

Assessing the Impact of Sustainable Structural Interventions on Visitor Experience and Archaeological Tourism at Wazir Khan Mosque, Lahore

Dr Muhammad Kamran^{*1}, Dua Anjum², Hadia Yasir³, Jannat Riaz⁴

^{1*}Assistant Professor, College of Earth and Environmental Sciences, The University of Punjab, Lahore, Pakistan.

²Tourism and Hospitality Management, College of Earth and Environmental Sciences, The University of Punjab, Lahore, Pakistan.

³Tourism and Hospitality Management College of Earth and Environmental Sciences, The University of Punjab, Lahore, Pakistan.

⁴Tourism and Hospitality Management, College of Earth and Environmental Sciences, The University of Punjab, Lahore, Pakistan.

Corresponding author: muhammadvk@pu.edu.pk

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The main goal of this study is to look at how sustainable changes at Wazir Khan Mosque affect people who visit and tourism related to buildings. Wazir Khan Mosque is an important old site from the Mughal era but it has a lot of problems like the environment getting worse the building falling apart and too many visitors. This study wants to find out how to keep the site authentic and make visitors happy which can help with tourism. To do this the study used a method where numbers are used to analyze data and information was collected from visitors using a set of questions that everyone answers the way with 120 people taking part. The information was looked at using a computer program called Statistical Package for Social Sciences. The results show that using methods like old building materials, special architectural features making it easy for people to get around and managing visitors well makes visitors very happy and interested. These changes also help keep the site authentic and make visitors like it more so they want to come. The study found that using methods and managing tourism well helps keep old sites safe and makes the experience better for visitors. This gives ideas to people who make decisions and plan tourism for old sites, in the Walled City of Lahore showing that it is very important to think about the environment, culture and social aspects all together.

1. Introduction

The Walled City of Lahore is culturally and historically of great significance in Pakistan and represents the architectural, religious and social development of the city over the centuries. Built during the Mughal period, the Wazir Khan Mosque is a notable landmark, with its elaborate tile work, frescoes, and architecture. The mosque is one of the historical structures but it has many issues including those of environment, urbanization, corroding of structure and increasing number of tourists. The issues raised here highlight the need for sustainable conservation strategies to be developed and implemented that will ensure the preservation of the monument, while at the same time offering the visitors a chance to enjoy and archaeological tourism. The implementation of structural interventions has proven to be an effective method of managing a heritage site, without compromising its authenticity and heritage value, whilst also being sustainable. According to Elert et al. (2002) traditional materials such as lime mortar would be more appropriate for historic buildings and are better for the long-term preservation. Similarly, Singh et al. (2014) noted that the buildings' deterioration can proceed at a higher rate if the use of inappropriate modern materials is found in historic buildings. Therefore, the principles of sustainable conservation are conservation of the original architectural elements, structural stability and environmental compatibility. The concept of sustainable heritage management is not only based on the physical conservation aspects, but also considers social, economic and environmental aspects. Keskin et al. (2020) stated that life-cycle conservation strategies are useful in enhancing the sustainability of historic buildings. Similarly, In the same way, Arfa et al. (2022) noted that adaptive reuse is one of the ways to reuse heritage buildings, whilst maintaining their history. They allow to maintain the relevance of the heritage place in the present society.

Another important aspect of the heritage tourism is the quality of the visitors' experience. The educational, cultural, recreational and spiritual experiences offered to visitors within a heritage site is used to gauge visitor satisfaction and intentions to return. According to Jorissen (2012) the educational, entertainment and cultural experiences are important facets of the tourist experiences. In addition, Bhuiyan and Darda (2020) have found the factors of accessibility, infrastructure and site management to be significantly affecting the visitors satisfaction. Positive visitor experiences help encourage repeat visits, and awareness and appreciation of cultural heritage. The archaeological tourism has a great importance both in the economic development and in the conservation of culture. However, the development of tourism and conservation should go hand in hand. Ross et al. (2017) argued that the archaeological tourism should be based on the interaction between tangible and intangible heritage resources. Likewise, Orbasli (2013) stressed the need for community involvement and sustainable management to achieve long-term conservation. There is extensive research that has focused on heritage conservation and tourism but not as much work that has explored the combined effects of these, especially on the case of Wazir Khan Mosque. As such, the impact of sustainable structural interventions on visitor experience as well as on archaeological tourism is examined. The results will help shape sustainable management of heritage and offer useful policy, conservation authority and tourism planning suggestions.

