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A SYSTEMATIC ANALYSIS OF CONSERVATION THE WORLD ARCHAEOLOGICAL SITE AL QAL'A BANI HAMMED IN ALGERIA

Abstract: The protection of urban heritage is not an abstract intellectual theory, as it resembles any planning process subject to a set of factors. Those factors are determined in a progressive and continuous way by the actors of this field. If the political decision was considered the main motor of its dimensions and objectives, the technical factor is not less important, it is embodied these dimensions and objectives. In this context this study came to approximate between the Points of View the first and the second the area of conservation the World archaeological site Al Qal'a Bani Hammed in Algeria (PPMVSA). Although their theoretical reference is the same, but technical evaluation has different in determining the protection perimeter, using the geographic information system (GIS) and multiple-criteria decision analysis (MCDA) to systematically and precisely analyse the factors controlling the determination of the archaeological protection area, we are reducing the percentage of biased points of view and we propose an alternative to protection plan based on precise scientific principles and standards.

Key words: Bani Hamed Qal'a, conservation plan, multiple-criteria decision analysis (MCDA), location preferences

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Introduction

The protection process of urban heritage resembled any planning process subject to a set of factors. Alois Riegel (2003) distinguishes between historical value and artistic value, the most evident at the time, and still today for cultural heritage. Furthermore, he shows that these two values can be included in broader notions: the historical value in that of remembrance and the artistic value in that of contemporaneity²¹. The values of remembrance are linked to the fact that the object speaks of the past, contemporary values do not depend on whether it is old or recent, inherited or produced. He distinguished three values of remembrance (Erinnerungswerte), which have appeared successively throughout history, each being an extension of the previous one. He describes them going from the most recent to the oldest (seniority value, historical value, intentional recall value) (Riegl & Boulet, 2003); as such Brandi makes a distinction similar to Riegl's between historical value and artistic value, speaking of historical instance (*istanza della storicità*) and aesthetic instance (*istanza estetica*). But Brandi's notion of instance, used in the sense given to it by phenomenology, is not reduced to that of value: it is the manifestation of a reality independent of that which the work receives, while value remains attributed and therefore subject to the free choice of the one who attributes it; value creates duties only in respect of current, future or potential beneficiaries of the estate, which therefore remains an asset, as the UNESCO Convention calls it (Hamon, 2003).

Heritage has today become a vivid topical phenomenon, largely exceeding the circle of specialists, the complex shapes and pluralities of objectification of a past-present or an "already-there": tradition, memory, history, culture, environment, etc. (Tornatore, 2010). As Heritage also refers to what nations intend to conserve for future generations it includes both a relationship to history and to the future, made up of continuities and discontinuities (Le Hégara, 2015). He is the witness of civilizations and societies throughout the history of his existence. A civilization is the reunion and the junction of the human being with the earth, diachronically and synchronously, which justifies the diversity of the latter (Paquot, 2001).

After a period when its preservation is the work of a cultural elite, the state seizes the heritage to make it an instrument of the unification of the nation before the populations reclaim it, to awareness of the importance of heritage in motivating organizations to initiate its protection according to two concepts: The right of conservation and preservation and the duty of transmission, both nationally and internationally, concerning the protection of tangible and intangible heritage at the world level (Limouzin & Icehr, 2008), implies an approach to the identification and recognition of specified qualities, characteristics and significant relationships in the built and natural territory, resulting from processes over time and associated with, multiple layers of significance. These layers of significance are related to the history of the place and to the definition of the qualities of the place itself. Consequently, we can speak of the common resources of the place, which are related to the spiritual, economic, social, historical, archaeological significance of the city. "Safeguarding" and "Integrated Development" mean encouraging processes of planning and management, while monitoring and controlling the forces and rates of change so as to retain and/or regenerate and enhance the qualities of heritage, must be well integrated into the management system and plans in order to be effective (Martini, 2013). Based on assessing the situation, intervening and evaluating, it also includes developing strategies and implementing them through professional activities which aimed make the desired change (Payne, 1991).

While some researchers see that professional intervention is an attempt to change in another format that may lead sometimes to positive or negative change. In the end, it is subject to the idea of relativity and non-absoluteness (Rooney et al., 2017) from the above we ask the following question: How can we say that an urban heritage has retained its values?

This paper complements and further expands the research strategy outlined in the preferences Preparation Plan of the conservation of Al Qal'a Bani Hammad in Algeria (PPMVSA, 2015). The aim here is to move from Bullet interpretations of the Heritage conservation to process underpinning the site with all its factors, to get a protection plan that does not conflict with the planning and reconstruction strategies of the neighbouring city.

