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Multi-Criteria Decision Making of Sustainable Adaptive Reuse of Heritage Buildings Based on the A'WOT Analysis: A Case Study of Cordahi Complex, Alexandria, Egypt

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ABSTRACT

This study presents a multi-criteria strategic approach of decision-making in sustainable adaptive reuse by evaluating cultural heritage assets and identifying potential alternatives. For effective preservation, adaptive reuse of heritage buildings is a strategic decision. Whereas adaptive reuse decisions are based on several, sometimes contradictory criteria, in addition to decisions from multiple parties and stakeholders are potentially inconsistent. This research finds that the reuse process should consider many important criteria to expand and enhance the knowledge base. This paper presents a systematic application and analytical method in decision-making for adaptive reuse of heritage Cordahi complex in Alexandria, Egypt. The A'WOT analysis application was used as an analytical tool to obtain results through the integration of a SWOT matrix and an Analytical Hierarchy (AHP) process. The SWOT technique was used to examine the internal and external factors and identify the important strategic factors, then apply the AHP method to prioritize these factors to make them measurable. Then, SWOT priority factors were used to formulate strategies using the TOWS Matrix. The proposed strategy relates to protecting and promoting the importance of heritage and the context, enhance the tourism potential, economic development for the population, interpretation strategy, community engagement, sustainable management, partnerships.

1. INTRODUCTION

The most vital problem today is how to protect the historical heritage. Increasingly of the built heritage is often destroyed to give a chance to high-rise buildings. Historic buildings are an essential part of social capital. Heritage protection and reuse provide cultural, economic, and social benefits to urban communities. The choice of reuse a heritage building requires a different set of considerations including location, heritage value, architectural properties, environmental treatments, and market trends. Recently, the character of building preservation has changed from just protection to be a major part of a comprehensive strategy for urban regeneration and sustainability. Adaptive reuse is, therefore, a strengthening plan to deal with this change [1].

1.1 Adaptive reuse of heritage buildings

The reuse of heritage is one of the most essential strategies for conservation cultural heritage [2, 3], which adds to the benefits of achieving sustainable renewal by transforming the heritage buildings and sites into usable places [1, 4].

The process of adaptive heritage reuse is an extensive framework to protect the value of heritage through different historical areas [5, 6]; attracting special investments and reducing the economic burden on governments [1].

Several different dimensions share the interpretation of the multifaceted problems related to the preservation of cultural heritage, including the diversity of actors and stakeholders who play an important role in decision-making, as well as historical and artistic values, economic constraints, and related technology [7, 8]. The development of effective cultural heritage asset management strategies valorization is a complicated process that necessitates detailed information of its characteristics and identity across history, as well as numerous decision-making actors and stakeholders whose goals are incompatible and competing [9, 10].

Adaptive reuse is characterized as a shift in the use of current heritage buildings for developing the environmental, economic, and social dimensions of sustainability while taking into account asset quality, cost reduction, and real value preservation [1, 5, 8, 11]. Various initiatives aimed at promoting awareness, use, and public enjoyment of cultural heritage, as well as conservation and preservation work, are given forms and standards as part of the enhancement of cultural heritage. Heritage development is a multifaceted concept. Additionally, the assessment of heritage development is a multidisciplinary (cultural-socio-environmental-economic) process that shows how investment decisions affect shared resources. As a result, to handle these issues and support decision-making processes, many integrated frameworks are required [7, 12, 13].

1.2 Multi-criteria decision making

When considering the adaptive reuse of heritage buildings, many stakeholders share in the decision-making, and each has a different vision. Participants in the reuse decision-making range from owners, developers, producers, investors, regulators, and marketers. Because of the diverse backgrounds,

stakeholders participate in the decision-making procedure to re-use the heritage building at different levels. These levels vary between looking at financial resources, wanting to see the future for construction, looking to the latest market requirements, as well as being connected to the original architecture, structure, function, space, and others. This leads to a layer of complexity, in addition to the classification of stakeholders to influence the decision, either directly or indirectly [14].

Because of the complexities and potential conflicts of interest in the cultural heritage process, it is better to use particular evaluation methods to address decision-making. It is necessary to differentiate between use-values, that apply to the real benefits provided by heritage to society, and the values of nonuse, as well as financial benefits for current and potential users [15-17].

In this regard, the study focuses on the Cordahi Complex in Alexandria, Egypt. Paper proposes a multi-criteria strategic approach of decision-making in sustainable adaptive reuse by evaluating cultural heritage property to enhancing their preservation and restoration, as well as generating further cultural, economic, and social advantages. This study examines the topic of adaptive reuse of cultural heritage under the perspective of multi-criteria decision support by using a mixed multi-criteria process (A'WOT) to support the adaptive reuse process. This approach incorporates the analytic hierarchy framework (AHP) and SWOT (Strengths, Weaknesses, Opportunities, and Threats) technique for users to analyze different types of resolution [10, 18, 19]. The SWOT analysis uses internal and external assessment parameters to recognize strengths and opportunities that help achieve goals, as well as weaknesses and threats that can hinder the attainment of goals [20, 21]. Maintaining strengths, offering different solutions for weaknesses, capitalizing on opportunities, and avoiding threats, improving sustainable valorization strategies for the adaptive reuse of cultural heritage. Since the qualitative nature of SWOT analysis' value judgments makes it difficult to make clear decisions, AHP is used to derive the goals and relative significance of criteria, sub-criteria, and alternatives in a systematic analytical way [10]. Then, SWOT priority factors were used to formulate strategies using the TOWS Matrix. The integrated approach is being used to improve the quantitative side of adaptive reuse [22].

