



Assessing Tourists' Willingness to Pay for Sustainable Tourism in Petra, a Contingent Valuation Study

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ABSTRACT

Tourism is a vital economic sector globally, but its growth has raised concerns about its environmental impact. The study utilized the Contingent Valuation Method and Willingness to Pay to estimate additional costs tourists would pay for sustainable tourism in Petra. A survey of 446 international tourists examined their willingness to pay higher fees for improved services, providing insights into sustainable tourism management and pricing policies. Results reveal a positive inclination towards sustainable practices, with a majority expressing willingness to pay additional fees for entry, accommodation in eco-lodges, and electric transportation services within Petra. Cultural preservation also emerged as a priority, with tourists willing to pay for cultural events and donate towards site maintenance. However, interest in culinary experiences and professional photography services was comparatively lower. Regression analyses indicate age and marital status as significant predictors of WTP, emphasizing the importance of tailored marketing strategies. Recommendations include diversifying revenue streams, integrating cultural experiences, and fostering collaborations between stakeholders to promote sustainable tourism practices. This study contributes to understanding tourists' preferences and behaviors regarding sustainable tourism, offering insights for the management and marketing of heritage sites like Petra while balancing economic growth with environmental conservation.

INTRODUCTION

Tourism is globally acknowledged as one of the world's fastest-growing economic sectors, with strong interconnections to all other industries both locally and internationally, influencing its core functioning. According to the World Tourism Organization, the numbers indicate that the tourism sector employs approximately 310 million people and generates an income exceeding \$1.8 trillion. Furthermore, more than 1.3 billion tourists traveled the world in 2019 (WTTC 2023).

The impact of the COVID-19 pandemic cannot be considered as a measure of the tourism sector's effect. However, there has been a noticeable recovery in the tourism sector after the pandemic, and it is expected that the demand for tourism will continue to grow in the coming years. The significant increase in global tourism demand, fueled by the desire for adventure, entertainment, and various other reasons, has resulted in a corresponding rise in the consumption of goods and services both before, during, and after travel. However, this surge in tourism has also raised concerns among environmentalists regarding the escalating negative environmental impact.

Currently, tourism contributes to approximately 8% of all global greenhouse emissions (Bahja & Hancer 2012, Dolnicar 2012). In response to this issue, there is a growing awareness among stakeholders about the urgent need to take action to mitigate the environmental consequences associated with tourism. The focus is now on achieving sustainable tourism development through the promotion of accessible tourism, eco-tourism, and green tourism practices.

Sustainable tourism aims to minimize the negative environmental impacts of tourism while enhancing visitor experiences. The willingness to pay (WTP) method is a valuable tool for assessing tourists' readiness to incur additional costs for sustainable practices. This approach provides insights into consumer behavior and supports the development of effective pricing policies for sustainable tourism initiatives.

Mitigating the negative environmental effects of tourism typically necessitates the implementation of actions that may not align with the preferences of some tourists, potentially resulting in reduced service quality or higher investment costs (Bahja & Hancer 2021). To ensure informed and effective decision-making is essential to seek the perspectives

of various stakeholders, with particular emphasis on the input of tourists. Such engagement can prove invaluable to policymakers, enabling them to make informed choices by evaluating the tourists' willingness to pay additional costs in the pursuit of sustainable and responsible tourism practices (Ma et al. 2022).

Some governments and international organizations have implemented a range of practices, policies, and incentives to motivate tourism establishments to adopt and implement various practices, such as the use of recycled raw materials, the adoption of alternative energy sources, and other environmentally friendly actions. Furthermore, certain organizations offer awards or certifications to incentivize tourism firms to actively participate in sustainable development, accessible tourism, and the adoption of eco-friendly practices (Awang et al. 2018, Doran & Hanss 2022).

This topic has attracted numerous researchers who have studied it using various methodologies to assess the customers' willingness to pay additional costs for achieving sustainable tourism development. One of these methodologies is the willingness to pay or the contingent valuation method, which is among the most useful approaches and highly adaptable in such cases. There has been an increasing focus on utilizing the Contingent Valuation Method (CVM) to estimate the value of introducing new services or improving the quality of existing services or products. This can be attributed to improvements in valuation techniques and a growing demand for new or existing goods or services.

Tourism in Jordan has a rich history, spanning many years, with rich heritage, archaeological sites, and diverse environmental and religious attractions. Among the numerous tourism components in Jordan, are the traditional attractions of sea, sand, and sun. One standout destination in Jordan is Petra, considered the most significant historical site worldwide. The demand for tourism in Petra has been steadily increasing year after year. In 2019, the number of tourists surpassed one million, and by the end of June 2023, it had already exceeded 700,000 tourists visited Petra. Projections indicate that the number of tourists to Petra in 2023 will surpass one and a half million tourists.

However, this flow in tourism places pressure on the infrastructure and services in Petra, leading to potential environmental damage to the site and its surroundings. This study aims to address the problem of balancing the growing tourism demand in Petra with the need for sustainable tourism development and minimizing the negative environmental impact on the site and its surroundings. Hence, the purpose of this study is to address the following question: To what extent are tourists visiting Petra willing to pay additional costs to foster sustainable tourism?