Methods and Materials

Study Area

AlQal'a of Beni Hammad, also known as Al Qal'a is located in geographical coordinates between Latitude and longitude (35.82737, 4.81140), and the line 35°49'16.01" North and line 4°47'21.26" East. The historian and archaeologist Rachid Bourouiba mentioned" where Prince Hammad ibn Buluggin ibn Ziri Al Senhaji founded it in 1007 in Maadid Mountains to become a military base for his armies and the capital of the Hammadids 10 years later. Al Qal'a was also referred to as "Al Qal'a of Abi Tawil"(Payne, 1991). Many historians mentioned them in their books, including Ibn Khaldun who stated, "Al Qal'a soon reached high prosperity; its population grew rapidly, and artisans and students alike came in droves from the most distant countries and extremities of the empire. This influx of travellers was due to the great resources that the new capital offered to those who cultivated science (Bourouiba, 1975), commerce and the arts" as quoted in Al Bakri also described it as "a great fortress with impenetrable power that seized upon the ruins of Kairouan as the people of Africa moved, and today it is the destination of merchants and travellers from Iraq, the Hijaz, Egypt, and all the countries of the Maghreb, and today it is the stable kingdom of Sanhaja" (Williams, 1962).

The ancient city of AlQal'a of Beni Hammad received great interest among the French and Algerian archaeologists. They chronicled their archaeological discoveries, such as Paul Blanche in 1897, and Beylie G. in 1909 (Lucien, 1909), Golvin L. in 1965 (Lucien, 1962), Bourouiba Rachid. in 1964, and the Polish-Algerian Mission 1987 (Dworaczynski et al., 1990).

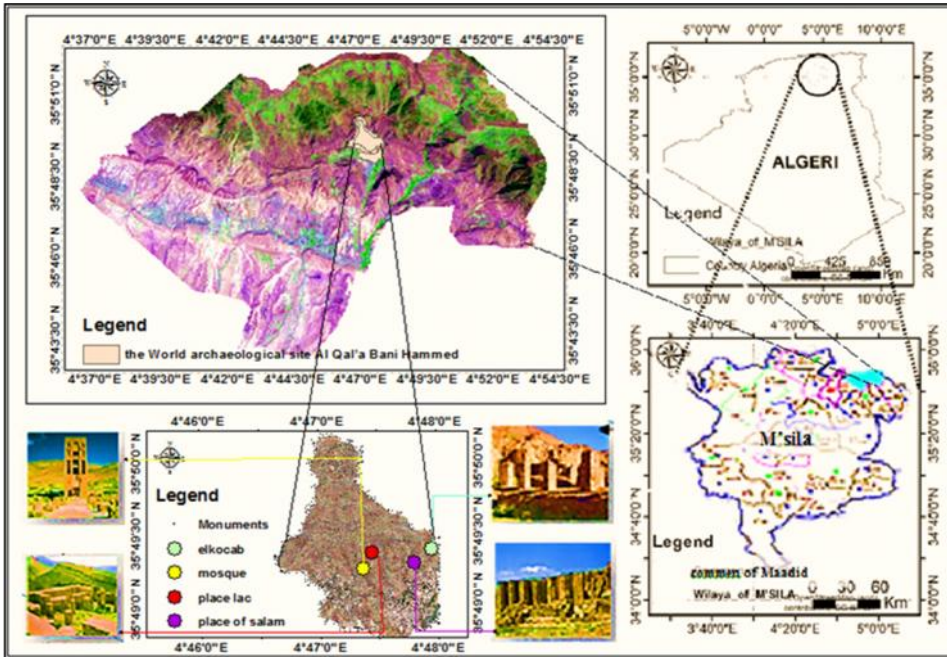


Fig. 1. Location and Monuments of the archaeological site, Al Qal'a (Source: Authors)

Factors for Demarcation the Surroundings of Historic Monuments and Archaeological Sites

As mentioned earlier, Louis Regel set the theoretical criteria were that control the type, method, preservation rate that varies from heritage to another. These values are:

- J The memory values (Remembrance): it considers all that is related to seniority value (age), historical value, as well as the importance of preservation.
- J The contemporary Values: it considers all that is related to value of use, and relative art value (technical value, creativity).

According to Law 98-04 in Algeria, relating to the protection of cultural heritage, and formulated it practically to implement as follows:

The geometrical criterion. As a technical safety requirement, we create a protection radius of at least 200 meters around the monument in order to preserve its physical integrity.

The visual criterion. In our case study, we consider the perspectives of other plans (POS; ZET; PDAU) and all that is in relation to co-visibility with the plan to preserve in its environment, However the archaeological site is integrated in her environment urban, because historical context from which it is inseparable.

The historical criterion. The study of the historical evolution of the fabric surrounding the archaeological site and of the historical context of the latter's integration into the urban fabric can reveal elements linking the site to its environment beyond the limit of visibility. As a result, the absence of an operating tool for the delimitation of the protection perimeter by this said criterion opens the field to contextual assessment, giving rise to personal applications. To do this, our approach must:

- J Readjust the limits of the protection zone, established by the geometric criterion of 200 meters, considering all the characteristics of the elements that make up the zone, considering it on a case-by-case basis.
- J The consideration of the Archaeological elements density evaluated by the historical criterion, and recognized through the remains discovered during rescue or accidental excavations.
- J Consideration of the site's natural physical constraints (steep embankments, significant height differences), or the physical limits set up by the traffic routes (boulevards, streets, ramps of urban stairs, etc.).
- J Considering the logic of current or planned urban structuring concerning the surroundings of archaeological sites evaluated by the criterion of urban composition (delimitations of districts and contiguous urban blocks, networks of various pipelines, etc.).
- J Consideration of the specific destination of certain spaces, such as urban centres, equipment and services area, tourist or natural area.