2. METHODOLOGICAL FRAMEWORK

The study of the relationship between the historical and cultural resources and their surrounding environment, as well as the internal and external factors that impact the effective achievement of sustainable measures to rehabilitate and improve them, is part of strategic heritage management and valorization [10].

2.1 SWOT analysis

Through the use of SWOT dedicated to the analysis of both internal and external surroundings, a systematic approach is obtained to assess internal and external factors and then support the decision position in the good alignment between internal and external issues [23-26]. The strengths and weaknesses are spotted through internal environmental assessment, while the opportunities and threats are spotted through the external environment assessment [27, 28]. This provides a fact-based and data-driven perspective into planning decisions and actions, as well as a solid foundation for identifying strategy [29].

By defining strengths, weaknesses, opportunities, and threats, strategies can be based on their strengths, elimination of weaknesses, using opportunities to counter threats. The knowledge obtained can be systematically presented in a matrix as many categories of the matrix's four variables, which, if applied in a true way, supply a strong essential for strategy development [24, 30-32].

2.2 Analytic Hierarchy Process (AHP)

AHP is a multi-criteria decision-making method that can help with the overall decision-making process by breaking down a complex problem into a multi-level hierarchical system of objectives, criteria, and possibilities [33-35]. To measure the relative value of a variable, the AHP relies on pairwise comparisons at different levels of the hierarchy. Then compares the alternatives at the lowest level of the hierarchy to make the best choice among the hypothetical alternatives. AHP is therefore a suitable approach to problem-solving by hierarchically organizing decision criteria into sub-criteria. Thus, it is considered an effective way to make decisions, especially when there is subjectivity [36-38]. It is used AHP to define the relative priorities of the double standards of absolute comparisons of discrete and continuous multi-level hierarchical structures [39, 40]. Given the assessment scale (Table 1) developed (1980) by Saaty, and by identifying a number, a priority evaluation mechanism is achieved to clarify the comparative significance of the criteria. The pairwise comparisons of these factors give matrices for calculating the significance [22, 33, 34].

Table 1. Pairwise comparison scale of Saaty [41, 42]

Intensity of importance	Definition	Explanation
1	Equal importance	Two conditions are equally relevant in achieving the goal.
3	Weak importance of one over another	One of the criteria is supported over the other based on experience and judgment
5	Strong or essential importance	One of the criteria is intensely supported over the other based on experience and judgment.
7	Demonstrated importance	A criterion is considered extremely significant and dominant
9	Extreme importance	The heights thinkable order when the evidence indicating one criterion to be more significant than another.
2,4,6,8	When it is necessary to compromise, Median values between the two related judgments	
Reciprocals 1/3,1/5,1/7,1/9	When comparing the criteria I standard j, if there is one of the numbers listed above dedicated, then there is a mutual value.	

This study uses AHP to prioritize SWOT components. Once the problem is solved and the hierarchy is built, the

prioritization process begins determining the materiality of the criteria. At each level, the criteria are compared bilaterally according to their levels of impact and based on the criteria identified at the higher level. In AHP, several pairwise comparisons are built on a nine-level standardized comparison scale [22, 43]. By using AHP through the SWOT framework, an organized assessment of SWOT factors and alignment of their severity are done. In combination between SWOT and AHP, a quantitative measure of the importance of each factor in decision making can be provided [26].

2.3 A'WOT method model

A'WOT is a hybrid technique that combines famous SWOT analysis with the Analytic Hierarchy Process (AHP) [44]. The idea to use AHP work within the framework of SWOT is the systematic evaluation of the SWOT factors and make them measurable in relation to their intensity [45]. According to the identification of SWOT sub-factors, alternative strategies can be identified [46]. By making pairwise comparisons between the SWOT factors and then analyzing them via AHP; additional values can be achieved. SWOT can be considered the basic framework within which decision situation analysis can be conducted, by helping the AHP implement it in a more analytical manner. After comparisons are made, useful quantitative information about the decision-making situation can be acquired. The A'WOT hybrid method Figure 1 continues as follows [22, 26, 29].

(i) Relevant internal and external environmental factors are identified and included in the SWOT method to be conducted.

(ii) Comparisons of SWOT marital factors are made about which of the two comparison factors is the most important, separately within each group. Thus, the exchange of priorities for these factors is calculated from the comparison inputs [19].

(iii) The mutual values of the SWOT groups are determined.

(iv) The alternatives of the strategy are evaluated with respect to each SWOT factor.

(v) Priorities for strategy alternatives can be studied according to the general hierarchy of A'WOT decisions.