In this study, the willingness to pay (WTP) approach will be adopted to examine the following hypothesis:

- Tourists visiting Petra will not demonstrate a significant willingness to pay additional costs to support sustainable tourism practices.
- The level of tourists' willingness to pay for sustainable tourism in Petra will not be influenced by demographic factors such as income, education, and age.
- Tourists who perceive the environmental impact of tourism in Petra as significant will not exhibit a higher willingness to pay for sustainable tourism practices compared to those who perceive it as less significant.

PAST STUDIES

Tourism plays a vital role in achieving economic development for countries, especially developing ones. It does so by creating employment and income opportunities for individuals and governments (Goffi et al. 2019, Yanes et al. 2019). One of the challenges faced by developing countries is achieving a balance between the requirements of economic development in nations facing high unemployment rates, poverty, inadequate infrastructure, and population growth that surpasses economic growth, resulting in governments' inability to address sustainable development issues and environmental preservation (Cui 2022). Jordan is not far from these challenges, as it is the third poorest country in the world in terms of water resources (Taamneh et al. 2020), (Saad Shbaita & Gücel 2022), and has an unemployment rate of over 23%. Additionally, it faces limited natural resources, which leads to many unemployed youths. Jordan also suffers from a high public debt-to-GDP ratio, exceeding 96% (Al-Tarawneh et al. 2022), (Alharbi 2020). However, in 2019 Jordan received about 5.3 million tourists, contributing to approximately 13% of the GDP and employing over 60,000 workers in the tourism sector (MoT 2021).

Jordan seeks to attract higher numbers of tourists through promotion and marketing programs, as well as incentivizing tourism companies to do so. All of this requires the adoption of policies that maximize the importance of sustainable tourism in preserving the heritage resources, which are the backbone of tourism in Jordan, with Petra being one of the UNESCO World Heritage sites and one of the New Seven Wonders of the World.

In recent years, there has been a significant increase in the demand for environmentally friendly destinations, which has emerged as a prominent force in the global tourism industry. This trend is often referred to by various names such as alternative tourism, sustainable tourism, green tourism, and others (Eckert & Pechlaner 2019), (Khan et al. 2021).

This raises several important questions: Are sustainable practices considered as pull factors that attract visitors to specific sites? And do people perceive these practices as part of their heritage (Tu 2020)? Several studies have explored these questions and shed light on the demographic factors that impact willingness to pay (Murphy et al. 2018). This suggests that destinations promoting sustainability practices are particularly appealing to educated individuals who have a deeper understanding of environmental issues and appreciate the value of sustainable practices.

The greatest concern regarding the development of cultural heritage tourism is that increasing numbers of arrivals lead to problems with maintaining the environment. There is a strong connection between tourism and the environment since tourism depends on a healthy environment more than any other business (Revfine 2021). However, negative environmental impacts could occur if tourism is not well managed. Overcrowding, misuse of natural resources, the construction of buildings and infrastructure, and other activities associated with tourism produce impacts on the environment (Dražković & Perović 2022). Because of its nature, (Plog 1974) notes that 'tourism contains the seeds of its own destruction, tourism can kill tourism, destroying the tourism attractions which visitors come to a location to experience'. However, some of the impacts may be controlled, regulated, or directed (Sudipa et al. 2020). If properly managed, tourism has the potential for maintaining or even enhancing the cultural and natural resource base. If mismanaged, or allowed to expand with short-term goals and objectives, it has the capability of destroying the resources upon which it is built (Blanco-Cerradelo et al. 2022).

Furthermore (Abuamoud et al. 2014) found that education level and income are associated with people who choose to travel to environmentally friendly destinations. This implies that individuals with higher education and income levels are more inclined to prioritize sustainability in their travel choices. This aligns with the notion that educated individuals often have a greater awareness of environmental concerns and are more willing to support destinations that align with their values.

According to a recent report by the World Travel and Tourism Council (WTTC), an impressive 69 percent of travelers are actively in search of sustainable travel options for the year 2023 (WTTC 2023). This suggests that a significant proportion of travelers are actively seeking out destinations that offer sustainable practices and unique experiences beyond traditional mass tourism. An increasing interest in sustainable development among decision-makers, academicians, and individuals especially those who support the preservation of heritage and the environment (Fatima & Elbanna 2020, Baba et al. 2021). Also, it has become an

added value for archaeological or environmental sites that adopt sustainable policies. Several studies have addressed this topic and examined it using the willingness to pay (WTP) model and contingent valuation method by adopting several hypotheses that link tourists' willingness to pay additional costs for sustainability. These hypotheses include demographic factors such as age, income, and educational level, as well as factors related to price, service level, site nature, and importance.

In their study on determining the extent of tourists' willingness to pay for the use of environmentally friendly packaging (paper instead of plastic), tourists expressed their readiness to do so to adopt more sustainable practices. This indicates an increase in positive awareness of the environment and a sense of responsibility in embracing more sustainable policies (Herrmann et al. 2022). Other studies have addressed the identification of factors influencing individuals' willingness to pay additional costs or sacrifice personal preferences to apply environmental practices (Ali & Ali 2020). These factors revolve around income, educational level, as well as personal tastes and preferences. Certainly, higher educational attainment and income levels have a positive impact on fostering a sense of responsibility toward the environment and increasing awareness of the importance of sustainable tourism (Abuamoud et al. 2014).