Methods

The methods of statistical applications in (geo) archaeology are proven by, Carlson (2017), Conolly and Lake (2006), and Nakoinz and Knitter (Verhagen et al., 2010), as multicriteria decision analysis (MCDA or MCDM). MCDA incorporates decisions made by individuals who have very specific views, demands, and goals on how their interests could be realized (Mendoza & Martins, 2006). Technically, and the integration of various GIS attributed datasets that contain environmental data and surface classifications (Groenhuijzen, 2019). In some cases, is used to study Multivariate modelling (and particularly multivariate site location analysis) rather follows an inductive approach that evaluates the specific site conditions in a particular region to detect preferences of the patterns (Weaverdyck, 2019). Accumulative surfaces deriving from environmental data analyses thus enable the inductive evaluation of physical parameters without excluding human interactions, then tries to see if the evidence fits in reality.

MCDM has been an active area of research since the 1970s. There are several MCDM-related organizations including the International Society on Multi-criteria Decision Making (Liou & Tzeng, 2012), Euro Working Group on MCDA (Oppio et al., 2018) and INFORMS Section on MCDM (Liou & Tzeng, 2012). The decision space corresponds to the set of possible decisions that are available to us. The criteria values will be consequences of the decisions we make. Hence, we can define a corresponding problem in the decision space. For example, in designing a product, we decide on the design parameters (decision variables) each of which affects the performance measures (criteria) with which we evaluate our product. Mathematically, a multiple-criteria design problem can be represented in the decision space as follows:

$$\text{Max } q = f(x) = f(x_1, \dots, x_n) \quad (1)$$

$$\text{Subject to } q \in Q = \{f(x) : x \in X, X \subseteq \mathbb{R}^n\} \quad (2)$$

where X is the feasible set and x is the decision variable vector of size n .

A well-developed special case is obtained when X is a polyhedron defined by linear inequalities and equalities. If all the objective functions are linear in terms of the decision variables, this variation leads to multiple objective linear programming. It can be thought

of as an extension or generalization of linear programming to handle multiple, normally conflicting objective measures. Each of these measures is given a goal or target value to be achieved. Deviations are measured from these goals both above and below the target. Unwanted deviations from this set of target values are then minimized in an achievement function. This can be a vector or a weighted sum dependent on the goal programming variant used. As satisfaction of the target is deemed to satisfy the decision maker(s), an underlying satisficing philosophy is assumed. Goal programming is used to perform three types of analysis:

-) Determine the required resources to achieve a desired set of objectives,
-) Determine the degree of attainment of the goals with the available resources,
-) Providing the best satisfying solution under a varying amount of resources and priorities of the goals.

We used Arc GIS 10.41 program for field analysis and collect data through remote schematic sensing using satellite images obtained from the Algerian space agency ALSAT2, the archives of the US space agency NASA USGS, as well as Google Earth Pro. These systems are among the most innovative technologies that allow the geographic and cartographic representation of the characteristics included in the relational databases (Al-Sabagh; 2020; Balew, 2020; Dajani, 2009; Dhanaraj, 2020; Esra & Yupo, 2000). This kind of data bases permit the visual representation of the geographical distribution of historical monuments. Also, applications of GIS in urban planning indicates it is a strong and effective tool that can aid in decision-making (Bahaire & Elliott, 1999). The power of GIS is based on its ability to visualize spatial relationships, as well as on its potential to illustrate a more holistic view of the world with its different interrelated components and complex relationships of similarity or contrast (Bualhamam, 2009).

In recent years, this technology used to develop several important national programs in many countries (Austria, Cyprus, Czech Republic, Germany, Greece, Iraq, Italy, Japan, Kazakhstan, Malta, Morocco, Russia, Slovak Republic, Spain, Syria, Turkey, UK, etc.) which were focused on collection, processing, verification and centralization of data necessary in the process of managing and conserving immovable cultural heritage (preservation, active or passive restoration, recovery and hoarding).

In Algeria, the city directive law No. 06/06 of February 2006 confirmed the use of GIS program for field analysis and collect data through remote schematic sensing using satellite images obtained from the Algerian space agency ALSAT2.