2. Literature Review

It has been pointed out above that previous studies have underscored the need for sustainable conservation practices in the preservation of historic monuments. Elert et al. (2002) have shown that lime-based mortars are environmentally friendly and structurally sound for the restoration and rehabilitation of historic structures. Likewise, Singh et al. (2014) have determined that the traditional materials used by the Mughals have more compatibility with historical buildings than modern cement-based materials. Roca (2011) also suggested that conservation strategies should be based on a principle of minimum intervention, which allows for the maintenance of authenticity and the structural stability. The idea of sustainable heritage conservation has developed and now comprises of three aspects: environmental, social and economical sustainable. Keskin et al. (2020) suggested a life-cycle concept in terms of heritage conservation which focused on long-term conservation and resource efficiency. Arfa et al. (2022) emphasized on adaptive reuse as a sustainable approach, which allows heritage buildings to continue to serve their current purpose whilst retaining their historical values. Pintossi et al. (2023) and Vythoulka et al. (2025) also emphasized stakeholder involvement and planning for the long-term in managing heritage. Research has moved from physical to emotional and experiential aspects of visitor experience.

Jorissen (2012) formulated a conceptual framework that focussed on four elements of tourist experiences: education, entertainment, cultural identity, and leisure. Bhuiyan and Darda (2020) reported that the level of accessibility and services quality positively influences the satisfaction of visitors visiting heritage sites. Huete-Alcocer et al. (2019) concluded that emotional engagement and service quality have a significant influence on tourist's satisfaction. Visitor satisfaction is strongly correlated with tourist loyalty and competitiveness of the offering destinations. Navajas-Romero et al. (2020) found that high visitor satisfaction increases their prospects of coming back to a heritage site and recommending it to friends. Finally, Buonincontri et al. (2017) stated that positive heritage experiences foster emotional connections and promote responsible visitor actions and sustained support for conservation. Nowadays, archaeological tourism has become an important part of the cultural tourism. Ross et al. (2017) proposed that archaeological tourism should be a combination of history interpretation, culture and visitor participation. Orbasli (2013) stated that community involvement in site management is essential for sustainable management. Chong (2019) emphasized the economic advantages of heritage tourism, but also pointed out that uncontrolled development of tourism could be a problem for the cultural authenticity. In Pakistan, research on the heritage sites in Lahore is still limited in scope. Jabeen and Munir (2023) found that the sustainable rehabilitation around Chowk Wazir Khan helped preserve the heritage and also improved the socioeconomic development. The study of the visual and architectural features of Wazir Khan Mosque was carried out by Abid (2018) who concluded that its design has a significant impact on the emotional and spiritual experiences of visitors to the mosque.

The promotion of religious tourism was emphasized by Ramzan (2023) with respect to the role of the mosque. Although there have been many publications about the

conservation of heritage and tourism, the joint effects of sustainable structural interventions and guest experience and archaeological tourism are not well understood. This study aims to fill this gap by offering an all-encompassing evaluation of conservation and tourism results of Wazir Khan Mosque.

