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Developing a Synthetic Theoretical Approach for Archaeological Heritage Conservation in Post-Conflict Iraq

Keywords: archaeological landscapes, contextual decision framework, GIS, remote sensing, post-conflict heritage

Түйін сөздер: археологиялық ландшафттар, шешім қабылдаудың контекстік жүйесі, ГАЖ, қашықтықтан зондтау, қақтығыстан кейінгі мұра

Ключевые слова: археологические ландшафты, контекстуальная система принятия решений, ГИС, дистанционное зондирование, постконфликтное наследие

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The study on the preservation of Iraqi archaeological heritage in post-conflict contexts addressed a theoretical framework. The research employs PRISMA-guided theoretical synthesis (41 sources) and thematic analysis to consolidate fragmented evidence into a contextual decision framework specifically designed for the Iraqi context. The framework connects technologies to practical applications using three tools: the technology matrix × constraints; the scene matrix × intervention phase × priority; and the threshold matrix – actions, supported by six operational rules structured as if-then-because statements and a decision tree. The findings suggest that remote sensing and geographic information systems are optimal for Iraq, given their benefits in access, safety, and scalability, whereas ground-penetrating radar and 3D scanning encounter considerable challenges. The effectiveness of technology is influenced by five constraints: access and security, available skills, physical sensitivity, legislation, and cost/time. Contribution is a transferable, evidence-based approach that connects intervention phases with technology selection and local constraints, enabling practitioners to transition from theoretical concepts to practical decisions. The research suggests conducting field verification of the framework and creating interactive digital tools to facilitate adoption and enhance capacity building.

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Иректағы қақтығыстан кейінгі археологиялық мұраны сақтаудың кешенді теориялық моделін жасау

Иректың археологиялық мұрасын қақтығыстан кейінгі жағдайда сақтауға арналған зерттеуде осы мәселені теориялық аспектіде шешу қарастырылады. Жұмыста PRISMA (41 дереккөз) әдісі бойынша орындалған теориялық синтез, сонымен қатар Ирак жағдайына арнайы қалыптасқан шешім қабылдаудың контекстік

моделіне әртүрлі мәліметтерді біріктіре алатын тақырыптық талдау қолданылады. Ұсынылған модель тәжірибелік міндеттермен үш технологияның көмегімен орындалады: «технология × шектеу» матрицалары; «көрініс × араласу фазасы × басымдылық» матрицалары, сонымен бірге «егер – сол – сондықтан» форматындағы алты операциялық ережелермен толықтырылған шекті матрица әрекеті және шешім ағашы. Алынған нәтижелер Ирак үшін олардың қол жетімділігі, қауіпсіздігі мен масштабтау артықшылықтарына орай қашықтықтан зондтау және географиялық ақпараттық жүйелер оңтайлы екенін көрсетеді, ал георадар мен 3D сканерлеу елеулі шектеулерге тап болды. Технологияларды қолданудың тиімділігі бес түйінді факторларлармен анықталады: қол жетімділік пен қауіпсіздік, қолда бар құзіреттің деңгейі, нысандардың физикалық осалдығы, заңнамалық шектеулер және шығындар/уақыт. Зерттеудің ғылыми үлесі – араласу фазаларын технологияларды таңдау мен жергілікті шектеулермен байланыстыратын, дәлелдерге негізделген тасымалданатын тәсілді әзірлеуде, ол мамандарға жалпы теориялық тұжырымдамалардан тәжірибелік шешімдерге өтуге мүмкіндік береді. Жұмыста берілген моделді далалық тексеруден өткізу, сондай-ақ мамандардың профессионалдық дайындығын көтеру және оны енгізуді жеңілдету үшін интерактивті сандық құрал жасау ұсынылады.

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Создание комплексной теоретической модели сохранения археологического наследия в послеконфликтном Ираке

В исследовании, посвященном сохранению иракского археологического наследия в постконфликтных условиях, рассматривается теоретический аспект решения этой проблемы. В работе применяется теоретический синтез, выполненный по методологии PRISMA (41 источник), а также тематический анализ, которые позволяют объединить разрозненные данные в контекстную модель принятия решений, специально адаптированную к условиям Ирака. Предложенная модель соотносит технологии с практическими задачами посредством трёх инструментов: матрицы «технология × ограничения»; матрицы «сцена × фаза вмешательства × приоритет»; а также пороговой матрицы действий, дополненной шестью операционными правилами в формате «если – то – потому что» и деревом решений. Полученные результаты показывают, что для Ирака наиболее эффективными являются дистанционное зондирование и геоинформационные системы благодаря их доступности, безопасности и масштабируемости, в то время как георадар и 3D-сканирование сталкиваются с серьёзными ограничениями. Эффективность применения технологий определяется пятью ключевыми факторами: доступом и безопасностью, уровнем имеющихся компетенций, физической уязвимостью объектов, законодательными ограничениями и затратами/временем. Научный вклад исследования заключается в разработке переносимого, основанного на доказательствах подхода, который связывает фазы вмешательства с выбором технологий и локальными ограничениями, позволяя специалистам переходить от общетеоретических концепций к практическим решениям. В работе предлагается провести полевую проверку представленной модели, а также создать интерактивные цифровые инструменты для облегчения её внедрения и повышения профессиональной подготовки специалистов.

