Research Article:

The Effect of Implemented Heritage Building Projects On Outstanding Universal Value: The Case of Erbil Citadel

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Abstract

The preservation of outstanding universal value is a key criterion for inscription on the World Heritage List (WHL). This study investigates the impact of implemented rehabilitation projects on the Outstanding Universal Value (OUV) with a particular focus on the authenticity and integrity. The research applies a mixed method utilizing quantitative analysis with expert evaluations. A detailed questionnaire is provided with a virtual tour. The virtual tour containing information about all three projects in Erbil Citadel as World Heritage Site indicators. The questionnaire was structured based on the Nara Grid and UNESCO operational guidelines (OGs). And qualitative inductive content analysis. The projects were selected based on the types of physical and functional interventions in rehabilitation projects . The results reveal a positive and statistically significant effect of the rehabilitation efforts on the authenticity, integrity, and overall OUV. The Erbil Citadel projects demonstrate that when conservation is carefully planned and aligned with international standards, it can sustain and even enhance Outstanding Universal Value. The study emphasized the importance of both tangible and intangible aspects of authenticity and components of integrity. Moreover, reinforces the idea that authenticity and integrity are complementary and must be addressed together to preserve OUV.

1 Introduction

The conservation of cultural heritage is increasingly challenged by rapid changes occurring in the contemporary world [1]. The birth of the World Heritage (WH) Convention, also known as the United Nations Educational, Scientific, and Cultural Organization (UNESCO) Convention Concerning the Protection of the World Cultural and Natural Heritage, looked to save Heritage sites that fulfill the definition of Outstanding Universal Value (OUV)[2]. The World Heritage Convention introduced the concept of designating heritage assets with internationally recognized value as World Heritage Sites (WHSs)[3]. The most recognized aspect of the Convention is the World Heritage List (WHL), which includes natural and cultural heritage sites. To be included on the World Heritage List (WHL), sites must be of Outstanding Universal Value. The three pillars of OUV, as shown in **Figure 1**, are (1) must meet at least one of the ten criteria(i to vi related to cultural heritage), (2) relevant conditions of integrity and/or authenticity, and (3) requirements for protection and management [4][5]. An additional document to the convention was approved in 1977 to elucidate various subjects related to the management of World Heritage Sites, known as the "Operational Guidelines for the Implementation of the World Heritage Convention" (OGs), which has undergone several revisions and is a crucial instrument for a property's inclusion in the World Heritage List[6]. Each nominated property must then undergo an independent evaluation by the International Council on Monuments and Sites (ICOMOS) (for cultural heritage sites)[4]. Cultural heritage, as described in Article 1 of the World Heritage Convention, consists of (monuments, groups of buildings, sites).

Monuments refers to "architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions,

cave dwellings, and combinations of features, which are of Outstanding Universal Value from the point of view of history, art, or science". Groups of buildings consists of "groups of separate or connected buildings which, because of their architecture, their homogeneity or their place in the landscape, are of Outstanding Universal Value from the point of view of history, art or science". Sites are "works of man or the combined works of nature and of man, and areas including archaeological sites which are of Outstanding Universal Value from the historical, aesthetic, ethnological or anthropological points of view"[5]. Specific properties may fulfill multiple criteria (e.g., serving as both a monument and a group of buildings)[5]

Heritage sites often require implementing building projects to ensure their long-term longevity and relevance [7][8].

2 Literature Review

While the implemented heritage building projects contribute to the longevity of the structure and cultural significance, they may inadvertently alter the historical characteristics of heritage properties and affect their authenticity and integrity. In cases of extensive alterations during interventions, they may be compromised [7][8][9].

However, these projects may have both positive and negative impacts on the attributes that contribute to a site's OUV, raising concerns about the potential loss of authenticity and integrity [9].

From previous studies, it was noted that some only evaluated authenticity, such as [10],[11],[12], some only evaluated integrity, such as [13],[14], and others assessed both together, such as [15][16][17].

Researches related to authenticity indicate that authenticity can be influenced in different ways; it can be protected by appropriate interventions, as can be seen in studies such as [18]and [19] Which preserved form and design, and symbolic meaning of the projects, while [18] highlighted according to the NARA Grid, which is an assessment tool based on the Nara Document for evaluating authenticity, indicating that all aspects gained a higher score than neutral, and the form and design received slightly fewer points. Other studies highlighted both positive and negative effects. As in the study [20] Where the intervention retained scientific value and symbolic meaning, but hurt cultural significance and original tangible attributes such as typology, historical layers, and materials. And in the study [12]While intervention enhanced aspects such as materials and construction techniques, other aspects, form, and design were compromised. Conversely, some projects have compromised authenticity and removed it, and when architectural elements and original spatial arrangements are altered, the artistic value and aspects such as material and substance, form and design are compromised [21][17]. And alteration of authenticity is caused by some restoration intervention [22].

Researches related to integrity indicate that Heritage site interventions have different impacts on the sites; several studies indicated positive outcomes, enhancing integrity through conservation and development [17]. And maintained integrity, especially wholeness, through preservation and conservation efforts in [23] positively impacted the wholeness of integrity, in [6] restoration and reuse in [24] positively contributed to retaining integrity. Conversely, other cases revealed adverse or mixed effects of interventions, undermining visual integrity despite preserving structural stability in [13] in sufficient conservation, weakening the integrity in the study of [25], and modern development pressures are causing integrity weakness [2], and [26] Highlighted that reconstruction can compromise integrity.

2.1 Terms and Concepts

This section explains the terms and concepts related to Implemented Heritage Building projects and Outstanding Universal Value (OUV)

2.1.1 Implemented heritage building projects.

Interventions and practices involved activities aimed at protecting or recovering damaged heritage elements, such as conservation, restoration, Rehabilitation, adaptation, adaptive reuse, and reconstruction, can be seen in **Figure 1** They are crucial for maintaining the cultural significance of heritage properties and sustaining their physical condition.[8][7].

2.1.1.1 Conservation:

Means all the processes of looking after a place so as to retain its cultural significance, including non-intervention, maintenance, preservation, restoration, adaptation, rehabilitation, and reconstruction, as well as retaining, reintroducing, and changing use. Conservation regulates alterations and seeks an ongoing balance between contemporary values and the layers of cultural significance and their attributes.[7][27]

2.1.1.2 Preservation

means maintaining a place in its existing state and retarding deterioration. It is a concept that maintains all the attributes that convey cultural significance, aiming to maintain the maximum integrity of cultural significance. Other interventions, such as repair and restoration, may be applied together to maintain the maximum integrity of cultural significance[7][27].

2.1.1.3 Restoration

It is a specialized process based on aesthetic, historical, and archaeological values, referred to in various documents. The process of returning an artifact to some former state of being at some defined time period. This may require the removal of later fabric and the replication of missing tissue [7].

2.1.1.4 Reconstruction:

The complete refabrication of an artifact to replace a structure that is missing. This must be done only in extreme circumstances and only where documentation exists [27].

2.1.1.5 Adaptation:

Adaptation refers to modifying a place to suit its existing use or a proposed use [27][28].

2.1.1.6 Adaptive reuse:

Making changes to a building to accommodate a new use is often a means of enabling the continued usefulness of a historic building [7].

2.1.1.7 Rehabilitation:

refers to all the changes that involve, on the one hand, the physical aspect of a place to preserve its cultural significance, including its continued or renewed use, and, on the other hand, the change of use, when it is no longer considered culturally significant. Specifically, this refers to all the changes necessary to make a place habitable again. This may involve introducing new facilities or systems to meet contemporary living requirements [7][27]. The difference with conservation intervention is mainly given by the wider possibility to adapt the existing structures to modern living standards. Any decision must be made based on the available information and documentation, as well as an accurate architectural survey of the actual structures and the traces of the missing parts. In principle, the structures, architectural decorations, and finishing must be preserved. The introduction of modern materials and the optimization of traditional techniques have allowed for the enhancement of the durability and safety of the structures. [27]The New Zealand Charter (2010) identified 'adaptation' as a principal concept regarding the degree of intervention for conservation objectives. In contrast, 'adaptation' emphasized a wide array of 'change' to accommodate functionality while protecting cultural significance. The definitions of 'rehabilitation' and 'adaptation' paradoxically remain overlapping. Concerning common ground, it was determined that 'adaptive reuse' constitutes a subcategory of 'adaptation' or 'rehabilitation' associated with 'new use [7][29].

2.1.1.8 Types of rehabilitation

Changing the destination of a historic building involves both functional rehabilitation and physical rehabilitation, as can be seen in **Figure 1**, which can include replacing or partially modifying the building [29].

2.1.1.8.0 Physical rehabilitation

Restoration should adhere to the principle of minimal intervention; the original historical information, spatial pattern, style, and structure should not be altered, and the multiple values of buildings should be protected as much as possible. The intervention should retain the original structural system. The rehabilitation process should be tailored to the building's nature and layout, and architectural style, ensuring minimal impact on its architectural heritage values [30].

2.1.1.8.1 Functional rehabilitation

Involves altering a building's functions to align with adaptation solutions. The function is derived from the origin, construction time, and significant events of inheritance[31]. Specialists in architecture, history, heritage, archeology, arts, maintenance, and interior design agree on 1) cultural functions as the most appropriate for rehabilitating heritage for preservation. 2)Other suitable functions include educational,residential, entertainment, administrative, commercial, and health functions. 3)Industrial functions cause damage and cracks, leading to long-term loss [32] [27]. **Figure 1** shows the conceptual framework of the relationship between independent and dependent variables and their subcategory.