In one early study by Jabarin & Damhoureyeh in 2006, both the Contingent Valuation Method and the Travel Cost Method were employed to assess the demand function and examine recreational patterns within Dibe'en National Park (DNP) located in Jerash, Jordan. The Travel Cost Model was utilized, employing Poisson regression analysis for estimation purposes. The results indicated that the average monetary value assigned to recreation in Dibe'en National Park amounts to \$100 per individual, per day of recreation. Furthermore, the study found that the average willingness to pay for the conservation and enhancement of services was determined to be \$7.8 (Jabarin & Damhoureyeh 2006).

In a separate investigation led by Shamsudin in 2009, the Contingent Valuation Method was utilized to evaluate the pricing strategy for Taman Negara National Park (TNNP) in Malaysia. The study involved surveying 180 participants, encompassing both local and international visitors, to ascertain the highest amount they were prepared to pay for non-market goods within TNNP. The results demonstrated that visitors exhibited a greater willingness to pay when it came to entrance fees (Matthew et al. 2011).

In a study conducted in Indonesia to determine tourists' willingness to pay additional costs for the conservation of sharks, the Contingent Valuation Method and willingness to pay were employed. This method helps explain tourists'

behavior and their awareness of the importance of marine tourism through their willingness to pay. The study revealed tourists' readiness to pay additional costs for the preservation and protection of the marine environment in the study area (Booth et al. 2022).

The willingness-to-pay method not only aims to measure how much individuals are willing to pay a higher price for sustainability, but it also helps us assess consumer behavior and individuals' sense of responsibility towards the environment. This is based on several factors, including awareness of the relationship between humans and the environment and the understanding that any harmful practices or irresponsible behavior pose a threat to sustainability. Additionally, factors influenced by social psychology theories, Environmental Beliefs, and income, all impact behavior toward sustainability (de Araújo et al. 2022).

Furthermore, the willingness-to-pay model also helps in studying individuals' willingness to pay an additional price for addressing the environmental damages resulting from natural disasters (Soejarwo et al. 2021). The willingness-to-pay model can be widely used, as it helps determine an acceptable addition to the original price tourists are willing to pay, compared to the original price as a baseline price (Rommel & Sagebiel 2021).

Several studies have applied psychosocial theory to explain pro-environmental behavior, to understand how individuals interact with the environment and their willingness to pay for sustainability. To gain a better understanding of people's behavior toward the environment, some studies have examined various factors, including age, income, and level of education.

Additionally, researchers have incorporated theories such as the Planned Behavior Theory and the Value-Belief-Norm Theory to further analyze this behavior (López-Mosquera & Sánchez 2012). Natural and cultural resources are considered important economic resources for the countries' economy, as they help attract tourists and contribute to economic returns. However, they are not market goods, making their economic evaluation challenging. Economists have agreed on the viability of using contingent valuation methods to assess non-market goods through using the willingness-to-pay approach (Lawton et al. 2022).

The objective of this study is to investigate how willing tourists are to pay for sustainable tourism practices. By building on prior research, the study aims to deepen our

understanding of the extent to which visitors to Petra are open to incurring extra expenses to support the implementation of sustainable measures for the preservation of Petra's cultural heritage.

Tourism in Jordan

Tourism plays a pivotal role in Jordan's economy, serving as a vital source of income for thousands of people. The sector encompasses various industries such as airlines, hotels, restaurants, ground transportation, and local communities, all of which benefit from tourism activities. Over the past two decades, Jordan's tourism sector has experienced rapid development, establishing itself as one of the most attractive countries for tourism in the Middle East (Alzriqat et al. 2022). Jordan has a rich historical heritage spanning 8,000 years and its diverse natural landscapes. Additionally, Jordan stands out as a peaceful haven amidst a troubled region, boasting a stable government. During the years from 2020 to 2022, tourism worldwide faced significant challenges due to the COVID-19 pandemic, resulting in a sharp decline in tourist numbers in Jordan and globally, reaching levels exceeding 85% (Abuamoud et al. 2022). This decline led to substantial losses. However, by the end of 2022 and the beginning of 2023, the world witnessed a recovery in tourism activity reaching more than 60% worldwide and more than 83% in the Middle East, including Jordan ("UNWTO World Tourism Barometer and Statistical Annex, January 2023," 2023). In Jordan, the tourist income in the first quarter of 2023 witnessed an increase of 88.4% compared to the same period in 2022, reaching a value of \$1,671.1 million, during the first quarter of 2023, the tourist income achieved an increase of 88.4%, totaling JD 1,184.8 million (\$1,671.1 million), driven by the increase in the number of tourists, which reached 1,476.5 thousand tourists (Table 1), this was due to the rise in the number of overnight tourists, reaching 1.5 million tourists (CB 2023).

The significance of tourism for Jordan becomes evident when considering the country's limited natural resources. The sector accounts for more than 13% of the country's GDP and serves as a crucial source of foreign exchange. Recognizing the potential of tourism, the Ministry of Tourism projects the construction of more than 20 new hotels in Petra and the Dead Sea within the next five years. These investments are expected to create a direct impact by generating 15,000 jobs and an additional 36,000 indirect employment opportunities. Jordan's National Tourism Strategy 2021-2025 aims to

Table 1: Number of Tourists in Jordan (in thousands).

2017	2018	2019	2020	2021	2022
4,833.20	5,329.20	5,697.90	1,012.10	1,260.80	2,369.40

collaborate with the private sector to create additional new jobs, as outlined by the Ministry of Tourism (MoT 2021).