After studying the main factors closely, and those derived contributions in the form of numerical values of the factors, goals can be set that help in the strategic planning process [47].

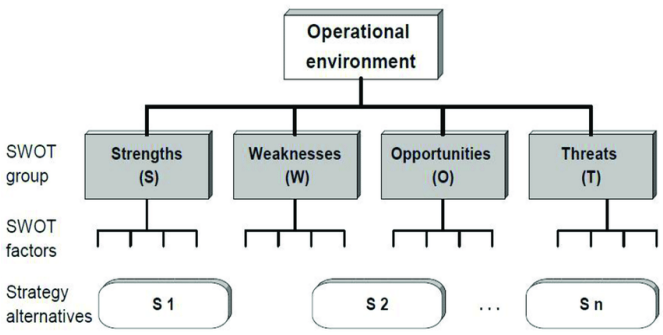

Figure 1. A hierarchical view of A'WOT analysis [31, 47]

3. CASE STUDY: CORDAHI COMPLEX, ALEXANDRIA, EGYPT

The Cordahi complex lies in the central quarter of Alexandria Figure 2(a) It consists of 3 blocks, "Mohamed Ali theater" sayed Darwish or Alexandria Opera House Figure 2(b) and two residential buildings (Cordahi building 1 and 2) Figure 2(c) on Fouad street part of the former Via Canopic. Canopic was one of the oldest streets in Alexandria existing since its foundation in 331 BC in addition to Cinema Plaza Building located beside Cordahi building 1 and the adjacent piazza which is located in front of the theater Figure 2(d) To reach the main approach of the theater, one must pass through the Cordahi Building I Figure 2(e).

(a) Existing blocks plan

(b) Mohamed Ali Theater

(c) Cordahi Building 1

(d) the open courtyard between the two Cordahi buildings and Sayed Darwish

(e) The passage through Cordahi building leading to Mohamed Ali Theater

Figure 2. The Cordahi complex [48]

The Cordahi complex is designed by the French and Cairo-based architect George Parcq, made to order by Mr. George Cordahi, the most famous investor and developer in Alexandria. The complex was constructed between 1921 and 1928 on the site, which has been occupied by the prestigious theatre previously Zizinia (1863-1917).

The complex contains outstanding examples of Alexandria and Cairo's eclectic revival techniques, which were common in the late nineteenth and early twentieth centuries. It incorporates a variety of artistic vocabulary that combines Eclectic Renaissance and Art Deco styles [49, 50].

The Cordahi complex was restored in 2003 with the restoration of the surrounding buildings, the piazza, and the entrance hall in the process of renovating the theater, and the importance of the urban context of the restored monument was highlighted. However, incomplete design, unrealistic initial budget, and constant replacement of consultancy services, and specifications disrupted the site's operation and led to inflated costs from 3.5 to 25 million pounds [51].

The Cordahi complex incorporates the Cordahi Building. The Cordahi building's south-eastern façade overlooks one of Alexandria's most prominent streets (Fouad Street). While its North- Western façade overlooks Sayed Darwish and is considered the theater's front façade and key approach.

