conceptual model examines the structural relations among environmental attitude, concern, value and knowledge towards pro environmental behavior of ecotourist. 439 Iranian ecotourists from Mashhad mountains were randomly surveyed. This study uses the structural equation model (SEM) to evaluate the factor that influence the pro-environmental behaviors. Results shows that pro-environmental concern, anthropocentric and ecocentric environmental attitude has a significant influence on pro-environmental behavior.

Keywords: Pro-environmental behavior; Environmental attitudes; Environmental values; environmental knowledge; Iranian ecotourist; structural equation model.

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Influencia de las actitudes medioambientales en el comportamiento de los ecoturistas iraníes

RESUMEN

Este estudio investiga los efectos de las actitudes medioambientales sobre el comportamiento proambiental. Un modelo conceptual examina las relaciones estructurales entre la actitud medioambiental, la preocupación, el valor y el conocimiento hacia el comportamiento proambiental del ecoturista. Se encuestó aleatoriamente a 452 ecoturistas iraníes de las montañas de Mashhad. Este estudio utiliza el modelo de ecuaciones estructurales (SEM) para evaluar los factores que influyen en los comportamientos proambientales. Los resultados muestran que la preocupación proambiental y la actitud medioambiental antropocéntrica y ecocéntrica influyen significativamente en el comportamiento proambiental.

Palabras clave: Comportamiento proambiental; Actitudes ambientales; Valores ambientales; Conocimiento ambiental; Ecoturista iraní; Modelo de ecuaciones estructurales.

1. INTRODUCTION

The global landscape is witnessing an escalation of environmental problems driven by the degradation of natural resources. In recent years, there has been a growing interest in understanding environmental behavior, an aspect that has gained significant attention in social science research. As a result, scholars have aimed to identify the factors that influence and predict environmental behaviors (Casaló *et al*., 2019; Steg and Vlek, 2009). Social science researchers have devoted considerable efforts to identifying the determinants and predictors of environmental behaviors (Steg and Vlek, 2009).

In the field of environmental science, pro-environmental behavior refers to actions aimed at safeguarding and respecting a healthy environment, often justified within the societal context (Krajhanzl, 2010). The definition widely acknowledged for pro-environmental behavior (PEB) is centered on purposeful actions aimed at reducing negative impacts on the natural environment, as defined by Stern (2000) and Kollmuss and Agyeman (2002). A comprehensive examination of existing literature in this field reveals the significant influence of various factors on PEB, as discussed by Gifford and Nilsson (2014) and Steg and Vlek (2009).

Numerous scholarly articles highlight that while changes in attitudes are necessary, they alone are not adequate to consistently drive behavioral changes (Zsóka *et al*., 2013). Nevertheless, certain studies demonstrate that environmental attitudes can serve as robust indicators of pro-environmental behavior (Bamberg & Möser, 2007). Additionally, environmental value and environmental concern have gained widespread recognition as fundamental and indispensable prerequisites for any decision-making related to pro-environmental behavior (Unal *et al*., 2018). Several scholars have emphasized that a deficiency in environmental knowledge acts as a barrier to the adoption of pro-environmental behavior (PEB) among individuals (Unal *et al*., 2018). Conversely, possessing a deep understanding of specific environmental knowledge has the potential to augment PEB (Kollmuss & Agyeman, 2002).

The management of natural resources entails a significant consideration of the human-nature relationship, as highlighted by Xu and Fox (2014). Page and Connell (2009) acknowledge the presence of a symbiotic association between humans and the environment within the domains of ecotourism and tourism. The appeal of ecotourism lies in its ability to captivate tourists who place value on cultural, social, and environmental aspects. According to Ceballos-Lascurain (1996), engaging in ecotourism enables tourists to expand their understanding of ecological environments and actively engage in pro-environmental behaviors. Ecotourism is often identified by reduced environmental and social impacts, its maximum consideration of local culture and its significant economic benefits, as underlined by Wight (1993). Therefore, ecotourism activities fit very well with the values and expectations of people with pro-environmental behaviours, hence the connection between these two themes studied in this research.

Moreover, in economically disadvantaged regions endowed with significant natural resources, ecotourism holds substantial potential as a means of poverty reduction (Neto, 2003). Ecotourism and rural tourism activities have become powerful tools for local development and job creation.

Taking into account the insights garnered from classical theories employed in PEB research and the practical strategies implemented, this study intentionally focuses on environmental attitude, pro-environmental value, pro-environmental concern, and environmental knowledge as key parameters representing individual attitudinal determinants of PEB.

The primary aims of this research encompassed assessing the causal connections between environmental attitude and knowledge, pro-environmental concern, and values, in relation to pro-environmental behaviors.

This research focuses on the intricate interactions between individuals' attitudes, their environmental values and knowledge, and their influence on their environmental behavior. On the other hand, the research is carried out in a developing country, Iran, about which there is little knowledge of its natural and tourist reality. Environmental spaces are of great importance in countries with strong environmental limitations and risks and large urban agglomerations.

The subsequent sections of this manuscript are organized as follows: Initially, a concise overview is provided, outlining the background and rationale underlying our research hypotheses. Following this, the research contexts, sample, variables, and methodology are delineated. The methodology encompasses the utilization of structural equation modeling, with each analytical step grounded in theoretical reasoning. Subsequently, the empirical research findings are presented, aiming to ascertain the influence of environmental attitudes and knowledge, pro-environmental concerns, and values on the pro-environmental behavior of ecotourists. The article concludes with a discussion of the principal findings, limitations inherent in the current study, and suggestions for future research directions.

2. CONCEPTUAL DEVELOPMENT

2.1. Theoretical Background

Given the growing recognition of environmental behavior studies, researchers have increasingly focused on investigating the key determinants that influence individuals' adop-

tion of such behavior. As a result, numerous models employing diverse theoretical frameworks have emerged. Among the initial models we can highlight the Theory of Planned Behavior proposed by Ajzen and Fishbein (1980), and the Models of Responsible Environmental Behavior introduced by Hines *et al*. (1987). Altruism, empathy, and pro-social behavior models provide an additional framework for examining pro-environmental behavior, along with the Value-Belief-Norm theory (Allen and Ferrand, 1999; Stern *et al*., 1999).

However, in addition to these models, various other factors have been identified as influencing factors on pro-environmental behavior. These factors encompass demographic, institutional, economic, social, and cultural aspects, as well as indicators such as awareness, environmental knowledge, motivation, values, attitudes, emotions, liability, priorities, and more (Li *et al*., 2019). The theoretical foundation of this research is rooted in the theory of planned behavior (TPB), which is an extension of the theory of reasoned action (TRA) proposed by Ajzen (1991). The theory of reasoned action was initially developed to explore the association between attitudes and behaviors (Rampedi and Ifegbesan, 2018). To comprehend the interrelationships between knowledge levels and behaviors, the Theory of Reasoned Action (TRA) has been widely employed, incorporating the linkages between environmental attitudes and pro-environmental behaviors (Paço and Lavrador, 2017).

In relation to the Theory of Reasoned Action (TRA), Paul *et al*. (2016) suggest that this model has been extended to include the prediction of intentions (the inclination to engage in a specific behaviours) (Ajzen, 1985), which subsequently influence reasoned action in everyday life contexts. Ferrell and Gresham (1985) acknowledge the extensive testing of the Theory of Reasoned Action (TRA) model across various regions and the exploration of its interrelationships by numerous scholars and within different contexts. TRA, along with the Theory of Planned Behavior (TPB), has been widely employed in studies examining pro-environmental behavior and related behaviors (Lee *et al*., 2013).

