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VALORIZING URBAN ARCHAEOLOGICAL HERITAGE: EVALUATING THE SUSTAINABLE MANAGEMENT OF TIPAZA'S SITE THROUGH THE RST02 GRID

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ABSTRACT

This study aims to evaluate the valorization of the archaeological heritage of Tipaza through the RST02 Grid, focusing on governmental, social, economic, environmental, and cultural dimensions. Using a questionnaire-based approach, 250 surveys were distributed to assess perceptions, challenges, and opportunities regarding the preservation and promotion of Tipaza's archaeological site. The collected data is analyzed to highlight key factors affecting sustainable management and propose strategies to enhance the integration of urban and archaeological heritage within a sustainable development framework.

KEYWORDS

Archaeological Heritage, Tipaza, Sustainable Urban Development, RST02 Grid, Heritage Valorization

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1. Introduction

Urban archaeological heritage plays a pivotal role in preserving historical identity and fostering sustainable urban development (Teklemariam, 2024). Tipaza, a UNESCO World Heritage site in Algeria, is renowned for its Roman ruins and cultural significance. However, rapid urbanization, lack of awareness, and insufficient resource allocation pose threats to its conservation and revitalization (Aoudia & Chennaoui, 2017). This research investigates the challenges and opportunities in valorizing Tipaza's archaeological heritage, emphasizing its potential for sustainable urban development. By employing the RST02 Grid, the study seeks to provide a structured evaluation and actionable recommendations for policymakers and stakeholders.

1.1 Context

Tipaza's archaeological site holds historical, social, and cultural significance, representing centuries of Roman influence intertwined with local heritage (Aoudia & Chennaoui, 2017, Song & Selim, 2022). As an urban landmark, its integration into contemporary urban fabric necessitates a balance between conservation and development (Barone, 2023). Despite existing legislation and cultural initiatives, challenges such as urban sprawl, insufficient funding, and public disengagement persist. The RST02 Grid provides a comprehensive framework to evaluate and address these dimensions, fostering a multidisciplinary approach to sustainable heritage management (Ferial et al., 2018, Belhannachi et al., 2024).

1.2 research questions

The study seeks to answer the following research questions: What are the strengths and weaknesses of current heritage management practices at Tipaza? How do local communities, tourists, and heritage professionals perceive the cultural, economic, social, and environmental aspects of the archaeological site? What opportunities exist for enhancing heritage valorization through policy, funding, and community involvement? Lastly, how can modern technologies and sustainable practices contribute to the long-term preservation and management of Tipaza's archaeological sites?

1.3 Relevance of the study

This study is highly relevant in the context of the archaeological heritage, as it aims to provide a comprehensive understanding of the challenges and opportunities for its preservation and valorization. The findings will inform policy-makers, heritage professionals, and local communities on effective strategies for improving heritage management. By addressing key aspects such as sustainability, tourism, cultural preservation, and community engagement, the study contributes to the broader field of heritage studies and offers practical recommendations for Tipaza and similar heritage sites in Algeria. Furthermore, the integration of modern technologies in heritage management makes this study particularly timely, given the increasing global focus on digital tools for cultural preservation and the need for sustainable tourism practices.

2. Literature Review

The preservation of archaeological sites is an evolving field that intersects various disciplines, including heritage management, urban planning, and sustainability studies (Fayez, 2024). This literature review examines key frameworks, models, and methodologies for evaluating the sustainability of archaeological sites, with a specific focus on urban heritage preservation. It also investigates the role of quantitative assessment tools in evaluating heritage sustainability.

2.1 Frameworks and Models for Evaluating Sustainability in Archaeological Sites:

Several frameworks and models have been proposed to assess the sustainability of archaeological sites, with an emphasis on preserving both tangible and intangible cultural heritage (Fayez, 2024b). These frameworks generally address the social, economic, and environmental dimensions of sustainability (Conroy et al., 2024). The ICOMOS (International Council on Monuments and Sites) Sustainable Development Guidelines (2004) serve as one of the foundational documents for understanding sustainability in heritage preservation. These guidelines emphasize the balance between heritage conservation and development, focusing on integrating sustainable practices into management strategies (ICOMOS, 2004). Similarly, UNESCO's Convention on the Protection of the Underwater Cultural Heritage (2001) provides a legal framework specifically for underwater archaeological sites, incorporating sustainability principles into their management.