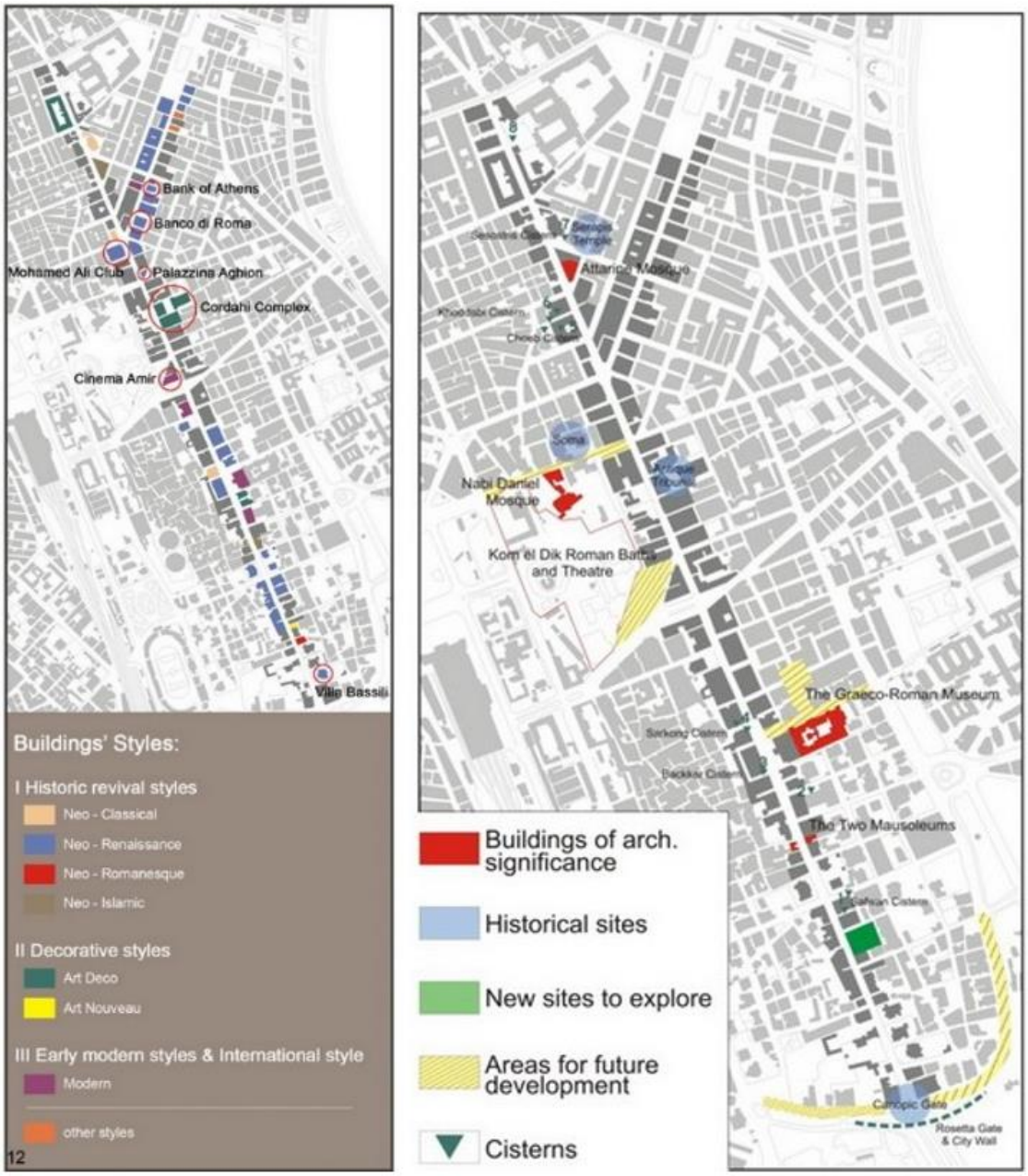

Figure 3. Maps showing the historical sites and architectural styles along Fouad st [49]

The rectangular footprint of the building is 1,000 square meters, with openings (balconies and windows) on all four facades. Cordahi building belonged to the private Sigma Company "a Real estate developer specialized in developing and managing heritage-listed buildings." Owing to the lack of care and maintenance, the building requires much renovation and restoration. It is planned to undergo large development for adaptive reuse and energy rehabilitation, by converting it into a luxury hotel [48]. The site lies at the intersection of Fouad Street and Nabi Danial Street in the heart of downtown Alexandria. It is in close proximity to the most important touristic cultural nodes as the Greek Roman museum, the archaeological site of the Roman Theater, El Raml tram station and the Manshiya square Figure 3. Furthermore, the number of cinemas surrounded the site in and around downtown Alexandria. Many left-wing art spaces have been shut down since the revolution in 2011. There has been a lack of social spaces in downtown Alexandria. Some such spaces that lie near the site are El Dokan art center, Roof Studio (Arts & Organization agency that supported Music and Arts in Alexandria), El Cabina, which is one of the Gudran Association for Art and Development's projects (2010), Artelier Metro, El Terracina, Tahr-el-Bahr, El Dekka.

3.1 The A'WOT model

This paper provides a new adaptive reuse strategy for the properties of the Cordahi Complex with the aim of protection and valorization starting from the SWOT analysis of the historic Complex. Then, to classify the various factors of SWOT Figure 4, an A'WOT model was created. The classification was determined on the basis of their potential for implementing an effective valorization strategy. In terms of possible effective intervention goals, they are ranked from the best to the worst.

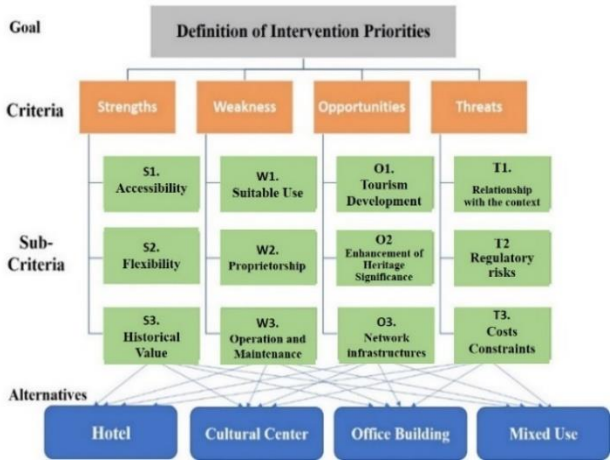

Figure 4. Building of the decision problem in light of A'WOT (Researcher, 2021)