The number of workers in different tourism activities reached 54,764 employees in 2022, with a growth rate of 11.3% compared to 2021, these workers are distributed among several activities, including hotels, travel and tourism agencies, tourist restaurants, car rental offices, oriental souvenir shops, tour guides, desert safari facilitators, tourism transportation companies, diving centers, water sports, and tourist camps (MoT, Tourism sector in Jordan 2023).

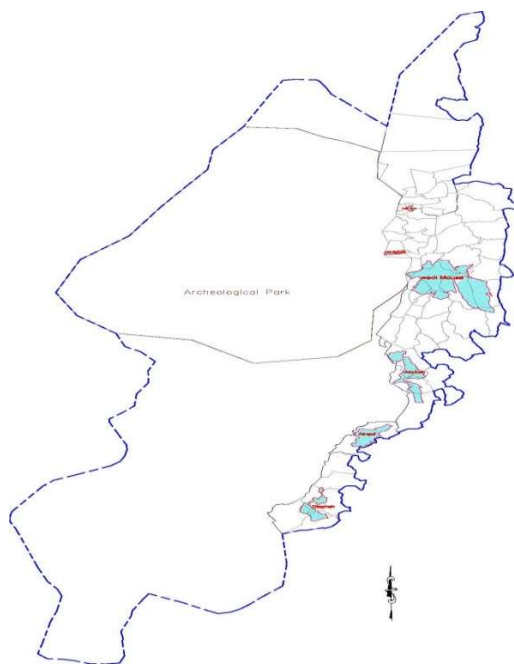
Tourism Trends in Petra

Petra is located in the southern part of Jordan around 230 km from Amman. The region covers an area of (441 km²) of which (262 km²) is dedicated to the Petra Archaeological Park (PAP). It also includes six urban communities with a population of around 35 thousand; Petra is a UNESCO World Heritage Site since 1985 and a World Wonder since 2007. Fig. 1 shows the map of the administrative region of the Petra Development and Tourism.

In 2019, the number of visitors to Petra exceeded 1,000,000 tourists Fig. 2, rapidly approaching the maximum capacity of Petra's hotels, estimated at 2,500 rooms per night. On average, tourists stayed in Petra for about 1.3 nights per person, but plans were in motion to extend this duration to 2 nights per tourist. Consequently, the expected surge in room demand amounted to 0.54, equivalent to 1,325

additional rooms. Notably, there is a significant and growing population of young people with a preference for adventurous destinations, flavorful cuisine, unique experiences, and engaging activities.

Petra has experienced a notable upswing in tourism in 2023, signifying the recovery of tourism in Petra from the adverse impacts of the COVID-19 pandemic. This recovery is evident through the influx of foreign and local visitors. During this period, hotels have witnessed a substantial increase in occupancy rates, which had plummeted to zero percent during the peak of the pandemic. After the number of tourists to Petra exceeded one million and 100 thousand in 2023, there was optimism in the tourism sector for a promising tourist season for the years 2024 and beyond. However, political developments and the war on Gaza led to a decline in the number of tourists after October 7, reaching less than 500 tourists per day during December 2023. The number continued to rise until mid-February 2024, reaching only about a thousand tourists per day from February to April. This constitutes only about 16% of the daily number of tourists to Petra in 2023. PDTRA is introducing new tourism programs and products in Petra in 2023, including cultural and heritage festivals, as well as safari trips organized in collaboration with tourism companies. The launch of several projects in Petra, such as the Heritage Village project in the Al-Bayda area, the completion of the tourism street project, the establishment of the Al-Bayda Visitor Center, adventure



Source: PDTRA

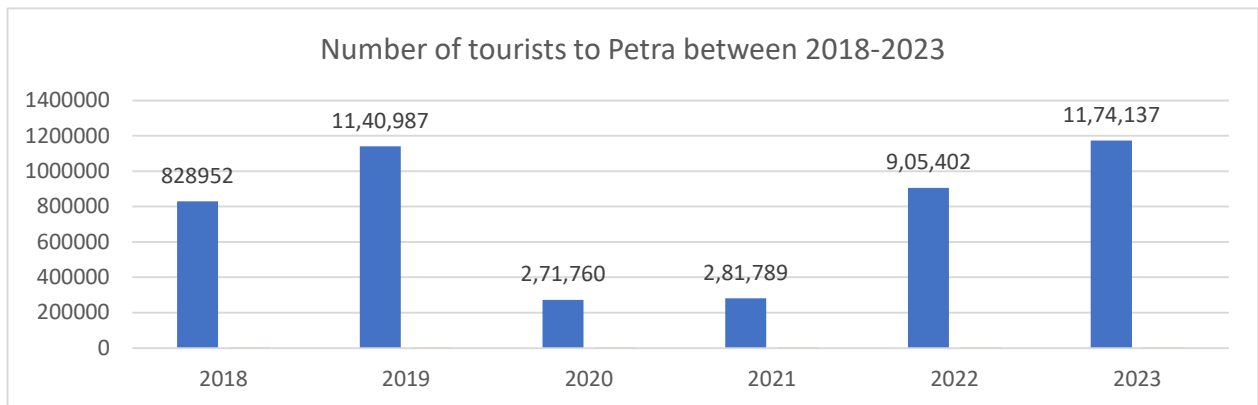
Fig. 1: Map of the administrative region of the Petra Development and Tourism Region Authority.

vehicles, and a cable car. According to statistics released by the PDTRA, the total number of approved hotel rooms exceeds 900, with 350 rooms already operational, while efforts are underway to rehabilitate and equip an additional 550 new hotel rooms in preparation for the upcoming tourist season. Petra is currently attracting investment interest in the hotel sector, driven by the recovery of the tourism season and the investment incentives provided to stakeholders in the hotel accommodation industry. Several investors have proposed the construction of at least 500 new hotel rooms, with these proposals currently undergoing evaluation and study procedures to obtain the necessary construction approvals.