2.1 Theoretical Framework

It has been pointed out above that previous studies have underscored the need for sustainable conservation practices in the preservation of historic monuments. Elert et al. (2002) have shown that lime-based mortars are environmentally friendly and structurally sound for the restoration and rehabilitation of historic structures. Likewise, Singh et al. (2014) have determined that the traditional materials used by the Mughals have more compatibility with historical buildings than modern cement-based materials. Roca (2011) also suggested that conservation strategies should be based on a principle of minimum intervention, which allows for the maintenance of authenticity and the structural stability. The idea of sustainable heritage conservation has developed and now comprises of three aspects: environmental, social and economic sustainable. Keskin et al. (2020) suggested a life-cycle concept in terms of heritage conservation which focused on long-term conservation and resource efficiency. Arfa et al. (2022) emphasized on adaptive reuse as a sustainable approach, which allows heritage buildings to continue to serve their current purpose whilst retaining their historical values. Pintossi et al. (2023) and Vythoulka et al. (2025) also emphasized stakeholder involvement and planning for the long-term in managing heritage. Research has moved from physical to emotional and experiential aspects of visitor experience. Jorissen (2012) formulated a conceptual framework that focussed on four elements of tourist experiences: education, entertainment, cultural identity, and leisure. Bhuiyan and Darda (2020) reported that the level of accessibility and services quality positively influences the satisfaction of visitors visiting heritage sites.

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Hypothesis

H1: Sustainable structural interventions make a positive impact on visitors' experience at Wazir Khan Mosque.

H2: There is a significant positive impact of the sustainable structural interventions on the development of the archaeological tourism of Wazir Khan Mosque.

H3: The archaeological tourism has a significant positive relationship with the experience of visitors.

H4: Structural interventions that are sustainable have a significant positive effect on the satisfaction of visitors and on intentions to return.

H5: Sustainable structural interventions have a positive effect on the preservation of cultural authenticity and the tourism attractiveness.

3. Methodology

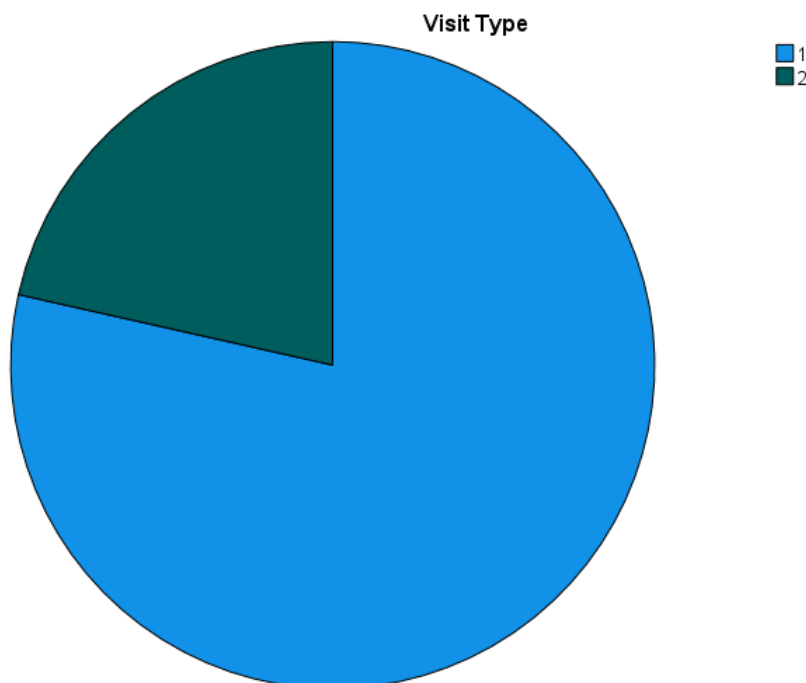
The quantitative research design was used in this study to analyze the effect of sustainable structural interventions on the experience of the visitors and archaeological tourism at Wazir Khan Mosque, Lahore. A case study approach was used as the mosque is one of the most important Mughal heritage monuments of Pakistan and has been subject to various conservation projects in recent years. The study area was made up of the Wazir Khan mosque and the surrounding heritage environment of the Walled City of Lahore. The study was dedicated to sustainable solutions such as materials conservation, façade rehabilitation, improving ventilation, shading systems, accessibility solutions, and circulation control for visitors. The primary data were obtained from the questionnaires that were structured and interviewed to visitors, tourists and worshippers. A total of 200 respondents participated in the survey. The questionnaire included demographic data and statements that evaluated the perceptions about the sustainable structural interventions, the experience of visitors and archaeological tourism, with the answers being scored on a five-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5). Field observations were conducted to document the state of conservation interventions and visitor comfort and movement before and after conservation interventions. The site has been recorded photographically and observed with checklists regarding physical features and visitors' interaction within the site. Data analysis was done using the Statistical Package for the Social Sciences (SPSS). Data was analyzed in terms of descriptive statistics (frequency and percentage, mean and standard deviation). An internal consistency of the measurement scales was performed through the use of the reliability analysis (Cronbach's Alpha). Using inferential statistical techniques, relationship between the variable's sustainable structural interventions and the variable visitor experience and archaeological tourism was explored, in particular through the correlation and