2.2 Outstanding Universal Value (OUV)

“Outstanding Universal Value means cultural and/or natural significance which is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of all humanity. As such, the permanent protection of this heritage is of the highest importance to the international community as a whole (paragraph 49)[5]. The discussion surrounding Outstanding Universal Value (OUV) in the context of World Heritage List (WHL) properties emphasizes the significance of assessing these sites' physical state and surroundings to ensure they appropriately convey their OUV [33]. Authenticity and integrity are fundamental concepts in the World Heritage Convention and are critical to discussions about risks to World Heritage sites. The convention specifies that “to be deemed of outstanding universal value, a property must meet the conditions of integrity and/or authenticity [34].

2.2.1 Authenticity

It can be defined as the capacity of heritage to convey its cultural significance[18]. Properties nominated under OUV criteria (i) to (vi) must meet the conditions of authenticity[5].

The term ‘authenticity’ originates from the Greek word authentic, which means genuine and original [11]. Early frameworks, such as the SPAB Manifesto (1877) and the preamble of the Venice Charter (1964), highlighted a material-based understanding of authenticity, prioritizing original site and physical continuity without defining authenticity [12][35]. The adoption of the 1972 World Heritage Convention marked a paradigm shift, introducing OUV and integrating authenticity as a technical criterion. This was formalized through UNESCO's Operational Guidelines of 1977, which satisfied the "test of

authenticity" to qualify for designation as a World Heritage site.[22]. In paragraph 9, the test of authenticity explained that the property should meet the test of authenticity in design, materials, workmanship, and setting. The Nara Document on authenticity broadened the concept, delineating authenticity for both tangible and intangible aspects of heritage assets, emphasizing that these interpretations may vary across different cultures and even within the same culture [22]. (.Natalia Dushkina of ICOMOS Russia proposed at the 1994 Nara meeting that both material aspects (form, setting, techniques) and non-material aspects (function, use, tradition, spirit) were historically the carriers of authenticity in a monument [35].

The Nara Document on Authenticity, as an outcome of the conference, states in its 13th article, "Depending on the nature of the cultural heritage, its cultural context, and its evolution through time, authenticity judgements may be linked to the worth of a great variety of sources of information. Aspects of the sources may include form and design, materials and substance, use and function, traditions and techniques, location and setting, spirit and feeling, and other internal and external factors. The use of these sources permits elaboration of the specific artistic, historic, social, and scientific dimensions of the cultural heritage being examined."[36] [18].

Building on this, Van Balen (2008) developed the NARA Grid, an assessment tool based on the Nara Document (Article 13) for evaluating authenticity. Leonard Van Balen developed this tool at the Raymond Lemaire International Centre for Conservation (R.L.I.C.C) at the Katholieke Universiteit Leuven, Belgium. A matrix framework linking four value dimensions with six aspects of heritage attributes, as can be seen in **Table 1**. This tool facilitates a nuanced evaluation of authenticity, bridging tangible and intangible elements to address the complex, layered nature of heritage[17]

According to the NARA Grid, attributes (aspects) and the values(dimensions) are better explained and classified as:[18]

2.2.1.1 Aspects

1)Form and design**:** that encompasses the physical configuration (original or maintained), which includes shape, scale, and stylistic features.

2)Materials and substances: refer to original or introduced materials, sourcing, and compatibility.

3)Use and function: refer to continuity or adaptive transformation while preserving the heritage value.

4)Tradition and techniques-workmanship: refer to the inherited skills, knowledge, and methods used in creating or maintaining heritage places and objects.

5)Location and setting: refer to the original site and the surrounding context(physical environment).

6)Spirit and feeling capture**:** the intangible atmosphere and emotional connection evoke deep emotional connections and a shared sense of identity among those who experience the place.[37][10]

2.2.1.2 Dimensions

1)Artistic value: refers to the aesthetic, creative, and expressive qualities embodied in a heritage property, including shape, ornaments, color, texture, and decorative elements.

2)Historic value: This dimension concerns the connections between a heritage property and past events, periods, persons, or processes that shaped its significance.

3)Social value: relates to the social meanings and community values that promote social interaction and cultural engagement.

4)Scientific value**:** provides the scientific insights for understanding the importance of the heritage and utilizing it as a reliable scientific source [37].

Accordingly, as shown in **Table 1,** NARA GRID is based on those four "dimensions" (the horizontal row of the grid) and "aspects" (the vertical column of the grid) that would bridge between tangible and intangible attributes [18].

2.2.2 Integrity

defined as measures of the wholeness and intactness of the natural and/or cultural heritage and its attributes. All properties nominated for inscription on the World Heritage List shall satisfy the conditions of integrity [5]."Integrity" is synonymous with "wholeness," "completeness," "honesty," "purity," and "uprightness." It represents something complete, without any missing, damaged, or divided parts [38].

The Venice Charter (1964) focused on structural and visual aspects. In paragraph 14, the Venice Charter stated the notion of integrity: "The sites of monuments must be the object of special care to safeguard their integrity and ensure that they are cleared and presented in a seemly manner." This charter emphasizes structural and visual integrity, neglecting other aspects of integrity [39]. (ICOMOS, 1964).The 1972 World Heritage Convention formalized integrity as a criterion for natural heritage. Later, while the Nara Document on Authenticity primarily emphasizes authenticity, it also highlights integrity by expanding its analysis of cultural context, asserting that the diversity of cultural heritage exists across time and space, and advocating respect for other cultures and their belief systems. [33]Subsequent charters, including the San Antonio Declaration (1996), the Burra Charter, and the Riga Charter, broadened integrity beyond material wholeness to include intangible attributes such as cultural meaning, community practices, and dynamic functions [40]. The 2005 Operational Guideline. The 2005 revision of the UNESCO Operational Guidelines for the Implementation of the World Heritage Convention marked a major turning point in formalizing integrity

as an evaluative criterion for cultural heritage, not just natural properties. The 2005 guidelines integrated integrity into the core Outstanding Universal Value (OUV) assessment for all types of heritage [14]. They even note that for living cultural sites (like historic cities or cultural landscapes), the *"relationships and dynamic functions"* essential to their character should be maintained. This explicitly brings functional and relational integrity into play for cultural heritage. Furthermore, paragraph 79 states that properties nominated under criteria (i) (vi) must satisfy the conditions of authenticity. The 2005 standards incorporated integrity into the fundamental assessment of Outstanding Universal Value (OUV) for all categories of assets. Paragraph 87 said that all properties proposed for inclusion on the World Heritage List must meet the integrity criteria. [38] Consequently, evaluating the integrity conditions demands an assessment of the extent to which the property is affected[41]. It is still unchanged in the operational guidelines for 2025 and includes three evaluation requirements.

a) includes all elements necessary to express its outstanding universal value; b) is of adequate size to ensure the complete representation of the features and processes that convey the property's significance; c) suffers from adverse effects of development and/or neglect[5].

2.2.2.1 Wholeness

Includes all elements necessary to convey its OUV, and adequate size for representing features and processes. [5]

2.2.2.2 Intactness

Refers to the good condition of the physical fabric and significant features, and is free from adverse effects from development or neglect.[5]

2.3 Research Questions and Objective

The most important issue for World Heritage sites is to remain on the World Heritage List, which is a crucial tool for their protection. For inscription in this list, the protection of Outstanding Universal Value(OUV) is a requirement. While conservation efforts are essential for protecting physical elements, they sometimes lead to adverse effects on OUV. Properties nominated to (WHL) shall satisfy the authenticity and integrity conditions of OUV according to UNESCO operational guidelines. Besides that, many studies have been conducted on authenticity and integrity. Still, there has been an absence of studies that combine the NARA grid assessment tool for authenticity evaluation with the UNESCO operational guidelines framework for integrity evaluation as a conceptual framework for this study, to answer these two questions.

1. To what extent did the Rehabilitation projects within implemented heritage building projects impact the authenticity condition of OUV in world heritage sites?
2. To what extent did the Rehabilitation projects within implemented heritage building projects impact the Integrity condition of OUV in world heritage sites?

To understand the impact of heritage building projects on Outstanding Universal Value (OUV), this study evaluates the authenticity and integrity of the Erbil Citadel's implemented heritage building projects as a World Heritage Site, and studying the degree of importance of all aspects of authenticity and integrity to have priority in the implementation of heritage building projects.

3 Methodology

The study employs a mixed-methods approach, combining quantitative and qualitative research methods to answer the research questions, including various techniques and tools which contributed to the methodology, such as observation, photography, and measurement, which contained a detailed virtual tour. A questionnaire was distributed to experts based on the Nara grid assessment tool and operational guidelines framework for evaluating three buildings in a World Heritage Site (WHS). Content analysis was employed as a qualitative method to analyze documents and photos related to the case studies. These tools are used for understanding the effect of implemented heritage building projects on OUV.[10][42][43][37][35]

3.1 Quantitative approach

For measurement and quantification of variables to answer the research question and achieve the objective, the quantitative approach enables the gathering of data in numerical form for analysis [44].