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1 Introduction

Iraqi archaeological preservation requires technological, governance, environmental, and community interaction. Prolonged war, natural stressors like climate variability, and socio-political instability increase the destruction of ancient monuments [Fatorić & Seekamp 2019]. Restoration and conservation projects must use current non-invasive technologies for comprehensive analysis and to reduce site disruption. For

documentation, geographical evaluation, and heritage management, GIS, GPR, and satellite imaging are potential technologies. Integrating varied datasets like site-specific survey results and high-resolution satellite images into GIS allows spatial analysis that can influence preservation priorities. Modern modular GIS architecture allows analysts to undertake data management, spatial modeling, and vector-raster integration in reproducible processes [Ivanov 2022: 3]. Such systems have shown adaptation in historic contexts, integrating evaluations of tangible assets with environmental and social factors [Bilgin Altlnoz et al. 2023: 3]. Assessing Iraq's fragile ancient environments, which face immediate devastation and long-term degradation, requires flexibility [Al-Shammari 2024]. This research paradigm relies on organized decision-making methods like the Analytic Hierarchy Process. AHP helps compare competing priorities by breaking down the preservation challenge into technological feasibility, governance readiness, environmental conditions, and community-linked values. This is especially important when financial or resource scarcity forces trade-offs between saving high-value monuments or undertaking large-scale preventive stabilizing measures [Al-Akkam 2013]. Governance methods for heritage protection are fragile. Public authorities in Iraq, particularly Kurdistan, lack commitment to cultural heritage policy frameworks. Weak enforcement has prevented stakeholders from working together and excluded local communities from conservation planning [Amin, Adu-Ampong 2016]. This exclusion undermines legitimacy and diminishes local knowledge mobilization, which is essential for managing threatened geographically scattered locations. Municipal authorities must collaborate with national agencies, conservation institutions, and foreign partners to strengthen these institutional processes [Al-Akkam 2013]. Structural defects may result from climate change, making conservation decisions more complex and urgent. Global coastal archaeological sites demonstrate how expert knowledge co-production can improve adaptation techniques [Fatorić, Seekamp 2019]. Archaeological sites in Iraq, of all kinds and locations, greatly require the intervention of climate scientists to make decisions, in addition to architects, archaeologists and urban planners. Let us not forget the most important role of local communities in solving problems and creating highly balanced interventions in anticipation of future risks. Remote sensing is efficient for large-area archeological monitoring under such constraints. Other endangered archaeology documentation programs use systematic grid-based surveys with satellite-derived data to quickly assess vast landscapes for disturbance records before selective ground validation [Breen et al. 2022]. In Iraq's huge desert plateaus and riverine plains with tell mounds and ancient city remnants, broad-scale detection and tailored in-situ inspection improve resource efficiency and informational integrity. Sustainability must be a priority throughout this process because tourism might exacerbate historic environment vulnerabilities.

1.1 Theoretical Foundations of Archaeological Landscape Preservation

1.1.1 Theory of Cultural Landscape:

The idea of this theory stems from an understanding of the interrelationship between two important factors: human culture and the material elements surrounding it, including them as tangible and intangible components of value to the site This idea has transitioned from perceiving legacy as a distinct assemblage of monuments to recognizing the cultural landscape as an integrated network that encompasses geographical location, architecture, cultural practices, and collective memory [Haddad 2024]. Conservation theories seek to amalgamate material factors with social and environmental values, emphasizing sustainable utilization and adaptation to modern requirements while preserving historical integrity [Ahmed 2024].

Archaeology and heritage studies underscore the necessity of dual documentation of both physical and non-physical site attributes, facilitating the establishment of conservation priorities, particularly in

post-conflict regions like Iraq. Non-invasive methodologies, including radar and satellite imagery, enhance effective and secure site monitoring [Al-Hamdani, Van de Ven 2022; Anderson 2023]. The approach underscores the significance of incorporating local populations into the management process to foster a sense of responsibility and empowerment [Zaina et al. 2021].