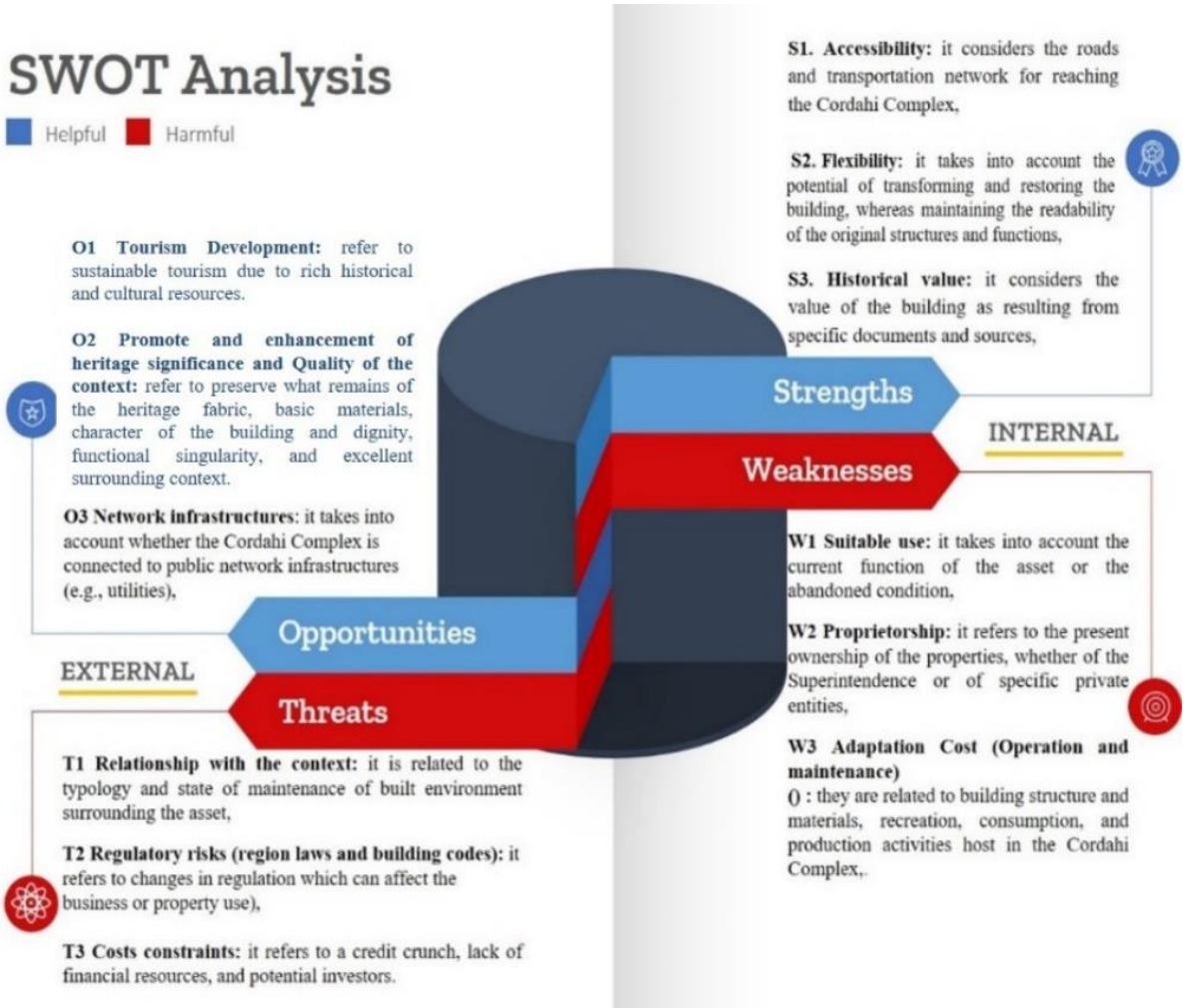

Figure 5. SWOT Matrix (Researcher, 2021)

Table 2. SWOT analysis of strengths identified for Cordahi complex (Researcher, 2021)

Strengths	
S1 Accessibility	▪ The high degree of accessibility to the site ▪ Connection with the central district of Alexandria, and it is mixed-use between retail, offices, and hotels. ▪ Its south-eastern façade lies on one of Alexandria's well-known streets (Fouad Street); ▪ Accessibility by public transportation, car, or by foot; ▪ Presence of driveways with good walkability and paths connecting to the Cordahi Complex
S2 Flexibility	▪ Efficiency by reducing costs ▪ The building's dimensions, which are not excessive, promote adaptations and transformations; ▪ The continuity of public space between the plaza in front of Alexandria Opera house and the outdoor performance stage is carried for the improvement of urban space quality on the site and its surrounding areas. ▪ The main facade' of the building on Fouad street has a vaulted corridor for entrance reinforced by arches on the ground floor. It can be recovered and saved. ▪ Ground, first and typical floors hosts a series of interconnecting spaces.
S3 Historical Value	▪ Due to presented three prominent examples of the Eclectic Revival Styles, the richness and diversity of cultural heritage has increased. It combines Eclectic Revivalism and Art Deco styles to create a diverse creative vocabulary. ▪ The existence of many archaeological sites and excavations along with historic buildings around the site due to historic importance of the district in and around the Fouad st. that has been developed since the Hellenistic period of Alexandria (as early as 33/BC).