Furthermore, Ajzen (1991) granted permission to incorporate supplementary variables in order to enhance the explanatory power of the Theory of Planned Behavior (TPB) in elucidating specific behaviors. Drawing upon a comprehensive review of established theories employed in the field of pro-environmental behavior (PEB), as well as practical implementation strategies, we intentionally identified pro-environmental value, pro-environmental concern, and environmental knowledge as the primary parameters that determine individuals' attitudes towards engaging in pro-environmental behavior. Numerous empirical investigations have embraced these conceptual frameworks and have indicated that individuals' pro-environmental values and pro-environmental concern can stimulate a sense of dedication and positive attitude towards specific pro-environmental behaviors, consequently influencing their decision-making process (Kiatkawsin and Han, 2017). In summary, Li *et al*.'s (2019) study suggests that the determinants of pro-environmental behavior are so intricate that a single model cannot comprehensively capture all the pertinent factors.

2.2. Pro-environmental behavior

Sivek and Hungerford (1990) provided a definition of pro-environmental behavior, characterizing it as an individual's action that fosters the sustainable utilization of natural

resources. Pro-environmental behavior entails a purposeful and conscious act (Casaló and Escario, 2018) aimed at mitigating adverse effects on the environment (Kollmuss and Agyeman, 2002). According to the proposition made by Higham and Carr (2002), pro-environmental behavior in the context of ecotourism involves reducing disruptions at the destination and making lifestyle changes based on the experiences gained. It encompasses the active efforts of tourists to minimize negative impacts. Tourists practicing pro-environmental behavior in ecotourism not only contribute to the restoration of environments but also encourage others to reduce their own negative impacts (Chiu *et al*., 2014; Kollmuss and Agyeman, 2002). The promotion of pro-environmental behavior among ecotourists in natural destinations contributes to their efforts in reducing negative impacts while engaging in recreational activities, thereby ensuring the preservation of the natural environment for future generations (Lee and Jan, 2017). Pro-environmental behavior of ecotourists brings about benefits not only to the environmental quality of nature but also enhances the overall experience for other visitors (Li and Wu, 2020).

According to various theoretical models, there exist numerous predictive factors that influence pro-environmental behavior. These factors can be categorized into three main groups: socio-demographic factors, external factors, and internal factors. (i) Socio-demographic factors encompass characteristics such as age, gender, education, social class, marital status, and household income. (ii) External factors refer to institutional and economic influences. (iii) Lastly, internal factors encompass personality characteristics including locus of control, self-efficacy, self-esteem, motivation, environmental knowledge, awareness, values, attitudes, and concern (Kollmuss and Agyeman, 2002).

Moreover, within these distinct groups, the findings of diverse studies demonstrate variations. For instance, concerning internal factors, multiple articles highlight that modifications in attitudes and values are essential but not entirely effective in driving action, as they may not consistently translate into behavioral changes (Zsóka *et al*., 2013; Casaló and Escario, 2018). However, findings indicate a robust relationship between environmental attitudes and pro-environmental behavior (Bamberg and Möser, 2007). Various behavioral theories, such as TRA, Ajzen, and Fishbein (1980), propose that there is a positive and consistent relationship between environmental attitudes and pro-environmental behavior. This relationship has been explored in different fields and is considered to be influential.

Several studies conducted in previous years, including Flamm (2009), Hines *et al*. (1987), and Polonsky *et al*. (2012), have consistently demonstrated the significant influence of environmental knowledge on individuals' inclination to take positive action toward environmental issues. These studies have highlighted that knowledge plays a crucial role as a predictive factor in various theoretical models that examine the connections between behaviors and attitudes. In fact, according to Paço and Lavrador (2017), knowledge has emerged as one of the primary determinants in understanding the relationships between attitudes and behaviors in the context of the environment. Research focusing on environmentally friendly behaviors, such as the studies conducted by Polonsky *et al*. (2012), Barber *et al*. (2009), and Flamm (2009), consistently highlight the pivotal role of attitudes as a mediating variable between environmental knowledge and behavior. These findings underscore the significance of attitudes in shaping the relationship between knowledge and behavior in the context of environmental actions.

2.3. Environmental attitude

The extent to which individuals connect with nature is closely linked to the nature of their attitudes (Schultz *et al*., 2004). Environmental attitude encompasses the motivational, emotional, and cognitive processes pertaining to various aspects of the environment (Cheam and Ong, 2018). Fishbein (1967) elucidated that attitudes enable individuals to adapt to their environment, offering a sense of certainty in their own behavior and their perception of others' behavior. In accordance with the theory of Planned Behavior proposed by Ajzen and Fishbein (1980), Hines *et al*. (1987) found that individuals who held favorable attitudes toward the environment were more likely to engage in pro-environmental behavior.

Thompson and Barton (1994) propose that individuals' concern for the environment is driven by different types of attitudes, including ecocentric, apathy, and anthropocentric attitudes (Schultz and Zelezny, 1999). Two primary attitudes towards nature, anthropocentrism, and ecocentrism, have been recognized as stemming from environmental ethics, according to Thompson and Barton (1994). An 'anthropocentric' attitude, initially recognized in the 1860s (Campbell, 1983), pertains to the belief that humans occupy a central position in the universe. Individuals with an anthropocentric perspective perceive nature primarily as a resource to be utilized and value its instrumental role in improving their quality of life (Godfrey-Smith, 1979). Furthermore, they hold the belief that economic growth is crucial for human progress and development (Page and Dowling, 2002). According to Eckersley (1992), the works of Kant and Descartes have established a belief that humans and nature are distinct entities and this perception has consequently led to the belief that human beings hold dominion over nature (Pointing, 1992). Scholars concur that an anthropocentric worldview is prevalent and has been implicated in numerous environmental challenges (Gaston, 2005).

The notion discussed has evolved into a stance known as ecocentrism. Ecocentrism recognizes the intrinsic value of nature, as noted by Page and Dowling (2002). This position asserts that nature has inherent worth irrespective of human beings, which highlights the parity of value between humans and nature, as argued by Wearing and Neil (2009). Additionally, this perspective views people as an integral part of nature. The viewpoint under consideration was first acknowledged in 1913 and was known as 'biocentrism,' as stated by Kortenkamp and Moore (2001). This perspective was later espoused by ecologists in the 1970s, which postulates that humans are an integral component of the natural world and recognize the inherent value of nature itself.

Regardless of whether individuals hold an ecocentric or anthropocentric attitude, research conducted by Schultz and Zelezny (1999) and Thompson and Barton (1994) has demonstrated that both groups can exhibit positive attitudes toward environmental concerns. Ecocentric individuals place value on nature intrinsically, emphasizing a nature-centered attitude, whereby the protection of nature is considered necessary due to its inherent value.

On the other hand, individuals with an anthropocentric perspective hold the belief that environmental preservation is essential due to its significance in safeguarding and improving the overall well-being of human life, as well as the potential advantages it can

offer to individuals, as stated by Thompson and Barton (1994). Empirical investigations conducted by Milfont and Duckitt (2004) as well as Miller and Spoolman (2008) have provided evidence that individuals adhering to either ecocentric or anthropocentric viewpoints can manifest positive attitudes towards environmental matters, albeit driven by diverse motives for example, individuals with an anthropocentric perspective may oppose the destruction of rainforest due to its potential as a valuable source of timber, as well as its role in facilitating recreational activities and tourism. Conversely, ecocentric individuals may hold opposition to such actions based on their belief in the inherent harmony between human beings and the natural world.

In addition, the study conducted by Bamberg *et al*. (2003) demonstrated a significant correlation between environmental knowledge and attitudes, highlighting a mutually reinforcing relationship between the two factors. This finding aligns with the observations made by Flamm (2009) and Barber *et al*. (2009), who noted that positive changes in environmental attitudes are linked to improvements in environmental knowledge. Polonsky *et al*. (2012) concurred that consumers' attitudes towards green products are prone to transformation when they are provided with greater information regarding such products. Indeed, in numerous theoretical models exploring the linkage between behaviors and attitudes, knowledge has emerged as a primary predictor, signifying its capacity to shape behaviors through attitudes (Liu *et al*., 2020).

