



Article

Sustainable Stewardship of Egypt's Iconic Heritage Sites: Balancing Heritage Preservation, Visitors' Well-Being, and Environmental Responsibility

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Abstract: While sustainability is widely recognized as necessary for managing heritage sites, balancing preservation demands with tourism development pressures presents significant challenges. A critical gap in the existing research relates to understanding the recurring issues that undermine the long-term sustainability of prominent archaeological destinations in Egypt and visitor well-being. Specifically, more research is needed to identify the specific sustainability and visitor experience problems that persist across Egypt's major archaeological sites despite ongoing management efforts. Addressing this knowledge gap could help inform strategies for these destinations to balance conservation priorities with tourism in a more sustainable manner that enhances visitors' cultural exploration. This study contributes a novel multisite content analysis of over 4423 online reviews from TripAdvisor pertaining to three of Egypt's premier archaeological destinations—Giza Pyramids, Al Mu'izz Street, and Saqqara. Using established text mining methodologies and algorithms within Voyant Tools, critical challenges were identified through word frequency, concept network, and trend analyses. Recurring issues documented included uncontrolled commercialization undermining the ambiance of historic locales, environmental degradation from inadequate waste management and tourism overflows, and overcrowding compromising visitor comfort, health and safety. Deficiencies in signage, transportation, and other tourist services were also prominent themes. The holistic evaluation of cross-cutting concerns faced at the diverse yet interrelated sites advanced the theoretical knowledge on cooperative governance models and competencies necessary for integrative heritage management. The recommendations center on collaborative stakeholder partnerships to reform commercial practices through licensing and enforcement, upgrading aging infrastructure to support sustainable tourism volumes, and implementing zoning and carrying capacity policies tailored to local community contexts. The proposed solutions aim to safeguard Egypt's irreplaceable cultural treasures by addressing recurrent problems that undermine environmental, economic and socio-cultural sustainability if left unresolved, positioning its archaeological wonders for appreciation and study by present and future generations.

Keywords: sustainable heritage tourism; visitor experience; destination management; archaeological sites; Egypt; cultural tourism



Citation: Hassan, T.H.; Almakhayitah, M.Y.; Saleh, M.I. Sustainable Stewardship of Egypt's Iconic Heritage Sites: Balancing Heritage Preservation, Visitors' Well-Being, and Environmental Responsibility. *Heritage* **2024**, *7*, 737–757. <https://doi.org/10.3390/heritage7020036>

Academic Editors: Nicola Masini and Dmitry A. Ruban

Received: 11 December 2023

Revised: 18 January 2024

Accepted: 31 January 2024

Published: 5 February 2024



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1. Introduction

Cultural tourism, defined as visiting cultural attractions, events, and landscapes for educational or recreational purposes [1], makes essential contributions to heritage appreciation, preservation, and destination economies worldwide [2]. However, negative visitor experiences from poor infrastructure, overcrowding, and mismanagement can threaten these benefits. For example, deteriorating infrastructure poses physical risks to visitors and

conveys a sense of neglect that damages the overall experience at a site [3]. Likewise, a lack of necessary preservation work and inconsistent maintenance can further degrade fragile heritage assets, undermining their historical and cultural significance over time [4,5]. Other common problems involve poor wayfinding within large complexes like the Egyptian pyramids, which leads to congestion and longer wait times [6,7]. Limited multilingual interpretive resources and inadequate signage also create unnecessary accessibility barriers that frustrate international tourists and reduce their enjoyment of their cultural tourism activities [8,9]. If unaddressed, recurring issues will continue discouraging visitation to essential attractions and landscapes, weakening cultural tourism's economic and social impacts at the affected destinations.

Moreover, aggressive commercial activities and a lack of vendor regulation compromise heritage quality and visitor well-being [1,2]. Insufficient online information and dull promotional materials further limit engagement and perceptions of support [3–5]. In this context, it is worth noting that Egypt boasts a significant collection of archaeological and cultural heritage sites that vividly depict its prosperous historical periods [6]. Among these notable destinations are the Giza Pyramids, Al Mu'izz Street in Cairo, and the step pyramid of Saqqara [7–9]. Unfortunately, as this study shows, these revered sites have experienced substantial deterioration.

While natural attractions and opportunities for cultural immersion in Egypt often generate positive impressions among visitors, recurring issues with inadequate maintenance, overcrowding, and poor facilities continue to be raised in tourism reviews [10,11]. Infrastructure deterioration, lack of consistent upkeep, and insufficient visitor amenities compromise the quality of heritage presentation and the tourist experience. If unaddressed, such shortcomings risk diminishing the appeal of Egypt's valuable cultural resources. Thus, further research is needed to better understand how to mitigate negative perceptions from such sore points. A comprehensive study investigating the factors impacting satisfaction across Egyptian sites could provide valuable insights towards more effective preservation strategies and visitor management that support sustainable tourism growth. Therefore, the current research aims to address the following research aims:

- *Research Aim 1:* To investigate the infrastructure and site maintenance deficiencies reported at Egyptian world heritage sites like Giza and Saqqara that most influence visitor satisfaction and perceptions. The aim is to identify recurring issues in need of addressing.
- *Research Aim 2:* To examine how overtourism and overcrowding challenges specifically encountered at popular locations such as the Pyramids and Al Mu'izz Street can be better managed to enhance the quality and intimacy of cultural exploration. The aim is to propose evidence-based solutions.
- *Research Aim 3:* To analyze approaches that may most effectively respond to negative aspects frequently cited in online reviews of Egypt's cultural tourism offerings. The aim is to provide constructive recommendations for improvement.

2. Literature Review

2.1. Cultural Tourism Experience and Sustainability in Heritage Site Management

Cultural tourism encompasses visits to cultural attractions, events, and landscapes for recreational or educational purposes [12]. It overlaps significantly with heritage tourism, which focuses on built, tangible cultural assets as well as intangible traditions [13]. Early conceptualizations divided cultural tourists into general or incidental participants consuming culture casually alongside other activities versus specific visitors traveling primarily for cultural engagement [12,14]. However, it proved challenging to reliably distinguish motives and observed behaviors. As a result, some studies overestimated niche markets by inferring purpose from sporadic cultural participation [14].

Nonetheless, cultural attractions remain vitally important for tourism globally. An experience economy emerged, emphasizing memorable, uniquely crafted cultural events [15]. Major cities, especially, witnessed increased visits to heritage sites, museums, and performances [16]. Unfortunately, overtourism has negatively impacted cultural experiences; for example, local residents might protest against intrusion into their community life [17]. Tourists interacting with cultural offerings may encounter varied experiences. While educational programs aim to nourish appreciation, inadequate maintenance, overcrowding, or poor management could unintentionally generate dissatisfaction [17]. Optimally administered heritage destinations systematically consider how to reward both committed cultural tourists as well as those encountering traditions incidentally through transformative learning experiences [12]. This balanced approach supports sustainable tourism by promoting cultural preservation.