Table 3. SWOT analysis of weaknesses identified for Cordahi complex (Researcher, 2021)

Weaknesses	
W1 Suitable Use	▪ Lack of present function as a result of: ▪ The inability to use the cinema Plaza's internal spaces. ▪ Needing the inner structure of cordahi building to transfer into new function.
W2 Proprietorship/ Ownership	▪ Although the theatre is managed by the Ministry of Culture, the other blocks are in the ownership of a private company
W3 Adaptation Cost (operation & maintenance)	▪ The Cordahi building's current state is deteriorating due to inadequate maintenance and service. ▪ The cinema Plaza building is almost fully abandoned in a terrible condition which requires high operation and maintenance costs.

SWOT technology follows a systematic way of thinking and overall judgment on factors related to a new product, design, management, or planning [52]. The modeling process begins with completing a SWOT study and the development of the matrix to structure the decision problem. The data SWOT was collected through a questionnaire of specialists, and the participants were university professors, heritage preservation and specialists in the development and management of heritage buildings. The respondents' responses to the SWOT were listed, revised, discussed, and organized into a meaningful small number of groups. Although it is useful to consider many factors, the number of pairwise comparisons in AHP will grow exponentially with more factors. Consequently, the SWOT categories (Strengths, Weaknesses, Opportunities, and Threats) were subdivided into particular 3 sub-criteria, which reflect the most important aspects of evaluating cultural heritage resources. The SWOT factors identified can be described as follows Figure 5 and Table 2, 3, 4, 5.

Table 4. SWOT analysis of opportunities identified for Cordahi complex (Researcher, 2021)

Opportunities	
O1 Potential for Tourism Development	▪ due to rich historical and cultural resources.
O2 Promote and enhancement of heritage significance and Quality of the context.	▪ Excellent surrounding context: ▪ Having very active historical landmarks in the city today like Alexandria Opera house (fully operating/functioning) ▪ Presently in use art spaces fields; ▪ many cinemas in and around downtown Alexandria. ▪ Fouad st. a European style street which holds a great deal of the city's history with a number of surviving notable landmarks.
O3 Potential for network infrastructures	▪ There is a good network of main and secondary streets, pedestrian roads ▪ Presence of public transportation network "tram and train station" ▪ New and improved services**.**

Table 5. SWOT analysis of threats identified for Cordahi complex (Researcher, 2021)

Threats	
T1 Relationship with the context	▪ Multiple surrounding regional competitive resources ▪ The lack of an informative interpretation reduces the cultural significance of the place. ▪ lack of enough interest from the surrounding community ▪ Lack of green areas and open spaces that are needed to allow people to gather and communicate from nearby cultural activities ▪ Lack of Active Tourism development plans.
T2 Regulatory risks (region laws and building codes)	▪ Historical constraints can have an effect on the business plan or land use.
T3 Costs Constraints	▪ Negative perception regarding conservation and the large surface area, finding financial resources and potential investors can be difficult. ▪ Lack of support for conservation and enhancement ▪ A scarcity of funds to invest in new technologies. ▪ The poor economic strength of citizens and companies

AHP technology is applied to a SWOT matrix. First, using the 1-9 Saaty comparison scale, pairwise comparisons are made for the SWOT groups, the results are shown in Table 6. Second, the elements of the SWOT matrices are compared considering each SWOT group as shown in Tables 7, 8, 9, 10.

Table 6. Pairwise comparisons matrix of SWOT factors (Researcher, 2021)

SWOT Groups	S	W	O	T	Importance Degrees of SWOT Groups
Strengths (S)	1	3	1	3	0.366
Weaknesses (W)	1/3	1	1/4	2	0.143
Opportunities (O)	1	4	1	2	0.371
Threats (T)	1/3	1/2	1/2	1	0.120
Consistency Ratio CR = 6.3%					

Table 7. Pairwise comparison matrix of the strengths criteria (Researcher, 2021)

SWOT Groups	S1	S2	S3	Importance Degrees
S1. Accessibility	1	1/5	1/9	0.058
S2. Flexibility	5	1	1/5	0.207
S3. Historical Value	9	5	1	0.735
Consistency Ratio CR = 12.2%				

Table 8. Pairwise comparison matrix of the weaknesses criteria (Researcher, 2021)

SWOT Groups	W1	W2	W3	Importance Degrees
W1 Suitable use	1	5	3	0.627
W2 Ownership	1/5	1	1/4	0.094
W3 Adaptation Cost	1/3	4	1	0.280
Consistency Ratio CR = 8.9%				

Table 9. Pairwise comparison matrix of the opportunities criteria (Researcher, 2021)

SWOT Groups	O1	O2	O3	Importance Degrees
O1 Potential for TourismDevelopment	1	1/4	7	0.240
O2 Enhancement of heritage significance and Quality of the context.	5	1	7	0.702
O3 Network infrastructures	1/3	1/5	1	0.059
Consistency Ratio CR = 30.8%				

Table 10. Pairwise comparison matrix of the threats criteria (Researcher, 2021)

SWOT Groups	T1	T2	T3	Importance Degrees
T1 Relationship with the context	1	5	1/3	0.297
T2 Regulatory Risks	1/5	1	1/5	0.086
T3 Costs Constraints	3	5	1	0.618
Consistency Ratio CR = 14.1%				

Finally, the SWOT factors overall priority are calculated as shown in Table 11.