regression analysis technique. Ethical considerations were observed in terms of voluntary participation, respondent confidentiality and informed consent and confidentiality was maintained while collecting the data. The methodological framework could provide reliable and systematic evidence of the effectiveness of sustainable conservation measures and its contribution to the development of tourism at the Wazir Khan Mosque.

4. Data Analysis and Results

The information in this study was based on 200 respondents. The demographic findings showed that 63% of visitors were in category 2 and 37% in category 1, thus a wide spectrum of visitors. Most (83%) were in the first age group, and there were many young visitors. In addition, 78.5% of the respondents were Visit Type 1, indicating that the majority of respondents had the same visitation habits. The test of the reliability of the research instrument was carried out and the results showed that the instrument was reliable. The internal consistencies of Sustainable Structural Interventions, Visitor Experience and Archaeological Tourism were measured by the Cronbach's Alpha, which was 0.804, 0.892 and 0.893, respectively. These values are higher than the recommended value (0.70), which reflects good internal consistency and reliability. Positive perceptions were obtained in descriptive statistics in all study variables. The analysis of Sustainable Structural Interventions showed an average score of 3.7993, which meant overall agreement about the effectiveness of the conservation measures.

Figure No 1: Visit type Pie Chart



Visitor Experience scored on average 3.6479, indicating a positive perception by the visitors about comfort, accessibility and satisfaction. The mean value of Archaeological Tourism was the highest with 3.9293 which showed very high level of support for the

activities of heritage tourism in Wazir Khan Mosque. All of the variables showed negative skewness values, which means that respondents tended to choose higher level of agreement. Similarly, large values of kurtosis indicate that the responses were clustered around high ratings. The frequency distributions also showed that the majority of the respondents indicated that they had favorable views on sustainable conservation and tourism development by choosing scores ranging from 3.5 to 5.0. The results support the hypotheses and show that sustainable structural measures have a positive effect on visitors' experiences and archaeological tourism. Better restoration quality, accessibility, environmental management and conservation practices increase visitors' satisfaction and maintain the cultural authenticity of the mosque. Sustainable conservation therefore is both for the preservation of heritage and tourism development.