The cultural heritage component of the site is constantly at risk of damage due to weather conditions and human factors, whether from visitors or residents. This necessitates continuous monitoring, restoration, and preservation of the site. Additionally, the waste generated by tourist activities

requires proper management. Due to the geographical and topographical features of Petra, which include slopes, valleys, and the flow of rainwater and occasional floods, it poses a continuous threat to the archaeological site. Consequently, there is a need to establish infrastructure capable of accommodating floods and protecting properties and tourists.

Furthermore, the increasing investments in Petra resulting from the growing demand for tourism necessitate the development of infrastructure to provide services for both tourists and citizens. Moreover, the rising demand for tourism may create social and economic imbalances within the community. Therefore, the Petra Development and Tourism Region Authority is required to implement community protection programs that have economic and social dimensions. All of this requires budget allocation and additional costs for the local government. Thus, this study



Source: PDTRA.

Fig. 2: Number of tourists to Petra between 2018-2023.

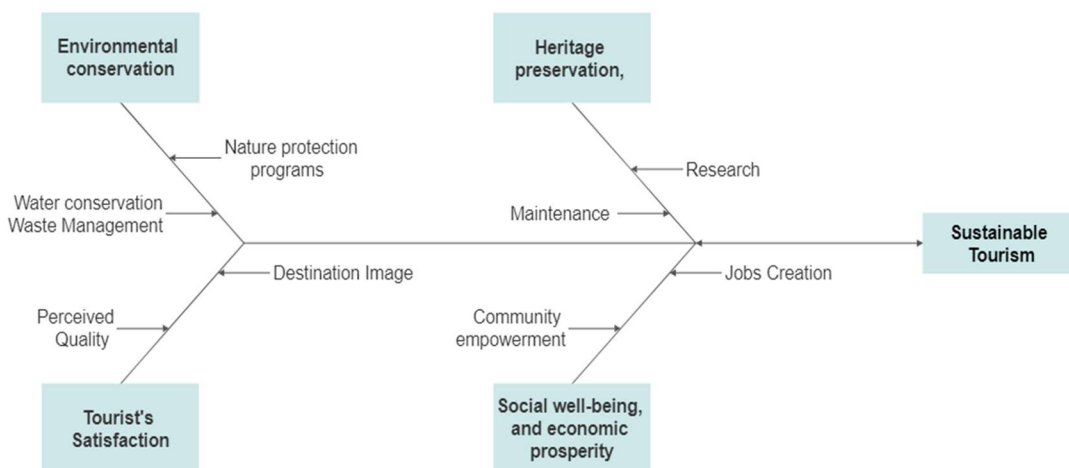


Fig. 3: Principles of sustainable tourism in Petra (created by the author).

aims to explore the extent to which tourists are willing to pay to cover these additional costs, which aim to achieve sustainable tourism in its comprehensive environmental, heritage, social, and economic aspects (Fig. 3). Because all these four aspects are interconnected and should be considered holistically in sustainable tourism development. By balancing environmental conservation, heritage preservation, social well-being, and economic prosperity, destinations can achieve a more sustainable and inclusive tourism model.

MATERIALS AND METHODS

In this study, the Contingent Valuation Method CVM and Willingness to Pay (WP) were applied to estimate the additional cost that tourists are willing to pay to apply sustainable tourism in the study area. The WP method is a behavioral method that assumes values from what people do, or it measures the value of people's actions. Contingent valuation measures the values of what people say, it is an attitudinal approach, in other ward measures what they say not what they do, The main theories relevant to the Willingness to Pay (WTP) model include:

Planned Behavior Theory proposes that behavior is shaped by intentions influenced by attitudes, subjective norms, and perceived control. In WTP, individuals' readiness to pay for environmental goods hinges on their sustainability attitudes, social norms, and perceived affordability. The Value-Belief-Norm Theory suggests that pro-environmental behavior stems from environmental values, beliefs, and social norms. In WTP, individuals valuing conservation and endorsing sustainable practices are inclined to pay for sustainability initiatives. While the Psychosocial Theory delves into psychological and social influences on behavior, including attitudes, beliefs, and social norms. Within WTP, it elucidates how individuals' perceptions and social influences impact their readiness to pay for sustainable practices.

(Del Saz-Salazar et al. 2015). A survey conducted on foreign tourists examined the hypothetical factors that impact respondents' willingness to pay and to estimate how much value could be captured by applying new prices for a list of services in Petra. Also, it will help to estimate the demand for the tourists' services. For the reason of this survey, respondents know the study area because they survived during their visit to Petra. They also provided a brief explanation about the reason for planning for sustainable tourism in Petra.

The CVM method assumes that the value of the site or its recreational services is reflected in how much people are willing to pay to visit the site. It is referred to as a "revealed preference" method because it uses actual behavior and

choices to infer values (Thoma 2021), peoples' preferences are discovered by their choices. The CVM method is applied by collecting information about the number of visits/visitors to the site from different areas. This information allows calculate the number of visits purchased at suggested prices.