Table 11. Priorities for comparisons for the SOWT groups and sub factors (Researcher, 2021)

SWOT Groups	Group Priority	Swot Factors	Factor's priority within the group
Strengths	0.366	S1. Accessibility	0.058
		S2. Flexibility	0.207
		S3. Historical Value	**0.735**
Weaknesses	0.143	**W1 Suitable use**	**0.627**
		W2 Ownership	0.094
		W3 Adaptation Cost	0.280
Opportunities	0.371	O1 Potential for Tourism evelopment	0.240
		O2 Enhancement of heritage significance and Quality of the context.	**0.702**
		O3 Network infrastructures	0.059
Threats	0.120	T1 Relationship with the context	0.297
		T2 Regulatory risks	0.086
		T3 Costs Constraints	**0.618**

By combining AHP and SWOT techniques, the following results show the ranking for each priority in the SWOT group of the Cordahi complex:

Opportunities won the main role in the successful implementation of valuation strategies by obtaining (37.1%), while threats fell and ranked fourth with (12.0%). It's a logical result of asset valuation processes since assets' potential is embodied in opportunities, which offset the adverse effect of poor assets on strategic implementation. Regarding the significance of the sub-criteria (fourth column of Table 11), the historical value with respect to the strengths has the highest priority by having (0.735), followed by the flexibility of the building for the new function (0.207) and accessibility (0.58), which has little effect in relation to other factors.

As well, the top priority for appropriate use is (0.627) for the weaknesses. Whereas the enhancement of heritage significance and context is a considerable opportunity (0.702) and the potential for network infrastructures is the lower important (0.059), while the potential for tourism development occupies a middle position between them (0.240). As expected, cost constraints are the most important threats (0.618). Although the rating of the Regulatory risk is ranked third (0.086), in absolute terms, it is important to consider since it was defined as a threat in the SWOT study. The context's relationship takes up the space between them (0.297). It's worth noting that previous preferences indicate the relative value of SWOT variables in relation to the SWOT class of Cordahi Complex.

3.2 The proposed strategy

To achieve the goals of sustainable adaptive reuse, effective strategies are formulated and implemented in cooperation with all stakeholders, related authorities, institutions, and the population. While setting up and developing these strategies, the priorities of criteria and sub-criteria are considered in addition to a comprehensive view of all requirements. A holistic perspective is needed to evaluate strategies related to sustainable conservation goals to maximize the benefit from

adaptive reuse.

Studying this approach formulates a strategy in which the internal and external factors fit well. The terms of this strategy can be formulated according to the information generated after computing the priorities of SWOT factors with AHP. The TOWS matrix, which helps in the analysis of information, was used to organize strategic options. Thus, a strategy was formulated keeping in mind the internal and external factors derived from the SWOT analysis. The TOWS Matrix identifies four strategic groups: Strengths - Opportunities (SO), Strength Threats (ST), Weaknesses - Opportunities (WO), and Weaknesses - Threats (WT). According to Weihrich "The strategy is derived by maximizing strengths and opportunities as well as minimizing weaknesses and threats. SO, strategies maximize both strengths and opportunities, while ST strategies rely on strengths that can deal with threats in the environment. WT strategies are created by minimizing both vulnerabilities and threats, while WO strategies attempt to minimize vulnerabilities and maximize opportunities [46]." According to the internal and external factors in the SWOT matrix, he TOWS matrix formulated the strategic proposals for sustainable adaptive reuse in the Cordahi complex as shown in Table 12.

The building may be used as a hotel, cultural center, office building, or mixed-use building, according to this study. Finally, Tables 13 and 14 displays the priority vectors of alternatives for each sub-criterion, as well as the Cordahi complex's final reuse order.

The most successful reuse option is the Cultural Art Center, according to the performance of each model depending on assessing the sub-criteria. It needs only small interventions so the current user expectations are consistent with the original design. It does not need any changes, including addition or modification, that affect the safety and stability of the building, and it also led to the residents forgetting the history of the building and its original function. In addition to protecting the building and preserving the surrounding environment. It also provides the best performance regarding the original properties of the building as well as the functional requirements. The next alternative is mixed uses, then the office building, and finally the hotel. The hotel ranks lower as it lacks a strong connection and relationship with its surrounding environment and does not enhance the building's heritage significance and unique architectural features enough.