While cultural tourism can support the vital goals of heritage appreciation and preservation, there are many potential pitfalls that require careful consideration. More importantly for sustainability, negative visitor experiences arising from infrastructure flaws [18], bad commercialization, and poor management undermine the very cultural assets tourism aims to showcase. A variety of factors linked to physical conditions, management practices, commercial activities, and online presence have been cited in tourism reviews as sources of visitor dissatisfaction with iconic cultural sites [10]. In the following section, we will analyze these complaints more closely to understand the impediments to optimal preservation and presentation reported from a user perspective.

2.2. Visitor Experience, Well-Being at Heritage Sites and Potential Factors Affecting Visitors' Negative Perceptions of Heritage Sites

2.2.1. Challenges of Managing Iconic Archaeological Sites

One of the major issues plaguing heritage sites is deteriorating infrastructure, including damaged architectural structures, dilapidated pathways, and inadequate railings or signage. Such infrastructure deficiencies pose physical safety risks to visitors exploring the sites [18]. They can encounter falling debris, tripping hazards, or a lack of safety barriers preventing accidental falls. This deterioration conveys an impression of neglect to visitors and blemishes their site experience [19]. Comments on review sites frequently lament safety issues that curb their enjoyment of cultural landmarks or raise doubts about the true priorities of preservation efforts [20]. When heritage assets are not properly maintained, they suffer from further degradation, jeopardizing their popularity and ability to attract tourism in the long run [19]. Deteriorating infrastructure impacts visitor satisfaction and the long-term sustainability of cultural heritage for future generations [20].

Lack of consistent preservation work compounds the natural degradation of heritage properties over time. When monuments and sites appear unkempt or in a state of ruin due to insufficient conservation, it undermines their perceived historical significance and value proposition to visitors [21]. Previous studies often complain that restored areas or stabilized structures are few given the vast scale of conservation needs [22]. Poor maintenance also raises doubts in visitors' minds about the authentic long-term commitment of authorities to safeguard invaluable cultural legacies, negatively influencing destination choices [18]. Insufficient conservation threatens the physical preservation of heritage and the valuable social and economic roles these sites play through cultural tourism [19]. Regular maintenance is crucial to sustainable development and casts heritage assets as priorities worthy of protection [22].

2.2.2. Visitor Services and Support

One of the critical issues affecting visitor perceptions of heritage sites is poor directional signage and difficulties navigating attractions independently [23]. When wayfinding systems are inadequate or unclear, tourists feel confused and lost and experience frustration as they struggle to find their intended destinations within the cultural properties [22]. When visitors visit any destination, they are likely to have site navigation problems that hinder

the enjoyment of the whole experience offered at the historical landmarks. Improving directional cues and infrastructure legibility is an important factor positively influencing the formation of visitors' impressions of how well attractions are managed for accessibility [18]. Without clear wayfinding, tourists are more likely to be dissatisfied and spread unfavorable opinions about their cultural encounters [23].

A lack of multilingual interpretive and informational materials tailored for international tourist demographics poses accessibility barriers that leave many feeling alienated from fully engaging with heritage sites [24]. In visitor management studies, scholars observe this as an inadequacy in management priorities for cross-cultural outreach that blemishes perceptions of inclusiveness and the support services offered. When cultural properties fail to provide guides, signage [23], and digital content in multiple languages relevant to their visitor profiles, it limits engagement [25]. It acts as a deterrent in influencing destination choice. Targeted multilingual resources are thus vitally crucial for optimizing visitor perceptions and advocacy towards supporting cultural tourism agendas [26].

2.2.3. Commercial Activities and Online Presence

The poor commercial activities present at heritage sites can significantly damage visitor perceptions and cultural tourism experiences [27]. Aggressive or misleading vendors harassing tourists contradict expectations of safe, stress-free visits to historical landmarks. Such negative encounters shape impressions of an unsupervised commercial environment lacking proper controls [28]. Visitor reviews in tourism destinations frequently cite issues with vendor management undermining the enjoyment of attractions [18]. Better oversight helps support positive perceptions by curbing infringement on cultural activities. Likewise, a lack of regulation for commercial activities like unauthorized sellers or unlicensed tour operators potentially compromises the quality and integrity of heritage presentations while posing a risk to visitor well-being [1]. While a lack of regulation for commercial activities may not directly endanger physical safety, unsupervised vendors' emotional exhaustion and frustration could gradually wear down visitors' mental well-being throughout a trip if left unchecked. Previous studies have also linked unregulated commerce and a lack of oversight at heritage sites to increased reports of aggressive solicitation and deception targeting tourists. Without proper enforcement of norms and codes of conduct for licensed tour operators and sellers, there is potential for negative encounters to compromise the overall quality and psychological comfort level of cultural tourism activities at some destinations. Feedback often notes perception issues stemming from an impression of a lack of authority and diminished faith in local businesses due to inadequate governance. Proper norms and enforcement strengthen the image of protected, higher quality cultural tourism [29].

Visitor perceptions also depend on the promotions employed by heritage sites through digital platforms and printed materials [3]. Insufficient online multilingual information deprives potential international travelers of complete knowledge about destinations before visits [4]. Insufficient online services limit optimized experiences from the start. Meanwhile, dull or disorganized destination websites fail to make it desirable to plan and book a trip, thus weakening the brands. Feedback shows how poor digital assets diminish perceptions of supported sustainable tourism advocated by authorities [5]. Analogously, low-quality brochures or collateral publicity underwhelm and convey unfavorable impressions of professionally managed marketing for attractions [3]. Visitors emphasize the role of visually appealing, engaging promotional tools in forming positive outlooks [5].

2.3. This Study's Context

Egypt possesses an invaluable collection of archaeological and heritage landmarks that showcase a rich and multilayered historical narrative. As the cradle of some of humankind's earliest civilizations, Egypt holds the distinction of housing many cultural heritage properties globally, representing diverse epochs ranging from the Ancient Egyptian, Ptolemaic, Roman, and Islamic periods [6]. Egypt boasts a rich array of open-air monuments that

showcase its diverse cultural heritage. These remarkable sites function as expansive outdoor museums, authenticating and displaying the magnificence and achievements of the ancient Egyptian civilization while being exposed to the natural elements. Significantly, these monuments provide insights into Egypt's ancient past, withstanding the test of time even as the desert sands and climate have impacted their preservation [30]. Cultural tourism focused on experiencing these monuments firsthand makes up a large part of the international visitors arriving in the country each year [31]. For instance, the magnificent Pyramids of Giza, situated just outside Cairo, never cease to amaze tourists with their massive scale and precise geometry as one of the earliest structures and sole surviving Wonders of the Ancient World [7,32]. Visitors can witness firsthand the architectural sophistication used to construct such grand tombs for the pharaohs nearly 4500 years ago in the shadows of the Great Pyramid of Khufu, once standing 481 feet tall. Nearby, crowds gather daily at performances featuring Egyptian music and dance near the iconic Sphinx [33]. In Cairo, Al Mu'izz Street takes tourists through the historic Fatimid district lined with medieval places of worship and learning, such as Al-Azhar Mosque, the second oldest degree-granting university [8,34,35]. At Saqqara, tourists marvel at architectural advancements spanning pharaonic tombs and the earliest royal Step Pyramid before exploring artefacts in the on-site museum [9]. These landmarks thus immerse visitors in Egypt's outstanding historical heritage through cultural performances and contextualized exploration.