Notwithstanding the benefits of this comprehensive model, its implementation encounters numerous challenges, including the difficulty of reconciling physical preservation with intangible cultural elements, as well as the intricacies of governance and coordination among stakeholders in complex environments such as Iraq [Haddad 2024; Abdul Huq, Puthuvayi 2024]. The program encounters deficiencies in technical expertise and training, coupled with an expensive dependence on technology, alongside financial sustainability risks and challenges in safeguarding data and heritage from commercial exploitation [Zaina et al. 2021; Abdul Huq, Puthuvayi 2024; Leventis et al. 2023].

Preserving the cultural landscape necessitates a meticulous equilibrium among environmental, social, economic, and political factors, while utilizing technology and acknowledging that practical implementation is shaped by local context, governance conditions, and available resources [Al-Shammari 2024].

1.1.2 Heritage conservation principles

International agreements, such as those of ICOMOS since the sixties have framed the standards of heritage preservation according to specific principles and standards, the most important of which are authenticity and integrity, with attention to technical, ethical and procedural standards. A set with of policies for managing these sites was created, as is the case in the HIA heritage impact assessment, by combining it with sensitive initiatives for heritage development [Liang et al. 2023].

These principles adapt to environmental and social changes, directing restoration efforts based on material criteria while acknowledging the site's significance to contemporary society and incorporating intangible aspects such as identity and memory into conservation strategies [Abdul Huq, Puthuvayi 2024]. The global framework underscores the necessity of periodic data collection and systematic evaluation of site conditions via mechanisms like interactive monitoring or UNESCO periodic reports. The efficacy of these programs relies on the capacity of local organizations to catalog locations, assess difficulties, and convert findings into concrete strategies [Al-Shammari 2024; Abdul Huq, Puthuvayi 2024].

Modern preservation has reinforced the idea of aligning tangible heritage such as buildings and architectural remains with intangible heritage such as social traditions and customs to give importance and authenticity to the physical environment. This equilibrium is crucial in regions such as Iraq, where historic sites persist in collective memory. The bias in preservation processes that focus solely on physical appearance can jeopardize the authenticity and permanence of the scene, potentially resulting in aesthetic projects that lack the original essence of the location or clash with the values of the local community [Haddad 2024; Zaina et al. 2021].

To attain genuine equilibrium, policies necessitate community engagement in conservation decisions, through collaborative recording and the incorporation of local knowledge, including heritage names and folklore, in asset inventories. Contemporary technology, including geographic information systems (GIS) and drones, are utilized to precisely map both the tangible and intangible elements, as well as to connect architectural buildings to areas of communal celebration or sacred routes [Anderson 2023; Zaina et al. 2021].

The international framework highlights the necessity of addressing governance issues, as the success of policies is associated with the balance of power between central and local authorities, as well

as the transparency and participation in the decision-making process [Jasim et al. 2018]. The inclination towards large projects often overlooks small interventions that preserve intangible heritage. Therefore, it is advisable to incorporate social and cultural evaluation criteria into quality matrices and funding decisions, alongside technical criteria.

Adaptive and contextual conservation is fundamental to site protection; conservation measures should be customized to the site's environmental, social, and political characteristics, with ongoing assessment facilitated by 3D digital monitoring tools and preventive laser scanning [Fatorić , Seekamp 2019; Pavelka Jr, Pacina 2023]. Advanced materials and nanotechnology contribute to the reinforcement of sensitive structural elements while preserving their optical authenticity [Azizan et al. 2024].

The integration of three sustainability criteria, environmental, economic, and social is essential, as the success of any conservation project necessitates the inclusion of all these dimensions. A restoration or management plan is likely to fail if it does not achieve a balance between environmental safety, quality of life, and the potential of the local community [Haddad 2024].

Securing financing for sustainability presents a considerable challenge. It should not be confined to supporting physical restoration efforts; rather, it must encompass funding for community programs, including oral documentation, craft education, and the enhancement of relationships between residents and the site [Abdul Huq, Puthuvayi 2024].

In summary, contemporary heritage conservation principles encompass:

- Adherence to international technical and ethical standards;
- Community involvement and acknowledgment of intangible values;
- The implementation of adaptive conservation strategies that address environmental and socio-political risks;
- The promotion of economic and social sustainability, focusing on the equilibrium between preserving physical structures and maintaining the cultural vitality of the site [Fatorić, Seekamp 2019; Haddad 2024; Anderson 2023; Zaina et al. 2021; Liang et al. 2023].

1.1.3 Risk and Resilience Frameworks

This type of framework is of great importance in order to maintain the safety and authenticity of the physical structure from risks, with the importance of assessing the fragility of the site as well as the effects that can be expected to mitigate it, especially if related to risks such as earthquakes, war, and changing climate problems [Leventis et al. 2023]. This process seeks to transition from reactive conservation measures following damage to proactive preventive strategies, thereby enhancing the sustainability of the archaeological and material value of sites [Fatorić, Seekamp 2019].