Despite the widespread use of these frameworks, a gap remains in their application to urban archaeological sites, where issues such as urbanization, tourism, and socio-economic pressures complicate sustainability assessments (Said & Dindar, 2024). Many of the existing models are more suited for rural or isolated sites and do not account for the challenges specific to urban archaeological environments. Further research is needed to adapt or develop new frameworks that address these unique challenges and integrate more dynamic, context-specific variables, such as local governance and stakeholder interests (Inostroza & Taubenböck, 2024).

2.2 Multidimensional Sustainability in Urban Heritage Preservation:

Urban heritage preservation is a complex field that involves balancing the preservation of historical and cultural values with the demands of modern urban development. Multidimensional sustainability—which integrates environmental, social, economic, and cultural sustainability—has become increasingly relevant in urban heritage studies (Guzman, 2020). The integration of sustainable practices in urban heritage preservation has been explored through various case studies, such as in the Old City of Dubrovnik, which emphasizes the importance of maintaining local identity and reducing environmental degradation while fostering economic growth through tourism (Funduk et al., 2023).

However, while much research focuses on the economic and cultural aspects of sustainability, there is a lack of focus on the environmental sustainability of urban heritage sites, particularly in terms of energy efficiency and waste management. Furthermore, the social aspect—especially community involvement and engagement in decision-making—is often inadequately addressed, despite its importance for long-term sustainability (Ramos, 2024). Future research should focus on creating more comprehensive models that incorporate all dimensions of sustainability, particularly through the use of participatory processes that include local communities as key stakeholders in decision-making and site management.

2.3 Role of Quantitative Assessment Tools in Heritage Sustainability Studies

Quantitative tools have been increasingly used to assess the sustainability of archaeological sites, providing valuable data to inform heritage management decisions (Ornelas et al., 2023). Tools like Geographic Information Systems (GIS), remote sensing, and life cycle assessments (LCA) are commonly employed to analyze the environmental impact of heritage sites (Liu et al., 2024). For example, GIS has been used to assess the spatial distribution of heritage assets and evaluate environmental factors such as urban encroachment or climate change risks (Yao et al., 2023).

Despite their potential, these tools are often criticized for being too technical or disconnected from the socio-cultural aspects of heritage preservation. While GIS and remote sensing can offer insights into the physical and environmental conditions of heritage sites, they are less effective at capturing intangible cultural aspects, such as community sentiment or heritage values (Geng et al., 2024). Additionally, the data obtained through these tools are sometimes difficult for non-experts to interpret or apply in practical decision-making scenarios. As such, further development is needed to integrate quantitative tools with qualitative methods, such as participatory action research, to better capture the multifaceted nature of sustainability in heritage preservation (Banda et al., 2024).

2.4 Critical Analysis and Research Gaps:

While existing literature offers valuable insights into sustainability in heritage preservation, several gaps remain. First, the frameworks and models used to assess sustainability are often general and do not adequately address the specific challenges of urban archaeological sites, particularly in developing countries like Algeria (Bounoua et al., 2023). There is also a lack of consistency in integrating all three pillars of sustainability—environmental, social, and economic—into a unified framework that can be applied across different contexts. Furthermore, the role of community engagement and local governance in sustainability practices is underexplored and requires more attention (Affre et al., 2024).

In terms of quantitative tools, the current methods, while useful for physical assessments, fail to address the more subjective and intangible aspects of heritage sustainability, such as local heritage values or community sentiments. Future research should focus on integrating digital technologies with more inclusive, participatory methods to offer a more holistic approach to heritage sustainability (Chakraborty & Ji, 2024).