3.1.1 Questionnaire Survey

For this study, the (authenticity and integrity) conditions of (OUV) were measured for three selected implemented heritage building projects using the questionnaire. [10][21][25], which consists of five sections. The first section gathers demographic information about the participants. The participants, including architect experts who specialize in the heritage field, whether they are academics at a university or practicing professionals in the heritage field from different sectors such as government, private sectors, and UNESCO staff[10], [19][12][25]Including head and site managers of World Heritage Sites and consultants and senior architects from UNESCO who had worked or had a background information about working in the Erbil Citadel. The second section of the questionnaire evaluates authenticity according to the Nara Grid Assessment tool, which consists of 24 cells. Only one cell of the grid contained one question; most of the cells contained two or three questions. The average of

the mean score of cell questions was used to evaluate each cell, and there are 63 questions[18]. The third section assesses integrity according to the UNESCO Operational Guidelines framework, which contains nine questions for wholeness and eight questions for intactness, and the exact mechanism of authenticity was used to account for scores. The fourth section evaluates the degree of importance of each aspect of authenticity based on experts' opinions. The fifth section evaluates the degree of importance of each concept of integrity based on experts' opinions. For evaluation, the (five-point) Likert Scale was used, with 1 (Strongly Disagree) and 5 (Strongly Agree). The 360° virtual tour included in the questionnaire provided information on stages and techniques for all three projects **Figure 2**, accessible via the link in the questionnaire. Creating a Virtual tour plays a crucial role in evaluating the authenticity and Integrity of them. This technology significantly enhanced the engagement, and it is used to evaluate traditional buildings [42] At the same time, assist the respondents in filling the questionnaire as all elements can be inspected and transferred to experts for evaluation, eliminating the need to come to the location or face information limitations, and providing all detailed information about the project. The questionnaire was distributed via email and WhatsApp. The questionnaire was distributed to 23 experts, and 20 experts returned the questionnaires. Each expert evaluated all three buildings, resulting in 60 questionnaires. [10][45][46][47].

3.1.1.1 Reliability of the questionnaire.

The test that evaluates the internal consistency of a scale or questionnaire is Cronbach's alpha, which ranges from 0 to 1. A higher value indicates greater internal consistency or reliability.in The **Table 2** The questionnaire shows excellent internal consistency, and it is reliable.

3.2 Qualitative approach

This approach focuses more on understanding meanings through using photos, drawings, and documents rather than measuring variables.

3.2.1 Observation

Gathering and recording information about the rehabilitated projects in Erbil Citadel in the form of photos, measured drawings, notes, and documents, which can be helpful for the evaluation of authenticity and integrity, this method contributes to studies such as, [20][19][18][17]Which evaluated these two conditions of (OUV) in implemented projects and [48]Signed to its importance.

3.2.1.1 Field observation (primary data)

Collecting primary data about the authenticity and integrity in the case studies in real-time to collect information about the aspects of authenticity(form and design; materials and substance; use and function; traditions, techniques; location and setting; spirit and feeling) and integrity(Wholeness, and intactness) through visiting the site directly. This is also used in studies such as [20][48]

3.2.1.2 Indirect Observation

Collecting data from records, historical documents, and photos of the High Commission for Erbil Citadel Revitalization(HCECR) related to the case study.

3.2.1.3 Content analysis

The inductive content analysis, as a qualitative approach, was used to generate new insights based on raw materials (drawings and photographs)[49] obtained from observation, which were used to enrich the evaluation of the effect of implemented heritage building projects on the OUV of three heritage building projects in Erbil Citadel. The cases were analyzed using layout drawings, and the amount of restoration (major, moderate, and minimum) that occurred before and after the intervention.

Photographs were used, which were compared between the original condition, before, and after implementation. The content analysis was effectively linked to all aspects of the (authenticity and integrity) frameworks used in the questionnaire and the results. This procedure was repeated in all cases.

3.3 Data gathering

The study highlighted a systematic and multi-phased approach for gathering qualitative and quantitative data. The initial information about the case study was obtained from the HCECR staff and observation. Following the information on frameworks about the evaluation of authenticity and integrity from the previous studies. The selected samples were carefully chosen based on the criteria. The detailed questionnaire was carefully structured based on the study's conceptual framework, which depended on the 360° virtual tour and information about the cases. The steps of the process start from (Taking panoramic 360° photos with an Insta X4 360 (camera model, exporting photos from the camera by using the Insta 360 studio program, using the Kuula platform for making a virtual tour 360° in all spaces of all projects, as shown in **Figure 2** And adding information about stages and techniques that have been used in the buildings from old documents to the virtual tour.. Then, Architectural experts in the heritage field filled out the questionnaire. The questionnaire took nearly three weeks to collect. The next phase involved inductive content analysis of information and photographs gathered from observations and HCECR staff, which enriched the evaluation. In the final phase, data generated from the previous phases are subjected to rigorous statistical analysis to identify the impact of interventions on the authenticity and integrity conditions of OUV.

3.4 Statistical analysis

A statistical analysis was conducted on the

questionnaire results using SPSS 27. This analysis included the frequency of demographic information about respondents, reliability of the questionnaire, descriptive statistics (mean, standard deviations), one-sample t-test, and one-way ANOVA to understand if OUV is affected by implemented heritage building projects.

3.5 Case study

The Erbil Citadel, a UNESCO World Heritage site and one of the world's oldest continuously inhabited settlements, is a pertinent case study for evaluation. The Erbil Citadel has undergone numerous conservation and rehabilitation projects under the supervision of the High Commission for Erbil Citadel Revitalization(HCECR)[11].The 330 historic houses in Erbil Citadel constitute the most important group of traditional buildings in the Kurdistan region of Iraq. For inscription in the World Heritage List, it needs OUV, and Erbil Citadel is the only place in the Kurdistan region on the list. The nomination file for the Erbil Citadel was prepared and presented to the World Heritage Center in January 2013. The Citadel was inscribed on the base of (iv criteria)which is “be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history”[5] on the UNESCO World Heritage List on June 25, 2014, at the 38th session of the World Heritage Committee meeting held in Doha, Qatar. This made Erbil Citadel the subject of this study[51]

The conservation and rehabilitation master plan is the name of the Erbil Citadel master plan. The site's importance comes from the continuity of life on it. The rehabilitation is an approach that leads to this purpose. Most conservation projects should be rehabilitated in the future, according to the master plan. Rehabilitation generally has a greater adverse effect on projects than conservation.

The rehabilitated projects selected in this study were based on these criteria:

- The building of the implemented project with heritage value of more than 100years.
- A project with historical values; (a place where notable historical events took place or that belongs to a famous person or family)
- The building's aesthetic and architectural significance [50]
- Projects according to types of rehabilitation (physical and functional)
- Availability of information and accessible resources. [50]

The rehabilitated projects are (38)buildings, and after applying these criteria, the three implemented projects remained. The selected implemented projects are shown in **Table 3** with types of rehabilitation and some scenes of the selected project added in the **Figure 3 Figure 4 Figure 5**

3.5.1 Erbil Citadel Interpretation Center (Yaqub Agha)

It is part of a large complex that was separated by a central road cut through in 1958. It was a notable landmark at the northern end of the citadel and possibly the largest house of all houses that had double-story wings arranged in a U-plan with a courtyard closed on the fourth side by a single-story structure. The primary wing has two iwan arches on the ground floor. On the upper floor, there used to be another iwan over the western one on the floor below. However, above the eastern iwan, there was a portico supported on decorative timber columns. The east wing, which has disappeared, used to have a timber gallery providing access to the rooms on the upper floor. The western wing had two large pointed arches on the ground floor. An arched doorway with a decorative plaster door head provides access to the stairs, which rise over an arch, but the rest of the wings have disappeared. Behind the arches, there is a reception room, now divided into two by a modern partition, with a magnificent plaster fireplace on the eastern wall. At the western end of the room, which has been a private hammam, entered through the vault passage of more than one period of construction, there are more wall paintings visible over the vaults[51]. **Table 4** is related to the analysis of existing documents about the case. Constructed in the Late Ottoman period. The last implementation was in 2015, and the Original function was Residence; the current use is the Erbil Citadel Interpretation Center. The project involved a major restoration with a new use (adaptive).

3.5.2 Erbil Citadel traditional Hammam.

Abdullah Pasha, the father of Yaaqub Agha, reconstructed the Hammam. The building is composed of an outer changing hall (barrani), of about 9 by 9 metres, with pointed arches across the corners to form the octagon on which the dome sits. The entrance door and the octagon are ornamented with carved stonework. Under the centre of the dome, there is a modern heptagonal fountain. Towards the north is the access to the middle hall (wastani), slightly warmer, covered with a barrel vault and with masonry benches around the walls. At the northern end is the inner hall (jawani), very hot and steamy. This hall, the plan of which is an octagon within a square measuring some 11 by 11 metres, has six alcoves used for private bathing. It is also surmounted by a large dome with small round-glass openings to provide natural light inside. The hammam of the Citadel ceased to function in the 1960s and was restored in 1978 (the dome and south and west sides of the changing room were rebuilt) without it being brought back into its original use. A small number of houses have a private hammam: 2/1, 28/3, and 58/3[51][52]. **Table 5** is related to the analysis of the existing documents about

the case. Reconstructed in the early Ottoman period, and the Last implementation in 2025. The original function was a traditional hammam. Before starting the project, it was used as a gallery. Now rehabilitated to be a traditional Hammam. Moderate restoration of intervention in physical rehabilitation with the original function.