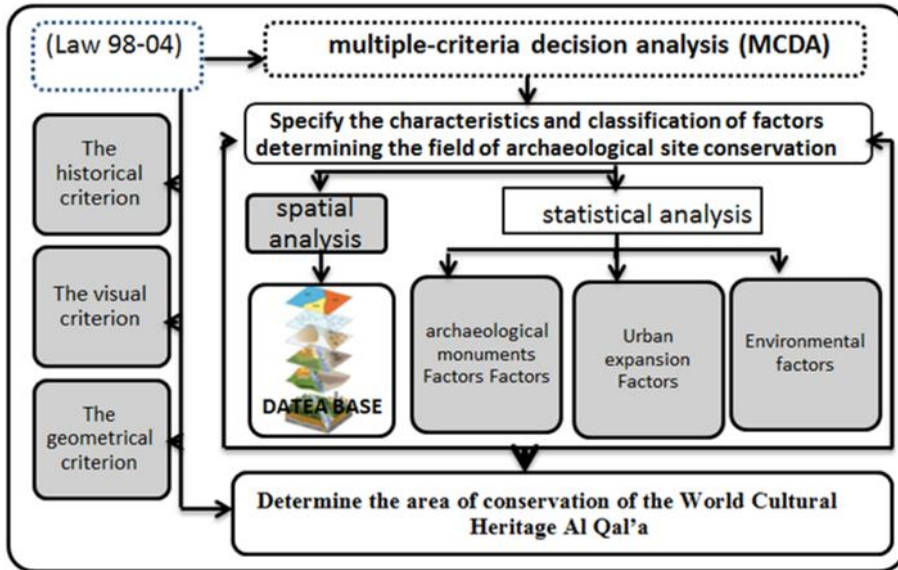


Fig. 2. The analysis procedure followed for this research

Results

After the administrative division in 1974, Al Qal'a belonged to the municipality of Maadid, which is 36 km northeast from province of M'sila. Was classified as a national heritage in 1967 (Official journal, 1986) and as a universal and human heritage by the UNESCO in 1980 (ICOMOS, 1980; Official journal, 1986). The local authorities have also drawn up a protection plan for this world heritage to protect it from the dynamism of the surrounding urban sphere (Figure 3).

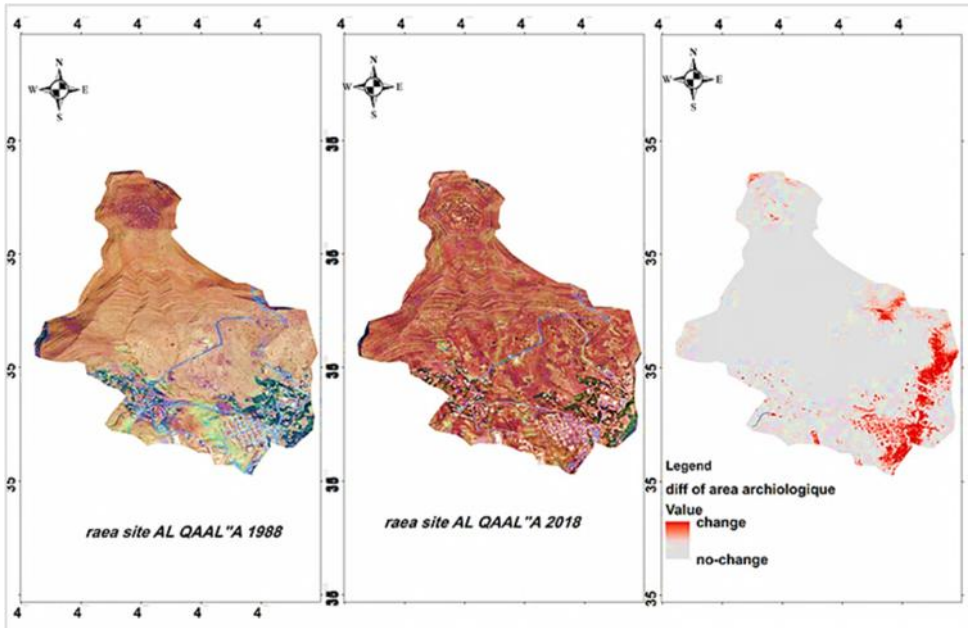


Fig. 3. the changes to urban sphere of Al Qal'a (Source: Authors)

However, the standard of technical assessments led to a difference in field implementation and its results, as the first protection scheme prepared in 1998 was revised to expand the first area of protection. The archaeological site from 150 H to 270 H. Thus, it is overlapping with the urban area by virtue of Law 29/90 of 1990, related to the preparation and reconstruction, for the failure to respect the archaeological easement distance estimated at 200 m far from the walls of the virtual of Al Qal'a, on the basis use a Geophysical Radar with a 400 MHz antenna. The archaeological site was divided into two Zoned.