3. Methodology

The study used a mixed-methods approach, combining both quantitative and qualitative research techniques, including a structured questionnaire for data collection and various analytical frameworks.

3.1 Choice of Questionnaire as a Research Method

The questionnaire was structured to encompass five key dimensions, which correspond to the categories of the RST02 Grid. The questions were formulated to explore these dimensions from various perspectives, ensuring a broad analysis of both tangible and intangible aspects of heritage valorization.

- **Governmental Dimension:** Questions focused on legislative measures, policy effectiveness, funding availability, and organizational structures involved in heritage management and protection (Žuvela et al., 2023).
- **Social Dimension:** Items explored community engagement, public accessibility, local identity, and the involvement of local populations in heritage preservation (Serrano-Estrada et al., 2024).
- **Economic Dimension:** Questions assessed the financial mechanisms supporting heritage sites, the role of tourism, and the potential for economic development through cultural heritage initiatives (Alexandrakis et al., 2019).
- **Environmental Dimension:** Respondents evaluated practices related to sustainability, environmental conservation, and waste management in the context of heritage sites (Boermans et al., 2024).
- **Cultural Dimension:** The survey included items addressing cultural preservation, the integration of heritage into urban planning, and the promotion of cultural diversity (Abdurahiman et al., 2024).

3.3 Distribution and Data Collection

A total of 250 questionnaires were distributed to a diverse range of respondents, including local residents, tourists, policymakers, heritage professionals, and cultural stakeholders. The sampling strategy was designed to ensure a representative demographic, capturing a wide variety of viewpoints from different groups with varying levels of engagement and expertise in heritage preservation. The data collection process aimed to reflect a comprehensive set of perspectives on Tipaza's archaeological heritage.

3.4 Data analysis

The data collected from the questionnaires were analyzed through several complementary approaches, providing both qualitative and quantitative insights.

3.4.1 Descriptive Statistics:

The first step in data analysis involved the use of descriptive statistics to summarize the responses. Frequency distributions, percentages, and measures of central tendency (such as the mode) were calculated for categorical and ordinal data. This provided an overview of general trends and patterns in the respondents' perceptions, such as the level of satisfaction with current heritage management or the perceived importance of private investment in heritage preservation.

3.4.2 Sentiment Analysis:

For open-ended responses, a sentiment analysis was conducted to gauge the emotional tone of the participants' feedback. Responses were categorized as positive, negative, or neutral based on the language used, and common themes (e.g., concerns about urbanization, suggestions for improving site management) were identified. This allowed for a deeper understanding of public sentiment regarding the preservation of Tipaza's heritage.

3.4.3 SWOT Analysis:

Using the findings from both the closed and open-ended questions, a SWOT analysis was performed to identify the Strengths, Weaknesses, Opportunities, and Threats related to the valorization of Tipaza's archaeological site. Strengths highlighted key positive aspects such as the site's cultural significance and public interest. Weaknesses pointed to areas in need of improvement, such as management practices or accessibility. Opportunities explored potential areas for growth, like increasing private sector involvement or integrating modern technology for virtual heritage experiences. Threats included factors such as urbanization or inadequate funding for preservation efforts (Javaid et al., 2024).

3.4.4 RST02 Grid:

Finally, the responses were mapped onto the RST02 Grid to assess the five core dimensions of heritage valorization (Governmental, Social, Economic, Environmental, and Cultural). Each dimension was scored based on the data, with attention paid to both quantitative responses (such as ratings of institutional effectiveness) and qualitative suggestions (such as recommendations for improving site management). This grid helped prioritize the key areas of focus, highlighting where intervention is most needed to enhance the preservation and promotion of Tipaza's archaeological heritage.