3.5.3 Erbil Citadel Cultural Center (Salih Chalabi).

It used to be two stories high, raised above a semi-basement, and therefore had more rooms than other houses in the citadel. However, the upper story over the north and south wings was demolished in the 1950s or 1960s. A three-bay Mousil alabaster portico fronts the main southwest wing and contains two large rooms connected by an open doorway. The central room has two gypsum shelves, the older one being higher. There are two side wings, each containing a single room. The stairs to the upper floor of the entrance wing rise over a large arch in the southwestern wing. The external northeast elevation curves out in an arch to accommodate a small room and the curved stairs to the former upper story. After the massive fire, the HCECR implemented the project to turn it into the Erbil Citadel Cultural Center. The center hosts multicultural activities and events such as seminars, exhibitions, lectures, etc.[51] **Table 6** is related to the analysis of existing documents about the case. Constructed in the Late Ottoman period. The last implementation was in 2014. The original function was Residence, and its current function is Erbil Citadel Cultural Center.Minimum restoration in physical rehabilitation, and with a new function.

4 Results

The findings of this study are presented through a combination of qualitative and quantitative analysis, offering a comprehensive understanding of the assessed cases in the world heritage site.

4.1 Questionnaire Survey

The analysis of section one of the questionnaire, which is demographic information, as shown in **Table 7** It reveals that women constituted the majority of participants, at 55%, while men comprised 45%. The age of participants is categorized into five groups, and the results show that 5% (23-30), 35% (31-40), 30% (41-50), 15% (51-60), and 15% (above 60) years old. The BSc and PhD participants had the most participation in the study, with 35% each, while the MSc participants contributed 30%. The working sectors of participants include universities, with the majority, 41.67%. The government sector is 25%, while UNESCO and the private sectors are 16.67%. The ratio exceeds 100% because some respondents work in more than one sector. The majority (30%) had 11–15 years of heritage experience, followed by 16–20 years (25%), and 6–10 years (20%). 1–5, 21–30 (10%), and above 30 years (5%).

4.1.1 Descriptive statistics

In the analysis, each NARA grid cell included multiple questions, and integrity was assessed separately through the concepts of wholeness and intactness. Average scores were calculated for each set of questions and converted to scale data.

According to the mean score of aspects and dimensions of Nara Grid for authenticity, the highest aspect mean score is form and design, indicating that form and design are the most attended to aspects. Other aspects also attained high mean scores, all exceeding four, and among these, the scientific dimension achieved the highest mean score. Others attained more than four, and overall, all authenticity attained 4.101, according to **Table 8.**

For integrity, the mean score of wholeness is 3.9296, and intactness is 3.9312. The scores are close to each other, as shown in **Table 9** Total Integrity, which is the average mean of both components of integrity, wholeness, and intactness, attained 3.9304 and obtained a high score of agreement from respondents.

4.1.2 One-sample t-test

The data from respondents on authenticity, integrity, and OUV are distributed normally according to the Kolmogorov-Smirnov test, and for this purpose, all statistical tests were done in parametric form. Regarding authenticity, attained (4.1010) according to a one-sample t-test reveals a significant difference with the test value (3) (p-value < 0.05), indicating an impact. Moreover, it is positive according to **Table 10,** because the mean difference is (1.1010), and it is positive. Regarding integrity, the result (3.9304) from a one-sample t-test reveals a significant difference with the test value, indicating an impact. Moreover, according to **Table 10 .**The mean difference is positive (0.9304). Overall scores of Outstanding Universal Value (OUV), which is equal to the average of (authenticity and integrity means), attained 4.0157, which has a significant difference from the test value. The mean difference is positive, indicating that the implemented heritage building projects positively affected the Outstanding Universal Value through evaluating the projects' authenticity and integrity conditions of OUV. And the effect size is very large, as can be seen in **Table 10** According to Cohen's d (effect size point estimate,>1). The results show that the positive effect of implemented heritage projects is very large on authenticity, integrity, and overall, the OUV.

4.1.3 One-way ANOVA

One way analysis of variance(ANOVA)was conducted to show whether there is difference in means among three implemented projects to because the p-value>0.05 the result shows that there is no statistically significant difference among means of all the implemented projects in all of authenticity, integrity, and overall OUV, according to a one-way

ANOVA test, p-value.0.837 related to authenticity, related to integrity p-value=0.462, and for overall OUV p-value =0.747 for all three projects. it indicates that, according to available data, the projects do not vary significantly across the three implemented projects, which means that each project has the same impact on these scores. As shown in **Table 11.**

4.1.4 The degree of importance

Based on the evaluation of Experts, as shown in **Table 12** The most critical aspect of authenticity, according to the Nara grid, is spirit and feeling, with a mean score of 4.60, followed by form and design (4.55) and material and substance (4.53). The result suggests that both intangible qualities and physical attributes are essential in evaluating authenticity in rehabilitation projects as one of the conservation approaches. The 'Use and Function' aspect score of 3.82 is the lowest-rated aspect, indicating that the original or continued use and function of sites was perceived as less essential. Regarding integrity, experts rated wholeness with a score of 4.43, which is slightly higher than Intactness, which scored 4.40, while some aspects of authenticity received higher ratings than integrity components, others were rated lower. This suggests that experts view authenticity and integrity as complementary in preserving heritage sites.

4.2 Inductive Content Analysis

The inductive content analysis through analysing drawings and photographs highlighted that there is an intervention, which is a large restoration in the physical rehabilitation implementation of the Interpretation Center. The process involves removing non-original parts and restoring the original layout and form by building missing parts on the first floor and adding a second floor. Regarding materials and substances, new buildings and patterns incorporate the same materials and types, with the addition of modern materials like ceramic tiles and glass doors. The function of the building is adapted to cultural use, as can be seen in **Table 4 .**

For the traditional hammam, there is restoration by a moderate amount, which restored the outside part of the hammam according to available documents, with small modifications in dimensions. In relation to material the implementation preserved original material and new material used with the same type and the reuse of materials which were in a good condition. the project planned to use as original function of a traditional hammam, this can be seen in **Table 5.**

The third cultural center shows in **Table 6** that there is not change in the layout and form of original building inspite of the modern glass and alunium structure covered the courtyard of the building .the implementation was focused more on structural stability due to loss of materials caused by the fire .the most interventions was in materials and there was efforts to use the same materials with local craftspeople the modern roofs material is also accounted as the alteration in materials. The function also changed to cultural use These changes occurred to make the buildings adapt to the new use. The rehabilitation types for all cases shown in **Table 3**

5 Discussion

The current study demonstrates that the rehabilitation projects implemented in the Erbil Citadel had a positive and significant impact on the site's Outstanding Universal Value (OUV), as measured through both authenticity and integrity. The results of this research present a positive outcome. Regarding the authenticity condition of Outstanding Universal Value(OUV), multiple studies have shown that adaptive reuse implementation have a positive impact the results of [10][19]preserved authenticity through form and symbolic meanings of the project. According [18] used the NARA Grid assessment tool, all aspects obtained a higher score than neutral and positively impacted. And the form and design got slightly fewer points, while in this study, the form and design gained the highest score among other aspects. The location and setting is the most attended to in [18].it has the lowest score in this study, but overall, both impacted positively, and the overall authenticity score of this study is more than that.In [20] the mixed effect produced by implementation, while the study retained scientific value, which this study achieved the same result, and the scientific value obtained the highest score among all dimensions. In the [20] Negatively impacted the form and design aspect of authenticity, in contrast with this study.[12] highlighted that while material and construction techniques, and other aspects retained .in the same time form and design compromised. other studies impacted negatively by form and design, and the reason for this is that changing building elements and spatial arrangements, material, and substance have the most contribution in this negative impact as shown in studies [17][21]While these two aspects obtained the highest score in this study. Regarding the integrity condition of Outstanding Universal Value(OUV), studies show that careful restoration and preservation can enhance or strengthen integrity In this study, the implementation contributed and impacted positively on integrity in the case study through wholeness and intactness components, and the same result was achieved with studies. [15][17]Which the implementation in both of the other studies positively enhanced wholeness and maintained integrity. Other studies positively impacted the overall integrity as presented in these studies.[24][6]. Other studies[13][25] revealed adverse or mixed effects on integrity, in the study[13]. While they impacted

integrity, especially intactness, through their structural stability, the intervention harmed wholeness. Studies show that poorly planned and implemented interventions can weaken the integrity of world heritage sites and harm their cultural significance. [25] highlighted that the insufficient implementation led to removal from the World Heritage List. . According to the content analysis, there were interventions in form and design through restoring the original layout in case 1 and case 2, and using a new modern form in case 3. These changes don't affect the perception of experts, and this aspect scored as the highest, which indicated that the amount of intervention is not important; the quality of intervention is the core of the conservation. The use of modern materials is another issue in implementation. The material and substance also obtained the second-highest score after form and design from the questionnaire results, indicating that the use of modern materials, if implemented according to conservation guidelines, can enhance or not negatively affect the cultural significance. The functions of cases 1 and 3 are adapted to the new use of this aspect. According to expert opinion, this aspect is less important than others, suggesting that changing it to a more suitable function for the place would not significantly impact the authenticity. For this reason, despite changes in functions, the results show that the Use and function aspect has been enhanced. Additionally, the expert evaluations in this study emphasized the importance of both tangible and intangible aspects such as form, material, and spirit in defining authenticity, consistent with previous findings.[17][18] Moreover, integrity components reinforce the idea that authenticity and integrity are complementary and must be addressed jointly to preserve OUV. as can be note in the sequences of the aspects from the higher to the lower in the degree of importance rated by experts in this sequence (spirit and feelings, form and design, Material and substances, wholeness, intactness, tradition and techniques, location and setting, and use and function) this sequence indicate that the preservation of Outstanding Universal Value achieve if holistically pay attention to all aspects of integrity and authenticity tangible, and intangible. The Erbil Citadel implemented building projects that enhanced both integrity and authenticity, as shown in **Table 13** and **Table 14,** demonstrating that well-managed rehabilitation, aligned with international standards of implementation of a project, can enhance heritage values without compromising OUV.