When visiting Egypt's treasured archaeological sites, tourists frequently encounter both positive and negative experiences that shape their perception of cultural heritage attractions. While aspects such as natural beauty, educational guidance, and cultural immersion often lead to favorable impressions, insufficient maintenance, overcrowding, and poor visitor facilities have been cited as common sore points [10,11]. The present study focuses specifically on negative experiences reported by tourists in their online reviews of selected sites. By closely examining prominent complaints, this research aims to better understand factors hindering optimal heritage preservation and presentation from a visitor perspective. The two leading propositions are as follows:

Proposition 1: *"Deteriorating infrastructure, lack of conservation efforts, and inadequate crowd control measures correlate with below-average visitor satisfaction levels across several iconic Egyptian monuments".*

Proposition 2: *"Poorly managed commercial activities, scarce directional signage, and lack of multilingual support services disproportionately impact foreign tourists' enjoyment and affinity toward Egypt's invaluable historical landmarks".*

Addressing these propositions is crucial as Egypt holds strategic cultural and soft power on the global stage through its renowned ancient monuments. However, negative online reviews can undermine this influence and discourage future visitation if issues persist. As destinations worldwide compete fiercely for post-pandemic tourism investment, iconic heritage assets must be optimally positioned and problems addressed to remain internationally appealing. This study contributes to this by identifying specific experience-based challenges voiced directly by past visitors. The findings can consequently guide evidenced-based solutions to enhance perceptions, support industry revival, and safeguard Egypt's cultural treasures for sustainable appreciation into the future. With globalization increasingly exposing cultural offerings worldwide, regularly evaluating user satisfaction and addressing shortcomings become ever more imperative for competitive destinations. In conclusion, given Egypt's dependence on successful heritage tourism and cultural diplomacy leveraging its renowned monuments, understanding visitor experience pain points revealed through online sentiments represents a timely and important undertaking. This study aims to furnish practical direction for strategic management, strengthening Egypt's popularity, economic recovery from the pandemic's impacts, and appropriate presentation of cultural treasures for future generations.

3. Materials and Methods

We conducted a content analysis of tourists' negative online reviews and feedback pertaining to some of Egypt's premier historic and cultural destinations. For the present study, we selected the following three of Egypt's most iconic heritage destinations in Cairo, the capital of Egypt, and the Giza governorate, which collectively receive the highest tourism volumes: the Giza Pyramids plateau, Al Mu'izz Street in Cairo's historic Fatimid district, and the step pyramid fields at Saqqara. These sites were chosen as they not only represent diverse epochs but also offer a cross-section of reviewer feedback encompassing varied management models, locations, and visitor experiences tied to Egypt's world-renowned yet fragile historical and archaeological heritage.

The three heritage locations of the Giza Pyramids, Al Mu'izz Street, and Saqqara were strategically chosen for this initial study for several important reasons. As Egypt's highest volume tourist destinations by a wide margin, they afforded the opportunity to capture insights from reviews representing the experiences of hundreds of thousands of annual visitors. This maximized the sample size and generalizability of findings. Additionally, spanning various periods from 2500 BC to the 11th century AD, the sites offered a longitudinal view of management approaches and visitor perceptions across Egypt's ancient, classical, and medieval epochs. Practically, an abundance of online reviews were readily available for these premier locations, allowing for in-depth content analysis. Finally, each locale presents unique attributes—from outdoor monuments to urban thoroughfares—that together provided a holistic cross-section of Egypt's diverse cultural offerings and tourism models.

The aim is to gain useful insights by extracting prominent themes, connections, and reviews of comments from tourists' user-generated negative comments about visiting experiences, perceptions of management and maintenance, and overall unsatisfactory impressions [36]. These insights seek to overcome issues that tourists have raised to help tourism authorities and administrators rectify any problems. The goal is to improve the overall tourism offerings, visitor experiences, and satisfaction levels at these invaluable archaeological monuments that constitute the foundation of Egypt's historical and architectural heritage.

3.1. Data Collection and Validation

As per Park and Nicolau [36], online reviews from credible third-party sources provide a rich dataset for qualitative analysis. Therefore, we selected TripAdvisor as our data source due to its status as a leading online platform for travel reviews [37]. Consumers and researchers alike frequently use TripAdvisor, which has emerged as a significant platform for user-generated content in the tourism industry [38]. With monthly visitors averaging over half a million and a cumulative total of over one billion to date, it represents a significant repository of tourism-related experiences and perceptions. Previous studies also attest to TripAdvisor's perceived reliability and trust among users [39]. To ensure review credibility aligned with our research aims, we focused our analysis on the subset of below-average user ratings of 4423 visitor reviews (1–3 stars) within the selected Egyptian heritage sites. Including these more neutral evaluations (reviews below 3 stars equal poor reviews) served an important purpose in our study. As intermediate ratings, 3-star reviews likely capture experiences containing both positive and negative aspects. Analyzing the complaints voiced even in impartial ratings allowed us to have a unique lens into challenges significant enough to potentially neutralize overall satisfaction for some visitors. This provided valuable insight towards understanding pain points that management should target in order to fully optimize experiences. In exclusively analyzing negative reviews, our objective was to gain insights specifically into challenges voiced by dissatisfied visitors in order to help inform practical solutions. While positive reviews provide valuable complimentary perspectives, focusing initially on complaints allows for a targeted investigation of recurring issues reported as detracting from experiences. Our rationale aligned with previous research suggesting negative cues tend to be perceived

with less ambiguity than positive ones. Furthermore, exploring extreme negative ratings provided a lens into major pain points voiced unambiguously across a large sample size.

By examining prominent themes in the large volume of negative word-of-mouth comments under these ratings, we sought to gain valid qualitative insights into potential shortcomings, issues, or areas for improvement reported by dissatisfied visitors. The first step of the research involved collecting visitor reviews from TripAdvisor for three major Egyptian heritage sites: the Pyramids of Giza, Saqqara, and Sharia Al Mu'izz Li-Din Allah. An initial screening was conducted of all reviews available for each individual site. For the Pyramids of Giza, which had a total of 8630 reviews, 192 were rated as 'terrible' and 144 as 'poor.' Saqqara and Sharia Al Mu'izz Li-Din Allah had fewer total reviews. Nevertheless, the breakdown showed 6 'terrible' and 28 'poor' reviews for Saqqara and 15 'terrible' and 1 'poor' review for Sharia Al Mu'izz Li-Din Allah. Most reviews for these sites were positive; so, the research focused on the subset of below-average 1–3-star ratings categorized as 'terrible,' 'poor,' and 'average.' This initial screening across the three sites showed 848 relevant negative reviews. The search was expanded to include reviews of the activities in the main heritage areas to obtain a more substantial dataset for analysis. This expanded the total number of reviews incorporated into the study to 4423. For the Pyramids of Giza, approximately 830 reviews were analyzed. For Saqqara, around 1500 reviews were examined. For Sharia Al Mu'izz Li-Din Allah and the surrounding regions, about 2100 reviews comprised the sample. A manual content analysis of prominent themes within this extensive 1–3-star ratings collection was then conducted. The goal was to uncover critical issues, shortcomings, or areas for potential improvement as reported by dissatisfied visitors through their negative word-of-mouth comments. This approach allowed us to explore the extent to which such feedback reflects on-the-ground realities and identify weaknesses to inform strengthened tourism management and preservation efforts at these invaluable historical landmarks.