4 Results

4.1 Demographic Overview of Respondents:

The data presents the age distribution of a population sample of 200 individuals, divided into three age groups as illustrated in figure 01:

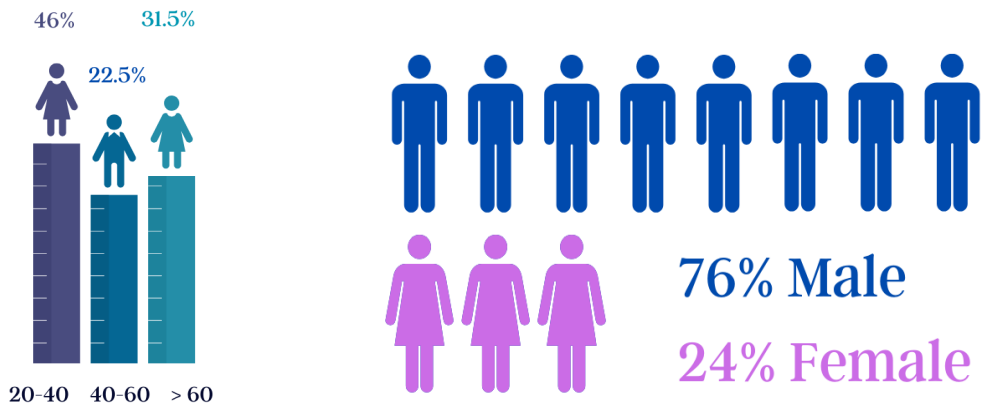


Fig. 1. Age and gender distribution of the population. Source: Authors

The cumulative percentages indicate that by adding the second group (40-60), **68.5%** of the population is under 60 years old, while the remaining **31.5%** are above 60 years old.

This shows a relatively balanced distribution, with the majority falling within the younger age bracket (20-40), and a significant portion (nearly one-third) in the oldest age group (over 60). The sample is predominantly male, with 76% (152 individuals), while 24% (48 individuals) for Female.

The distribution of positions in figure 02 shows that architects constitute the largest group, representing 24.5% of respondents, followed by archaeologists at 11% and university lecturers at 7.5%. Other notable professions include artisans (5%), engineers (6.5%), and IT specialists (4.5%). A significant proportion, 34.5%, fall under "various other professions," highlighting diverse occupational backgrounds (Figure 2).

4.2 Sentiment Analysis

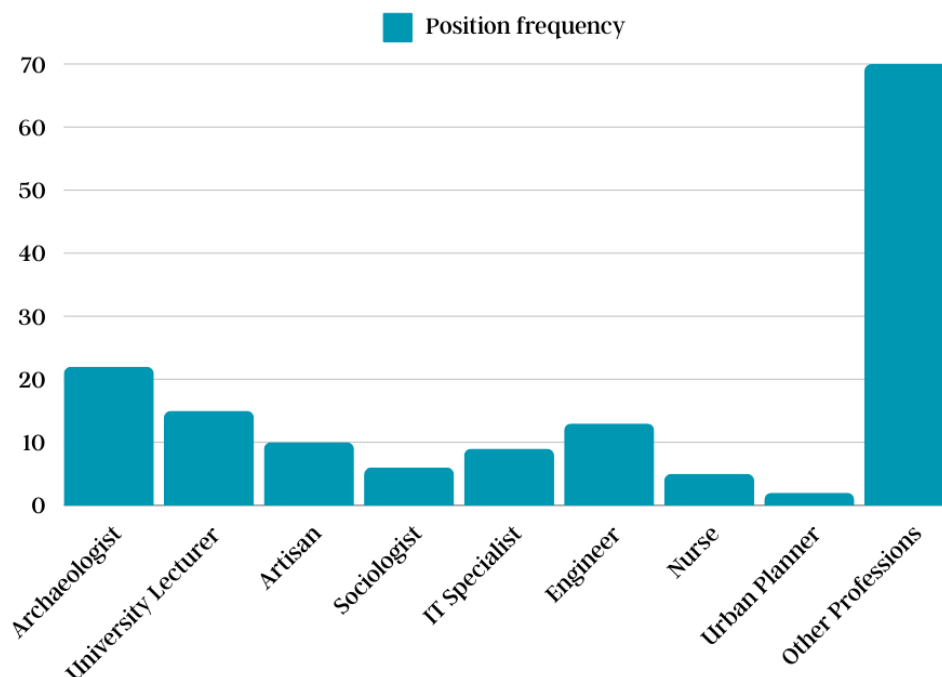


Fig 2. Population responses percentages. Source : Authors

Integration of Private Investors in the Management of Protected Heritage Sites:

The sentiment towards the integration of private investors in managing protected heritage sites is divided. Among the 200 respondents, the answers reveal mixed perspectives, with nuanced conditional support and significant opposition.