2.4. Environmental Knowledge

The factors that influence pro-environmental behaviors can be both internal and external, as indicated by Vicente-Molina *et al*. (2013) in their research. Environmental knowledge, as defined by Laroche *et al*. (2001), encompasses an ability to recognize symbols, concepts, and behavior patterns associated with environmental protection, based on acquired environmental information. The existing literature strongly suggests that individuals possessing a higher level of environmental knowledge are more inclined to engage in pro-environmental behaviors (Bamberg and Möser, 2007; Polonsky *et al*., 2012). Furthermore, it is commonly presumed that in the absence of environmental knowledge, individuals are less likely to exhibit conscious concern for the environment or intentionally take actions that support the environment (Gifford and Nilsson, 2014). Zsóka *et al*. (2013) emphasized that the perception of the underlying causes of environmental problems is a highly influential factor in shaping pro-environmental behavior. Additionally, Kitzmüller (2013) argued that individuals who engage in pro-environmental actions are well-informed about the potential actions they can take or are aware of the possibilities available to them. In other words, when individuals are equipped with actionable knowledge, they are better positioned to make informed decisions and are more likely to translate their intentions into environmentally friendly actions.

Contrarily, certain studies indicate that there is no substantial association between these variables (Laroche *et al*., 2001). Frick *et al*. (2004) argue that environmental knowledge is commonly viewed as a prerequisite for pro-environmental behavior, as indicated by numerous meta-analyses. However, the empirical evidence on this relationship is not consistent, as shown in studies by Bamberg and Möser (2007) and Kollmuss and Agyeman (2002). Furthermore, it can be noted that despite the exponential growth in the abundance

of environmental information over the past few decades, the correlation between this surge in data and the adoption of pro-environmental behavior is not apparent (Paço and Lavrador, 2017). According to Kollmuss and Agyeman (2002), merely providing information on environmental issues is unlikely to be effective or beneficial.

Xiao and Hong (2010) conducted a study investigating the link between environmental knowledge, environmental concern, and attitude. Their findings reveal a strong positive association between higher levels of environmental knowledge and greater levels of environmental concern that contradicts the findings reported by Hayes (2001). According to the research conducted by Vicente-Molina *et al*. (2018), Kaiser *et al*. (1999), Flamm (2009), Casaló and Escario (2018), and Casaló *et al*. (2019), it has been concluded that knowledge plays a crucial role in cultivating environmental attitudes, which, in turn, contribute to the promotion of pro-environmental behaviours. Scholars have formulated several theories to elucidate the connection between attitudes and behaviors, with the theory of planned behavior (TPB; Ajzen and Madden, 1986) being among the most extensively employed. In this study, we also hypothesize that environmental knowledge exerts an impact on pro-environmental values, concerns, environmental attitudes (including anthropocentrism, apathy, and ecocentrism), and pro-environmental behavior.

2.5. Pro-environmental values

Pro-environmental value is another psychological factor frequently employed in scholarly literature to elucidate the drivers behind pro-environmental behavior. Values are defined as significant objectives or principles that serve as guiding forces in an individual's life (Rokeach, 1973). Distinguishing themselves from beliefs, values form a structured system that is commonly considered to influence attitudes and behaviors (Schultz and Zelezny, 1999). According to Park *et al*. (2008), pro-environmental values encompass the beliefs held by individuals, communities, or societies regarding the significance of the natural environment and the appropriate perspectives and behaviors humans should adopt towards it. Pearce and Turner (1990) suggest that environmental values are influenced by personal and public priorities, as individuals are expected to align their preferences with the physical circumstances and social standards in which they operate.

The value-basis theory proposed by Stern and Dietz (1994) posits that the importance individuals place on the environment is influenced by their perception of the environment, which subsequently shapes their utilization of its resources. Building upon this theory, Stern *et al*. (1999) developed the Value-belief-norm theory, which suggests a causal relationship between an individual's values and their attitude towards the human-environmental relationship, ultimately influencing their environmental behavior. The measurement of values in relation to the environment has been facilitated by the use of value scales such as those developed by Rokeach (1973) and Schultz and Zelezny (1994).

2.6. Pro-environmental concern

According to Dunlap and Jones (2002), the concept of pro-environmental concern pertains to the level of individuals' consciousness regarding environmental issues and

their willingness to actively contribute to their resolution. The operationalization of the pro-environmental concern construct generally occurs when individuals possess a comprehensive understanding of the gravity of environmental problems and develop a favorable disposition toward safeguarding the environment (Dunlap and Jones, 2002). Certain scholarly investigations have proposed that environmental knowledge and awareness could potentially heighten levels of environmental concern (Unal *et al*., 2018). Zhao *et al*. (2014) reported a robust correlation between environmental concern and knowledge, further supporting the notion that increased knowledge tends to foster heightened environmental concern. However, contrasting findings have emerged from several studies, indicating an insignificant relationship between environmental concern and environmental knowledge. Arisal and Atalar (2016) discovered that knowledge regarding environmental problems exerts a relatively minor influence on environmental concerns.

In contrast, scholars have identified a direct association between environmental concern and pro-environmental behaviors, encompassing activities such as green purchasing, waste recycling, and energy conservation (Zhao *et al*., 2014). Kilbourne and Pickett (2008) asserted that as concern regarding environmental problems intensifies, individuals tend to exhibit a greater willingness to enact behavioral changes. Furthermore, researchers have discovered a positive and direct influence of environmental concern on various behaviors. For instance, Binder and Blankenberg (2016) demonstrated that higher levels of environmental concern enhance the propensity to engage in volunteering activities and join environmental organizations. Several studies investigating interest groups, particularly environmental organizations, have consistently reported that individuals who identify as environmentalists tend to obtain higher scores on the New Environmental Paradigm (NEP) Scale, indicating the greater environmental concern (Pierce *et al*., 1992).

2.7. Ecotourism

There are numerous definitions, some complicated, others simple, with the inevitable confusion regarding the modalities it encompasses, places where it is developed, implications, etc. Among them is Ceballos-Lascuráin (1996), who described it as "environmentally responsible tourism consisting of traveling or visiting natural areas relatively undisturbed in order to enjoy, appreciate and study the natural attractions (landscape, flora and fauna) of these areas, as well as any cultural manifestations (present and past) that can be found there, through a process that promotes conservation, has low environmental and cultural impact and promotes an active and socioeconomically beneficial involvement of local populations".

A simpler and currently widely used definition comes from The International Ecotourism Society (TIES): "Responsible travel to natural areas, conserving the environment and improving the well-being of local communities" (Lindberg and Hawkins, 1993).

A more detailed discussion of the definitions of ecotourism in the world and its relationship with other forms of tourism can be found in the publications of Pérez de las Heras (1999), and especially Mowforth (1993) who gives a list of terms associated with ecotourism (which he qualifies as alternative tourism): Ecotourism; sustainable tourism; environmentally friendly tourism; nature tourism; green tourism; scientific tourism;

cottage tourism; wildlife tourism; wilderness tourism; safari tourism; designer tourism; hard-core tourism; risk tourism and adventure tourism. In short, ecotourism is a form of tourism for which there is no concrete definition, which is linked to multiple activities and which is opposed to mass tourism.

Generally speaking, studies on ecotourism are divided into two main groups (Diamantis, 1999): (i) Case studies that analyze issues related to the impacts of ecotourism; (ii) Research focusing on planning and development issues.

Many of the case studies have been located in developing countries, since it is in these regions of the world where nature is least transformed and where some of the world's most valuable natural areas are located, such as Latin America and East and Southern Africa (Budowski, 2001).