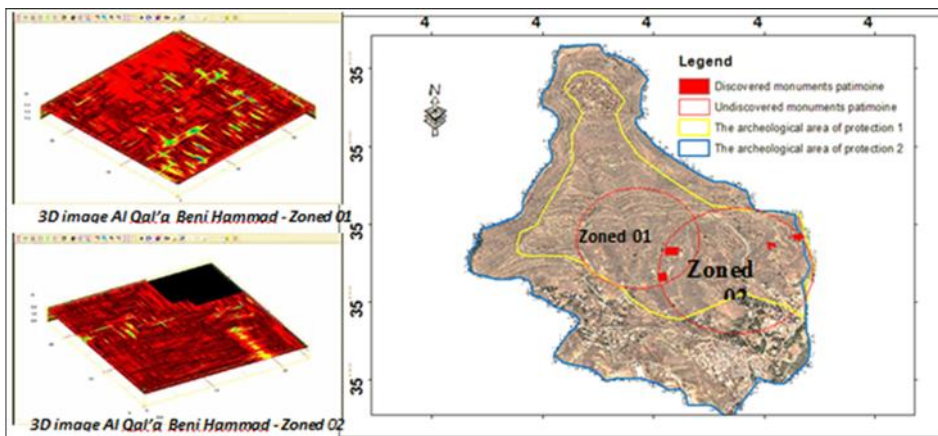


Fig. 4. The Protection Area of Al Qal'a According to the PPMVSA Plan 2015 (Source: Authors)

By using the image A and the fixed palette of n colours G, calculate the nple N, which determines the number of pixels in A with colours close to those in G. Radar with sensed the presence of archaeological objects in the Zoned 1. Indeed, the 3D image shows several

large areas (83) as well as some specific points (in yellow) which could correspond to archaeological remains. These results correspond to different areas detected during the interpretation of files despite the historical, the cultural, and the economic values of the archaeological site. It suffers from continuous deterioration which leads to its destruction or to disregard it as a world human heritage. This catastrophic situation is mainly due to not defining a field of protection takes all the factors the interlocking and transitive planning of its urban environment.

Discussion

To discuss the exact estimates for each of the planners, we computed the consistency ratio is computed from the eigenvalue, λ_{max} , which will often turn out to be larger than the value describing a fully consistent matrix. In order to provide a measure of severity of this deviation, Saaty defined a measure of consistency, or consistency index (CI) by size of matrix (Belton & Stewart, 2002).

$$CI = \frac{\text{Principal eigenvalue} - \text{size of matrix}}{\text{size of matrix} - 1} = \frac{\lambda_{max} - n}{n - 1} \quad (3)$$

To give the confirmation factor (CR) the consistency indicator is compared with the Derivative value from the ratios of factors which selected from different categories that must have the same explanation for a phenomenon and with different weights. Also, the assertion factor has been set at 3.6 and above Derivative from multiple factors n specified at $3 \leq n \leq 10$.

Tab. 1. Comparative values

Size of matrix	3	4	5	6	7	8	9	10
Comparative value	0.52	0.89	1.11	1.25	1.35	1.40	1.45	1.49

Source: Belton and Stewart, 2002: 156

Based on the eigenvalue method the largest eigenvalue in this study was (4.019). Since $n=8$, the consistency ratio is 7.649465. AN consistency ratio of 10 or less is generally stated to be acceptable.

Tab. 2. A matrix calculating weights factors and C.R determining the area of Al Qal'a archaeological site protection, using MCDA

Factors	CASS											
Environmental factors	Landscape	1	1	0.33	0.33	0.42	0.6	0.32	0.32	0.002	0.479	0.11
	Topographic	1	1	0.33	0.33	0.42	0.6	0.32	0.32	0.002	0.479	0.11
	Valleys	0.33	0.33	1	0.13	0.71	0.2	0.11	0.11	2.432	0.265	0.06
Urban expansion factors	Houses	0.32	0.32	0.11	1	1.2	1.8	0.024	0.024	0.628	0.15	0.15
	Public utilities	0.42	0.42	0.13	0.88	1	1.2	0.019	0.019	0.608	0.14	0.14
	Roads	0.6	0.6	0.2	0.56	0.71	1	0.009	0.009	0.554	0.13	0.13
Qualitative of archaeological monuments factors	Discovered monuments	0.32	0.32	0.11	1	1.2	1.8	0.024	0.024	0.628	0.15	0.15
	Undiscovered monuments	0.32	0.32	0.11	1	1.2	1.8	0.024	0.024	0.628	0.15	0.15
	TOTAL									4.273	1	
										number of criteria	8	
										C.I	4.019	
										R.I	0.525	
										C.R %	7.649	

Source: Authors

Re - Limitations of Archaeological Site Protection (The archaeological area of protection 2), distributions compared to the distance from the function of each plan. The position of the function is indicated by Points, polylines, and polygons. The extension of the red circles circumscribing shapefile does not match with the scale of the map; they are used here only as symbols for the size of these functions.

