





Challenges and opportunities for heritage sustainable management: a case study on vandalism of built heritage in Jordan

Desafios e oportunidades para a gestão sustentável do património: estudo de caso sobre o vandalismo no património construído na Jordânia

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Abstract

Vandalism poses a significant threat to the integrity and sustainability of heritage sites worldwide. While existing literature addressing heritage sites' management provides useful insights, there is a gap in knowledge regarding specifically on vandalism in the Middle East. Hence, this study examines the phenomena of vandalism on Jordan's built heritage, focusing on: 1) types of vandalism; 2) motivations behind it; and 3) its impact on the site's integrity and sustainability. The research applied a qualitative approach and a comparative case study analysis of Petra, Jerash, and Machaerus fortresses. Data was collected through a rigorous review of existing literature, analysis of archival records, observations, and interviews. Results revealed that unwariness and delinquency are the critical reasons for vandalism, underscoring the urgent need for conservation strategies. The findings highlighted trends about the importance of community engagement, public awareness campaigns, and effective law enforcement in combating vandalism to safeguard Jordan's built heritage for future generations.

Resumo

O vandalismo representa uma ameaça à integridade e sustentabilidade dos locais patrimoniais no mundo. Embora exista literatura sobre a gestão de locais patrimoniais, há lacunas no conhecimento sobre o vandalismo no Médio Oriente. Este estudo examina o fenómeno do vandalismo no património construído da Jordânia, focando-se em: 1) tipos de vandalismo; 2) motivações por trás dele; 3) o seu impacto na integridade e sustentabilidade do local. Usou-se uma abordagem qualitativa e uma análise comparativa de estudos de caso das fortalezas de Petra, Jerash e Machaerus. Recolheram-se dados através da revisão da literatura, análise de registos arquivísticos, observações e entrevistas. Os resultados revelaram que a negligência e a delinquência são as razões críticas para o vandalismo, sublinhando a necessidade urgente de estratégias de conservação. As conclusões destacaram a importância do envolvimento da comunidade, campanhas de sensibilização pública e aplicação eficaz da lei no combate ao vandalismo para salvaguardar o património construído da Jordânia.

KEYWORDS

Built heritage
Vandalism
Sustainable management
Heritage Conservation

PALAVRAS-CHAVE

Património construído
Vandalismo
Gestão sustentável
Conservação do património

Introduction

Sustainable heritage management is a comprehensive process that seeks to ensure the long-term conservation, preservation, and responsible use of cultural assets, this process requires a delicate balance between preservation and accessibility, conservation and tourism, and traditional and contemporary sustainable heritage management. In most cases, the lack of assertive management of built heritage leads to numerous harms for the sites; therefore, it is essential to implement sustainable management strategies to protect invaluable cultural assets while mitigating potential risks and threats.

Sustainable heritage management is a comprehensive strategy for the conservation of any valuable heritage attribute, aiming at protecting its integrity and longevity [1]. It is about how to optimize the appreciation of heritage in such a way that it will still be relevant in the future [2]. Consequently, sustainable heritage management seeks to prolong the lifespan of cultural properties through implementing strategies and practices that ensure their long-term viability. Therefore, it is crucial to preserve built heritage, especially when facing challenges such as vandalism.

Cultural heritage has been increasingly recognized as a key factor in the sustainable development of cities [3]. It has the power to shape a region's identity while contributing significantly to its economic development. Historical and natural properties are among the most significant sources of a country's tourism capital [4]. The reason is that the cultural diversity, uniqueness, and richness of an area make a significant contribution to the tourism potential of a country and guarantee a source of capital in the future. Therefore, when conserved, built heritage adds economic value and sustainability for future generations.

The world's built heritage is threatened with deterioration as a result of social processes, active industrial activities, and the aggressive impact of mass tourism [5]. In addition, the phenomena of vandalism pose a significant threat to cultural and historical assets. It emerges as a major global challenge, causing unprecedented problems at archaeological sites [6-7].

Many interpretations of vandalism have been presented in scholarly literature. Conklin [8, p. 110] defined vandalism as the "(...) destruction, damage, degradation of shape or appearance of a property without the permission of its owner", and the "(...) behavior of damaging structures, official institutional goods, and others' belongings for various reasons or pleasure". It is mostly an "illegal destruction of goods belonging to someone else or intentional, purposeful and deliberate deterioration of their appearance" [9]. Documents from UNESCO [10, pp. 1-182] and ICOMOS [11, pp. 1-14] agreed that vandalism includes both the intentional and unintentional destruction or damage in whole or in part of cultural heritage compromising its integrity.

Studies of human aggression, including vandalism in locations and settings, have been conducted mostly in recreation, leisure, criminology, psychology, and sociology [12]. For instance, in a study conducted by psychologists [13], human aggression is considered any behavior directed towards another member of a community or their property that is executed with the intention to cause harm or damage. Vandalism threatens all types of cultural heritage properties, endangering tangible and intangible attributes.

Hence, vandalism on built heritage has diverse patterns and motivations, stemming from both natural and anthropological factors [14]. Anthropogenic (intentional) factors are just as dangerous as the natural (unintentional) factors [14]. The loss of built heritage due to such threats has been observed in different parts of the world [15]. The forms of vandalism on built heritage can be categorized as presented in Table 1. The different range of patterns, factors, and motivations are summarized in the following Table 2.