3.2. Data Analysis

To obtain meaningful insights from the large corpus of tourists' negative reviews, we conducted a rigorous thematic analysis. Thematic analysis includes content analysis, which is a well-established qualitative approach that allows for the systematic examination and classification of textual data to accurately identify prominent themes, connections, and sentiments. Content analysis, which involves identifying patterns and themes within qualitative data, is an important technique that forms part of the overall approach known as thematic analysis [40,41]. By applying content analysis techniques such as review mining, text mapping, and frequent word/phrase analysis within their surrounding context, we gained a rich understanding of the key areas of dissatisfaction, complaints, and issues highlighted across the large dataset [40]. This facilitated a nuanced exploration of "what" aspects visitors perceived as problematic experiences, "how" these experiences were qualitatively described, and "why" certain themes may have arisen based on word associations and usage. Content analysis proved crucial to fulfilling our research aims for several reasons.

First, it enabled a comprehensive yet structured analysis of the vast volume of qualitative feedback. Second, it allowed themes to organically emerge from the data as opposed to being predetermined. Third, it generated deep qualitative insights beyond simple word counts or sentiment ratings. Finally, it helped uncover connections and a "big picture" understanding of reported tourism and heritage challenges and their root causes or patterns across destinations [29]. This granular yet holistic analysis formed a solid evidence base to inform improvement efforts. To obtain insightful and accurate results from our rigorous thematic analysis, we utilized a specialized digital text mining and analysis tool. Content analysis of large textual datasets requires advanced computational approaches to comprehensively and systematically code qualitative data [42,43].

Voyant, an open-source web-based reading and analysis environment, was determined to be most suitable for our research aims and data format. Voyant has several advantages that make it an adequate analytical tool [42]. First, it has powerful full-text analysis and visualization capabilities tailored for exploration of concepts, keywords, and their occurrence patterns across large corpora. Second, its interface is intuitive yet powerful, allowing non-technical users to efficiently examine collections and generate visualizations without extensive training. Finally, the tool reports analysis provenance, allowing for the traceability of origins for all findings [43]. This aligned well with our intent for a rigorous, auditable methodology supporting result validation. Through functions like document/term frequency graphs, trend charts, and concept clustering, Voyant enabled a data-driven exploration of our review dataset that would have been impossible with manual methods alone. It thereby met our objectives of achieving accurate, reliable, and evidence-based results capable of informing meaningful practical recommendations [44].

The typologies used in the analysis are as follows: (1) Word frequency analysis displays the most commonly used terms in a body of text. It helps identify prominent topics by showing how often keywords appear. This technique helps explore key themes and concepts in qualitative data. (2) Concept network visualization connects significant terms from the data by mapping the relationships between ideas and how topics are linked. It provides an overview of themes and their associations. (3) Moreover, there is an issue flow diagram that traces mentions of particular topics over time. Through a flow chart format, it clarifies the progression of certain concepts. Issue flow diagrams help in understanding how discussions evolve. (4) Sentiment trends extract sentiment from the text over time through computational linguistic analysis. Line graphs effectively convey changes in the expressed opinion over different periods. Sentiment trend graphs offer insights into shifting public perspectives. These visual analytic typologies provide quantitative and qualitative views on themes, connections, developments, and emotions within the context under examination.

To ensure that the timeline of the reviews has no issue and to conduct a more robust temporal analysis of themes in the visitor reviews, we stratified the total sample of 4423 reviews into three distinct periods for independent analysis. The first period included reviews from 2006 to 2010, representing the early years covered in our data. Reviews from 2011 to 2015 made up the mid-sample. Finally, reviews from 2016 through 2023 comprised the most recent period. Each period's set of reviews was separately input into the Voyant content analysis software. This allowed us to code and examine prominent concepts within each period independently. By comparing output across the three timeframes, we could identify variations in frequently discussed issues or shifts in emphasis over time. According to visitor commentary, our findings revealed high conceptual similarities between periods, suggesting the core problems have persisted as recurring challenges. However, we noted minor frequency variances for some topics between the early, mid, and recent periods. These nuances were further discussed to provide a more nuanced perspective on the issue of evolution versus stagnation across our 2006–2023 review period. As recommended, taking this staged temporal approach strengthened our ability to account for changing conditions over time.

4. Results

4.1. The Giza Pyramids Plateau

A word frequency analysis of visitor reviews (see Figure 1) revealed certain common terms that provide insight into aspects of the visitor experience being discussed at the Great Pyramids of Giza. A word frequency analysis of visitor reviews (see Figure 1) revealed words such as “camel”, “riding”, “horses”, “pounds”, “wore”, “ride”, and “tickets”, which provide insight into poorly managed aspects impacting the heritage site experience at the Great Pyramids of Giza. These words reflect issues like extortionate money requests from camel handlers and guides, a lack of enforcement against aggressive sales approaches, and inadequate signage or infrastructure for navigating attractions independently. Such

Consistent results emerge from the linked word analysis in Figure 6, where terms such as “noise”, “crowds”, “vehicles”, and “cleanliness” are interconnected with concepts like “pollution” and opportunistic “scams”. This relationship implies that traffic loads, environmental disturbances, and unsavory business tactics jointly compromise professional site administration and preservation touristic goals. Figure 7’s stream graph shows that the main problems come from high numbers of people and cars, which creates problems like too much litter and annoying people trying to obtain your attention. While authorities try to curb these issues, interconnected downsides persist, as evidenced in the analysis. Finally, Figure 8’s word trends pinpoint “crowds” and “vehicles” as enduring hindrances limiting the exploration of this area’s historical qualities. This underscores the need for holistic remedial strategies that are time consuming while experiencing a specific space.