Figure No 2: Frequency Table Visit Type

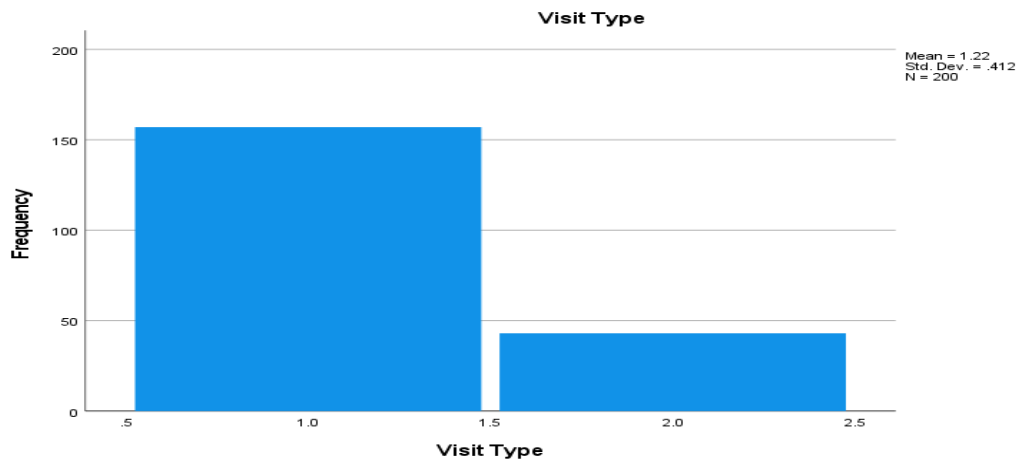
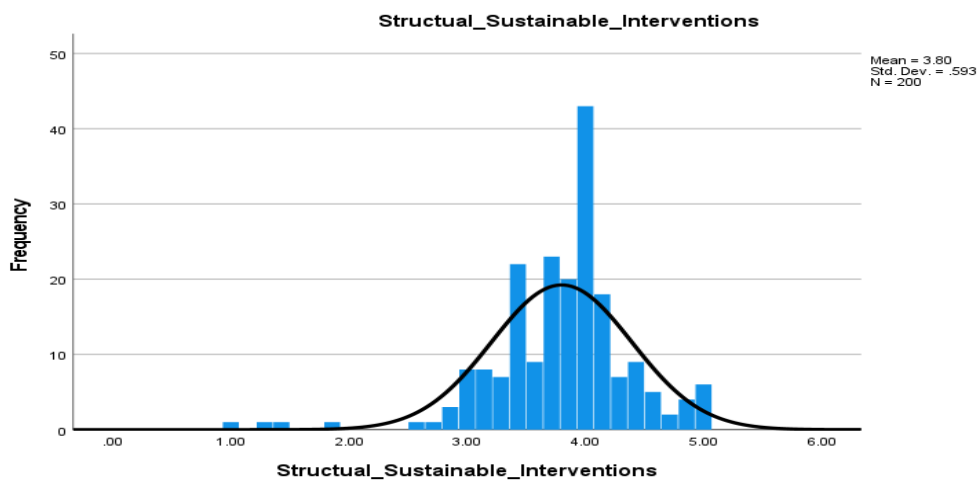


Figure No 3: SSI Frequency Table



5. Conclusion & Recommendations

The results have shown that sustainable structural interventions play an important role in the conservation of the heritage, the satisfaction of visitors and the development of the archaeological tourism at Wazir Khan Mosque building.

Hence, the importance of heritage authorities to be continued in adopting conservation programs using traditional materials and environmentally friendly restoration methods. Implement regular maintenance programmed to address deterioration that can be caused by pollution, weather and visitors. Enhance the tourism facilities with cleanliness, visitor information systems, seating and signage and guided pathways.

- Educational programs, awareness campaigns and involvement of the community in conservation activities should also be promoted to ensure environmental improvement around the historic site without compromising the historic fabric.
- Traffic volumes, air pollution, and business encroachments near historic sites should be controlled to ensure environmental improvements. Local communities are critical components of heritage tourism programs to maintain them in the long term. Moreover, the use of digital technologies, such as mobile applications, virtual tours, multilingual information systems, and interactive displays, should be promoted to better engage visitors and create educational experiences.
- Furthermore, the digital technologies, including those using mobile applications, virtual tours, multilingual information systems and interactive displays, should be promoted to improve visitors' engagement and provide educational experiences in the future tourism planning.
- Over-commercialization and too many tourists can threaten authenticity and structural integrity of monuments of heritage. Therefore, conservation objectives need to be considered as a key objective of the sustainable tourism policy in addition to the economic objectives.

Finally, the study suggests that the sustainable interventions in the structures, have positive effects on the experience of visitors and can contribute to enhancing the experience of the archaeological tourism at the Wazir Khan Mosque. Conservation activities not only improve accessibility, comfort and the quality of the environment and the appreciation of cultural heritage but also maintain the historical authenticity. Based on the results obtained it can be seen that efforts to conserve sustainable conservation activities must be combined with the management of tourism. Besides, it will not only help in the preservation of cultural heritage resources of Pakistan but will also contribute towards sustainable economic development and cultural tourism.

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