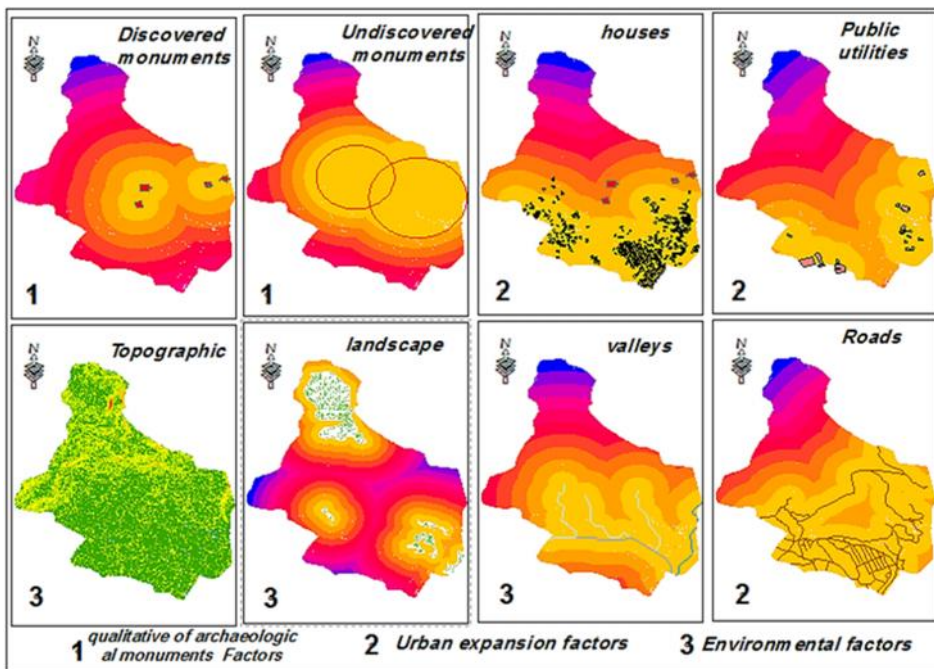


Fig. 5. Modeling of the size of the regional area factors in the field of Al Qal'a archaeological site protection (Source: Authors)

In the second stage; we classified the factors determining the scope of Al Qal'a archaeological site protection, taking into account Beneficial or not-Beneficial. On the basis of that we determined The Better and Lower the Better, which proposes the functions of the study region are equally important, with the use of mountainous terrain to protect the archaeological site as an obstacle to urban expansion; with Zoned 1 and 2 radar scanning the same importance.

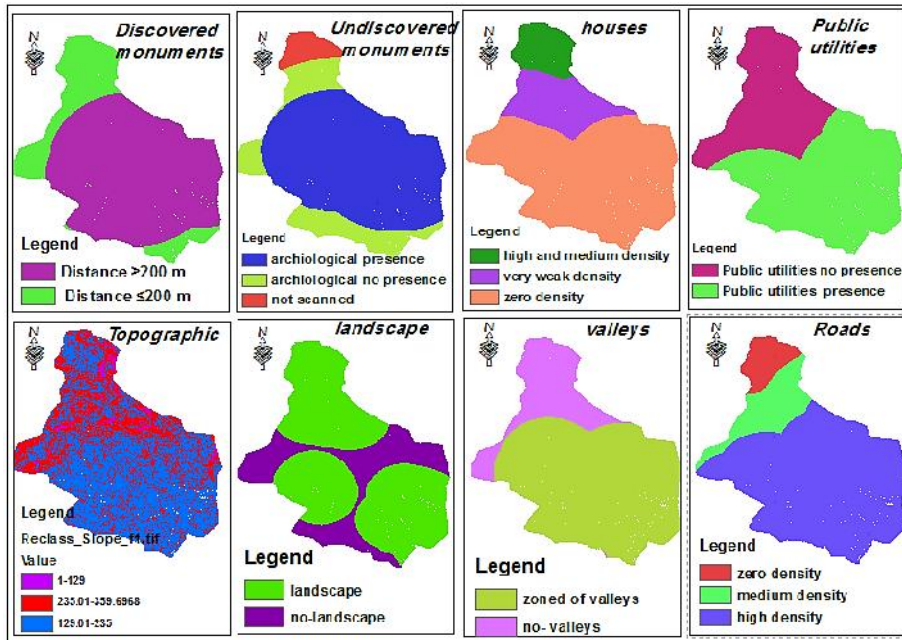


Fig. 6. Reclassify of the size of the regional area factors in the field of Al Qal'a archaeological site protection (Source: Authors)

After analytic the geographical database, and specific criteria and conditions were identified in order to propose the best preferences limitations analysis of archaeological site protection. In the light of these, we resulted an area of 21.62 H.