Table 1. Forms of vandalism.

| Form | Examples |
|------------------------------|--|
| Defacement of the structures | <ul style="list-style-type: none"> · Violent acts: bombing, burning, gunfire, shelling, carving, removing parts of the monument, cutting. · Text messaging and artistic movements: graffiti, carving, and spraying paint. · Unauthorized interventions: inadequate restoration and management, uncontrolled urbanization, unauthorized excavations · Environmental factors: natural disasters (earthquakes, water floods, biological factors, humidity, weathering, fire), industrial pollution. · Oversized industrial development plans, unsustainable tourism · Delinquency: misbehavior, ignorance |
| Looting | Stealing, illegal trading, personal use, and unauthorized excavations |

Table 2. Motivations of vandalism.

| Vandalism source | Motivations | Forms | Example |
|--|---|---|---|
| Intentional (anthropology - resulted from the human activities and manifestations that harm the environment) | Religious: refers to religious and /or cultural beliefs, intolerance, and ethical rules | <ul style="list-style-type: none"> - Defacement of structures - Looting | <ol style="list-style-type: none"> 1. The ancient city of Maaloula, and Temple of Baal, Palmyra, Syria; 2. Illegal trade of artifacts of Palmyra in Syria; 3. Meleager and the Calydon Boar, Vatican Museum. |
| | Political: based on revolutionary movements, acts of violence, terrorist attacks, and wars | <ul style="list-style-type: none"> - Defacement of structures - Looting | <ol style="list-style-type: none"> 1. Temple of Baal, Palmyra, Syria; 2. Archaeological looting in Iraq by the American invasion in 2003; 3. The ancient cities of Nimrud and Hatra in Iraq were looted and destroyed by ISIS in 2003; 4. Looting of Egyptian treasures in revolutionary movements in 2011. |
| | Personal/Social: unwariness delinquency | <ul style="list-style-type: none"> - Looting - Defacement of Structures | <ol style="list-style-type: none"> 1. Text massaging on the historical wall of Al Mushatta Palace in Jordan; 2. Graffiti and carving on 3500 stone in Luxor temple, Egypt, in 2013 by a teenage tourist; 3. Artistic movements on the fountain at the entrance of the Church of Saint Spyridon, Iași (1754); 4. Carvings on the Colosseum in Rome in 2020; 5. Breaking the stolen piece of ancient Moai status Rapa Nui by tourists into a dozen fragments in 2006; 6. The rock-cut portion of the Temple of Gerf Hussein in Egypt was flooded by the creation of Lake Nasser; 7. The Great Wall of China, when tourists took parts of it as a souvenir. |
| Unintentional (natural and anthropology) | Environmental: natural disasters | - Defacement of the structures | <ol style="list-style-type: none"> 1. The lighthouse of Alexandria (one of the seven wonders of the ancient world) was heavily damaged by earthquakes in the 10th and 14 centuries; 2. An earthquake in Syria in 2023 caused damage to the ancient Aleppo Castle; 3. A water flood in Derna, Libya in 2023, which caused damage to the ancient city of Cyrene (Greek and Roman city, UNESCO site). |
| | Unauthorized interventions: the failure to comply with the specific ethical principles of the scientific conservation process | - Defacement of the structures | Inadequate installation of heat and power systems inside Trinity Church (1800 -1850), Cilibiu, Golăești, Iasi County. |
| | Industrial and/or domestic pollution | - Defacement of the structures | <ol style="list-style-type: none"> 1. House with Lions (1898), Constanta 2. Oran city-Iran |
| | Neglect: ignorance, inexperience, neglect, or financial interests | - Defacement of the structures | The Hellenistic Temple of Iraq al-Amir in Jordan |

Vandalism has a complex impact on built heritage, causing both aesthetic and structural deterioration [16]. It undermines the cultural values of these sites and can lead to mechanical, physical-chemical, and biological degradation [17]. Consequently, vandalism contributes to the loss of authenticity, which refers to a site's ability to truthfully express its cultural and outstanding universal value through its features and integrity, which refers to the wholeness and intactness of those features, conveying the site's significance [18]. In addition, the emotional connection of communities to their heritage adds to the need to develop strategies for sustainable heritage management to tackle vandalism issues.

Among the available literature, attentions were given to the Middle East, focus on those that are experiencing a political conflict, such as Syria, Yemen, Iraq, and Lebanon. While some studies have examined vandalism on built heritage, there is still limited understanding of other patterns and motivations behind these acts, especially in the context of Jordan. Therefore, this study aims to fill this gap in knowledge to provide insights regarding the patterns of vandalism and its motivations across Jordan's built heritage, and the assessment of the impact of vandalism on the sustainable site's authenticity and integrity.

Sustainable management and vandalism at Jordan's built heritage

Jordan has valuable cultural heritage sites that date back several significant decades and are considered one of the most powerful draws for international visitors to the country [19]. Jordan witnessed a significant increase in cultural tourism in recent years, due to its high density of built heritage sites, like Petra, Jerash, Um Qais, Bethany beyond the Jordan (Baptism Site), and Mount Nebo, in addition to natural heritage sites such as natural reserve of Wadi Rum and Dana, the dead sea and the natural hot water springs. These sites are some of the hundreds that are significantly affected by different forms and patterns of vandalism, which have caused damage to their physical attributes over the years.

Jordan's legal framework primarily focuses on preventive measures to deter vandalism, including the imposition of fines and imprisonment. However, these measures have proven to be insufficient or not enough to prevent the widespread damage caused by vandalism. The prevailing conventional approaches, relying primarily on reactive measures and punitive penalties, have failed to address the underlying causes and motivations behind these acts. Archaeologist Munther Al-Jamahawi [20] emphasized that the high density of built heritage in Jordan poses a major challenge for governmental institutions, and conventional measures are not enough to prevent the harm and destruction of Jordan's built heritage. Hundreds of Jordan's built heritage are vandalized each year. Thus, a new approach is needed to prevent further destruction of the country's built heritage.

Al-Adwan [21], a social specialist, emphasized the concerning increase in damaging actions targeting ancient sites in recent years. Among thousands of Jordan's built heritage, a great number of these sites were exposed to continuing acts of vandalism related to different motivations. In 2012, among the documented sites, about 870 sites were damaged, meanwhile 1526 are endangered. The Ministry of Tourism also reported that 2877 sites are significantly damaged due to different forms of vandalism. In 2013, about 1500 archaeological sites in southern Jordan were damaged due to looting and vandalism. Archaeologist Al-Jamahawi announced the alarming prevalence of vandalism against archaeological sites in Jordan, reporting an estimated 1,000 attacks annually. He also mentioned that in 2017, the construction of dams and highways destroyed several archaeological sites [20]. In 2023, a report by the Department of Antiquities (DoA) documented 115 cases of vandalism, up from 85 cases in 2022. However, the number may be much higher.

Summarising, protecting Jordan's built heritage requires a new approach since the reactive conservation and management approach has not been achieving the goal of heritage protection and sustainability.