Much of these activities in natural spaces in developing countries are very focused on international demand, especially for travelers with a high economic income. On the other hand, the study of tourism and leisure activities in nature for the local or national population in developing countries has hardly been studied. These activities that do not generate foreign exchange earnings seem to be of lesser interest, which is why they are left out of the academy's analysis. This is one of the reasons why this study is developed.

The saturation of certain more massive tourist activities, such as coastal tourism or cultural tourism, as well as the need to create or reactivate traditional tourist products, makes ecotourism attractive for the tourism sector. This attraction is contrary to the principles of social and environmental sustainability of ecotourism. This is one of the dangers that loom over ecotourism (Fennell, 2021).

2.8. Hypotheses

In the current research, it is postulated that environmental knowledge, values, concerns, and attitudes (including anthropocentrism, apathy, and ecocentrism) are expected to exert an influence on the pro-environmental behavior of ecotourists. Building upon the insights derived from the literature review, the following hypotheses were created:

H.1: Environmental knowledge has a significant and positive influence on pro-environmental behavior.

H.2: Environmental knowledge has a significant and positive influence on pro-environmental values.

H.3: Environmental knowledge has a significant and positive influence on pro-environmental concern.

H.4: Environmental knowledge has a significant and positive influence on ecocentrism.

H.5: Environmental knowledge has a significant and positive influence on apathy.

H.6: Environmental knowledge has a significant and positive influence on anthropocentrism.

H.7: Pro-environmental values have a significant and positive influence on pro-environmental behavior.

H.8: Pro-environmental concern has a significant and positive influence on pro-environmental behavior.

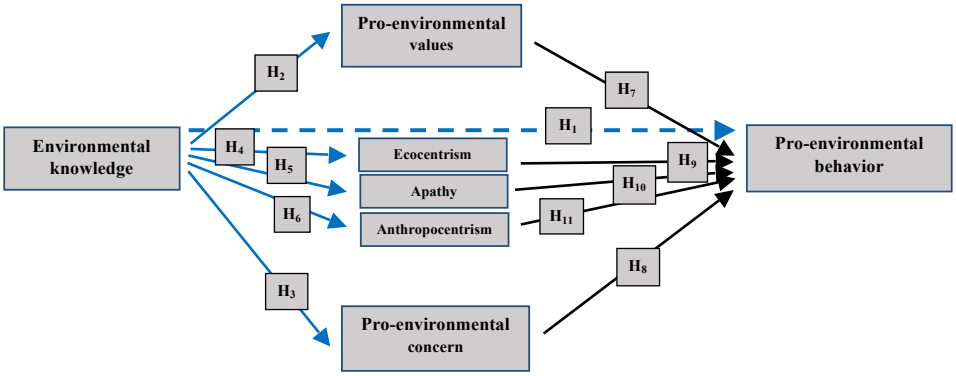
H.9: Ecocentrism has a significant and positive influence on pro-environmental behavior.

H.10: Apathy has a significant and positive influence on pro-environmental behavior.

H.11: Anthropocentrism has a significant and positive influence on pro-environmental behavior.

From the above discussion of the literature, a theoretical model was developed (Fig. 1).

Figure 1
THEORETICAL MODEL



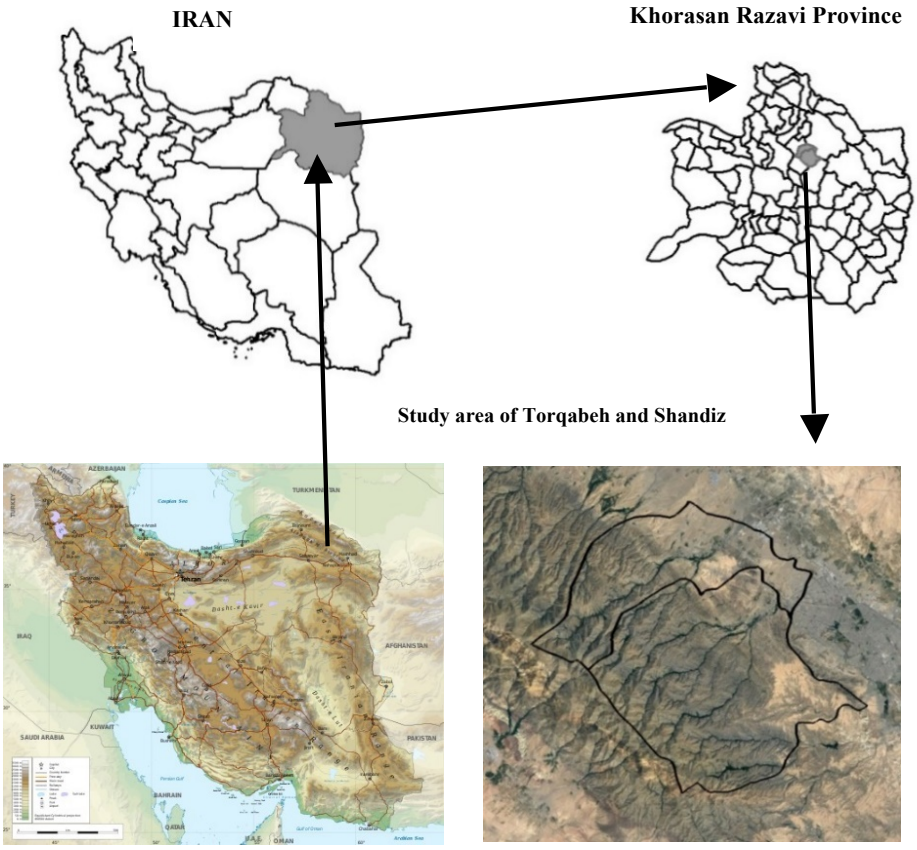
3. METHODOLOGY

3.1. The study area

Mashhad is the second largest city in Iran with three million inhabitants. Furthermore, Mashhad is one of the most important cities in the world for Muslim religious pilgrimage, hosting approximately three million pilgrims a year. Known as "Holy Mashhad", it has significant religious significance as one of the holiest pilgrimage sites for Shia Muslims. The city is a popular tourist destination that attracts millions of visitors annually. It is known for its monuments, crafts, saffron cultivation, and its literary tradition, which are intertwined with its rich history and cultural traditions.

To the west of Mashhad are the towering Beenalood Mountains, within the Torghabeh Shandiz district (Fig.2) This area is an ecotourism destination renowned for its picturesque countryside zone and lush gardens that have captivated nature enthusiasts. With its valley, river, and moderate and chilly climate, along with snowy winters, Torghabeh is a delightful ecotourist haven that has gained popularity among Mashhad residents, pilgrims, and travelers, especially during the hot and dry Iranian summer. The establishment of numerous restaurants with gardens along the roads of Torghabeh has transformed it into one of Iran's leading tourism hotspots. Despite being associated with the development of planned tourism infrastructure and facilities, Torghabeh has suffered severe environmental damage and loss of natural habitat due to the large influx of tourists throughout the year, which has threatened the region's ecological balance (Fadafan *et al*., 2018).

Figure 2
MAP OF STUDY AREA



Source: Elaborated by authors and Wikimedia Commons, Iconact.

Torghabeh Shandiz district boasts a remarkable abundance of animal and plant species. Nonetheless, the rapid development of tourism in this region has had a profound impact on the natural habitat of wildlife. Consequently, both animal and plant diversity has experienced a substantial decline due to these adverse effects (Fadafan *et al*. 2018). Torghabeh Shandiz Township possesses a cultural and historical heritage, encompassing significant landmarks, ancient structures, and picturesque mountainous landscapes, accompanied by lush greenery, flowing rivers, and favorable weather conditions. These remarkable characteristics collectively contribute to its allure, attracting a considerable influx of tourists. Notably, Torghabeh Shandiz Township holds the distinction of being the second most prominent tourism destination in Khorasan Razavi Province, following the city of Mashhad (Fadafan *et al*., 2018).