6 Conclusion

The conservation of the world heritage sites centres on preserving their OUV and is a key criterion and requirement for inscription on the World Heritage List. The preservation of OUV often requires physical intervention to protect structural stability and cultural significance. However, these interventions can sometimes inadvertently compromise OUV.

Rehabilitation is a common conservation approach that involves physical interventions ranging from minimal to moderate to large-scale physical restoration, and adapting to new or continued uses of the original. This study assessed the effect of implemented heritage rehabilitation projects on OUV, utilizing the Nara Grid assessment tool to assess authenticity and operational guidelines framework for integrity evaluation, examining whether rehabilitated projects affected OUV through authenticity and integrity conditions evaluation, and the nature and extent of the impact. Three rehabilitated projects in the Erbil Citadel World Heritage Site were evaluated through expert responses to a detailed, structured questionnaire with a virtual tour of all projects, and the opinion of experts on the degree of importance, authenticity, and integrity components. The results demonstrate that the implemented projects had a positive and significant effect on Outstanding Universal Value in the Erbil Citadel World Heritage Site. As measured through assessing (Authenticity and/or Integrity) conditions, which are two components of one of the three pillars of OUV. The findings reveal that, despite variations in rehabilitation approaches among the projects, all contributed positively to preserving and enhancing the OUV. Key aspects such as form and design, material, and substance received higher evaluation scores. Despite the restoration in the form and layout of buildings. Using modern materials and incorporating some modern elements, the form, design, material, and substance were not negatively affected. The scientific dimension also scored higher among the dimensions, and all other dimensions and aspects were positively affected and received high scores. Regarding integrity, both wholeness and intactness scored similarly, with slightly higher results for intactness, indicating that the heritage site includes all necessary features to convey cultural significance and is free from the adverse effects of development projects. The statistical analysis revealed a very large effect size for projects across all aspects of authenticity and integrity, resulting in the same effect being observed for the overall OUV. indicating the positive impact is substantial and significantly contributes to enhancing the site's OUV. The projects collectively impacted the site, with no significant difference among them. These results underscore the effectiveness of the interventions in aligning with international conservation standards.

Finally, the expert's opinion is that the tangible and intangible aspects of authenticity are crucial for preserving authenticity, and the use and function are less critical if adapted or continued. According to

their opinions, Integrity and authenticity are complementary in preserving cultural significance and remaining OUV. The study concluded in the assessment that the rehabilitated projects in Erbil Citadel affected the authenticity and integrity conditions of OUV positively and enhanced them. This study assessed the authenticity and integrity pillar of OUV and for future studies recommends that there is a need to assess the third pillar of OUV, which is the protection and management.

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تأثير مشاريع المباني التراثية المُنفَّذة على القيمة العالمية المتميزة: حالة قلعة أربيل

المستخلص

يُعد الحفاظ على القيمة العالمية الاستثنائية (OUV) معياراً رئيسياً للإدراج في قائمة التراث العالمي(WHL). تبحث هذه الدراسة في تأثير مشاريع إعادة التأهيل المُنفَّذة على القيمة العالمية الاستثنائية مع التركيز بشكل خاص على الأصالة(Authenticity) والسلامة(Integrity). يطبق البحث منهجاً مختلطاً باستخدام التحليل الكمي مع تقييمات الخبراء. يتم توفير استبيان مفصل مع جولة افتراضية(Virtual tour) تحتوي على معلومات حول جميع المشاريع الثلاثة في قلعة أربيل كمؤشرات لموقع التراث العالمي، بناءً على شبكة نارا (NARA Grid) و المبادئ التوجيهية التشغيلية لليونسكو(OGs). وتحليل المحتوى الاستقرائي النوعي. تم اختيار المشاريع بناءً على معايير إعادة التأهيل المادية والوظيفية. تكشف النتائج عن تأثير إيجابي وهام إحصائياً لجهود إعادة التأهيل على الأصالة والسلامة والقيمة العالمية الاستثنائية بشكل عام. تُظهر مشاريع قلعة أربيل أنه عندما يتم التخطيط للحفظ بعناية ومواءمته مع المعايير الدولية، فإنه يمكن أن يحافظ على القيمة العالمية الاستثنائية بل ويعززها. أكدت الدراسة على أهمية العلاقة التكاملية بين الجوانب الملموسة وغير الملموسة للأصالة والمكونات الهيكلية للسلامة في الحفاظ على أهمية التراث الثقافي.

الكلمات المفتاحية:

التراث الثقافي, مشاريع إعادة التأهيل , الأصالة , السلامة , قيمة العالمية المميزة .

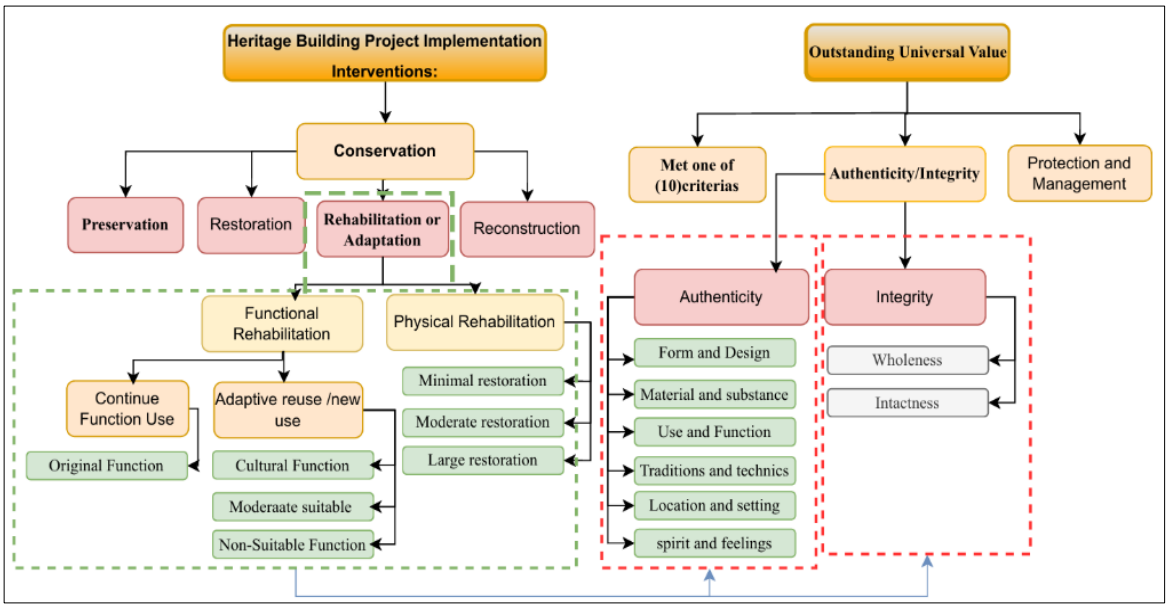


Figure 1 Conceptual Framework (Researcher)

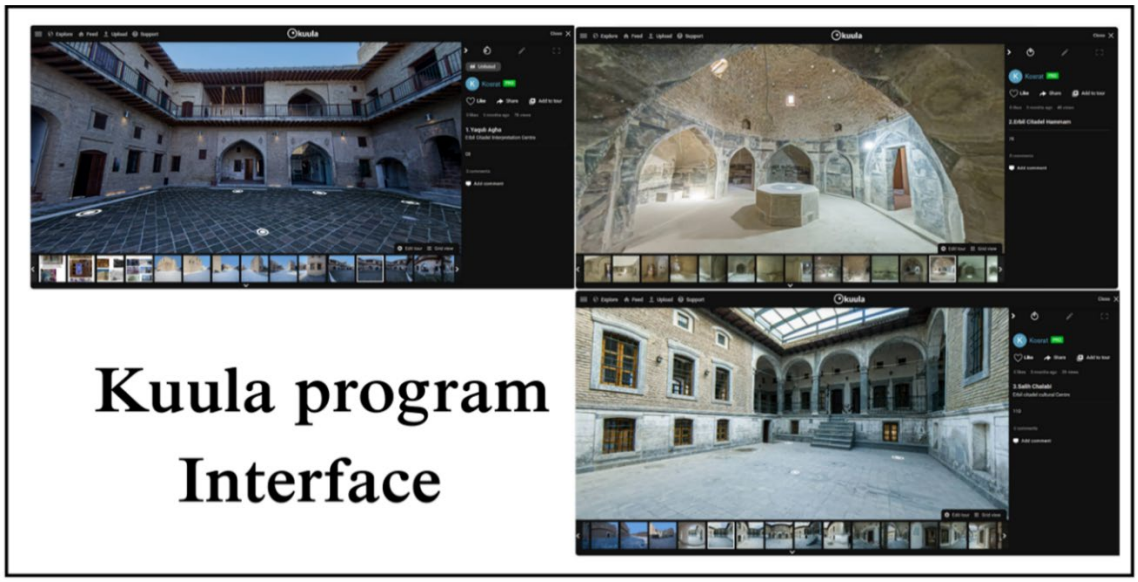


Figure 2 360-degree photos for each project in the Kuula platform (researcher)