Technology is essential for these frameworks; Geographic Information Systems (GIS), high-resolution damage recording tools, and remote sensing platforms facilitate accurate risk mapping on large scales while allowing detailed site-level analysis, thereby supporting effective planning of governors' interventions [Leventis et al. 2023]. These tools facilitate ongoing documentation and enable predictive modeling to identify locations needing urgent intervention to prevent significant damage.

In armed conflict contexts, risk management is complicated by direct damage from bombing, looting, and sabotage, alongside secondary impacts like infrastructure collapse. This situation highlights that heritage can be intentionally targeted to erase cultural symbols and collective identity, as observed in numerous historical regions affected by conflict [Pinho et al. 2023]. Integrating risk assessments into military operations plans and ensuring States' commitment to international humanitarian law and cultural

property protection conventions is essential for addressing these threats, despite practical challenges in implementation [Pinho et al. 2023].

The application of drone and space survey technologies facilitates the documentation of archaeological site conditions in hazardous regions, enabling the accurate differentiation between new damage and pre-existing damage. This data integrates field information recorded by community networks and non-governmental organizations, thereby enhancing monitoring capacity despite security constraints [Breen et al. 2022; Anderson 2023; Izeta, Cattáneo 2023].

Climate change poses significant risks of degradation to archaeological sites in Iraq due to altering weather patterns, as well as increased occurrences of floods and droughts. Climate change is degrading materials and affecting soil, thereby endangering historical monuments particularly those constructed from organic materials or located in humid environments due to accelerated decomposition [Fatorić, Seekamp 2019; Westley, Andreou 2023]. Intelligent conservation employs databases derived from satellite imagery and environmental data analysis, integrating local knowledge from communities capable of interpreting and identifying climate events and their effects on heritage. Integrating scientific predictions with heritage is important to guide priorities in integrated conservation that deals with all social, economic and environmental dimensions together, based on the certainty that sustainability cannot be maintained without the social and economic flexibility of the archaeological area [Haddad 2024]. Financing is a challenge to sustainability as well as political and institutional coordination, especially in war zones [Abdul Huq, Puthuvayi 2024].

Photogrammetry with laser scanning and the use of protective materials may enhance the site's resistance and maintain its authenticity [Pavelka Jr, Pacina 2023; Azizan et al. 2024]. Community vigilance is enhanced through the participation of local community members in early detection of risks, which has an impact on enhancing heritage preservation in the long term.

1.2 Fundamental Theoretical GAP:

The primary theoretical gap exists due to the lack of a comprehensive methodological framework that directs the selection and application of modern technologies for the preservation of Iraqi archaeological landscapes, considering local constraints and conditions. While numerous studies examine the use of digital technologies in heritage preservation, the majority concentrate on specific cases or diverse geographical contexts, lacking a comprehensive decision-making framework that addresses the distinct complexities of the Iraqi context [Aftabi, Bahramjerdi 2023; Balaban-Ökten 2023]. The absence of literature results in decision makers in this field lacking clear methodological tools necessary for making informed choices regarding the most suitable technologies for specific situations.

What was found during the research was the absence of a critical approach in the current research related to the features of archaeological landscapes, the necessary stages of intervention, and the techniques appropriate for each stage. I found that the studies only study the technique, ignoring integration with other influential factors. This oversight restricts the optimal advantages that can be gained from their combined use [Hackenbroich et al. 2023]. These circumstances necessitate the development of a synthetic theoretical approach that integrates knowledge of modern technologies with a comprehensive understanding of the Iraqi local context, aiming to produce a practical decision framework [Czajlik et al. 2020].

To address the theoretical gap, the research will aim to create a framework for decision-making that is contextually consistent with both techniques, implementation, and constraints at the same time in Iraq. It represents a methodological tool for decision-makers when preserving a heritage to suit each case. This