Figure 3
TORQABEH AND SHANDIZ, BEENALOUD MONTAINS

Source: Elaborated by authors.

Based on data presented in the International Tourism Highlights, 2020 Edition by UNWTO, Iran demonstrated remarkable growth in its tourism sector. In 2017, the country welcomed a total of 4.867 million foreign tourists, which experienced a significant increase of 49.9% in 2018, reaching 7.295 million foreign tourists. This surge in tourist arrivals propelled Iran to secure the second position among the world's fastest-growing tourism destinations. These statistics underscore the immense potential of Iran's tourist attractions and emphasize the necessity for implementing effective tourism management and planning strategies (UNWTO, 2020).

3.2. Measures

In the present study, a questionnaire was employed to gather data pertaining to socio-demographic characteristics as well as various aspects related to the environment. The questionnaire encompassed inquiries regarding individuals' environmental attitudes and knowledge, pro-environmental values, concerns, and behaviors. The questionnaire is composed of 43 items and 7 constructs (Table 3).

In order to evaluate pro-environmental behaviours (i), a set of **9** items was devised, drawing upon the previous works of Chiu *et al*. (2014), Lee and Jan (2017), and Salehi *et al*. (2012). The assessment of environmental attitudes (ii) was carried out using a five-point Likert-type scale, wherein **15** items were adopted from Thompson and Barton's (1994) research. The scale was divided into three distinct parts, with each part consisting of five questions specifically addressing anthropocentrism, apathy, and ecocentrism, respectively.

Pro-environmental concern (iii) was assessed by utilizing a set of **8** that were adapted from the revised New Environmental Paradigm (NEP) scale proposed by Dunlap *et al*. (2000). The adoption of a shorter version of the NEP scale, which has been commonly employed by other researchers such as Lee *et al*. (2014) and Li and Wu (2020), ensured consistency and comparability in measuring pro-environmental concern. These eight items specifically address individuals' beliefs regarding humanity's capacity to disrupt the natural world, the recognition of constraints on human economic growth and progress, and

the entitlement of humans to govern over the rest of nature. These dimensions include perceptions related to the reality of limits to growth, anti-anthropocentrism, the delicate balance of nature, the rejection of exceptionalism, and the potential for an ecological crisis (Dunlap *et al*., 2000). To evaluate pro-environmental values, a set of **4** items was employed, which were derived from the studies conducted by Kaiser *et al*. (1999) and Salehi *et al*. (2012). In order to assess environmental knowledge, a five-point Likert-type scale was utilized, consisting of **7** items. These items were derived from the works of Hooshmandan *et al*. (2016) and Salehi *et al*. (2012).

3.3. Sampling method and data collection

The survey was originally created in English and subsequently translated into Persian for the purpose of fieldwork. To ensure the clarity and comprehensibility of the survey questions, a pilot test was conducted on a sample of 30 ecotourists. The feedback obtained from the pilot test was taken into account, and a few statements were reworded to enhance the understanding of the questions. The finalized version of the survey questionnaire included an introductory note outlining the nature of the research. In order to enhance the inclusiveness and representativeness of the sample, a systematic random sampling approach was employed in this study. In June 2019, a total of 500 printed questionnaires were distributed within the designated study area. The decision to administer the questionnaires through direct face-to-face surveys was based on the higher response rate typically associated with this method, as indicated by previous research (Lee, 2013). Out of the 500 distributed surveys, 439 fully completed and usable questionnaires were collected and included in the subsequent data analysis. The annex provides some images of the field work and the collection of information.

3.4. Data analysis

In the present study, Confirmatory Factor Analysis (CFA) was employed to investigate the underlying dimensions of the survey scales. Specifically, the dimensions under scrutiny included Environmental attitude, and knowledge, pro-environmental values, pro-environmental concern, and pro-environmental behaviors. Reflective measures were employed in the CFA, as these measures assess the dimensionality of constructs by analyzing the interrelationships among their hypothetical indicators (Brown, 2012). In order to assess the internal consistency of the scale items, employed Cronbach's alpha coefficient. The obtained results, in Table 2, revealed that all of the Cronbach's alpha (α) coefficients are close to 0.7. This suggests that the scale employed in the investigation was reliable (Liu *et al*., 2020).

In this study, the researchers utilized a two-step structural modeling approach as outlined by Anderson and Gerbing (1988). The initial step involved the construction of a measurement model using confirmatory factor analysis (CFA) to verify the factor structures of the constructs incorporated in the proposed model. Additionally, the measurement model was employed to assess the psychometric properties, namely reliability and validity estimates. Subsequently, a structural path model was developed to evaluate the hypotheses put forward in the study. The present study utilized AMOS v.25 to conduct both confirmatory factor anal-

ysis (CFA) and structural equation modeling (SEM). The integration of SPSS and AMOS has gained popularity in recent research endeavors (Kiatkawsin and Han, 2017; Ribeiro *et al*., 2018; Megeirhi, *et al*., 2020) due to its user-friendly interface and the ability to visually represent conceptual models in an easily comprehensible manner (Megeirhi, *et al*., 2020).

Before conducting the confirmatory factor analysis (CFA), we evaluated the normality of the data by examining the skewness and kurtosis values. These metrics are essential as they can impact the analysis of variances and covariances that underlie structural equation modeling (SEM). According to Ribeiro *et al*. (2018), skewness values exceeding 2 and kurtosis values surpassing 7 indicate a departure from normality. The analysis conducted using AMOS revealed that none of the items exhibited skewness and kurtosis values exceeding the thresholds of 2 and 7, respectively. These findings provide evidence for the normality assumption necessary for conducting maximum likelihood estimation in structural equation modeling (SEM) and support the suitability of the collected data for further analysis.

The adequacy of model fit for both the measurement model and structural path model was evaluated by considering incremental (Tucker-Lewis Index or TLI and comparative fit index or CFI) and absolute model (root mean square error of approximation or RMSEA and standardized root mean square residual or SRMR) fit indices. Consistent with the guidelines proposed by Hu and Bentler (1999), a model is deemed to have a good fit if TLI and CFI values are equal to or greater than 0.90, and if RMSEA and SRMR values are equal to or less than 0.07.

4. RESULTS

4.1. Respondent profile

The sample consisted of 50.8% males and 49.2% females, spanning a wide age range from 20 to 73 years old and divided into four age groups (60.4% in the 20-35 years group, 24.4% in the 36-45 years group, 14.6% in the 46-65 years group, and 0.7% in the over 65 years group). In terms of marital status, 35.5% of the sample were single, while 64.5% were married. Regarding education level, the sample was categorized into four groups: 3.9% with a diploma, 65.6% with a bachelor's degree (BA), 27.3% with a master's degree (MA), and 3.2% with a Ph.D. or higher level of education, also all the interviewees were Iranian.

Table 1
DEMOGRAPHIC INFORMATION OF PARTICIPANTS (n = 439)

Variable	Category	Frequency	Percentage (%)
Gender	**Male**	223	50.8%
	Female	216	49.2%
Age	**20-35 years**	265	60.4%
	36-45 years	107	24.4%
	46-65 years	64	14.6%
	over 65 years	3	0.7%

Variable	Category	Frequency	Percentage (%)
Marital status	**Single**	156	35.5%
	married	283	64.5%
education level	**diploma**	17	3.9%
	bachelor's degree (BA)	288	65.6%
	master's degree (MA)	120	27.3%
	Ph.D. or higher	14	3.2%

Source: Elaborated by authors.