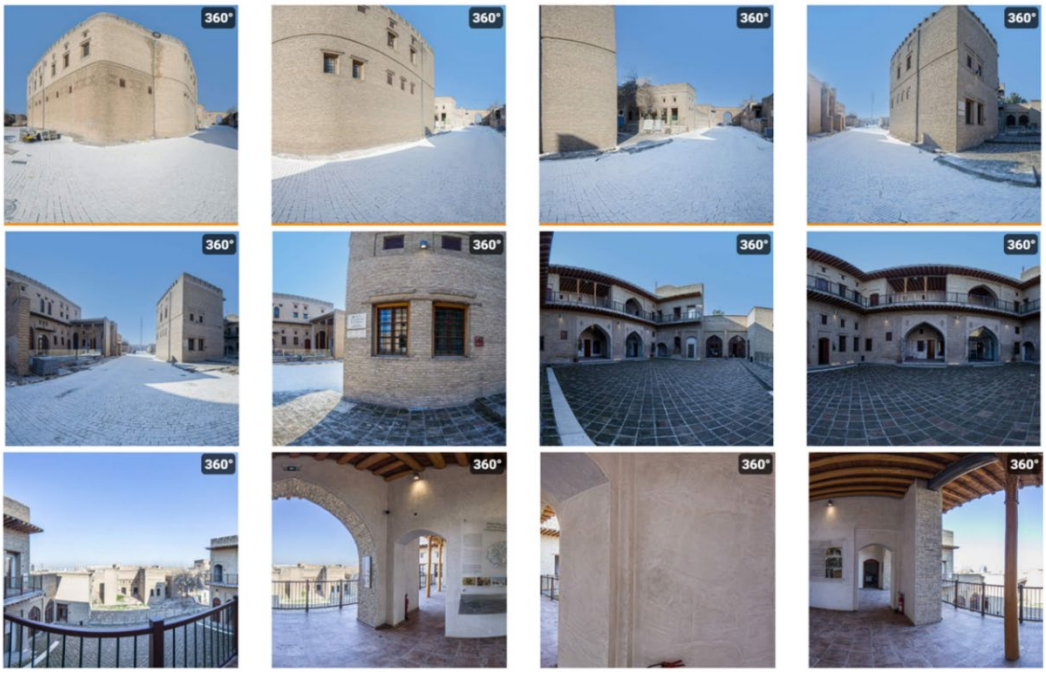


Figure 3 Some 360° scenes of the virtual tour in the Erbil Citadel Interpretation Center (researcher)

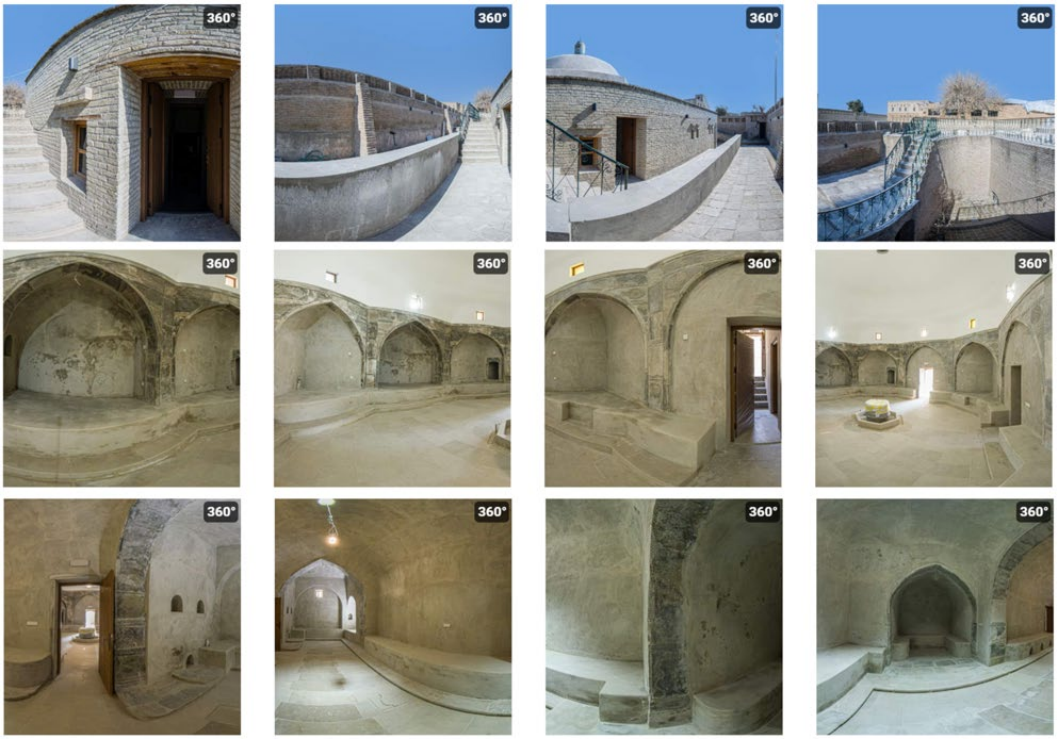


Figure 4 Some 360° scenes of the virtual tour in the Erbil Citadel Traditional Hammam (researcher)

Figure 5 Some 360° scenes of the virtual tour in the Erbil Citadel Cultural Center (researcher)

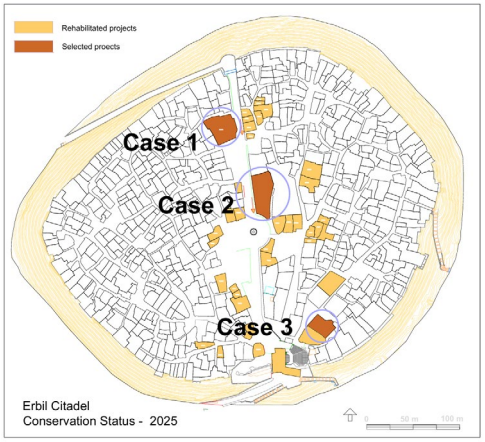
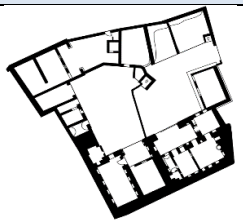
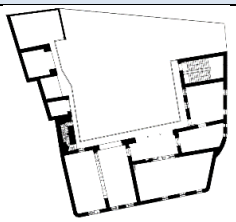
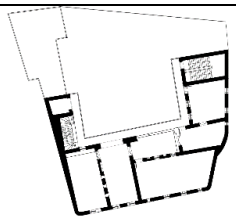
Table 1 NARA Grid table for authenticity assessment

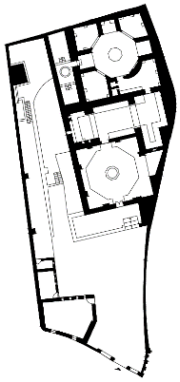
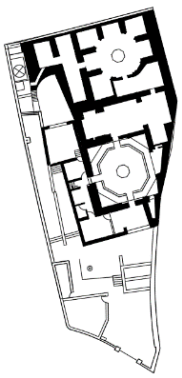
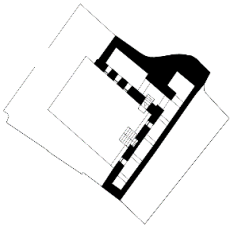
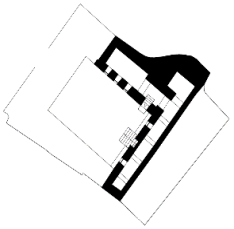
Aspects ↓ / Dimensions →	Artistic	Historic	Social	Scientific
Form and Design				
Material and Substance				
Use and Function				
Tradition-techniques-workmanship				
Location and Setting				
Spirit and Feelings				

Table 2 Reliability test

Cronbach's Alpha	N of Items
0.955	99

Table 3 Location of Cases, plans of the projects before, the current condition, and the type of rehabilitation

Selected cases	**Cases 1**	**Plans Before**	**Plans Current**
 Case's location according to the site	**Erbil Citadel Interpretation Center (Yaqub Agha) Late Ottoman Period (1880-1918)**	 Ground floor	 Ground floor
			 First Floor

Case 2	**Plans Before**	**Plan Current**	**Case 3**	**Plans Before**	**Plan Current**
Erbil Citadel traditional Hammam **Early Ottoman Period (1880-1918)**			Erbil Citadel Interpretation Centre (Yaqub Agha) **Late Ottoman Period (1880-1918)**	 Basement	 Basement