Positive Sentiment:

Approximately 45% of respondents expressed support for private sector involvement. Many acknowledged the potential benefits, such as improved management and the possibility of enhanced investment. Some supporters emphasized conditional approval, suggesting that such integration should be guided by experts in heritage management and closely monitored to protect the site's integrity.

Negative Sentiment:

The opposition, comprising around 55% of respondents, cited concerns about the commercialization of heritage sites, which might undermine their cultural and historical value. Common reasons included fears that private entities would prioritize profit over preservation, potentially leading to the degradation or marginalization of the sites' patrimonial significance.

The low cost of access to archaeological sites and its implications

Positive Sentiment:

The policy of attracting visitors to heritage sites suggests a positive approach. By encouraging tourism, improving accessibility, and increasing public engagement, it helps raise awareness of cultural heritage. This can lead to economic benefits and a broader appreciation for preserving historical sites. The positive sentiment arises from the idea that promoting heritage sites enhances their visibility and supports their preservation.

Negative Sentiment:

In contrast, the policy of abundance and neglect implies a negative impact. This approach suggests over-exploitation and a focus on quantity rather than quality, leading to the deterioration and neglect of heritage sites. Such policies can harm the preservation of cultural heritage, resulting in irreversible damage or the loss of historical value.

Analysis of Heritage Site Visitations Across Countries

Positive Sentiment:

Many participants have visited heritage sites in Algeria, followed by France, Tunisia, Italy, Morocco, Greece, and other countries like Syria, Egypt, Jordan, Spain, Lebanon, Portugal, and Libya. Algeria stands out as the most frequently visited country for heritage sites, with many responses mentioning it alone or in combination with other countries. A few respondents have also visited diverse regions such as Syria, Egypt, Iraq, Lebanon, and Saudi Arabia.

Negative Sentiment:

Several participants have not visited any heritage sites globally, with some responses simply stating "Non" to indicate no experience with visiting heritage sites abroad. While Algeria, France, and Tunisia appear frequently, other countries like Spain, Portugal, and Lebanon are mentioned less often, suggesting a range of experiences and travel preferences among the participants.

Analysis of Weaknesses in the Management of Tipaza Site

Positive Sentiment:

Several responses expressed a desire for improvements that would enhance the visitor experience and the site's management. These include the introduction of modern technologies to attract visitors, the addition of amenities like rest areas and restaurants, and the creation of commercial spaces. There is also a clear sentiment supporting sustainable tourism, with suggestions like providing waste sorting bins and encouraging cultural activities.

Additionally, responses advocating for the installation of specialized guides and better signage reflect a proactive approach to addressing the site's challenges and enhancing its cultural value. These responses highlight a commitment to improving the heritage site's management and making it more accessible and appealing to tourists.

Negative Sentiment:

On the other hand, several respondents pointed out the current deficiencies in the management of Tipaza, particularly in terms of security, maintenance, and accessibility. Complaints about insufficient lighting, lack

of rest areas, and limited waste management convey frustration with the site's infrastructure. The absence of guides, adequate guarding, and cleaning services also paints a picture of neglect in the site's upkeep and care.

The mention of insecurity and the difficulty of access for people with disabilities reflects a concern for safety and inclusivity, with some responses indicating that the site is not adequately prepared for all types of visitors. Overall, the negative sentiment is rooted in the perceived lack of adequate infrastructure and management, which could deter potential visitors.