Research methods

To gain a comprehensive understanding of forms and factors contributing to vandalism and their impact on cultural values, a thorough investigation was conducted on the acts of vandalism against Jordan's built heritage. A qualitative approach and case study comparison strategy were adopted. Three historical sites in Jordan were selected for in-depth analysis, namely Jerash – a Roman City, Petra – the Nabatean City, and Machaerus – a Herodian fortress-palace. Through studying these diverse sites, the research aimed to capture a wide range of patterns of vandalism and motivations, providing a comprehensive understanding of the phenomenon across different sites. Two types of data were used in this study: 1) primary data through personal observations and semi-structured interviews with stakeholders, including architects, the local community, and Department of Antiquities officials, and 2) secondary data through archival documents. Then, content analysis was used to analyze the collected data.

Case studies

The study selected three archaeological sites in Jordan: Petra, Jerash, and Machaerus Fortress-Palace (Figure 1). Each of these sites holds significant historical and cultural values in Jordan. Petra is a UNESCO World Heritage site, and one of the seven wonders of the world in 2007, known for its intricate rock-cut architecture, including the famous treasury and monastery. Jerash (the “Pompeii of the East”) is famous for its well-preserved Roman ruins, including a colonnaded street, temples, and an amphitheatre. Machaerus fortress-palace, a Herodian fortress, is the biblical site where John the Baptist was imprisoned and executed.

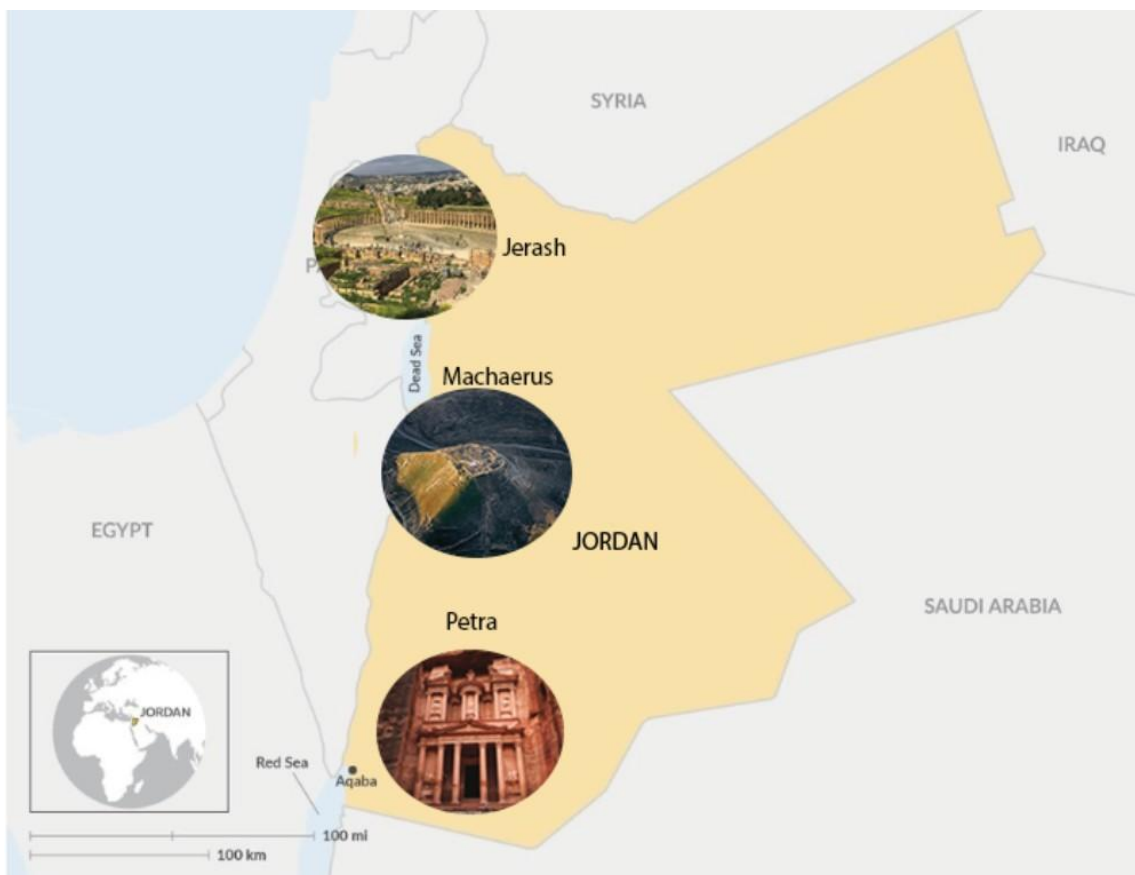


Figure 1. Jordan map showing the geographical location of Jerash, Machaerus Fortress, and Petra.

Table 3. Vandalism on Jordan's built heritage.

| Site | The act of vandalism | Location | Frequency | Responsibility |
|-----------|------------------------------------|---|------------|---------------------------------|
| Jerash | Inadequate restoration | Outdoor areas Accessibility zones | Occasional | Authorized institutions |
| | Urbanization | Restricted areas | Occasional | Locals- Authorized institutions |
| | Text messaging (Graffiti, looting) | Outdoor areas | Occasional | Locals |
| | Structures removals | Outdoor areas | Occasional | Locals |
| Petra | Urbanization | Accessibility zones | Occasional | Authorized institutions |
| | Text messaging (Graffiti) carving | Outdoor areas Restricted area | Occasional | Locals, tourists |
| | Structures removals | Outdoor areas | Occasional | Locals |
| Machaerus | Unauthorized intervention | Outdoor areas Restricted area | Rare | Authorized institutions |
| | Defacement of structures | Outdoor and indoor areas Accessibility zones | Occasional | Locals |
| | Neglecting | Outdoor and indoor areas Accessibility zones | | Authorized institutions |

In each case study, acts of vandalism (Table 3) were examined based on the following criteria:

- Location
 - Outdoor areas: vandalism affects external surfaces like walls, statues, or plazas;
 - Indoor areas: vandalism occurring within buildings or enclosed spaces;
 - Accessibility zones: areas with high visitor traffic and easy access, such as entrance gates, main pathways, or popular attractions.
 - Restricted areas: areas with limited or controlled access, such as archaeological excavations, storage rooms, or offices.
- Frequency
 - Regular: vandalism incidents occur frequently and consistently at the site;
 - Occasional: vandalism incidents occur at irregular intervals but with some frequency;
 - Rare: vandalism incidents occurring infrequently or sporadically.
- Responsibility
 - Tourists: visitors to the cultural heritage site who may be unaware of the cultural significance or value of the artifacts;
 - Locals: individuals residing in the surrounding community who may have personal or social motivations for vandalism;
 - Organized groups: individuals or groups engaging in vandalism as part of a coordinated activity or with a specific agenda.