Contingent Valuation is a method of estimating the value of public goods, or non-market goods which is not subject to the laws of the market in terms of pricing. This method can help economists, and decision-makers, to estimate the impact of economic decisions and activities and estimate the monetary value of all economic benefits that a society derives from public goods like cultural heritage resources (R & Shamsudin 2009). The public good must have two characteristics. First, are non-excludible. That means we can't keep it away from people to enjoy the good. The second characteristic is non-rival in consumption. That means more than one person can enjoy the good without reducing each other enjoyment (Abuamoud et al. 2014). Cultural heritage goods typically possess public goods characteristics, and they are agreeable to the use of non-market valuation techniques. Improving environmental conditions in a particular location is considered a recreational activity to the site, and need to find out if people are willing to pay for the improvement to the site. The willingness-to-pay method helps to reach a proper pricing policy to provide visitors with quality services at fair prices and reach sustainable management of tourism sites (de Araújo et al. 2022).

The method asks individuals about their willingness to pay (WTP) for some public goods or services, to estimate the public's willingness to pay for improvements in environmental quality (Grankvist et al. 2019). Despite that the contingent valuation method has some difficulties, it is still one of the most useful and successful methods used to give decision-makers the best picture of the value of recreation on a site. Especially with public goods that are not traded in the market (Durán-Román et al. 2021). The willingness-to-pay method helps to reach an appropriate pricing policy, not only to provide quality services and products at fair prices to visitors but also to achieve successful and sustainable management of tourism sites (Bamwesigye et al. 2020). Several key determinants were determined by previous literature on the valuation of recreational services using the willingness-to-pay method. These include the education, age, and income of consumers, and characteristics and price levels and goods and services.

Data Collection

To achieve the study objectives, a questionnaire was designed to collect data from 446 international tourists who visited Petra. The questionnaire consisted of 30 questions

covering various areas, including tourists' willingness to pay additional costs for sustainability programs in Petra. The questions aim to assess the tourists' willingness to pay a higher entrance fee, accommodation, restaurants, transportation, and city tax to allow the PDTRA to apply a sustainable tourism plan.

The data was collected with help from PDTRA staff and two other students from the University of Jordan after proper training for them. The questionnaire consists of 30 questions, designed and digitally converted using a QR code. The code was distributed to 1,530 international tourists in Petra after they completed their visit to Petra, either during their return journey from the site, at the hotel, or on the bus back to Amman. The QR code opened a webpage containing information about the study's objectives and Petra's need for sustainable tourism. The form was designed in multiple languages, including English, Spanish, French, and German. The response rate was (29%) out of the total number of QR codes distributed. The data collection period took place during June, July, and August of 2023. The answers were received electronically and stored in an Excel sheet. The data was reviewed, and incomplete responses (missing information) were excluded, accounting for (missing information) percent.

Logistic models in the form below were employed to estimate the results, the LM is widely favored in recreation studies due to its ability to determine the marginal effect of each explanatory variable, X_i , on the overall probability value (Borucka 2020). The logistic formula, expressed in equation (1) below, demonstrates its general form:

$$P_i = \frac{1}{(1 + \exp(-(Z)))} \quad \dots(1)$$

P_i represents the probability of individual i responding "Yes" to a question regarding their willingness to pay additional costs for sustainable tourism in Petar

$$Z = b_1 + b_2X_{2i} + b_3X_{3i} + \dots + b_nX_{ni} + u_i,$$

where the subscript i denotes the i th respondent. X_s represent predictor variables like income, education, and age, which determine p_i , while b represents the coefficient vector of the descriptive variables. Z_i can be calculated alongside P_i for everyone, considering their socio-economic characteristics (income, age, education, etc.). Using equation (1) ensures that the value of P_i falls between 0 and 1. The logit model can be employed to compute the marginal effect of X_s , as shown in equation (2):

$$\frac{dp}{dx} = B * (P_i) * (1 - P_i) \quad \dots(2)$$

This equation measures how the probability P_i changes with a one-unit change in a specific X , denoted as dp/dx .

Including the variables in the model, the following equation is obtained:

$$\ln 1/(1-p_i) = b_1 + b_2x(\text{gender}) + b_3x(\text{income}) + b_4x(\text{education}) + b_5x(\text{age}) + b_6x(\text{nationality}) + b_7x(\text{occupation}) \dots$$

The dependent variable, WTP (Willingness To Pay), represents the probability of being willing to pay an additional cost for sustainable tourism in Petra. The response data has a value of 1 if the answer is "Yes" and 0 if it is "No". The predicted response value from the model indicates the probability of tourists being willing to pay which falls between 0 and 1. This limitation of values is advantageous when using the Logistic model, unlike a linear regression model with no restrictions on values.