4.3 SWOT Analysis

The following SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis (Figure 03) presents an in-depth examination of the key dimensions involved in the valorization of urban archaeological heritage based on the questionnaire answers, focusing on governmental, social, economic, environmental, and cultural factors. The analysis highlights the strengths and challenges in preserving and enhancing archaeological sites while identifying potential opportunities and risks associated with sustainable management practices.

4.4 RST02 Grid Analysis

The RST02 grid (Table 01) analysis evaluates sustainability across five key dimensions: Governmental, Social, Economic, Environmental, and Cultural (Muniz et al., 2023). Each criterion is assessed on a scale from 0 (No sustainability) to 3 (Good sustainability).



Fig 3. SWOT Analysis matrix. Source: Authors

Table 1. Sustainability Classes of Tipaza's archeological site.
Source: Authors in Application of the RST02 Grid

Dimensions	Selected Criteria	Sustainability Classes					
		0	1	2	3	Total	Avg
		No	Average	Almost good	Good		
Governmental Dimension	- Publish legislative texts to enhance the urban archaeological heritage and its revitalization.				X		
	- Create a practical guide to facilitate the application of laws and legislative texts concerning the preservation of archaeological heritage.				X		
	Legislative measures to protect archaeological sites from unregulated urbanization within site protection perimeters.		X				
	Commission new organizations for the management and exploitation of protected cultural assets, e.g., OGEBC.				X		
	Allocate specialized funds for financing preservation and enhancement projects for urban archaeological heritage.			X			
	Allow private developers to invest in these valorization projects.	X					
	Develop participatory mechanisms to promote inclusivity and democracy in the management of archaeological sites.			X			
						14,00	2
Social Dimension	Design appropriate facilities that maintain group cohesion and user satisfaction, strengthening social bonds.		X				
	Adapt infrastructure to provide accessibility for everyone, including individuals with reduced mobility.		X				
	Collective appropriation and local community recognition of archaeological sites tied to their history, traditions, and cultural identity.			X			
	Establish educational and recreational programs to raise local awareness and provide information on conservation methods.		X				
	Encourage local fishermen at Tipaza's port and local artisans to practice their activities outdoors for sustainable site valorization.			X			
	Multidisciplinary involvement in the conservation and management of archaeological sites.			X			
	Develop a management plan integrating site conservation with waste management, considering diverse public needs.				X		
						12,00	1,71

Economic Dimension	Create special funds to finance archaeological site protection operations and encourage private investor mobilization for sustainable tourism.			X			
	Revise the low access fees to archaeological sites to reflect their importance.			X			
	Provide permanent or seasonal employment opportunities in the management, operation, and preservation of archaeological sites.				X		
	Utilize new information and communication technologies (ICT) to increase tourism flow and site revenue.				X		
						10,00	2,50
Environmental Dimension	Position archaeological sites as stimuli for urban and territorial sustainability, protecting their natural environment.				X		
	Promote ecological accessibility to the site using green transportation methods to enhance sustainability value.				X		
	Reduce and reuse waste by encouraging the reuse of materials found on-site and adopting durable materials.				X		
	Establish performance indicators to measure sustainable conservation parameters and adjust strategies accordingly.			X			
	Promote mobility within preserved archaeological sites using environmentally friendly transportation compatible with site morphology.			X			
	Ensure formal and spatial coherence with the topographic nature of archaeological sites.			X			
						15,00	2,5
Cultural Dimension	Preserve cultural diversity within heritage sites.				X		
	Provide a framework for dialogue and understanding to address social and environmental challenges.			X			
	Promote access to culture as a fundamental right to support sustainable tourism.				X		
	Monuments in archaeological sites represent the cultural identity of local communities.				X		
	Include cultural values in territorial planning strategies at the same level as restoration techniques.			X			
	Urban archaeological heritage valorization while preserving local cultural identity as a successful model for sustainable urban development.				X		
						16,00	2,67
Total		1	4	12	13	67,00	
Percentage		1,49	5,97	17,91	26,87	100	

5 Discussion

5.1 Demographic Insights and Their Implications:

The demographic data reveals a diverse respondent profile with a balanced age distribution. The majority of individuals (68.5%) are below 60 years old, indicating a relatively youthful population, while 31.5% are aged 60 and above, representing a significant portion of older participants. The sample is predominantly male (76%), with females making up 24%.