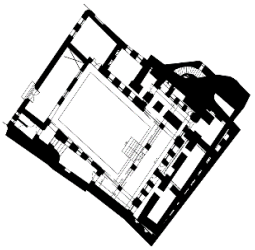
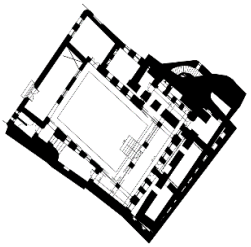
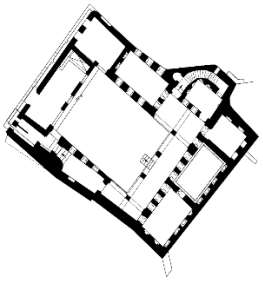
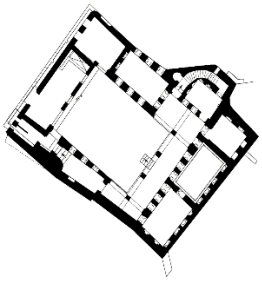
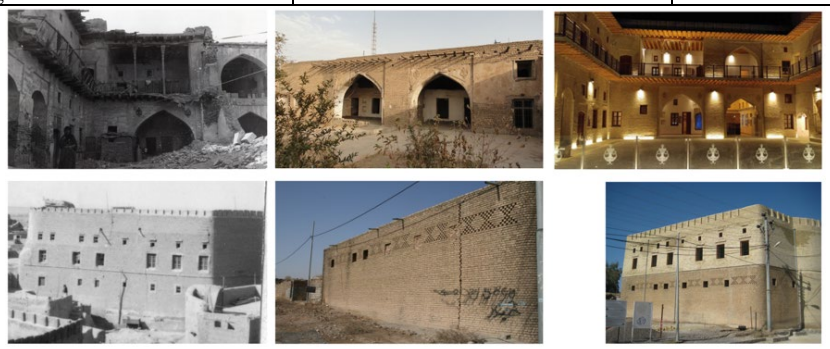
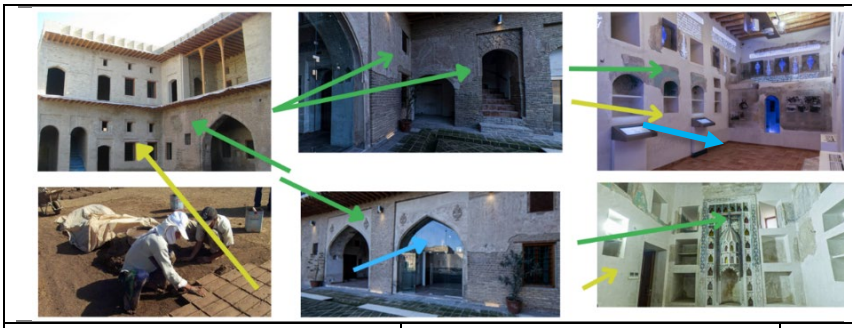
	Ground floor	Ground floor		 Ground floor	 Ground floor
Cases	Physical rehabilitation (amount of restoration)	Functional Rehabilitation		 First floor	 First floor
Case 1	Large	New use			
Case 2	Moderate	Original use			
Case3	Minimum	New use			

Table 4 Inductive content analysis of drawings and photos in Case 1

Case 1: Photo and Drawing explanation	**Description of the case**	**condition**	**Frameworks**
			**Authenticity aspect** **Form & Design**
Removing non-original parts Restoring missing parts Restoring first floor	Restoring the building's parts to their original shape	Original layout restoration	
			
Left to right (Original -Before-After)	Restoring Form & patterns according to the original documents	Original Form restoration	

<table>
<tr><td colspan="3">  </td><td rowspan="4">Authenticity aspect

Material & Substance</td></tr>
<tr><td>Original material (preserved)</td><td>Remaining parts</td><td>Enhanced, but modern materials are used</td></tr>
<tr><td>New material (Same source)</td><td>Restored parts</td><td></td></tr>
<tr><td>Modern materials</td><td>Adaptation needs</td><td></td></tr>
<tr><td colspan="3">  </td><td rowspan="2">Authenticity aspect

Use & Function</td></tr>
<tr><td>Informative panel about the original function and owner of the building and social activity</td><td>A trace of the original function exists. Promoted social engagement</td><td>The function and use are enhanced through the new adapted use</td></tr>
<tr><td colspan="3">  </td><td rowspan="2">Authenticity aspect

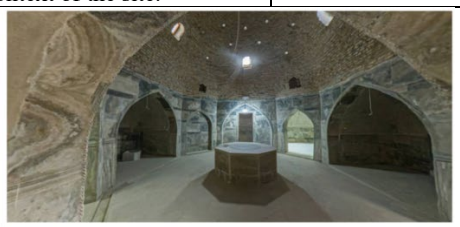
Traditions & workmanship</td></tr>
<tr><td>Same method in different periods</td><td>The same techniques used by local craft people</td><td>Historical Building Techniques used in the construction</td></tr>
<tr><td colspan="3"> 
Before 1958, the central road (building separated into two parts)</td><td rowspan="2">Authenticity aspect

Location & Setting</td></tr>
<tr><td>Left to right (Original -Before-After)</td><td>The implementation respected the historical context of the site .</td><td>Original setting is respected.</td></tr>
</table>

 			**Authenticity aspect** **Spirit & Feeling**
Atmosphere of the building	The experience of the site evokes a feeling of continuity with the past	Implementation enhanced the building's historical atmosphere	
   			**Integrity** Wholeness
All features related to wholeness (comparing the original with the implemented).	Most of the features related to OUV exist, and a functional relationship between parts of the site is preserved	Scale of the building and features satisfy enhancing wholeness	
     			**Integrity** intactness
Interior and exterior features related to intactness	The structural integrity of the building features is stable	The building is in good condition and free from adverse impact.	

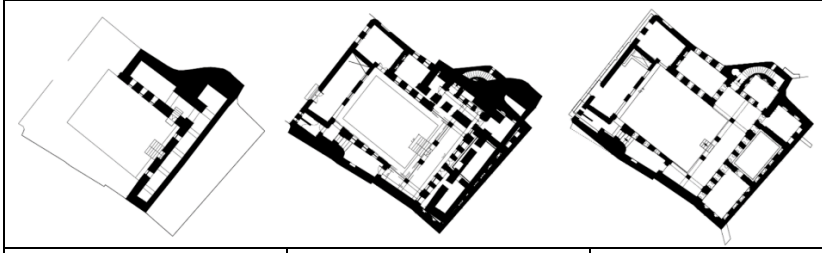
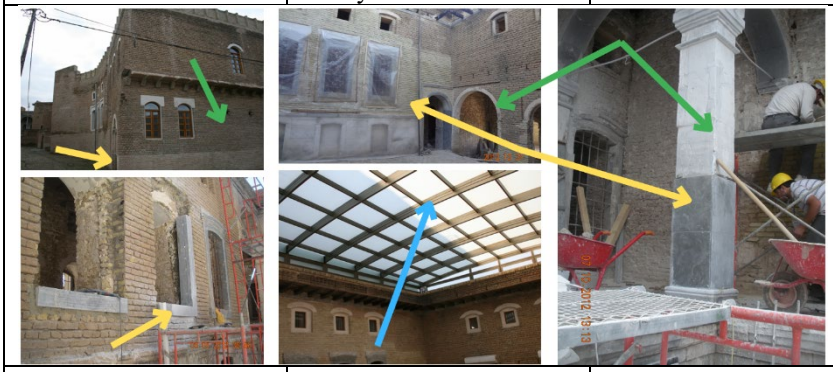
Table 5 Inductive content analysis of drawings and photos in Case 2

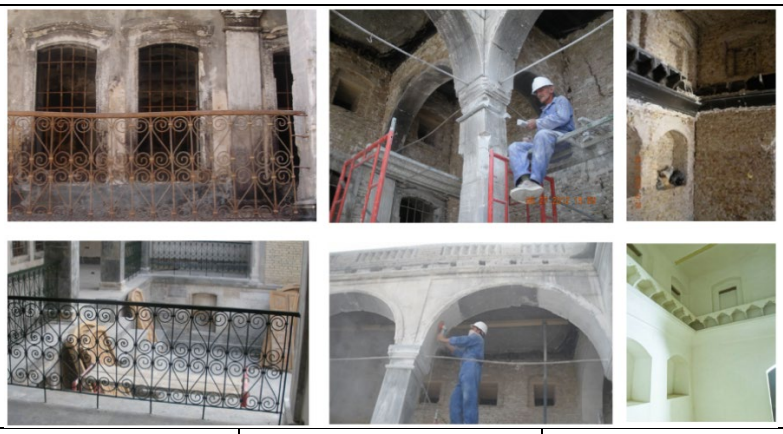
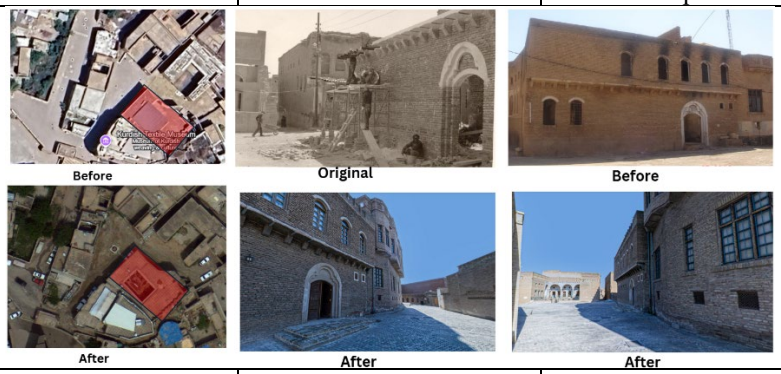
Case 2: Photo and Drawing explanation	Description of the case	condition	Frameworks
			Authenticity aspect **Form & Design**
Removing non-original parts Restoring missing parts	Restoring the building's parts to their original shape with some modifications	Original layout restoration with some modifications	
			Authenticity aspect **Form & Design**
(Original -Before-After)	Restoring Form & patterns according to the original documents and wall traces	Original Form restoration with some modification	
			Authenticity aspect **Material & Substance**
Original material (preserved) New material (Same source) Reused old materials	Remaining parts Restored parts Adaptation needs	Implementation: Enhanced material and substance	