RESULTS AND DISCUSSION

Logistic models were employed to analyze predictors of willingness to pay, revealing age and marital status as significant factors. The data reveals several key insights into respondents' willingness to incur additional costs across different services in Petra Table 2. In terms of paying an additional entry fee, the majority of respondents (55.3%) express a willingness to pay additional fees. This finding suggests that there is a market for supplementary fees, which could potentially be leveraged by businesses or organizations to enhance revenue streams. When examining the amount respondents are willing to pay for the entry fee, a significant proportion (76.1%) are prepared to pay \$80 and more, indicating a threshold at which many respondents find the cost acceptable. However, it is noteworthy that a notable portion of respondents (23.9%) are unwilling to pay any additional fee, emphasizing the importance of carefully balancing pricing strategies to accommodate varying consumer preferences and financial capacities. Regarding accommodation preferences, there is a notable divergence in respondents' willingness to pay for stays in different types of lodging. While a majority express a willingness to pay for a stay in an eco-lodge (73.6%), fewer are inclined to pay for a night in a 5-star hotel (41.0%). This suggests a potential preference among respondents for more environmentally sustainable or unique lodging options, possibly reflecting broader trends towards eco-sensible consumerism. In the same direction, in terms of transportation services, a significant majority (77.2%) of respondents are willing to pay for electric transportation within Petra, indicating a demand for convenient and sustainable travel options. However, there is variation in the amount respondents are willing to pay, with a majority (61.5%) willing to pay less than \$20, underscoring the importance of affordability in pricing electric transportation services.

The data provides insights into the willingness of respondents to incur additional costs for various sustainable practices and experiences within the Petra historical site. A significant majority (71.9%) express a readiness to pay extra for a meal at a restaurant within Petra that applies sustainable practices, indicating a strong interest in supporting environmentally responsible initiatives. This suggests a positive reception towards eco-friendly dining options among respondents. In addition, the majority (66.3%) are willing to pay for a 3-hour private eco-tourism guided tour in Petra, reflecting a desire for personalized and sustainable exploration experiences within the site. The data highlights the perceived value of eco-tourism initiatives in enhancing visitors' experiences.

Regarding entertainment activities in Petra, (67.7%) are willing to pay for a musical performance or cultural event inside Petra to support sustainable tourism, indicating an appreciation for cultural preservation efforts and the integration of sustainability into tourism activities. This highlights the potential for sustainable cultural events to contribute to the conservation and promotion of Petra's heritage. Among respondents, about (62.1%) of the respondents are willing to donate towards the preservation and maintenance of the historical site of Petra, demonstrating a recognition of the importance of conservation efforts and a willingness to contribute financially to safeguard Petra's cultural and natural heritage.

About (57.6%) of respondents expressed reluctance to spend on a cooking class or culinary workshop during their trip, suggesting a limited interest in culinary experiences as part of their visit to Petra. This indicates that culinary activities may not be a significant draw for visitors to the site, among respondents willing to pay for a cooking class or culinary workshop, there is a diversity in the amount they are willing to spend. The majority (39.9%) are willing to spend nothing, while others are distributed across different price ranges, with a sizable portion (27.0%) willing to spend \$10. This variation suggests differing perceptions of value and affordability among respondents interested in culinary experiences.

Regarding photography within the site, a substantial majority (66.3%) are unwilling to pay for taking photos, indicating a preference for capturing their own images rather than purchasing professional photos. This may reflect a desire for personalization and authenticity in documenting their experiences at Petra. Also, there is a significant interest in adventure tours such as hiking or zip-lining, with a majority (67.7%) willing to pay for such experiences. This highlights a demand for active and adventurous experiences within Petra, potentially appealing to adrenaline-seeking tourists,

among respondents willing to pay for adventure tours, there is a diversity in the amount they are willing to spend per hour. The majority (27.2%) are willing to spend nothing, while others are distributed across different price ranges. This variation emphasizes differing perceptions of value and affordability among respondents interested in adventure tours. Visitors predominantly rated their Petra experience highly, with a significant proportion giving ratings of 9 (29.2%) or 10 (28.7%) on a scale of one to ten.

The demographic data provides valuable insights into the characteristics and preferences of visitors to Petra. Understanding the visitor profile and their preferences is essential for developing targeted marketing strategies, enhancing visitor experiences, and ensuring the sustainable management of Petra as a cultural heritage site. The data revealed several key findings. In terms of age distribution, the majority of visitors were in the 21-30 age range (44.1%), followed by 31-40 (25.3%). Gender distribution showed a relatively balanced representation, with 46.3% male and 50.8% female visitors, while the rest preferred not to say. Regarding nationality, a diverse mix of visitors was observed, with a significant proportion being Europeans, particularly Italy (20.2%) and Portugal (7.9%). The majority identified as White (53.4%) or Caucasian (14.9%). In terms of education, visitors exhibited a high level of educational attainment, with a substantial proportion holding bachelor's degrees (22.2%) or master's degrees (10.1%). Regarding income level, the majority fell into the bracket of less than \$25,000 (33.4%) or \$25,000-\$50,000 (26.7%).

The high level of educational attainment among visitors suggests an interest in history, archaeology, and cultural heritage, aligning with Petra's significance as an archaeological marvel. The majority of visitors' income levels indicate a middle-income bracket, suggesting that Petra remains accessible to a broad range of people around the world. The positive ratings of visitors regarding their Petra experience highlight the site's appeal and the overall satisfaction of visitors. This high level of satisfaction promises well for Petra's reputation and continued success as a tourist destination. Also, the data reveals a positive attitude towards sustainable practices and experiences within Petra, suggesting a receptive audience for initiatives aimed at promoting environmental conservation and responsible tourism within the site.

Regression Analyses

The regression analyses aimed to identify predictors of tourists' willingness to pay for sustainable tourism experiences at Petra. Several independent variables were considered, including annual income, gender, education

Table 2: Preferences and ratings for sustainable tourism activities at Petra: mean and standard deviation analysis.