Jerash archaeological site (Gerasa)

One of the ancient Roman “Decapolis” cities dates back to the fourth century. It was a thriving urban center during the Roman Empire and played a significant role in the region's history and trade. The city has well-preserved ruins and architectural structures that provide valuable insights into the Roman civilization and its influence on the region. Jerash's historical and cultural significance make it a potential site for preservation, being in the Tentative List for UNESCO World Heritage recognition. Unfortunately, the ancient city of Jerash is also a victim of vandalism, it has been witnessing a continuous act of physical destruction.

The modern city's urban development has had an impact on the ancient city of Jerash. The occurrence of damage in structures of historical and cultural value has been largely observed in the urban environment. The main street cuts through the ancient city in half, dividing it into two sections: the modern city is on the eastern side, and the western side belongs to the Department of Antiquities (DoA). Urbanization and mixed land use within the boundaries of

the ancient city, though restricted, has been undermining the value of the site and leading to the physical destruction of material attributes of the ancient city. Buildings and infrastructure have been constructed without consideration of the cultural significance of the site. In addition, the mixing of residential, commercial, and industrial activities may obscure the historical context of the site, making it more challenging for visitors to understand and appreciate its importance.

Al-Saad [22] argues that the managerial backgrounds of Jerash stakeholders are not well-matched with the World Heritage Convention and international charters on sustainable tourism and cultural heritage protection. The continuous balance that various civilizations throughout Jerash's history have created has suffered significantly from unsystematic urban development in the modern city of Jerash. As a result of these acts, in 2007 the World Heritage Committee stated that the Jerash site does not meet the conditions of integrity and authenticity and lacks an adequate protection and management system to safeguard it from the impacts of urban development [23].

Many conservation and restoration works have been carried out in Jerash (Figure 2a). Nevertheless, previous studies revealed a huge weakness in the implementation of proper restoration works. The restoration of the Hadrian gate using cement caused significant structural damage and compromised the gate's integrity. The unauthorized material has resulted in cracks and deterioration, and compromised the integrity of the gate, leading to structural damage and detracting from its historical and scientific value.

The material elements, such as columns and walls, have been facing the challenge of destructive social behaviours. The recent appearance of graffiti on the columns at Cardo in 2023 by unknown individuals is not only a defacement of the ancient structures, but it also significantly diminishes the site's historical authenticity. These markings disrupt the visual integrity of the site, as they clash with the original design. Moreover, they detract from the site's historical value by introducing modern elements that distort the visitors' experience and understanding of the site's original appearance. Dealing with these acts further decreased the aesthetic value of these attributes (Figure 2b).

As a result of these acts, the ancient Roman city of Jerash Archaeological Site was not selected as a World Heritage Site, and the integrity and authenticity of the place are in decline (Figure 3 and Figure 4). The factors affecting the integrity and authenticity have been the poor management of the site, the unsystematic urban expansion of the modern city, the unidentified boundaries of the site, and improper conservation work [22].

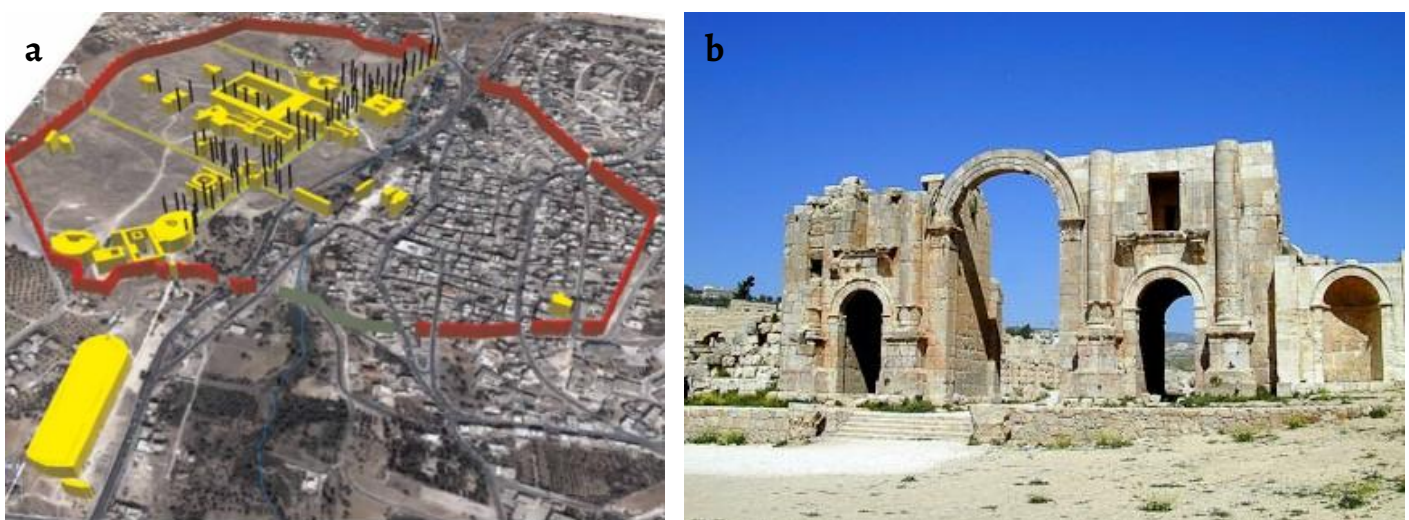


Figure 2. The boards of the ancient city of Jerash: a) the new city and the new main street dividing the ancient city into two parts [22]; b) Hadrian gate which was restored using unauthorized materials [24].



Figure 3. The same act was observed in two different areas of the archaeological site of Jerash: *a)* large concrete walls threaten the integrity and authenticity of the connection area between the archaeological site and the modern city of Jerash [22]; *b)* remains of east bath Jerash surrounded by modern buildings.