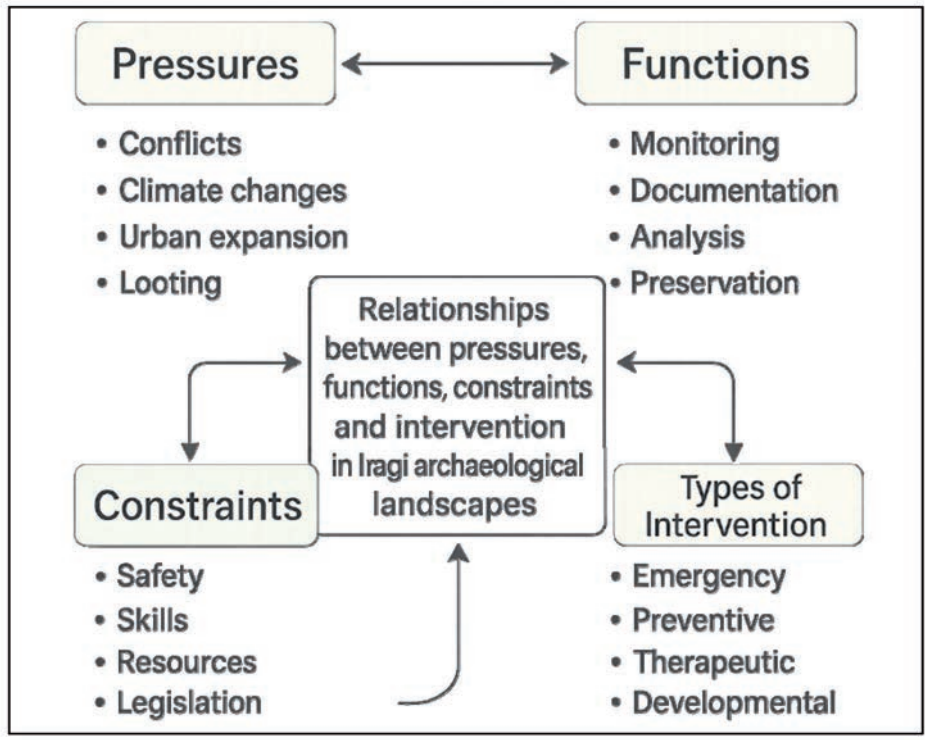

Fig. 1. A conceptual map of Iraqi archaeological landscape management pressures, functions, limits, and intervention patterns
1-сур. Ирактың археологиялық ландшафттарын басқаруға әсер ететін факторлардың концептуалды картасы, функциялары, шектеулері және араласу схемасы
Рис. 1. Концептуальная карта факторов, влияющих на управление археологическим ландшафтом Ирака, функций, ограничений и схем вмешательства

research aims to "provide a distinct theoretical contribution by developing an analytical methodology that can be applied to other contexts encountering similar challenges" [Ducke et al. 2014].

Figure 1 explains the conceptual model how four key factors affect Iraqi archaeological landscape conservation efforts. These locations initially face armed conflicts, climatic change, urban expansion, and looting. Second, current technologies must perform constant monitoring, exact recording, complex data analysis, and different conservation methods. As for what is related to the elements of safety, along with skill in using technology, benefiting from human resources, and the sensitivity of archaeological sites, as a third determinant that may limit the options for safe intervention, then come the types of emergency intervention, whether preventive, therapeutic, or to enable sustainability, in fourth place. To form an interconnected network that influences decision-making.

The parts form a dynamic, interconnected network that influences decision makers' policies. Stress level and intensity determine the urgency and type of intervention needed, while restrictions limit the range of functions that may be performed and the best techniques for each situation. To make conservation plans successful and adaptable, this model shows that practical reality requirements and external influence variables must be matched.

2 Methodology

This study relies on the Synthetic Theoretical Review Methodology (Theoretical Synthesis Review) as a comprehensive methodological framework for developing a contextual decision framework that integrates modern technologies and practical constraints in the preservation of Iraqi archaeological landscapes. This methodology is characterized by its ability to collect and analyze scattered knowledge from multiple sources and synthesize it into a coherent theoretical framework that can be applied practically. Synthetic theoretical review differs from traditional systematic review in its focus on theory building and developing conceptual frameworks rather than simply compiling empirical findings, making it particularly suitable for interdisciplinary fields such as archaeological heritage preservation [King, Rico 2024].

2.1 PRISMA Unified Pathway

A consistent PRISMA pathway was adhered to guarantee transparency and repeatability in the source selection procedure. The approach commenced with a preliminary search of prominent academic databases (Scopus, Web of Science, Google Scholar) utilizing the designated search criteria, resulting in 1.247 primary sources. Preliminary sorting criteria were implemented to eliminate duplicate and irrelevant sources, resulting in a total of 1.089 sources. In the subsequent phase, comprehensive evaluation criteria were employed to assess titles and abstracts, culminating in the selection of 346 sources for further analysis. Ultimately, definitive selection criteria were employed on whole texts to yield 41 sources for analysis and synthesis (see Table 1 and Figure 2).

Table 1 – Criteria for inclusion and exclusion
1-кесте – Қосу және алып тастау критерийлері
Таблица 1 – Критерии включения и исключения

Criterion	Included	Excluded
Subject Scope	Research on modern technologies for archaeological legacy conservation, archaeological landscapes, digital documentation, GIS, remote sensing, photogrammetry, GPR, and 3D surveying	Research on intangible heritage, fine arts, museums, and unrelated technologies
Geographic Scope	Research on Iraq or similar conditions (Middle East, post-conflict, desert, conventional construction materials)	Research limited to unique locations (tropical climate, modern construction materials, stable ecosystems)
Time Frame	From 2010 to 2023, research focused on current studies from 2018 to 2023	Pre-2010 research, except crucial references
Source Type	Scholarly literature, peer-reviewed journals, institutional publications, PhD dissertations	Unreliable sources, blogs, and news platforms
Language	Arabic, English, French	Other untranslated languages
Methodological Quality	Research with clear methodologies, outcomes, and references	Research with unclear methodologies, unsupported findings, and no citations