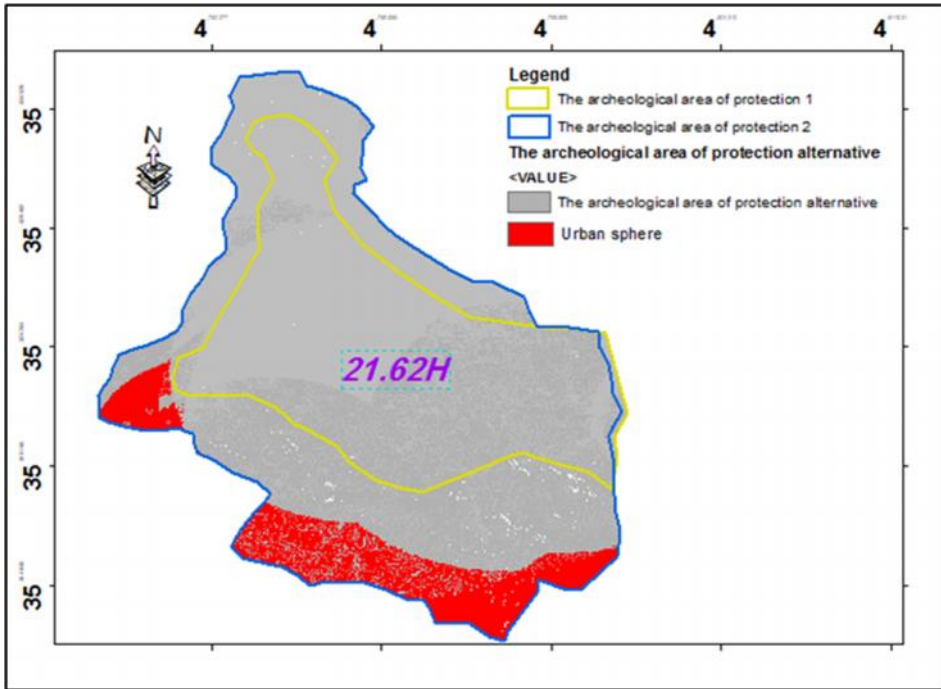


Fig. 7. Alternative Plan of the Preservation of Al Qal'a (Source: Authors)

Conclusion

This creative dimension of the theory of critical restoration meets the practice of several architects of the twentieth century, who, knowing or not knowing this theory, sought a synthesis between their influence by the modern movement and their belonging to the environment. This made the process of preserving historical monuments adopt a dynamic approach, which considers it as a living heritage. More specifically is defined here as “noble reuse”. This transmission-transformation of the project requires more varied and indirect tools than regulation and project management: awareness, training education, participation, and above all, it requires the project designer to have good reasons for their concepts, based on legal texts which had tried to encourage quality in spatial planning.

According to two concepts: The right of conservation and preservation and the duty of transmission, nationally and internationally, an arsenal of legislative texts has been adopted, concerning the protection of tangible and urban heritage at the world level. Algeria joined the world charters through the promulgation of Laws; the last one the Law 98-04 relating to excavations and the protection of historic sites. This legislation recommends a protection and enhancement plan is established for archaeological sites and their protection zone. The protection and enhancement plan fixes the general rules of organization (construction, architecture art, the land use easements), after analysing the case study “Al Qal'a”, which is considered one of the exceptional cases in Algeria (the first global classification of World archaeological in Algeria). We reached this conclusion after studying the remnants of conservation plans that were applied on this site from 1965 to the present day, as well as its management with the last conservation plan. These plans are one of the main

requirements for interpreting the subjective orientations of the planners and engineers of this program. After we understand the origin of the problematic and the components of the archaeological site, without a deep knowledge of all theoretical dimensions of conservation (modern technologies and conservation methods), and site characteristics (geomorphological, topographical, geological and hydrological), as well as its methodology to serve the self-dimensions of the conservation plan, now it is difficult to achieve and actually explain the theory of noble preservation and living heritage. This situation is not specific to our case study “Qal'a of Bani Hammad” only, but rather it is part of general difficulties in execution “complex and multi-actor” projects.

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

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References

- Al-Sabbagh, T.A. (2022). GIS location-allocation models in improving accessibility to primary schools in Mansura city - Egypt. *GeoJournal*, 87, 1009–1026.
DOI:10.1007/s10708-020-10290-5
- Bahaire, T., & Elliott-White, M. (1999). The application of Geographical Information Systems (GIS) in sustainable tourism planning: a review. *Journal of Sustainable Tourism*, 7(2), 152-174.
- Balew, A., Alemu, M., Leul, Y., & Feye, T. (2020). Suitable landfill site selection using GIS-based multi-criteria decision analysis and evaluation in Robe town, Ethiopia. *GeoJournal*, 87, 895-920. DOI:10.1007/s10708-020-10284-3
- Belton, V., & Stewart, T. (2002). *Multiple criteria decision analysis: an integrated approach*. Springer Science & Business Media.
- Beylié, L.(1909). *La Kalaa des Beni-Hammad: une capitale berbère de l'Afrique du nord au XIe siècle*. Bibliothèque nationale de France.
- Bourouiba, R. (1975). *La Qal'a des Bani Hammad*. Alger. In Imprimerie Officielle. Metropolitan Museum of Art.
- Bualhamam M.R. (2009). The study of urban growth impact in tourism area using remote sensing and GIS technique for north part of the UAE. *Journal of Geography and Regional Planning*, 2(6), 166-175.
- Carlson, D. L. (2017). *Quantitative methods in archaeology using R*. Cambridge University Press.
- Conolly, J., & Lake, M. (2006). *Geographical information systems in archaeology*. Cambridge University Press. www.loc.gov/catdir/enhancements/fy0665/2006296605-d.html
- Dajani, D. (2009). *Best Future Directions for the Expansion of the City of Damascus Using GIS* [PhD thesis, Faculty of Engineering, University of Damascus].