In terms of professions, architects form the largest group at 24.5%, followed by archaeologists (11%) and university lecturers (7.5%). Other professions, including artisans, engineers, and IT specialists, collectively account for smaller percentages, with 34.5% categorized under "various other professions." This variety underscores the diverse occupational and experiential backgrounds of the respondents, providing a broad perspective on the subject matter.

5.2 Sentiment Analysis and Stakeholder Perspectives

The sentiment analysis reveals a mixed response regarding heritage site management. On the integration of private investors, 45% of respondents are open to it, recognizing potential benefits like improved management and investment, as long as it is guided by experts to protect cultural value. However, 55% oppose it, fearing commercialization and profit-driven decisions could harm the sites. When it comes to low-cost access, there is support for policies that boost tourism and raise awareness, but concerns exist about over-exploitation and damage to cultural heritage. Regarding site visitations, Algeria, France, and Tunisia are the most visited, but some respondents have never visited heritage sites abroad, indicating limited exposure. Finally, while suggestions for Tipaza site improvements include better signage, waste management, and facilities, respondents also highlight significant issues like poor maintenance, inadequate security, and accessibility challenges, especially for people with disabilities. These responses reflect a need for better infrastructure, management, and preservation practices.

5.3 SWOT Analysis Interpretation

This SWOT analysis reveals a complex landscape of challenges and opportunities in the valorization of urban archaeological heritage. While significant strengths, such as legislative support, multidisciplinary involvement, and cultural integration, offer a solid foundation for preserving heritage, there are key weaknesses, including implementation challenges, resistance from local communities, and resource limitations, that need to be addressed. Opportunities in sustainable tourism, ecological practices, and economic development can provide pathways to ensure the long-term viability of heritage preservation. However, threats such as environmental degradation, urbanization, and cultural dilution must be carefully mitigated to ensure that heritage sites retain their value for future generations. Balancing these factors will require coordinated efforts across governmental, social, economic, environmental, and cultural dimensions to successfully preserve and valorize urban archaeological heritage.

5.4 Synthesis of RST02 Grid Analysis

The sustainability assessment reveals varying levels of performance across the five dimensions, indicating both strengths and areas requiring improvement. Generally, the cultural and environmental dimensions emerge as the most sustainable, while the social and governmental dimensions display notable gaps that hinder inclusivity and effective governance. This interpretation underscores the need for a balanced and targeted approach to enhance sustainability across all facets of urban archaeological heritage management.

Specifically, the governmental dimension, with an average score of 2, reflects moderate sustainability. Legislative and funding initiatives provide a solid foundation, yet there is a clear need for stronger private sector involvement and participatory governance mechanisms to foster inclusivity and efficiency. The social dimension, scoring an average of 1.71, highlights weak sustainability. Challenges in infrastructure accessibility and limited community engagement underscore the necessity for strategies that address diverse public needs and promote collective heritage management.

The economic dimension stands out with a strong average score of 2.5, emphasizing significant opportunities for sustainable tourism and site preservation through the utilization of ICT and funding mechanisms. Nonetheless, there remains potential for further development, particularly in creating employment opportunities within heritage management. Similarly, the environmental dimension, also scoring an average of 2.5, reflects robust sustainability efforts. Green practices, ecological site management, and

alignment with natural morphology are commendable, though more robust performance measurement mechanisms could elevate sustainability outcomes further.

The cultural dimension, achieving the highest average score of 2.67, underscores its position as the most sustainable aspect of heritage management. Effective preservation of local identities, cultural integration into development strategies, and the promotion of cultural values within territorial planning represent significant strengths.