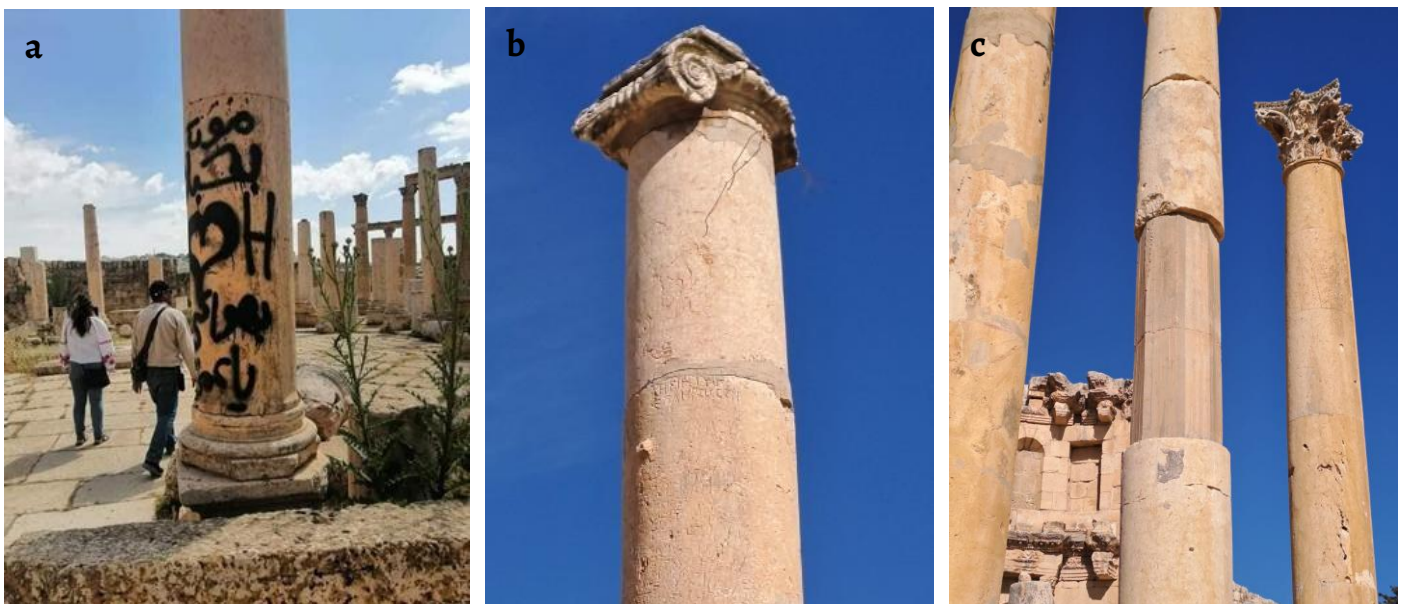


Figure 4. Columns: *a)* recent graffiti on one of Jerash's columns, Cardo (Source: Fadi Bal'awi, 2022); *b)* column conserved using steel wire, 2024; *c)* one of the restored columns number 21 and 12 using cement, 2024.

Petra

The Nabataean-carved archaeological park of Petra, also known as "Rose City", is a popular tourist destination in Jordan. DoA has been in charge of managing the site since 1968. However, Petra has experienced different patterns of vandalism that have been disturbing the process. Archaeologists from Brown University have reported a significant increase in criminal damage within the park.

"Unplanned and uncontrolled tourist development harms physically both the archaeological heritage and its cognitive and historical value" [5]. The number of visitors has increased by 300% in the past two years (Figure 5). A recent study in 2023 by the Ministry of Tourism and Culture reported the detrimental effects. The negative consequences of high visitor flows lead to overcrowding, which puts strain on the site's infrastructure, resulting in damage to the delicate structures and archaeological materials. The study also reported instances of tourists climbing on ancient ruins, touching artifacts, and carving names on the ruins, further contributing to the deterioration of the site. While tourism can bring economic benefits to a region, such as job creation and increased revenue, it is essential to balance these benefits with the preservation of the site's archaeological heritage. Uncontrolled and unplanned tourist development can result in long-term damage to the site, which may ultimately deter visitors and negatively impact the local economy. Therefore, implementing sustainable tourism practices and managing visitor

numbers are crucial for both preserving the site's historical value and ensuring the long-term economic benefits of tourism.

Regarding the effects on the site's natural landscape, the use of horses for tourist transportation within Petra has sparked worries. The frequent grazing of horses on the narrow trails may cause soil erosion and compaction, which may eventually compromise the stability of the nearby slopes. Additionally, the horses' waste can contaminate and pollute the delicate ecosystem of the site (Figure 6b).

The Bedouins residing within Petra have been criticized for their utilization of the site's carved caves as both a shelter and a venue to display their wares to tourists (Figure 7). While this practice may provide economic opportunities for the community, it can also have negative consequences for the preservation of the built heritage. The constant presence of people and commercial activities within the caves can lead to physical damage, such as graffiti or accidental destruction of the carvings. Furthermore, the commercialization of the caves can detract from the historical and archaeological significance of the site, turning it into a marketplace rather than a protected cultural landmark. Additionally, according to Holloway [25], Bedouins used rifles to reach the treasure inside the urn, which was constructed from solid stone, to cause damage. An urn adorns the entryway to the monastery, showing evidence of several bullet strikes.

The historic canals and water drainage system of Petra are essential for controlling water flow and averting flooding during the rainy season. The Nabataean civilization cleverly designed these systems to direct rainwater away from the structures, ensuring their preservation and structural integrity. However, the lack of proper maintenance of these systems has resulted in obstructions and blockages, which have exacerbated the problem of flooding. As a result, the ruins have suffered partial damage, compromising their cultural and historical significance.