- Dhanaraj, A., & Dasharatha, A. (2020). Land use land cover mapping and monitoring urban growth using remote sensing and GIS techniques in Mangaluru, India. *GeoJournal*, 87, 1133-1159. DOI:10.1007/s10708-020-10302-4
- Dworaczynski, E., Rojkowska, H., Liniecki, T., Lukacz, M., Ouameur, A., Ladjlat, M., Okonski, J., Pawlikowska, E., Pawlikowski, M., & Kawiak, T. (1990). *La Qal'a des Bani Hammad: Rapport de la mission Polono-algérienne 1987-1988*. Les Ateliers de restauration des monuments historiques.
- Easa, S. & Yupo C. (2000). *Urban Planning and Development Applications of GIS*. American Society of Civil Engineers.
- Groenhuijzen, M.R. (2019). Palaeogeographic-Analysis Approaches to Transport and Settlement in the Dutch Part of the Roman Limes. In: Verhagen, P., Joyce, J., Groenhuijzen, M. (Eds.), *Finding the Limits of the Limes. Computational Social Sciences*. DOI:10.1007/978-3-030-04576-0_12
- Hamon, F. (2003). Théorie de la restauration. *Bulletin Monumental*, 161(2), 182–183.
- Le Hégarat, T. (2015). *Un historique de la notion de patrimoine*. <https://halshs.archives-ouvertes.fr/halshs-01232019/document>
- Limouzin, J., & Icehr, F. (2008). Regards sur le patrimoine. Ouvrage collectif coordonné par François Icher sous la direction de Jacques Limouzin. *CRDP Languedoc Roussillon*, 66.
- Liou, J. J. H., & Tzeng, G.-H. (2012). Multiple criteria decision making (MCDM) methods in economics: an overview. *Technological and Economic Development of Economy*, 18(4), 672–695.
- Lucien, G. (1965). Recherches archéologiques à la Qalà des Banû Hammâd. *Journal of the Royal Asiatic Society of Great Britain & Ireland*, 98(2), 148-150. DOI:10.1017/S0035869X0012492XM
- Martini, V. (2013). *The conservation of historic urban landscapes: an approach* [Doctoral Dissertation, University of Nova Gorica].
- Mendoza, G. A., & Martins, H. (2006). Multi-criteria decision analysis in natural resource management: a critical review of methods and new modelling paradigms. *Forest Ecology and Management*, 230(1–3), 1–22.
- Oppio, A., & Lami, I. (2018). *Architecture and MCDA: Open challenges on the border*. European Working Group Multiple Criteria Decision Aiding. <http://www.cs.put.poznan.pl/ewgmcda/>
- Paquot, T. (2001). *Le quotidien urbain. Essais sur les temps des villes*. La Découverte.
- Payne, M. (1991). *Modern Social Work Theory*. Palgrave Macmillan London.
- Petrescu, F., (2007) *The use of GIS technology in Cultural Heritage*. Proceedings of the XXI International CIPA Symposium, Greece.
- Riegl, A., & Boulet, J. (2003). *Le culte moderne des monuments: sa nature, son origine*. Editions L'Harmattan.
- Rooney, G. D., Rooney, R. H., Hepworth, D. H., & Strom-Gottfried, K. (2017). *Direct social work practice: Theory and skills*. Cengage Learning.
- Tornatore, J.-L. (2010). L'esprit de patrimoine. *Revue d'ethnologie de l'Europe*, 55, 106-127.
- Verhagen, P., Kamermans, H., van Leusen, M., & Ducke, B. (2010). New developments in archaeological predictive modelling. In Bloemers, T., Kars, H., Valk, A., & Wijnen, M. (Eds.), *The Cultural Landscape & Heritage Paradox. Protection and Development of the Dutch Archaeological-Historical Landscape and Its European Dimension* (pp. 431–444). Amsterdam University Press.

- Weaverdyck, E. J. S. (2019). The role of forts in the local market system in the Lower Rhine: towards a method of multiple hypothesis testing through comparative modelling. In Verhagen, P., Joyce, J., & Groenhuijzen, M. (Eds.), *Finding the Limits of the Limes* (pp. 165–190). Springer, Cham.
- Williams, J. A. (1962). *Africa: Her History, Lands and People: Told with Pictures*. Rowman & Littlefield.
- World Heritage List. (2020). *Dictionary of Geotourism*. In: Chen, A., Ng, Y., Zhang, E., Tian, M. (Eds.). Springer, Singapore.