Table 12. The use of the TOWS matrix to formulate the strategy (Researcher,2021)

Strengths + opportunities (SO)	**Weaknesses + opportunities (WO)**
Alternatives that apply Internal strengths to take full advantage of external opportunities - The use of high historical and cultural values and the quality of the transportation network on the site stimulate and develop tourism sustainably. Which helps develop the economic condition of the population. -Using the high flexibility of the building for choosing the new use related to the Protection and enhancement of heritage significance and quality of the context. - Increase the cultural importance of the place by using relevant ongoing practices and celebrations.	Alternatives reduce weaknesses by taking advantage of existing opportunities to enhance and protect the product quality and context and develop tourism. -creating a new function for the building and the surrounding spaces to fit the function of the original features of the building and its interrelationships. -Stakeholders' participation in the adaptive reuse of the building, protection, and tourism development by integrating stakeholders from the public and private sector in decision-making. -The community's participation as a tourist guide to improve the economic situation, reform the new policy environment and enhance the site's tourism potential.
Strengths + threats (ST)	**Weaknesses + threats (WT)**
Alternatives that use internal strengths can be used to reduce external threats - Enhance the Community awareness and residents with the cultural, aesthetic, and historical values of the place, which makes them more aware of conservation, and thus they can be involved. -Give Consideration of the conformity of the proposed use with the beliefs, values, and interests of the community. - Emphasis on sustainable management and systems that reduces environmental impacts, reduce waste and recycling. - Distribute various tourism activities and practices throughout the year, which supports the identity and culture of the city by linking it to the historical, cultural, and artistic sites surrounding it. - Respect the functionality and interrelationships of the original features of the suitability of the new user. - Not subject the new use to personal and economic whims. - Promote the new use of the structural durability and physical stability of the building	Alternatives that minimize weaknesses and avoid threats -Implement an effective promotional strategy to preserve the building and its site to restore confidence -Expanding interpretation strategy: promotions, special events, billboards, trade fairs, television programs, public relations, advertisements. -Emphasis on organizational relationships and collaborative ties for collective action through a network of stakeholders. -Framework laws (legal protection) to save the site from various human pressures. -Maximum involvement of local residents to protect the building and its surrounding area. -Organizing permanent programs for partnership between the public and private sector -Empowering local authorities in implementing sustainability principles -Respect the suggested use and building codes

Table 13. Un-normalized alternatives pairwise comparison (Researcher, 2021)

	Strengths			**Weaknesses**			**Opportunities**			**Threats**			**T**	**Av.**
	S1	S2	S3	W1	W2	W3	O1	O2	O3	T1	T2	T3		
Hotel	7	4	4	3	5	1	1	3	1	4	3	9	45	3.75
Cultural Art Center	7	9	9	9	7	9	7	7	5	9	3	5	86	7.17
Office Building	7	7	9	5	3	8	5	4	5	5	3	6	67	5.58
Mixed Use	7	7	9	5	3	10	5	9	7	5	3	5	75	6.25
Total	28	27	31	22	18	28	18	23	18	23	12	25	273	22.75

Table 14. Normalized alternatives pairwise comparison (Researcher, 2021)

	Strengths			Weaknesses			Opportunities			Threats			T	Av.
	S1	S2	S3	W1	W2	W3	O1	O2	O3	T1	T2	T3		
Hotel	0.25	0.14	0.12	0.11	0.18	0.03	0.03	0.11	0.04	0.18	0.17	0.38	1.73	0.14
Cultural Art Center	0.25	0.32	0.26	0.32	0.25	0.30	0.24	0.25	0.19	0.41	0.17	0.21	3.18	0.26
Office Building	0.25	0.25	0.26	0.18	0.11	0.27	0.17	0.14	0.19	0.23	0.17	0.25	2.47	0.21
Mixed Use	0.25	0.25	0.26	0.18	0.11	0.33	0.17	0.32	0.27	0.23	0.17	0.21	2.75	0.23
Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12.00	1.00

4. CONCLUSIONS

The reuse of abandoned cultural heritage is of increasing importance, especially when there are a large number of buildings and sites of architectural excellence, which shape real wealth for a country. Heritage preservation needs to be planned and managed using a carefully selected sustainable approach. This paper presents a methodology for a multi-criteria assessment to help make decisions in relation to the careful choosing of alternative jobs, formulate strategy at the reuse of heritage [53]. The major output of this research is that it provides an integrated view that, be able to aid in designing strategic planning. Cordahi Complex, Alexandria, Egypt, has been selected as a case study to reuse in the framework of sustainability. The multi-criteria decision support technique uses quantitative and qualitative criteria to evaluate adaptive reuse alternatives and support-complicated decisions. By including all stakeholders in finding a "common solution" that the reuse can satisfy the needs of the local population while still being economically viable over time [54].

Therefore, A'WOT, a mixed approach of AHP and SWOT, has been used as a promising solution to support strategic decision-making processes [22, 26, 45]. Decision-makers achieve accuracy and depth in analyzing the situation by making pairwise comparisons and considering the weights of the SWOT factors. This paper evaluates alternative strategic decisions with regular SWOT analysis. Thus, the most important weakness of SWOT can be avoided by leveraging AHP within the SWOT, for the objectives of decision-makers to become critical in issues of strategic choice. Later on, it is possible that A'WOT is enhanced by counting the various objectives more clearly in the analysis (i.e. not just by SWOT factors). Then, strategies are formulated using SWOT priority factors through the TOWS Matrix.

A methodology has been developed for use in increasing and improving the information base for strategic planning processes, achieving strong decision support. It can be considered an active outline for communication and skills in supporting strategic decision-making in many situations where there are many decision-makers and differing opinions, expectations, and interests. Finally, this analytical approach discussed in this study can be applied to other similar entities. It can be used in more sustainability research by incorporating multiple other criteria.

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