4.2. Measurement model

In line with the recommendation of Anderson and Gerbing (1988), the current study employed a two-step analysis, encompassing confirmatory factor analysis (CFA) and structural equation modeling (SEM), to examine the proposed model. Additionally, Thompson (2007) suggested that conducting CFA prior to analyzing the structural equation model is crucial for assessing structural validity. Therefore, the CFA was conducted with two main objectives: (1) establishing a robust measurement model for subsequent SEM analysis, and (2) verifying the proposed factor structure to enable a psychometric evaluation (Lee and Jan, 2017). Utilizing AMOS v.25, CFA with maximum likelihood estimation was performed on the data obtained from 439 completed questionnaires in order to assess the reliability and validity of the overall measurement model.

Table 2
OVERALL MODEL FITNESS OF THE MEASUREMENT MODEL

Index	Model fitness	Norm	Accept
Chi-square test			
Chi-square	1153.463 (.000)	p>.01	Yes
Chi-square/df	1.417	<3	Yes
Goodness-of-fit indices			
GFI	0.901	>0.90	Yes
AGFI	0.875	>0.80	Yes
NFI	0.908	>0.80	Yes
TLI	0.968	>0.90	Yes
Alternative indices			
CFI	0.971	>0.90	Yes
IFI	0.971	>0.90	Yes
RMSEA	0.031	<0.05	Yes
SRMR	0.0370	<0.08	Yes

Source: Elaborated by authors.

To assess the fitness of the measurement model, commonly recommended indices were employed (Table 2). These indices include the goodness-of-fit statistic (χ^2), comparative fit index (CFI), and root mean square error of approximation (RMSEA) (Hosany and Witham, 2010). In terms of the goodness-of-fit statistic, the χ^2/df ratio has been suggested as a more appropriate measure than χ^2 itself (Chen and Tsai, 2007). Given the large sample size of this study (n = 439), it is important to consider the potential impact of sample size on the χ^2 value (McDonald and Ho, 2002), thus the χ^2/df ratio is utilized. A threshold of less than 3 for a stringent perspective or less than 5 for acceptable criteria is recommended (Lee, 2013). The present study, with a sample size of 439, appears to be adequate for conducting the SEM analysis, as indicated by Hoelter's statistic at p=0.01 (413) and the ratio of a sample size to indicators (43) and sample size to estimated parameters (7).

The analysis (Table 3) commenced by systematically incorporating one factor at a time, along with its respective items, into the model to construct an initial "ideal model." This ideal model encompassed all cross-loaders and error covariances. Subsequently, to refine this ideal model, problematic items were eliminated if their standardized factor loadings were below 0.7 (Ertz *et al*., 2016) or if they exhibited loadings on incorrect factors (Woosnam *et al*., 2018). Based on this criteria, 13 items (from the initial 56 items included in the CFA) were removed, remaining 43 variables. In Table 3, the factor loadings are presented, indicating that all of them surpassed the threshold of 0.7. This finding indicates that the measurement achieved convergent validity at the item level (Ertz *et al*., 2016).

The reliability and consistency of the questionnaire datawere tested before the SEM analysis. According to the results, all Cronbach's alpha (a) coefficients exceed standard the value of 0.7, as shown in Table 3, indicating that the scale was reliable. CFA is part of the structural equation model. Thompson (2007) proposed that the CFA should be completed to test the structural validity before analyzing the structural equation model. Structural validity consists of convergence validity and discrimination validity. In this study, CFA analysis was carried out for all facets. As shown in Table 3, the factor loadings were between 0.7 and 0.9, the combined reliability (CR) was between 0.85 and 0.9, and all average variance extracted (AVE) values were between 0.5 and 0.7. All the values exceed the standard value (Liu *et al*., 2020). Therefore, the questionnaire had appropriate convergent validity.

Table 3
FACTOR LOADINGS OF THE MEASUREMENT MODEL

Variables		**Factor loading**	**CA**	**AVE**	**CR**
Environmental concern					
EC1	When humans interfere with nature it often produces disastrous consequences	0.707	0.909	0.54	0.90
EC2	Humans are seriously abusing the environment.	0.744			
EC3	If things continue on their present course, we will soon experience a major ecological catastrophe.	0.736			
EC4	I think we do not try enough to conserve scarce natural resources.	0.771			

Variables		Factor loading	CA	AVE	CR
EC5	I am sorry that the government does not try seriously for controlling environmental pollution or preserving the natural environment.	0.737			
EC6	The government should sponsor researches related to waste recycling technology.	0.728			
EC7	In commercial advertising, manufacturers should be obliged to mention the environmental disadvantages of their products.	0.732			
EC8	In all schools, students should be required to take courses in environmental matters and conservation issues.	0.717			
Environmental Knowledge					
EA1	All living beings)micro-organisms, plants, animals, and humans(are interdependent with one another	0.793	0.908	0.59	0.91
EA2	Daily a number of plant and animal species in the world are extinct that the most common reason is the destruction of their habitat by humans.	0.762			
EA3	The two natural and renewable sources of power that can be used to generate electricity are solar and wind power.	0.784			
EA4	Increasing the number of livestock and over-grazing the rangelands will not harm them.	0.716			
EA5	Plowing of steep lands increase soil erosion and destructive power of flood.	0.792			
EA6	Burning and burying waste compared to preparation of compost from them, is a more appropriate way to dispose of garbage.	0.753			
EA7	Plastic materials decompose too late.	0.769			
Ecocentrism (environmental attitudes)					
Eco1	One of the worst things about overpopulation is that many natural areas are getting destroyed for development.	0.714	0.878	0.60	0.88
Eco2	It makes me sad to see natural environments destroyed.	0.74			
Eco3	Nature is valuable for its own sake.	0.777			
Eco4	Being out in nature is a great stress reducer for me.	0.768			
Eco5	Human are as much a part of the ecosystem as other animals.	0.875			
Environmental apathy (environmental attitudes)					
Apathy1	Environmental threats such as deforestation and ozone depletion have been exaggerated.	0.815	0.878	0.65	0.90
Apathy2	I do not feel that humans are dependent on nature to survive.	0.795			

Variables		Factor loading	CA	AVE	CR
Apathy3	I'm opposed to programs to preserve wilderness, reduce pollution and conserve resources.	0.916			
Apathy4	It seems to me that most conservationists are pessimistic and somewhat paranoid	0.779			
Apathy5	I find it hard to get too concerned about environmental issues.	0.729			
Anthropocentrism (environmental attitudes)					
Anthro1	It bothers me that humans are running out of their supply of oil.	0.773	0.866	0.55	0.86
Anthro2	We need to preserve resources to maintain a high quality of life.	0.737			
Anthro3	One of the most important reasons to keep lakes and rivers clean is so that people have a place to enjoy water sports	0.706			
Anthro4	One of the best things about recycling is that it saves money.	0.76			
Anthro5	Nature is important because of what it can contribute to the pleasure and welfare of humans.	0.743			
Environmental values					
EV1	All things, whether humans, animals, plants, or stones have the right to exist.	0.767	0.848	0.59	0.85
EV2	Animals should have legal rights.	0.759			
EV3	All organisms' lives are precious and worth preserving.	0.782			
EV4	The earth's value does not depend on people; it is valuable in itself.	0.754			
Environmental behaviors					
PEB1	I stop them, if some people destroy the environment.	0.796	0.919	0.56	0.92
PEB2	I sort my trash at the travel site.	0.790			
PEB3	I encourage others to reduce their waste and pick up their litter when they are at nature-base destinations.	0.747			
PEB4	I try not to harm nature during the travel even if it makes more trouble for me.	0.747			
PEB5	After a picnic, I leave the place as clean as it was originally	0.709			
PEB6	I collect the garbage spilled in nature even if the waste is poured over by another person.	0.712			
PEB7	I always carry garbage bags on the trips and picnics.	0.710			
PEB8	I bring the fuel needed to make fire on travel and picnic.	0.751			
PEB9	If I make fire, I will try to make sure that the fire is completely shut off.	0.786			

Note: Cronbach's alpha (CA), composite reliability (CR), average variance extracted (AVE)
Source: Elaborated by authors

4.3. Structural path model to examine hypothesized relationships

Subsequently, the measurement model was transformed into a structural equation modeling (SEM) framework in accordance with the theoretical model. Through the utilization of AMOS V.25, the relationships between the constructs within the model were examined individually using structural equation modeling techniques.