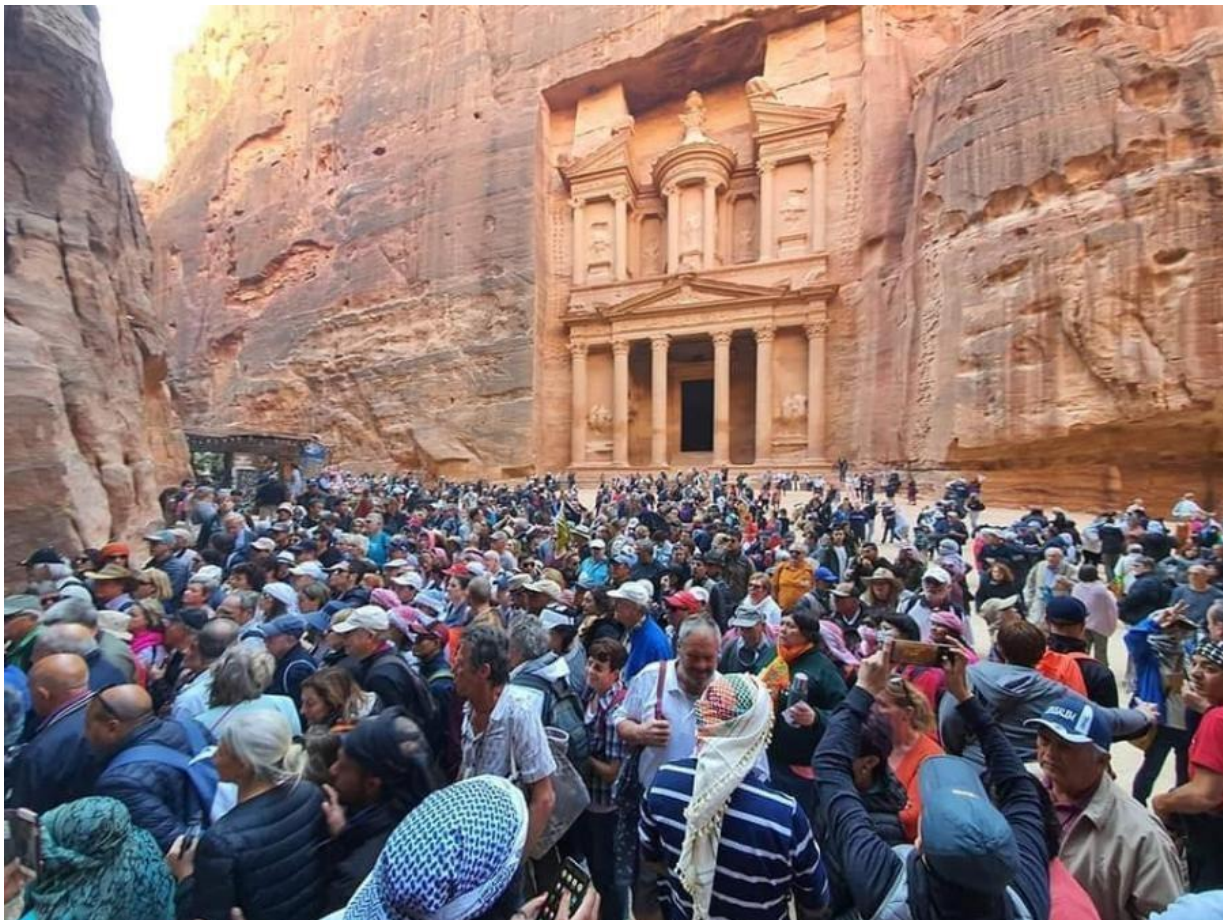


Figure 5. Excessive tourist traffic in Petra, 2021 [26].

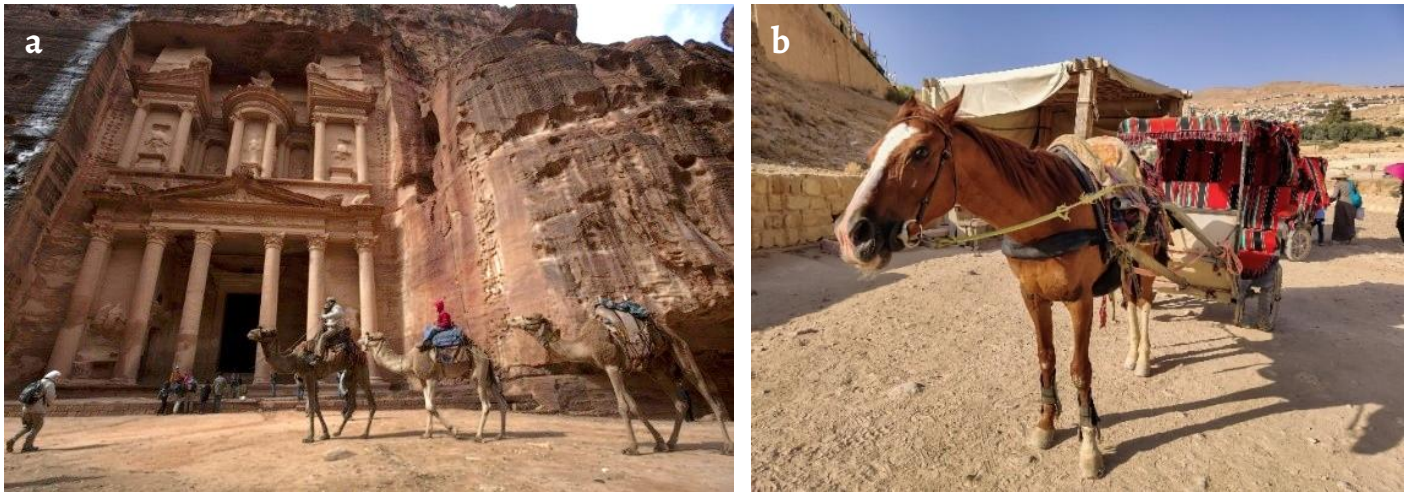


Figure 6. Animals used in Petra: a) camels; b) horses, 2022.



Figure 7. The Bidoun using cultural heritage to sell souvenirs: a) the ancient stairs; b) caves, 2022.

Machaerus Fortress-Palace

The Herodian Fortress-Palace is a biblical pilgrimage site. The historical site, which is connected to biblical events (John the Baptist's incarceration and execution), dates back to 90 BCE. The site is also subject to destructive acts that contribute to the site's value deterioration. Due to its location along Jordan's rift valley, Machaerus Fortress was exposed to continuous earthquakes, resulting in severe damage to its physical structure. The continued exposure to environmental factors such as erosion, weathering, and earthquakes can further accelerate the degradation, making it increasingly difficult to restore and preserve the site.