Question	Mean	Std. Deviation
Are you willing to pay an additional entry fees	.55	.49
Are you willing to pay an additional cost to stay one night in a 5-star hotel?	.41	.49
Are willing to pay to stay one night in an Eco Lodge?	.74	.44
Are you willing to pay for electric transportation services within Petra, including transportation to and from the historical site per day?	.78	.42
Are you willing to pay an additional cost for a meal at a restaurant within Petra, that applies sustainable practices?	.72	.45
Would you be willing to pay for a 3-hour private eco-tourism guided tour in Petra?	.67	.48
Would you be willing to pay for a musical performance/cultural event inside the site in Petra to support sustainable tourism?	.68	.46
Would you be willing to donate towards the preservation and maintenance of the historical site of Petra?	.62	.48
Would consider paying for a spa treatment or massage in Petra?	.47	.49
Would you be willing to spend on a cooking class or culinary work-shop during your trip?	.42	.49
Would be willing to pay for taking photos inside the site?	.34	.47
Would you be willing to pay for an adventure tour, such as hiking or zip-lining?	.68	.46
Would you be willing to pay for a 2 hour tour by ATV riding around Petra?	.42	.49
On a scale of one to ten, how would you rate your experience visiting Petra	8.2191	2.31
Valid N (listwise)		

level, marital status, age, and ethnicity. Overall, the models demonstrated statistically significant associations with moderate to modest effect sizes ($R = 0.469$, $R^2 = 0.220$, Adjusted $R^2 = 0.178$, $p < 0.001$; $R = 0.377$, $R^2 = 0.142$, Adjusted $R^2 = 0.096$, $p = 0.008$). Among the predictors, age consistently emerged as a significant contributor, with older individuals exhibiting less willingness to pay ($\beta = -0.435$, $p < 0.001$; $\beta = -0.350$, $p < 0.001$). Additionally, marital status was significant, indicating a higher inclination among those married or in committed relationships ($\beta = 0.271$, $p = 0.004$). However, gender, ethnicity, education, and annual income did not significantly influence willingness to pay ($p > 0.05$). The findings emphasize the pivotal roles of demographic factors such as age and marital status in shaping tourism-related decisions, highlighting the need for tailored marketing strategies. Furthermore, similar analyses for other tourism-related variables, including eco-accommodation preferences and transportation services, revealed significant associations with varying predictor significance, underscoring the complexity of decision-making processes in sustainable tourism initiatives. These results carry implications for tourism management and marketing strategies, emphasizing the importance of considering demographic factors in targeting and designing sustainable tourism experiences.

The findings of this study shed light on tourists' willingness to pay (WTP) for sustainable tourism practices in Petra. The results indicate a generally positive reception

towards sustainable initiatives, with a significant proportion of respondents expressing readiness to incur additional costs for various eco-friendly services and experiences.

One notable insight is the willingness of tourists to pay additional entry fees, suggesting a potential avenue for generating revenue to support sustainability efforts within Petra. Moreover, the strong interest in eco-lodges and electric transportation services underscores the demand for environmentally responsible accommodation and travel options among visitors. This aligns with global trends towards eco-conscious consumerism and reflects a growing awareness of the environmental impact of travel.

The study also highlights the importance of cultural preservation and heritage conservation in tourists' decision-making processes. Respondents expressed willingness to support sustainable tourism through activities such as attending cultural events and donating towards the preservation of historical sites. This underscores the significance of integrating cultural experiences into sustainable tourism initiatives and underscores the potential for cultural tourism to contribute to heritage conservation efforts.

However, the findings also reveal areas where tourists may be less inclined to spend, such as culinary workshops and professional photography services. Understanding these preferences is crucial for developing targeted offerings that align with visitors' interests and maximize revenue potential while promoting sustainability.

Regression analyses further elucidate the influence of demographic factors on tourists' willingness to pay for sustainable tourism experiences. Age and marital status emerged as significant predictors, highlighting the importance of tailoring marketing strategies to different demographic segments. These insights can inform strategic decision-making and help tourism stakeholders design more effective marketing campaigns and sustainable tourism initiatives that resonate with target audiences.

The study recommends diversifying revenue streams: Explore opportunities to leverage tourists' willingness to pay for sustainable practices, such as introducing supplementary fees for entry to fund conservation efforts or offering eco-friendly accommodation and transportation options. Also to integrate cultural experiences into tourism offerings, such as organizing cultural events and heritage tours, to promote cultural preservation and enhance visitor experiences.

The study also recommends fostering collaborations between public and private sector stakeholders, as well as local communities, to jointly develop and implement sustainable tourism initiatives and share resources for conservation efforts.

CONCLUSIONS

This study illuminates tourists' positive reception towards sustainable tourism practices in Petra, Jordan, revealing a willingness to pay for eco-friendly services and experiences. Key insights include the potential for generating revenue through additional entry fees and the demand for environmentally responsible accommodation and transportation options. Moreover, the study underscores the importance of cultural preservation and heritage conservation in tourists' decision-making processes, alongside demographic factors such as age and marital status influencing willingness to pay. Recommendations include diversifying revenue streams, integrating cultural experiences, and fostering collaborations between stakeholders to promote sustainable tourism while balancing economic growth with environmental conservation. These findings offer valuable guidance for the management and marketing of heritage sites like Petra, ensuring a harmonious blend of tourism development and environmental stewardship.

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