   			**Authenticity aspect** **Traditions & workmanship**
Traditional techniques in implementation	The traditional techniques used by local craft people	Historical Building Techniques used in the construction	
  			**Authenticity aspect** **Location & Setting**
(Original -After)	The implementation respected the historical context of the site.	Original setting is respected	
 			**Authenticity aspect** **Spirit & Feeling**
Atmosphere of the building	The experience of the site evokes a feeling of continuity with the past	Implementation enhanced the building's historical atmosphere	

			**Integrity** Wholeness
All features related to wholeness (comparing the original with the implemented).	Most of the features related to OUV exist, and a functional relationship between parts of the site is preserved	Scale of the building and features satisfy enhancing wholeness	
			**Integrity** Intactness
Structure of the building	The structural integrity of the building features is stable	The building is in good condition and free from adverse impact.	

Table 6 Inductive content analysis of drawings and photos in Case 3

Case 3 : Photo and Drawing explanation	Description of the case	condition	Frameworks
			
From left(Basement-Ground floor-First floor)	Without intervention in the layout	Original Layout preserved	
			**Authenticity aspect** **Form & Design**
From left (Original - Before-After)	preserving Form & patterns,but adding a modern glass roof for the courtyard	Original Form preserved, but a new modern element added	
			**Authenticity aspect** **Material & Substance**
Original material (preserved)	Remaining parts	Enhanced, but some modern material is used	
New material (Same source)	Restored parts		
Modern materials	Adaptation needs		

			
Traditional techniques in implementation	The traditional techniques used by local craft people	Historical Building Techniques used in the construction	
			**Authenticity aspect** **Traditions & workmanship**
Cultural activity	The function promotes social engagement	The function and use are enhanced through the new adapted use	
			**Authenticity aspect** **Location & Setting**
(Original -before - After)	The implementation respected the historical context of the site.	Original setting is respected	

  			**Authenticity aspect** **Spirit & Feeling**
Atmosphere of the building	The experience of the site evokes a feeling of continuity with the past	Implementation enhanced the building's historical atmosphere	
   			**Integrity** Wholeness
All features related to wholeness (comparing the original with the implemented).	Most of the features related to OUV exist, and a functional relationship between parts of the site is preserved	Scale of the building and features satisfy enhancing wholeness	
  			**Integrity** Intactness
(original-After-After) Structure of the building	The structural integrity of the building features is stable	The building is in good condition and free from adverse impact.	

Table 7 demographic information of respondents

Demographical Information				
items		Frequency	Percent	Cumulative Percent
gender	Male	27	45	45
	Female	33	55	100
Age	23-30	3	5	5
	31-40	21	35	40
	41-50	18	30	70
	51-60	9	15	85
	Above 60	9	15	100
Qualification	BSc	21	35	35
	MSc	18	30	65
	PHD	21	35	100
Sector	University	30	41.67	50
	Government	18	25	80
	Private Sector	12	16.67	100
	UNESCO	12	16.67	120
Years of experience in heritage	1-5	6	10	10
	6-10	12	20	30
	11-15	18	30	60
	16-20	15	25	85
	21-30	6	10	95
	above 30	3	5	100

Table 8 Mean score for Nara grid cells(aspects, Dimensions, and overall authenticity)

Aspects ↓ / **Dimensions** →	**Artistics**	**Historic**	**Social**	**Scientific**	**Mean score of (Aspects)**
Form and Design	4.189	4.111	4.189	4.216	4.176
Material and Substance	4.150	4.027	3.994	4.333	4.126
Use and Function	4.100	4.022	4.189	4.141	4.113
Tradition-techniques-workmanship	4.058	4.050	4.227	4.141	4.119
Location and Setting	4.061	4.016	4.016	3.916	4.002
Spirit and Feelings	4.122	4.094	4.022	4.033	4.068
Mean score of (dimensions)	4.113	4.053	4.106	4.130	Authenticity Score =4.101

Table 9 Mean score of integrity (wholeness, intactness, and overall integrity)

Wholeness Mean	3.9296	Intactness Mean	3.9312	Integrity mean	3.9304

Table 10 Results of One Sample t-test with the effect size of (Authenticity, integrity, and overall OUV)

variables	N	Mean	Std.	Mean Difference	t	p-value	Effect size, Cohen's d (Point Estimate)
Authenticity	60	4.1010	.55626	1.10104	15.332	.000	1.979
Integrity	60	3.9304	.63920	.93044	11.275	.000	1.456
OUV	60	4.0157	.58399	1.01574	13.473	.000	1.739

Table 11 Results of One-Way ANOVA related to (Authenticity, Integrity, and Overall OUV)

Variables	Projects	N	Mean	Std.	F	p-value
Authenticity	Project 1	20	4.1017	.57097	.182	.834
	Project 2	20	4.0469	.59156		
	Project 3	20	4.1545	.52802		
	Toatal	60	4.1010	.55626		
Integrity	Project 1	20	3.7851	.66924	.782	.462
	Project 2	20	3.9875	.64548		
	Project 3	20	4.0187	.60854		
	Toatal	60	3.9304	.63920		
OUV	Project 1	20	3.9434	.60203	.294	.747
	Project 2	20	4.0172	.60850		
	Project 3	20	4.0866	.56171		
	Toatal	60	4.0157	.58399		

Table 12 Results of the degree of Importance according to experts opinion

	Authenticity						Integrity	
	Form and Design	Material and substance	Use and function	Tradition and techniques	Location and Setting	Spirit and Feelings	Wholeness	Intactness
Mean	4.5500	4.5263	3.8167	4.3000	4.2500	4.6000	4.4333	4.4000

Table 13 Integrity evaluation in implemented heritage building projects in Erbil Citadel

wholeness	Includes all elements needed to convey its OUV with adequate size to represent features and processes
Intactness	Maintains intactness with good physical condition and no adverse effects from development or neglect.

Table 14 Complete NARA Grid evaluating authenticity in implemented heritage building projects in Erbil Citadel

Dimensions ⇒ / Aspects ⇓	Artistic	Historic	Social	Scientific
Form and Design	New form and design Elements match the Original style, motifs are accurately restored, and contrasts prevent falsifications.	Intervention reflects history using archives, reconstructions are distinguishable, and the original layout is preserved.	The forms reflect local cultural meanings, traditional design stays valued, and the sites support social activities.	The buildings reliably represent specific period architecture in typology, structure, and design.
Material and Substance	Material color, texture, and motifs align with original aesthetics and traditional craftsmanship.	Materials reflect the historical period, are documented, and new ones are compatible in appearance and function.	Materials reflect the era's social and economic context, use traditional sourcing, and express local identity.	Materials reveal the construction methods and are significantly linked to the original buildings.
Use and Function	Current uses highlight artistic elements, preserve decoration, and adapt the function to the original designs.	Uses retain the monument's original functions, and adaptations don't erase the site's historical character.	Current uses support community engagement, respect heritage values, and enhance access and visibility.	Current uses balance historical significance with modern needs and promote continued research and study.
Tradition-techniques-workmanship	Traditional artistic techniques are preserved in decoration, and modern interventions respect these methods.	Traditional construction techniques match the building's period, ensuring continuity between old and new elements.	Local craftspeople maintained the buildings using traditional techniques that reflect cultural practices, supporting knowledge transmission.	Traditional techniques reveal original construction methods, while current interventions support research on historical craftsmanship.
Location and Setting	Decorative elements harmonize with the environments, modern development respects artistic perception, and the contexts enhance the historical character.	The original sites are preserved, changes respect the historical layout, and the environment supports the building's significance.	The location fostered community revitalization, public engagement, and supports ongoing traditions and social activities.	The site supports research on historical planning and building-environment relationships, with an intact setting for analysis.
Spirit and Feelings	The buildings' forms evoke beauty and identity, design enhances the artistic atmosphere, and invites emotional immersive experiences.	The atmospheres reflect the building's history, preserving continuity with the past and respecting historical changes.	The place fostered community belonging, shared emotional ties, and supports cultural gatherings and collective memory.	The site provides insights into emotional and symbolic values, enabling the study of cultural beauty and memory.