Machaerus is also surrounded by many hermit caves that are of historical and spiritual significance. Shepherds improperly used the hermit caves as shelter. This misuse not only compromises the structural stability of the caves but also disrupts the intended cultural and historical context, contributing to the deterioration of this built heritage (Figure 8). Numerous instances have been revealed of intentionally destructive actions when individuals have deliberately targeted these columns, causing irreparable damage to the structural integrity of the site (Figure 9). Likewise, uncategorized interventions conducted at Machaerus fortress, such as the restoration of the royal courtyard, have been improperly executed without adequate research. This form of act involves misguided attempts to restore the site, leading to potential damage and a loss of authenticity.



Figure 8. Abandoned and misused hermit caves that surround Machaerus Fortress, 2022: *a)* an interior view revealing stone collapse and physical deterioration; *b)* a cave interior demonstrating accumulated debris, lack of conservation, and ongoing neglect.

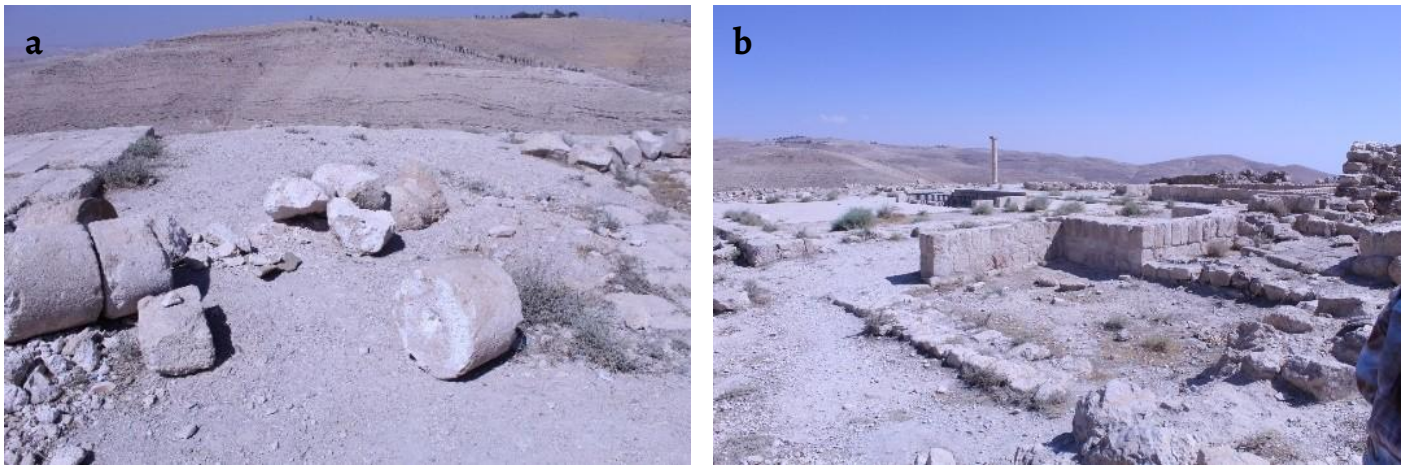


Figure 9. Machaerus: *a)* broken ancient column by unknown people, 2022; *b)* the ignorance of the site can vividly be seen through her growing plants, 2022.

Table 4. Impact of vandalism on Jerash, Petra, and Machaerus Fortress; H - high, M - medium, L - low (2024).

| Site | Physical destruction | Heritage values [27] | | | | | | | |
|--------------------|----------------------|----------------------|-----------|------------|------------|--------|----------|-----------|-----|
| | | Historical | Aesthetic | Scientific | Ecological | Social | Economic | Political | Age |
| Jerash | M | M | H | H | L | H | H | H | M |
| Petra | L | L | M | M | H | L | M | L | L |
| Machaerus Fortress | H | H | H | H | L | M | M | M | H |

To gain deeper understanding, [Table 4](#) summarises the impact of vandalism on Jerash, Petra, and Machaerus Fortress, employing a framework developed by Pereira Roders [28], which outlines eight key values associated with heritage sites: historical, aesthetic, scientific, ecological, social, economic, political, and age.

The previous table reveals that the Machaerus fortress is the most impacted by vandalism resulting from environmental factors, as it is situated near the Great Jordan Rift, which makes it exposed to earthquakes, abundance, unauthorized interventions, and a lack of awareness. These acts contribute to the deterioration of the physical structure and potentially hinder the scientific exploration of the site, in addition to its social and historical value. Followed by Jerash, which is primarily affected by unsystematic urbanization and a lack of public awareness manifested through graffiti and looting. These threats endanger the aesthetic value of the site and potentially compromise its historical integrity. The consequences of inadequate public awareness are further highlighted by Jerash's delisting from UNESCO. Petra, on the other hand, seems to face a different challenge: uncontrolled tourism and lack of awareness. While

tourism can offer economic benefits, it might also pose a threat to the social fabric of the local communities and potentially lead to the degradation of the site's aesthetic and historical value.

Interviews

Semi-structured interviews guided by eight questions were conducted to provide a comprehensive perspective on the motivations behind vandalism and the challenges faced by sustainable management of heritage sites according to various stakeholders. Twenty-five individuals, including five architects, 16 members of the local community, and four site managers with direct experience in heritage site management in Jordan, were interviewed in person between October and November 2023. Each question was tailored to each stakeholder group. Their insights were particularly valuable due to the first-hand exposure to the on-the-ground impacts of vandalism. Thematic analysis revealed two key clusters: 1) motivations for vandalism and 2) challenges and opportunities for sustainable management.