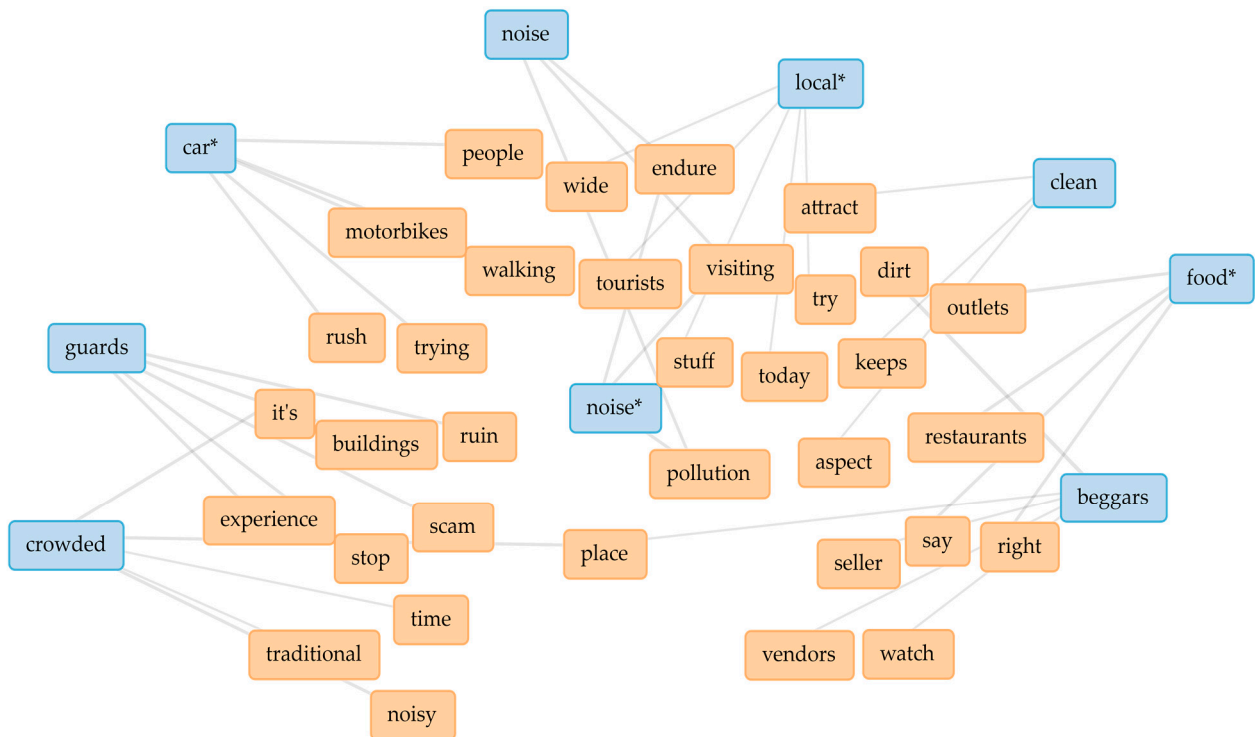


Figure 6. Concept network visualization (Al Mu’izz Street in Cairo).

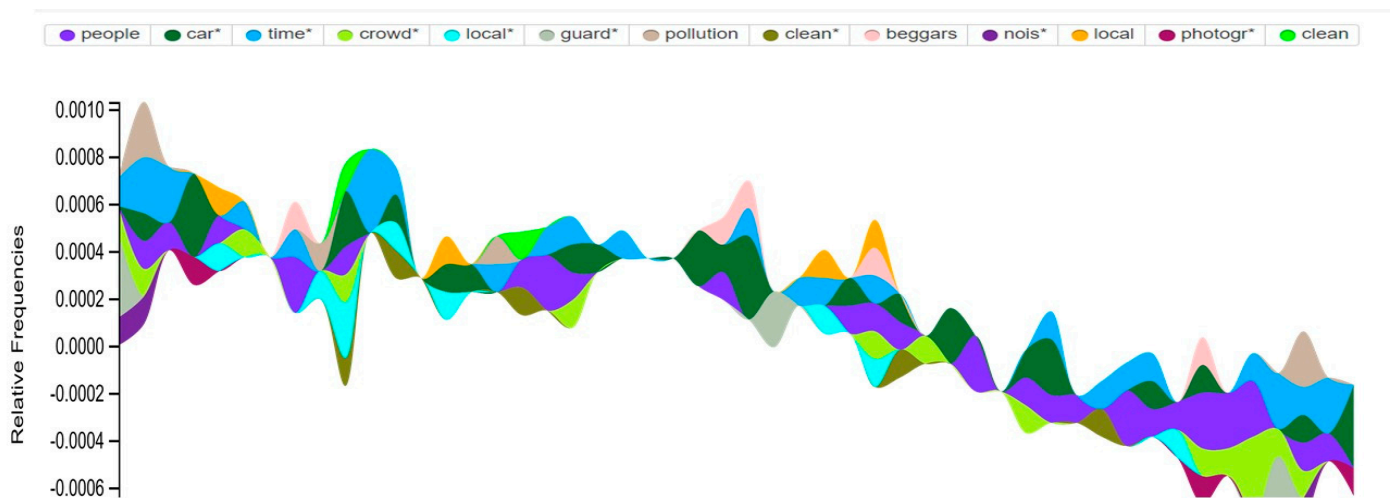


Figure 7. Issues flow diagram (Al Mu’izz Street in Cairo).

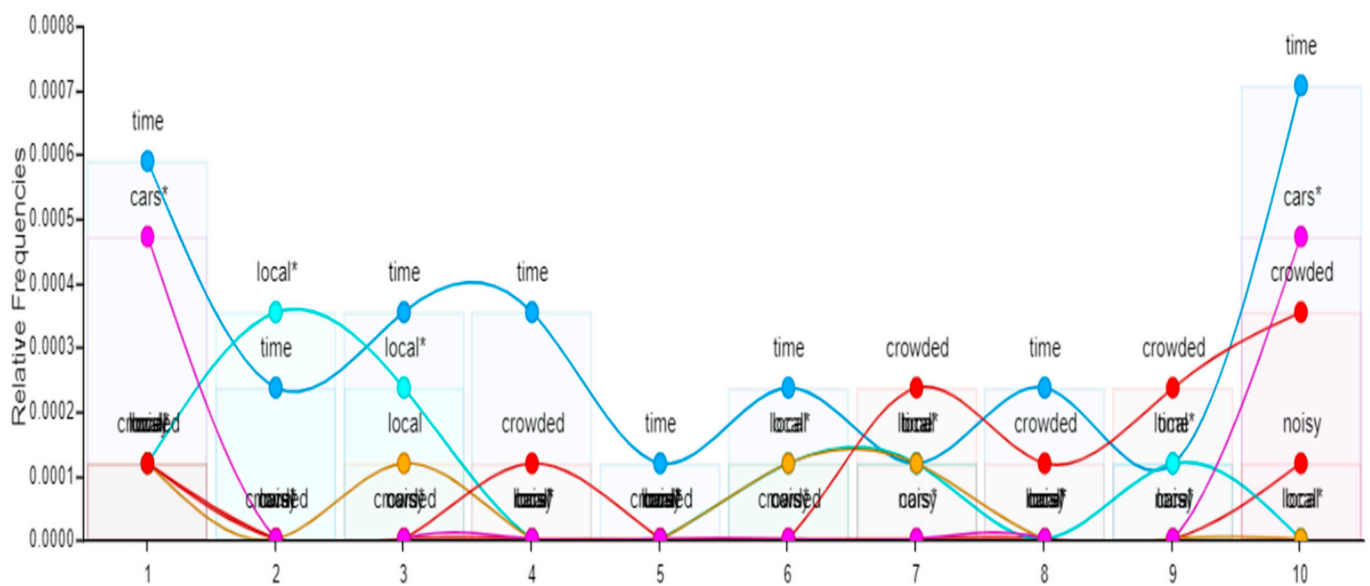


Figure 8. Sentiment trends over time (Al Mu'izz Street in Cairo).