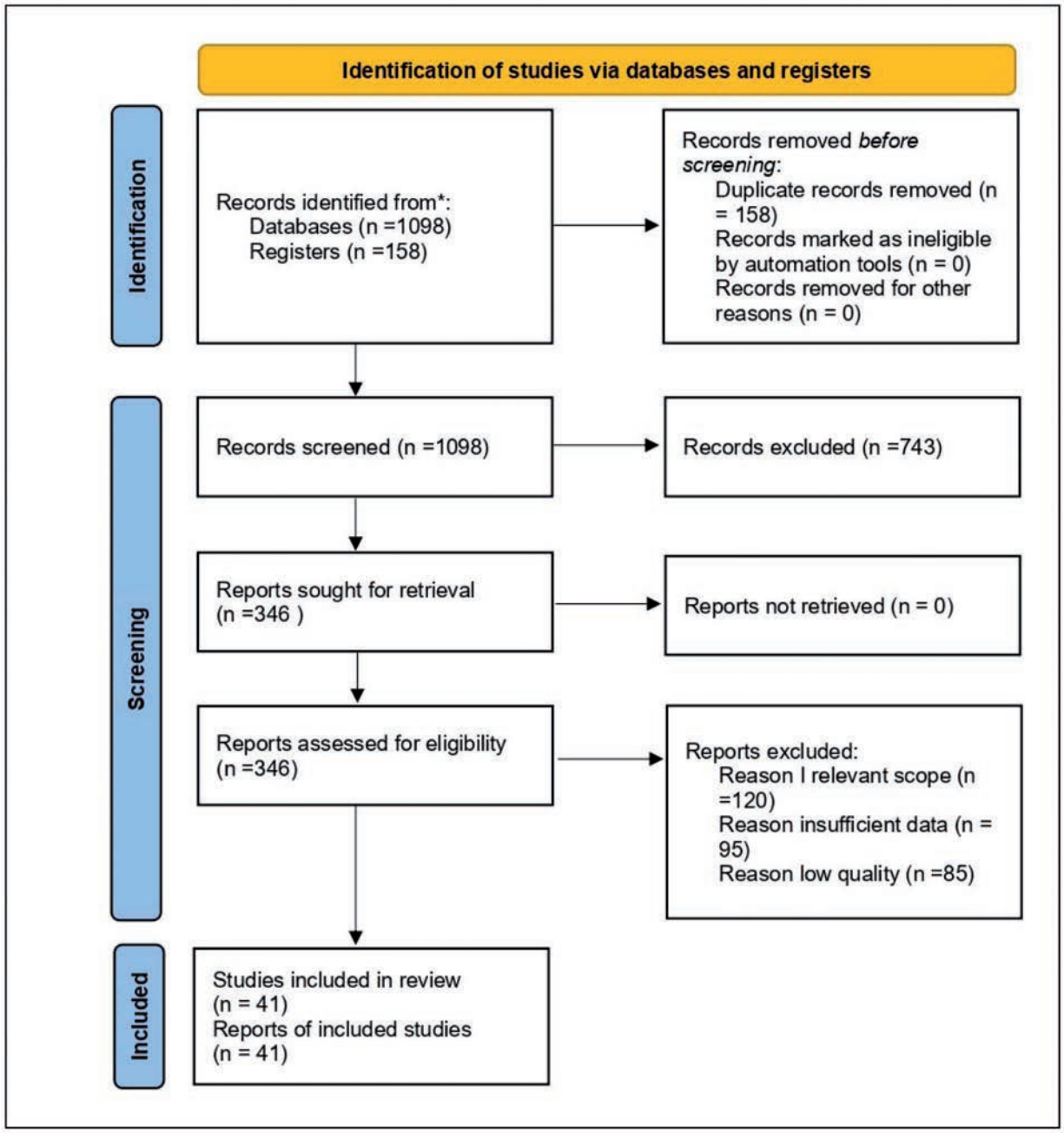

Fig. 2. PRISMA flow diagram
2-сур. PRISMA диаграммасы
Рис. 2. Диаграмма PRISMA

2.1.1 Research Methodology and Terminology

The research consisted of a set of basic archaeological terms in Arabic and English, as follows:

Archaeological landscapes – heritage preservation – digital documentation – geographic information systems – remote sensing – photography – post-conflict heritage – Iraq – decision framework.