- 1) Motivations behind vandalism: the interview revealed a complex relationship between the local community and heritage sites. Ten of the sixteen local community members expressed a lack of personal connection and sense of belonging towards their built heritage sites. This disconnect contributes to a general lack of awareness regarding the profound cultural significance of these historic structures, as highlighted by several participants, including two architects and three site managers. On the other hand, six of the local community respondents felt a sense of ownership, attempting to justify their destructive activities, and they had the right to damage or use the site as a form of ownership. Despite the contrasting perspectives, a fundamental issue emerged as a common thread: a lack of awareness and sense of responsibility among the local community regarding the profound cultural significance of these historic structures. This collective lack of awareness and knowledge gap contributes significantly to the frequency of harmful actions against these heritage sites.
- 2) Challenges and opportunities in sustainable management: interviewees, including three sites' managers and three architects, demonstrated shortcomings in the current management plans for Jordan's built heritage. While existing management plans are primarily individual efforts and focus on stabilizing structures, they fall short of addressing the long-term preservation and protection of these invaluable sites. All interviewees expressed concerns about the ineffectiveness of current preventive measures implemented by governmental institutions, particularly the lack of focus on 1) educational programs: this was identified by multiple interviewees as a crucial element for fostering a sense of ownership and responsibility within the local community; 2) stakeholder collaborations: several interviewees highlighted the importance of collaboration between government institutions, heritage management professionals, and the local community for effective site management.

Additionally, existing plans often lack strategies for engaging local communities in the preservation and protection of these sites, which can lead to a lack of local support and increased vulnerability to vandalism and destruction. This ineffectiveness is attributed to a failure to address the root causes and motivations behind these destructive acts.

Findings and discussion

Vandalism, is a result of negative direct interaction between the ruins and individuals, encompasses both intentional and unintentional, individual or group acts, which inflict a detrimental impact on built heritage, damaging physical structures, diminishing site integrity, and tarnishing the visitor experience. The negative effects extend beyond the immediate destruction caused, impacting the historical, aesthetic, and economic significance and, as a result, the authenticity and integrity of these sites. This loss of the site's values compromises its conservation, reduces its appeal to tourists, and hinders its sustainable development. The most prevalent act of vandalism in Jordan is the defacement of structures, including carving and graffiti, in addition to inadequate and weak conservation interventions, as they fail to effectively protect and maintain these structures.

The ancient city of Jerash is losing its integrity and potential values, which has adversely affected Jerash's inscription as a UNESCO World Heritage Site. Similarly, Petra is at great risk of losing its integrity due to the persistent vandalism caused by Tourists and Bedouins that damaged its impressive structures. The lack of comprehensive studies and unauthorized interventions at Machaerus Fortress has resulted in the destruction of ancient structures and looting acts, which significantly reduced the historical, religious, and spiritual value of the site and undermined its historical integrity for future research.

The Interviews revealed that the motivations of vandalism in Jordan are complex and multifaceted, often rooted in anthropological factors. The lack of awareness about the significance of these sites seems to lead to a lack of sense of belonging among Jordanian citizens regarding the importance of their cultural heritage. Consequently, this disconnection among locals contributes to these damaging practices. This gap in understanding serves as a primary driver of vandalism, as individuals lacking appreciation for these cultural treasures are less likely to recognize the need to take care of and to preserve them. Moreover, weaknesses of current heritage conservation and management further contribute to the negative impact on the integrity of the sites.

Conclusion and recommendations

This study investigated the act of vandalism on Jordan's built heritage and its consequences. It analysed current management strategies and discussed possibilities to improve them. Various forms of vandalism occurring in Jordan's built heritage were showcased through three case studies: Jerash, Petra, and Machaerus fortress. In addition, semi-structured interviews with stakeholders were conducted to get a sample of the motivations that could potentially contribute to the matter. The findings emphasize the importance of sustainable heritage management practices that go beyond just security measures and reveal that the tangible attributes have been vandalized as a result of unawareness and delinquency, not politically or religion-motivated. There is a lack of knowledge and understanding about the outstanding values of these properties to Jordan's cultural identity, economy, and tourism development.

By implementing sustainable heritage management, Jordan can move beyond simply reacting to vandalism and instead develop a proactive approach. That would involve security measures, education programs, and community engagement to increase a sense of belonging and responsibility among the community. International collaborations and integrated management of tourism. Several countries have successfully implemented such strategies, offering valuable lessons. For instance, the Palace of Versailles, in France, implements timed entry tickets, controlled visitor flows, and educational programs to manage crowds and promote respectful behaviour. Similarly, the Lascaux caves have a replica site (Lascaux II and subsequent iterations) to allow visitor access without damaging the original prehistoric paintings. Italy provides another example of a country that integrates legal frameworks with

tourism management to protect its heritage. While the Cultural Heritage Code's focus extends beyond tourism, it provides the legal basis for regulating tourist access, guiding development related to tourism (like hotels and infrastructure) to minimize impact on sites, and promoting sustainable tourism practices that respect the integrity of the heritage. For example, limitations on visitor numbers at fragile sites like the Cinque Terre and regulations on cruise ship traffic near Venice are rooted in this framework.

Ultimately, the efficacy of these initiatives is linked to several fundamental components. Fostering a robust sense of ownership within the community is crucial, as individuals are predisposed to safeguard that which they perceive as inherently theirs. The provision of concrete economic advantages associated with heritage can further enhance the motivation for preservation activities. Extensive educational and awareness initiatives are integral in cultivating an appreciation for the cultural and historical importance of these sites. The active involvement of local residents in monitoring, maintenance, and decision-making processes engenders a sense of accountability. Ultimately, synergistic collaborations among heritage organizations, municipal authorities, and the communities themselves, along with the empowerment of local stewards through the allocation of resources and authority, are vital for the sustained efficacy of community engagement as a formidable mechanism against heritage vandalism. This is vividly seen in the United Kingdom, where the National Trust's reliance on local volunteers for the upkeep and monitoring of heritage properties fosters a strong sense of ownership and pride, leading to increased vigilance against vandalism. Similarly, the Local Heritage Initiative encouraged community-led projects, embedding a culture of care for local historical assets. Australia provides another compelling example, where the central role of Indigenous communities in managing and presenting their cultural heritage has proven effective in protecting sites. Their direct involvement in tourism and active monitoring, often through ranger programs, cultivates a sense of custodianship that deters damage.

This would contribute to ensuring the long-term preservation of such irreplaceable cultural resources. This aligns with the Venice Charter's [29] vision for a holistic approach to conservation, ensuring the long-term survival of Jordan's irreplaceable cultural treasures. This comprehensive approach will help safeguard these important historical landmarks for future generations.

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