4.3. The Step Pyramid Fields at Saqqara

A word frequency analysis of visitor reviews about the Saqqara pyramid site (see Figure 9) revealed terms such as “camel”, “riding”, and “horses”, as well as additional words like “bathrooms”, “signs”, and aspects of the “retail” environment. It is important to note that Voyant treats the plural and singular forms of words as separate terms when creating word clouds and frequency lists. For example, in Figure 9, “Pyramid” and “Pyramids” are represented individually rather than consolidated into a single entry. While automatic text mining provides a starting point for analysis, plural and singular variations were not reduced in the results, and a closer manual examination is needed. These insights point to potential issues, including inadequate wayfinding, absent restroom facilities, and an undersupplied food and beverage retail offer that could hinder effective cultural heritage management. Figure 10’s linked word analysis shows connections between ideas like “bathrooms”, “signage”, “tips”, and “food”. This suggests that both missing basic services and business practices that make money but are not professional may hurt the goals of site administration. As the stream graph in Figure 11 demonstrates, key challenges appear interconnected with “tipping” behaviors occurring where guidance and oversight are lacking. Lastly, Figure 12’s word trends analysis identifies issues with “camel riding” money requests and deficient security paralleling problems previously observed at other heritage locales, signifying a need for corrective measures to strengthen destination management. Addressing such recurring sore points will be critical to safeguarding the entire pyramid landscape experience in the future.

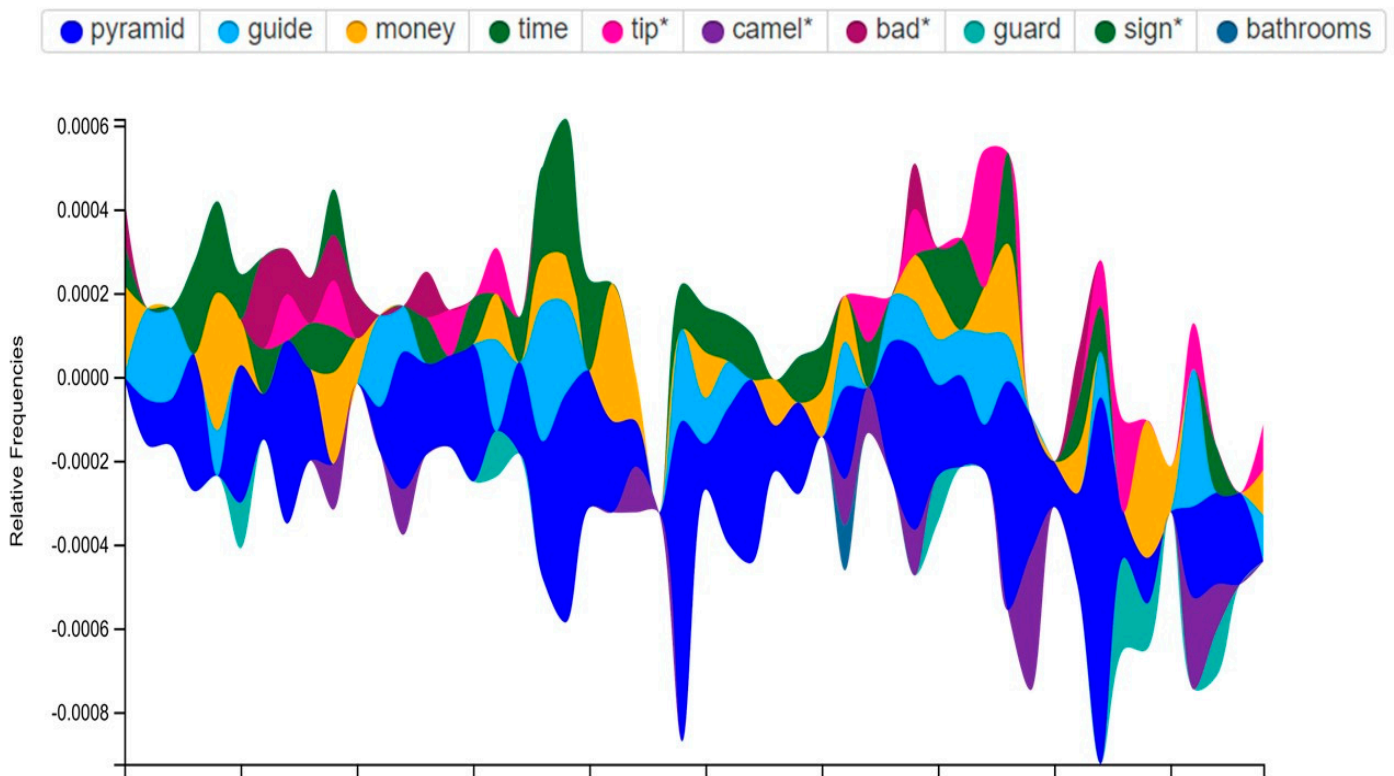


Figure 11. Issues flow diagram (Saqqara).

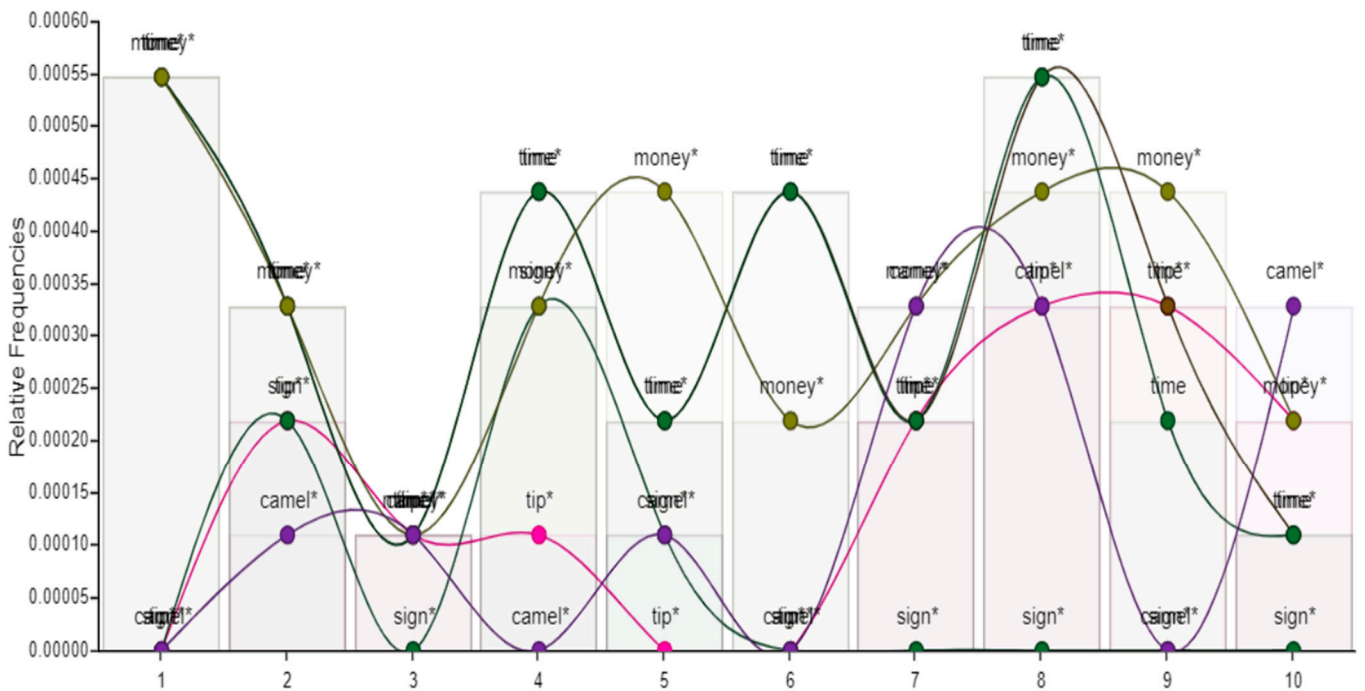


Figure 12. Sentiment trends over time (Saqqara).