Radar chart

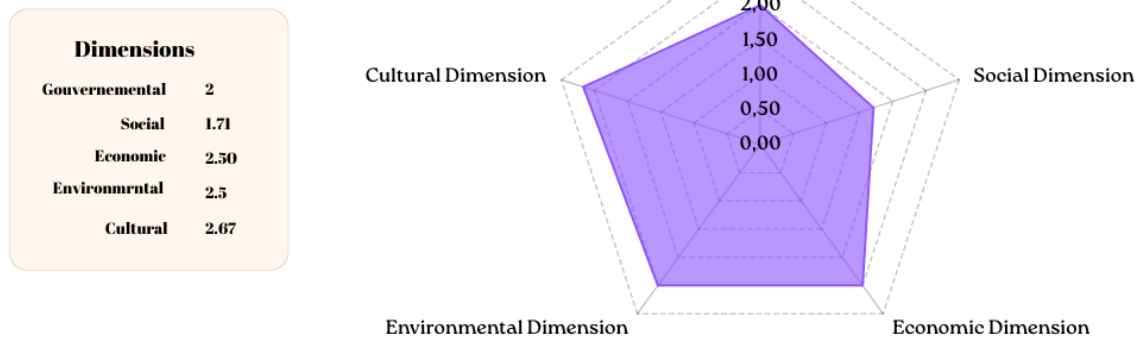


Fig. 4. Evaluation of Tipaza's archeological site according to Sustainability Classes
Source: Authors with Application of the RST02 Grid

The radar chart (figure 04) based on the average scores vividly illustrates the comparative performance of these dimensions. The cultural and environmental dimensions exhibit the broadest reach, while the social and governmental dimensions show narrower spans, reflecting their weaker sustainability. This visual representation reinforces the findings, highlighting areas for targeted action to achieve a comprehensive and equitable approach to sustainability in urban archaeological heritage management.

6 Conclusions

This research provides comprehensive insights into the management and preservation of the Tipaza archaeological site, addressing the key questions surrounding the strengths and weaknesses of current practices, the perceptions of various stakeholders, and the opportunities for enhancing heritage valorization. The study reveals both strengths and weaknesses in the current heritage management practices at Tipaza. Strengths include legislative support, some involvement of multidisciplinary experts, and efforts to integrate heritage into cultural development. However, weaknesses are evident in areas such as inadequate infrastructure, poor maintenance, limited security, and accessibility challenges, particularly for people with disabilities. These deficiencies hinder the site's potential to fully attract and accommodate visitors, reflecting the need for substantial improvements in management.

The perceptions of local communities, tourists, and heritage professionals reveal a mix of views across the cultural, economic, social, and environmental dimensions. Cultural aspects are seen as crucial for maintaining the identity and heritage of the site, with many stakeholders emphasizing the need for greater preservation efforts. Economically, there is recognition of the potential for sustainable tourism to generate revenue, but there are concerns about over-exploitation and commercialization. Socially, while some support increased accessibility and engagement, others highlight challenges in infrastructure and community involvement. Environmentally, the site's ecological management is generally regarded as robust, though there is room for improvement in terms of performance measurement.

Opportunities for enhancing heritage valorization include the implementation of policies that prioritize sustainable tourism, increased funding for preservation initiatives, and greater community involvement in decision-making. A coordinated approach involving both public and private sectors, alongside stronger community engagement, can significantly enhance the site's long-term preservation and its economic sustainability.

Modern technologies and sustainable practices can play a pivotal role in the preservation and management of Tipaza. The application of technologies such as digital mapping, virtual tours, and smart waste

management systems can improve visitor experiences while ensuring that the cultural and historical integrity of the site is maintained. Additionally, incorporating sustainable practices like eco-tourism and waste reduction can contribute to the long-term viability of the site, ensuring that it remains accessible and well-preserved for future generations.

In conclusion, this study underscores the need for a balanced, multidisciplinary approach to managing and valorizing urban archaeological heritage sites. While Tipaza benefits from existing strengths, addressing weaknesses through improved infrastructure, greater community involvement, and the integration of modern technologies will be essential for ensuring its sustainable future.

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