As for Arabic, it was– المناظر الطبيعية الاثرية – الحفاظ على التراث – التوثيق الرقمي – نظم المعلومات الجغرافية الاستشعار عن بعد – التصوير الفوتوغرامتري – التراث بعد الصراع – العراق – إطار القرار [ICCROM 2024] (see Table 2)

Table 2 – Vocabulary of terms
2-кесте – Терминдер сөздігі
Таблица 2 – Словарь терминов

Arabic Term	English Term	Operational Definition
المنظر الأثري	Archaeological Landscape	A unified physical and cultural entity with archeological sites, ecology, and cultural activities
نظم المعلومات الجغرافية	Geographic Information Systems (GIS)	A computer platform for collecting, analyzing, and visualizing archeological site spatial data
الاستشعار عن بُعد	Remote Sensing	A satellite or aircraft-based method for data collection without personal contact.
التصوير المجسم	Photogrammetry	A method for creating three-dimensional models and exact maps using photos
رادار اختراق الأرض	Ground Penetrating Radar (GPR)	Geophysical method using radar waves to locate underground structures
المسح ثلاثي الأبعاد	3D Scanning	A computerized method for precisely recording three-dimensional object form and visual attributes
مستوى الصلة	Relevance Level	The technology's suitability for a given limitation (high/medium/low)
مرساة الحكم	Judgment Anchor	The stated operational standard is used to support an assessment

2.2 Process of Evidence Extraction

A systematic strategy has been established to collect evidence from designated sources, encompassing fundamental details about each source (author, year, research type, methodology) and theme material (examined techniques, geographical context, principal findings, recommendations). Theoretical principles and practical guidelines pertinent to the utilization of contemporary technologies in the conservation of archaeological landscapes were also derived, emphasizing the problems and limitations inherent to the Iraqi setting [Ntafotis et al. 2022; Sassolini, Cinini 2010], (see Table 3).

Table 3 – Evidence extraction
3-кесте – Дәлелдемелерді алу
Таблица 3 – Получение доказательств

Extraction Element	Description	Example/Source Information
Author, Year, Study Type, Methodology	The author(s), publication year, research type, and methodology employed in the study	Case Study, Mixed Methods
Geographic Context	The geographical area studied and its environmental characteristics	Iraq; arid climate; traditional mudbrick construction

End of table 3
3-кестенің соңы
Окончание таблицы 3

Extraction Element	Description	Example/Source Information
Studied Technologies	Digital technologies applied or proposed within the study	Geographic Information Systems (GIS), Remote Sensing, Photogrammetry
Key Findings	Principal discoveries, interpretations, and conclusions derived from the research	Effectiveness of remote sensing for archaeological monitoring
Identified Constraints	Limitations, challenges, or obstacles highlighted in the study	Security issues, lack of specialized expertise
Recommendations	Practical guidelines or suggestions for implementation based on findings	Investment in local capacity-building programs
Theoretical Principles	Underlying theoretical frameworks or conceptual bases informing the study	Cultural Landscape Theory, Principles of Heritage Conservation
Relevance to Iraqi Context	Degree to which findings are applicable or transferable to the Iraqi archaeological context	High, medium, or low applicability

2.3 Analysis and Synthesis

The retrieved material was evaluated through "Thematic Analysis" to uncover repeating patterns and themes across various sources. The themes were further categorized into primary classifications: attributes of various technologies, practical limitations pertinent to the Iraqi setting, phases of intervention in archaeological landscape management, and criteria for decision-making. These categories are organized within a cohesive theoretical framework that connects many parts and offers practical direction to facilitate methodical and consistent decision-making.

3 Results

The suitability scores provided in this section should be interpreted within the defined constraints and do not represent absolute preferences. The scores indicate the suitability of each technology for operation under specific constraints in the Iraqi context, rather than the severity of the obstacles or the absolute preference for the technology.

3.1 Techniques × Constraints Matrix

A synthetic analysis of the reviewed sources led to the creation of a comprehensive matrix that connects five key technologies (GIS, remote sensing, Photogrammetry, Ground-Penetrating Radar (GPR), 3D scanning) with five key constraints impacting their application in the Iraqi context (access and security, available skills, physical sensitivity, legislative framework, cost and time). (see Table 4).

3.2 Operational Anchors

- Accessibility / Security
  - High: Does not require direct access to the site; can be applied remotely.
  - Medium: Requires limited access or application under security protection.
  - Low: Requires prolonged and direct presence on site.