5. Discussion and Conclusions

5.1. Discussion

The current study analyzes word frequency, concept network, stream graph, and trend analysis from visitor reviews to identify key issues impacting heritage management, sustainability, and visitor perceptions at three prominent archaeological sites in Egypt. For the Giza Pyramids Plateau, unchecked commercial practices and environmental problems

undermine effective stewardship. At Al Mu'izz Street, overcrowding and disturbances threaten the visitors. And for the Saqqara Pyramids, inadequate services and problematic entrepreneurial activities compromise goals. By examining challenges detected across location word analysis and correlations, holistic discussions evaluate implications for site operations, sustainable tourism development, brand image, and more.

For the Giza Pyramids Plateau, the word analysis findings (Figure 1) indicate significant issues adversely impacting site operations and the visitor experience quality domains pivotal to sustainable cultural tourism development. Unchecked commercialization in the form of coercive guiding and extortionate animal rides reflects poor management control, compromising heritage authenticity and ethical tourism goals [45]. Destinations rely on positive imagery; however, such sore points risk generating deleterious perceptions of mismanagement inconsistent with identity branding aims [46]. Congestion and improper waste disposal further detract from environmental stewardship ambitions crucial for longevity as a premier landmark [47]. Continued monitoring and remedying legacy challenges through collaborative stakeholder frameworks appear paramount to safeguarding this treasure trove of universal cultural value for identity [48].

For Al Mu'izz Street, the crowding, noise, and pollution issues identified (Figures 5–7) demonstrate an inability to adequately control congestion impacts threatening the historic ambiance [49,50] and community livability, which are integral to place-protecting agendas [45]. Such environmental degradations and commercial opportunism call the integrity of conservation priorities into question if left uncurbed [51], leading to, for instance, emergency evacuation in heritage buildings [52]. Issues with wayfinding and signage pose challenges that limit the potential for high-quality visitor experiences, economic growth, and fostering heritage appreciation, all of which are important goals for sustainable tourism development. Improving navigation and information access around the sites could help unlock greater benefits from the country's rich cultural heritage assets. Overly time-consuming visits further jeopardize valuable resource preservation by enabling excessive physical deterioration [53]. Holistic strategic planning through public–private [45] agreements appears necessary to equitably balance stakeholder needs with destination image-building and future-proofing objectives.

At the Saqqara Pyramid, inadequate facilities, unclear navigation signs, and inferior retail offerings (Figures 9–11) undermine management competencies and weaken the visitor service standards critical to forming positive perceptions of the site [54]. Such deficiencies risk prioritizing monetary extraction over preserving authentic heritage qualities and risk encouraging undesirable commercialization detrimental to sustainable tourism goals. The comparable difficulties evidenced at Saqqara emphasize such shortfalls as longstanding issues requiring transformational solutions through collaborative governance. A comprehensive revitalization effort is needed to boost the sustainable tourism capacity while mitigating environmental pressures and community impacts [23]. Only by addressing recurring sore points through an integrated approach can Saqqara optimize visitor satisfaction, safeguard the longevity of its ruins, and solidify its role in Egypt's cultural tourism vision. So, the information we obtained from the word frequency, concept network, stream graph, and trend analyses has important theoretical and practical implications for managing heritage sites in Egypt.

Notably, for this study, sustainability at cultural heritage sites entails balancing preservation needs with tourism development to meet the present needs without compromising future generations' ability to experience the sites. An integral dimension is ensuring visitor well-being and satisfaction, which supports longer-term viability. Recurring issues identified through the review analysis, such as overcrowding, poor services, and environmental degradation, can directly undermine sustainability if left unaddressed. Specifically, uncontrolled commercialization corrupts the authentic cultural experience and historic ambiance that attracts visitors. Deficient infrastructure and services further deteriorate the quality of the experience and the cultural value proposition of visiting. If issues recur frequently, as evident in negative commentary, they can accelerate the site's physical and experiential

deterioration. This poses sustainability challenges by eroding the heritage assets' aesthetic, historical, and ecological integrity over time, forming the basis of cultural tourism.

5.2. Conclusions and Implications

This study provides meaningful theoretical contributions to heritage management literature through its nuanced evaluation of visitor experience domains across the distinctive Egyptian archaeological contexts of Giza, Al Mu'izz Street, and Saqqara. By specifically looking at the sites' infrastructure and operations, it is possible to learn a lot about place-protective stewardship approaches and how they can be affected by policy and resource gaps. The word analysis surfaced entrenched issues like waste handling and unregulated commercialism impairing sustainable preservation goals. These new situational understandings help management theory grow when it comes to the many types of controls and partnerships that are needed to balance safety measures with successful cultural tourism systems.

Looking at how visitors are assisted provides valuable insights for improving management. The examination found shortcomings that hinder how much people can learn and be entertained at the sites, making it difficult to create positive impressions. These deficiencies limit the educational and enjoyable experience for tourists, challenging the goal of forming a great perception of the places. Insufficient facilities, unclear guidance, and attractive entrepreneurialism impede experiential quality priorities. This nuanced study, therefore, meaningfully shapes the theoretical understanding of the complex competencies and collaborative mandates necessary for meeting tourist needs while safeguarding heritage authenticity and community agency.

Evaluating commercial activities and navigational considerations additionally augments the theoretical knowledge. Linking monetary extraction to deficient security oversight constructs a new comprehension of integrity challenges emerging from deficient regulatory protocols. The connections found between poor signage systems and uncontrolled promotional activities help develop a better understanding of holistic place branding approaches. Models that take an integrated approach aim to improve the visitor experience through coordinated investments. This includes investing in physical infrastructure, like signs, as well as regulatory enforcement. It also includes public outreach efforts that help inform both visitors and local businesses. Such a comprehensive strategy may help address challenges that arise from issues with facilities, wayfinding, and a lack of standards. Therefore, this study offers critical theoretic advances to sustainable tourism and heritage management disciplines through its contextualized multisite exploration across Egypt.