In the process of validating theoretical models using structural equation modeling (SEM), it is crucial to assess the model fit as a prerequisite for establishing its adequacy (Byrne, 2010). A good model fit implies a closer resemblance between the model matrix and the sample matrix. To evaluate the model fit, several indices including x^2 /df, GFI, RMSEA, CFI, IFI, NFI, and AGFI, as recommended by McDonald and Ho (2002), were employed. As depicted in Table 4, all of these indices surpassed the predefined threshold, indicating a favorable model fit.

Table 4
OVERALL MODEL FITNESS OF THE STRUCTURAL MODEL

Index	Model fitness	Criteria	Accept
Chi-square test			
Chi-square	1182.986 (0.000)	p>.05	Yes
Chi-square/df	1.793	<3	Yes
Goodness-of-fit indices			
GFI	0.902	>.09	Yes
AGFI	0.831	>.08	Yes
NFI	0.901	>.09	Yes
TLI	0.938	>0.90	Yes
Alternative indices			
CFI	0.944	>.09	Yes
IFI	0.944	>.09	Yes
RMSEA	0.043	<.05	Yes
SRMR	0.0469	<.08	Yes

Source: Elaborated by authors

The configured structural model was then fitted. The results are shown in Table 5 and Figure 2. Fig. 2 shows the standardized parameter estimates and Table 5 shows the structural equation model path coefficient values, S.E. and C.R. values. Of the eleven proposed relationships, three were not significant ($p > 0.05$). Notably, the regression paths pro-environmental values (EVs) ® pro-environmental behaviours (PEB), Environmental attitude of apathy (EAApathy) ® pro-environmental behaviours, and Environmental knowledge (EK) ® pro-environmental behaviours (PEB) have been deleted, as neither was significant in the model. As a consequence, the model experienced a slight reduction in its overall fit. However, the decision to make this adjustment was warranted due to the enhanced

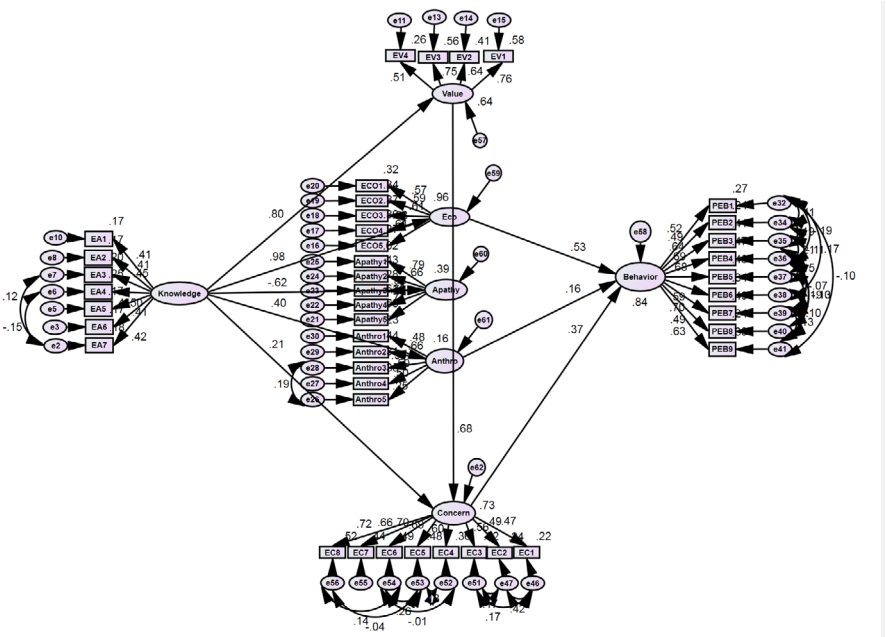
parsimony achieved. Despite the slight compromise in model fit, the trade-off was deemed justified given the improvement in the model's simplicity and efficienc.

Table 5
THE RESULTS OF HYPOTHESES

Hypotheses	Unstandardized path Coefficients	standardized path Coefficients	S.E.	C.R.	P
H_2: EK ---- > EV	0.552	0.698	0.047	11.808	***
H_3: EK ---- > EC	0.199	0.188	0.064	3.108	0.002
H_4: EK ---- > Eco	0.811	0.984	0.06	13.629	***
H_5: EK ---- > Apathy	-0.662	-0.513	0.073	-9.093	***
H_6: EK ---- > Anthro	0.404	0.344	0.065	6.188	***
H_8: EC ---- > PEB	0.501	0.425	0.063	7.986	***
H_9: Eco ---- > PEB	0.61	0.403	0.083	7.322	***
H_{11}: Anthro ---- > PEB	0.152	0.144	0.042	3.657	***

Note: ***, p < 0.001, C.R., critical ratio (i.e., the t-value corresponding to each item loading); **S.E.**, standard error.
Source: Elaborated by authors.

Figure 2
STRUCTURAL MODEL



Source: Elaborated by authors.

5. DISCUSSION

Hypotheses were tested and from the results presented, two hypotheses **2** and **3** are also accepted and the result confirmed that EK has a significant and positive influence on environmental values and concerns. This finding aligns with previous studies conducted by Zhao *et al*. (2014) and Bamberg and Möser (2007), which also identified a connection between environmental knowledge and concern. However, our findings diverge from those reported by Unal *et al*. (2018), who suggested that possessing better knowledge of a specific environmental issue does not necessarily correlate with a greater level of concern for that issue.

The findings of the study indicate that there is no direct impact of EK on PEB, thus refuting hypothesis **1**. Previous research has often considered EK as the primary determinant of individuals' engagement in environmentally friendly actions (Si *et al*. 2022; Rampedi and Ifegbesan, 2022; Polonsky *et al*., 2012). However, a considerable body of literature has demonstrated the limited strength of the direct association between EK and PEBs (Laroche *et al*., 2002). Kollmuss and Agyeman (2002) arrived at the conclusion that a clear and direct association between general EK and PEBs (PEB) is not readily apparent. These findings indicate that although individuals possess a certain level of EK, this factor alone does not inherently promote greater engagement in positive pro-environmental actions (Pourhossein *et al*. 2023; Nouri *et al*. 2023). In line with this perspective, Scannell and Gifford (2013) emphasized that the changes observed as a result of EK are typically confined to individuals who already possess a pre-existing concern for environmental issues. However, it should be noted that while general EK may not serve as a direct predictor of environmental actions, its indirect and mediating impacts should not be overlooked (Nouri *et al*. 2023). Such knowledge can play a crucial role in raising awareness and concern about environmental issues, thereby serving as a starting point for individuals to develop a willingness to take pro-environmental actions. On the contrary, hypotheses **4, 5**, and **6** are validated, and the results demonstrate that EK exerts a significant and positive influence on ecocentric and anthropocentric environmental attitudes while having a significant and negative influence on Apathy. Kaiser *et al*. (1999) and Zsóka *et al*. (2013) corroborated that view that EK serves as the basis for developing positive environmental attitudes.