The current study has several managerial implications. First, the word analysis for the Giza Pyramids Plateau and Saqqara Pyramids reveals considerable issues warranting administrative attention. Persistent monetary demands and coercive selling undermine UNESCO's ethical compliance. To change the way commercialization works and fix the sites' reputation, the government needs to make changes that obtain results, like licensing rules and more enforcement through task forces that are made up of both public and private sector partners. Signage investments and infrastructure upgrades are also needed to decentralize pressures and support independent touring, which is vital for sustainable site carrying capacities. Several strategies implemented at other prominent archaeological sites could help address issues facing the Giza Pyramids. Establishing a pre-paid voucher system for camel and horse rides would set standardized pricing to eliminate aggressive negotiations over fares. Designating specialized loading and unloading zones away from the pyramid structures could reduce congestion and overcrowding concerns.

Moreover, a mandatory certification program training animal handlers to avoid overly importunate requests for payment and ensure safety, drawing from international precedents, may also help reform commercial practices. Informative multilingual signage near stables could educate visitors about optional gratuity norms rather than implicit demands. The new shuttle bus services that run between parking lots and monuments, however, show that some change is already in place. Finally, permitting advance online ticket purchases,

designating staggered time slots, augmented reality [54], and emulating strategies could decrease last-minute monetary solicitations and overtourism impacts. Periodic audits of ride providers' satisfaction ratings would reinforce performance norms over the long term. Therefore, monitoring emerging entrepreneurial trends will help destination managers proactively refine strategies balancing facilitation, preservation, and community values.

Regarding Al Mu'izz Street, the findings point to unsatisfactory disturbance management negatively impacting the historic ambiance. Managers need to work together with transportation companies and stores to make plans that work for everyone. This will help fix problems with tourism by putting in place phased restrictions and programs that raise awareness and reward visitors who come during off-peak times. For instance, several strategies could be implemented to improve the visitor experience and protect historic sites. Conducting a pilot program to restrict vehicle access during busy periods and a public awareness campaign showcasing lesser-known attractions could help manage overcrowding. Enforcing regulations around noise and keeping street vendors informed of best practices at other heritage destinations would also enhance the atmosphere. Investing in upgraded security resources and technologies successfully employed at major archaeological sites would improve safety. Developing modern visitor facilities and implementing timed entry protocols could prevent congestion. Providing multilingual educational displays and enforcing codes of conduct would foster responsible tourism. Electric shuttles between parking lots and attractions would reduce their environmental impact. With input from cultural organizations and tourism stakeholders, these strategies, modeled on proven initiatives, could thoughtfully manage rising visitor numbers while preserving the integrity of historic sites. Only comprehensive operational realignments integrating upgraded offerings with best practice regulatory regimes can optimize the resident experience, safeguard resource longevity, and align this invaluable cultural ecosystem for future viability in Egypt's tourism vision.

5.3. Limitation and Future Studies

This exploratory study has some limitations that provide avenues for future research. First, the analysis relied solely on visitor reviews from TripAdvisor; so, the insights may not represent the full range of visitor perceptions, and additional data sources could reveal further themes. Moreover, while this study has begun to fill gaps in understanding issues at Egypt's most widely traveled heritage sites, it is limited by only examining three prominent destinations. To build a richer contextual understanding of regional variations and how tourism impacts smaller communities, future research could complement this analysis by also incorporating viewpoints on lesser visited sites. Extending the analysis to diverse locales such as Aswan, Luxor or Alexandria could uncover sociocultural factors and distinct management challenges in less trafficked areas. Comparisons between high- and low-volume sites may additionally reveal how preservation versus development priorities differentially influence experiences. Broadening the scope will expand generalizability whilst providing balanced recommendations beneficial for all of Egypt's invaluable ancient treasures.

A key limitation of the present study is its inability to attribute demographic characteristics to those posting TripAdvisor reviews. Insights are drawn solely from the words used without details on important visitor profiling factors such as nationality, socioeconomic background, educational attainment or overall travel experience. Understanding how perceptions may vary depending on visitor demographics represents an important avenue for follow-up investigations. By pairing content analysis of reviews with surveys administered on site, future studies could elucidate the roles of moderating variables like cultural background, wealth, gender and education level in shaping experiences and satisfaction levels. Such comparative demographic analyses would provide substantially richer interpretation of themes uncovered in the current study. This limitation highlights the potential for subsequent research to advance knowledge by examining potential intra-group and inter-group variations in perspective.

To build upon the theoretical contributions of this work, future studies could usefully employ a mixed-methods approach to analyze both the intended destination branding strategies as well as sentiments expressed in consumer reviews. For example, a content analysis of promotional campaigns across different media and markets could help establish the core identity constructs and benefits destinations aim to communicate to potential visitors. Cross-referencing this with our methodology examining recurring topics and sentiments in reviews would permit a meaningful evaluation of any divergences between how sites aim to position themselves versus traveler realities.

Another limitation is our reliance on computational text mining without direct review excerpts or manual coding to qualitatively assess sentiment and context around issues. As noted, animal abuse, local harassment, and physical site conditions are described but not fully explored. Quotes may have revealed subtleties affecting cultural, safety, or management dimensions beyond quantitative terms. Second, while patterns emerge, superficial analysis risks overlooking site-specific issues. While this initial exploratory study provides a useful lens into visitor experiences through text analysis of a large online review dataset, there are limitations that present opportunities for strengthening future research. Specifically, supplementing the quantitative content analysis with qualitative methods, such as conducting interviews with tourists on site, would facilitate a deeper exploration of themes and allow for the contextualization of the trends uncovered. Additionally, complementary data sources like surveys administered directly to visitors or analyzing social media posts could provide triangulated perspectives not captured through reviews alone. Building upon these foundational findings, comparative analyses of heritage destinations across various regions and longitudinal tracking of sentiment shifts represent logical next steps to expand the generalizability and impact of the knowledge gained. Incorporating mixed methods through both additional qualitative inquiry and quantitative data collection from multiple online and offline sources represents a strategic path forward to develop an even more robust understanding of how to ensure sustainable stewardship of Egypt's iconic cultural sites.

Author Contributions: Conceptualization, T.H.H. and M.I.S.; methodology, M.Y.A. and T.H.H.; software, M.Y.A. and T.H.H.; validation, T.H.H. and M.I.S.; formal analysis, M.I.S. and T.H.H.; investigation, M.I.S. and M.Y.A.; resources, M.I.S. and T.H.H.; data curation, M.Y.A. and M.I.S.; writing—original draft preparation, M.Y.A. and T.H.H.; writing—review and editing, M.Y.A. and M.I.S.; visualization, T.H.H. and M.I.S.; supervision, T.H.H. and M.I.S.; project administration, M.Y.A. and M.I.S.; funding acquisition, T.H.H. and M.Y.A. All authors have read and agreed to the published version of the manuscript.

Funding: This work was supported by the Deanship of Scientific Research, Vice Presidency for Graduate Studies and Scientific Research, King Faisal University, Saudi Arabia (grant No. 5725).

Institutional Review Board Statement: This study was conducted according to the guidelines of the Declaration of Helsinki.

Data Availability Statement: Data are available on request due to privacy/ethical restrictions.

Acknowledgments: We gratefully acknowledge the financial support provided by grant No. 5725 from the Deanship of Scientific Research, Vice Presidency for Graduate Studies and Scientific Research, King Faisal University, Saudi Arabia.

Conflicts of Interest: The authors declare no conflicts of interest.

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