The findings of this study further indicate that the presence of EC significantly and positively impacts PEB, so hypothesis 8 is accepted. This result aligns with previous research by Zhao *et al*. (2014), which demonstrates a direct association between ECs and various PEBs, including but not limited to green purchasing, waste recycling, and energy conservation. Despite some research indicating a comparatively feeble link between concern and behavior (Kollmuss and Agyeman 2002), Coelho *et al*. (2017) have discovered that some individuals may not exhibit PEB despite possessing a heightened degree of EC. As well as, the findings of this study provide evidence that hypothesis 7, which explores the influence of EVs on PEB, fails to receive support. The outcomes of our research contradict the conclusions drawn by Hoshyar *et al*. (2022), Dunlap *et al*. (1983) and Stern *et al*. (1999), who reported significant contributions of values in explaining both activist and non-activist environmental behaviors. Besides, this discovery corroborates the research

conducted by Kennedy *et al*. (2009), which presented proof of the existence of an environmental values-behavior gap in Canada.

The study's findings highlight the importance of environmental attitudes in influencing the PEB of individuals involved in ecotourism. Hypotheses **9** and **11** were confirmed, indicating that both anthropocentric and ecocentric attitudes directly impact the PEB of ecotourists. However, hypothesis 10 was not supported. This study reaffirms the notion that environmental attitudes are strong predictors of PEB, consistent with prior research (Liu *et al*., 2020). The results also align with previous studies, such as Goldman *et al*. (2006), which demonstrated the positive influence of environmental attitudes on environmental behavior. This research underscores that individuals with both anthropocentric and ecocentric attitudes can have positive attitudes toward environmental issues, as observed by Thompson and Barton (1994). Furthermore, individuals may engage in PEBs for various reasons, as noted by Schultz and Zelezny (1999). According to Xu and Fox (2014), those with an anthropocentric perspective do so to benefit people, while those with an ecocentric viewpoint act based on their nature-centered attitude.

Table 6
SUMMARY OF OUTCOMES FOR THE HYPOTHESES

Hypotheses	
H_1: Environmental Knowledge have a significant and positive influence on pro-environmental behavior.	**Not Supported**
H_2: Environmental Knowledge have a significant and positive influence on pro-environmental values.	**supported**
H_3: Environmental Knowledge have a significant and positive influence on pro-environmental concern.	**Supported**
H_4: Environmental Knowledge have a significant and positive influence on ecocentrism.	**Supported**
H_5: Environmental Knowledge have a significant and positive influence on Apathy.	**Partially supported**
H_6: Environmental Knowledge have a significant and positive influence on anthropocentrism.	**Supported**
H_7: Environmental values have a significant and positive influence on pro-environmental behavior.	**Not Supported**
H_8: Environmental concern have a significant and positive influence on pro-environmental behavior.	**Supported**
H_9: Ecocentrism have a significant and positive influence on pro-environmental behavior.	**Supported**
H_{10}: Apathy have a significant and positive influence on pro-environmental behavior.	**Not Supported**
H_{11}: Anthropocentrism have a significant and positive influence on pro-environmental behavior.	**Supported**

Source: Elaborated by authors

7. CONCLUSIONS AND RECOMMENDATIONS

This study presents a significant contribution to the field by delving into the intricate interplay between individuals' environmental attitudes, EVs, concerns, knowledge, and PEBs. Diverging from previous research, which primarily relies on conventional attitude theory, this investigation takes a more comprehensive approach to scrutinizing the multifaceted relationships among these variables. The study's findings hold notable theoretical implications in this domain, and it is conducted against the backdrop of Iran's substantial potential for ecotourism development. Despite the country's abundant resources and the growing global interest in ecotourism, Iran's presence in the global ecotourism market remains disproportionately modest (Motlagh *et al*., 2020). This inadequately explored aspect of Iranian ecotourism calls for increased scholarly attention, especially as it pertains to ecotourists, whose conduct within their natural surroundings significantly influences environmental sustainability (Seyfi, *et al*., 2018). Additionally, the bulk of research on environmental behavior has centered on developed countries, with limited focus on developing nations like Iran. Hence, it is imperative to investigate the determinants of PEB among Iranian ecotourists, shedding light on this underrepresented area.

Additionally, this research has validated the notion that the PEB of individuals engaged in ecotourism is influenced and molded by their perceptions of nature and their environmental attitudes. The findings demonstrate that environmental attitudes play a crucial role in mediating the translation of EK into actual behavioral actions. In line with previous scholarly investigations (Nouri *et al*. 2023; Barber *et al*., 2009; Kaiser *et al*.; 1999), environmental attitudes function as a central mediating construct between EK and PEB. Notably, even after accounting for the influence of other significant variables, our study highlights that environmental attitudes emerge as a robust and noteworthy predictor of PEBs. Despite the importance of attitude change, merely altering attitudes alone is insufficient to enhance PEB. It is imperative to cultivate strong attitudes that transcend a mere endorsement and reach a level where individuals are willing to bear the associated costs of engaging in such behaviors. According to previous studies, while many people may express support for pro-environmental attitudes, only a smaller number of individuals demonstrate a readiness to pay off the costs associated with engaging in PEB (Casaló and Escario, 2018).

Reaching high levels of environmental attitudes leads to greater commitment, which can help sustain PEB over an extended period. Past studies support this, with findings indicating that stronger environmental commitments predict the actual adoption of eco-friendly behavior and facilitate its maintenance, as well as overarching environmental attitudes, when considered independently, generally lack significant influence on precise behaviors. Instead, it is specific attitudes that play a more influential role in fostering behavioral alterations (Heimlich and Ardoin, 2008). Consequently, when devising programs targeted at addressing ECs, it is prudent to give precedence to behaviors that can substantially mitigate the prevailing environmental challenges. Furthermore, it becomes imperative to pinpoint the precise attitudes and determinants intricately linked to these identified behaviors. To enhance levels of attitudes, policymakers could formulate commu-

nication campaigns that emphasize the advantages of engaging in PEB and urge individuals to demonstrate commitment to such behaviors, despite potential challenges. Adopting a cost-benefit paradigm, people are more likely to perform a behavior if the expected benefits are higher than the costs (Casaló and Escario, 2018).

In the Iranian context, the translation of environmental awareness into tangible actions is a complex challenge, potentially influenced by multifaceted factors. It appears that the presence of traditional environmental knowledge among the Iranian populace, which often predates formal environmental education, plays a pivotal role in shaping individual behaviors and decisions concerning environmental conservation. Moreover, it has been noted that the current environmental education curriculum in Iranian schools may be insufficiently robust and effective in inculcating pro-environmental attitudes and behaviors among students. Despite commendable efforts by the media to raise public consciousness regarding environmental issues, a more targeted and comprehensive approach is warranted. Recommendations for promoting eco-consciousness and action include the development of multimedia content that delves into ECs, the implementation of educational programs directed at cultivating pro-environmental attitudes and behaviors, particularly in young children, and the orchestration of public awareness campaigns designed to underscore the intrinsic relationship between the environment and human well-being. To promote pro-environmental conduct, fostering interdisciplinary collaborations between policymakers and researchers should be advocated. This endeavor may involve launching cost-effective interdisciplinary initiatives within educational institutions to further inculcate EVs. These endeavors should underscore that adopting PEBs, though demanding, ultimately leads to benefits that surpass the associated costs. Effective policy formulation should also entail community involvement, where school programs that promote PEB are situated within a broader network involving parents and educators. Universities can further their engagement with local stakeholders, including governmental bodies, communities, industries, and non-governmental organizations, to provide diverse educational programs. Moreover, engaging students in the policymaking process can enhance their self-efficacy and foster the development of personal norms that prioritize environmental conservation, as corroborated by the study conducted by Liu *et al*. (2017). Importantly, the content of environmental education must be practical and actionable, equipping individuals with the knowledge and skills necessary to make informed choices in their daily lives that contribute to environmental betterment.

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ANNEX