Table 4 – Techniques × constraints matrix with operational anchors
4-кесте – Әдістер × жұмыспен байланысты шектеулер матрицасы
Таблица 4 – Методы × матрица ограничений с рабочими привязками

Technique	Access & Security	Available Skills	Physical Sensitivity	Legislative Framework	Cost / Time
Geographic Information Systems (GIS)	High	High	High	Medium	Medium
Remote Sensing	High	Medium	High	Medium	High
Photogrammetry	Medium	Medium	High	High	Medium
Ground-Penetrating Radar (GPR)	Low	Low	Medium	Low	Low
3D Scanning	Low	Low	Medium	Medium	Low

- Skills Available
  - High: Locally available expertise, open-source tools, basic training sufficient.
  - Medium: Limited expertise requires moderate training.
  - Low: Rare expertise requires advanced training and specialized equipment.
- Material Sensitivity
  - High: Non-invasive, does not affect archaeological remains.
  - Medium: Limited impact requires simple precautions.
  - Low: May involve direct contact or vibrations affecting remains.
- Legislative Framework
  - High: No special permits required, consistent with current laws.
  - Medium: Requires limited or routine permits.
  - Low: Requires complex or unavailable permits.
- Cost / Time
  - High: Affordable cost, rapid implementation.
  - Medium: Moderate cost requires preparation time.
  - Low: High cost, long execution time.

For example, GIS was rated Medium in the Legislative Framework dimension due to restrictions on accessing high-resolution governmental datasets and licensing requirements. Similarly, its medium score in Cost/Time reflects the need for a complex data pipeline and extended initial preparation (see Figure 3).

3.3 Landscape × Intervention Phase × Priority Matrix

A second matrix was developed to connect the "Types of Iraqi Archaeological Landscapes" with the required intervention phases and the most suitable technologies for each phase, while indicating the priority level and providing a rationale for each recommendation (see Table 5). Landscape × Intervention Phase × Priority Matrix.

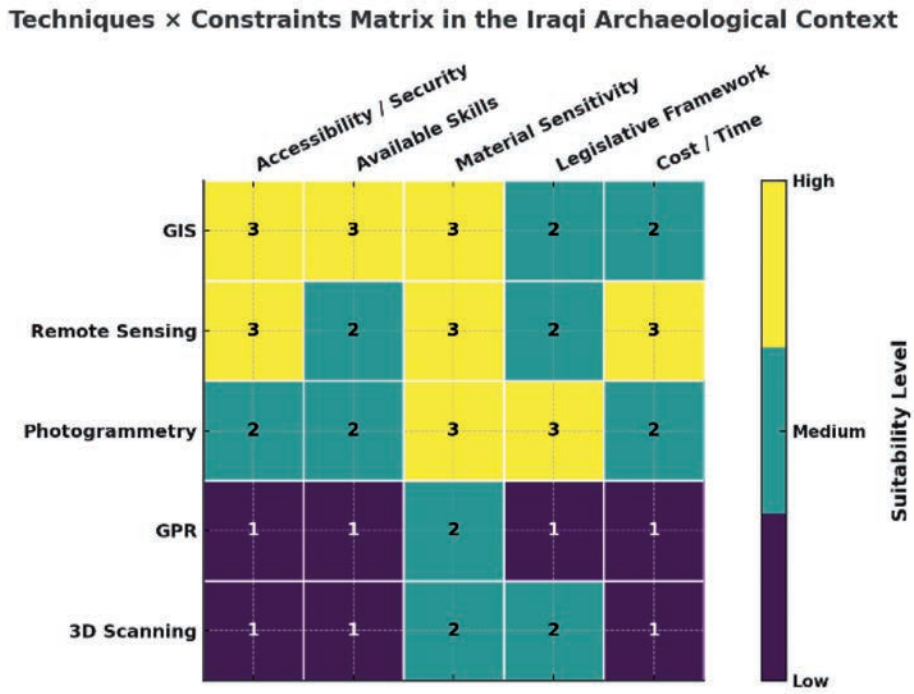

Fig. 3. Techniques × constrains matrix in the Iraqi archaeological context
3-сур. Ирактың археологиялық контекстіндегі шектеулер х әдістер матрицасы
Рис. 3. Матрица методов × ограничений в иракском археологическом контексте

Table 5 – Landscape × intervention phase × priority matrix
5-кесте – Ландшафт × араласу фазасы × басымдық матрицасы
Таблица 5 – Ландшафт × фаза вмешательства × матрица приоритетов

Landscape Type	Intervention Phase	Recommended Technology	Priority Level	Rationale
Conflict-affected landscapes (Nineveh, Ashur)	Emergency	Remote Sensing + Photogrammetry	Very High	Promptly assess and record damage to prevent further loss.
Relatively preserved landscapes (Ur, Babylon)	Preventive	GIS + Remote Sensing	High	Monitoring and heritage management planning.
Environmentally sensitive landscapes (Marshlands)	Integrative	Remote Sensing + UAVs	Medium	Integrating environmental and archaeological monitoring.
Complex urban landscapes (Historic Baghdad)	Developmental	GIS + Photogrammetry	Medium	Manage urban heritage sustainably
Remote sites (Anbar Desert)	Exploratory	Remote Sensing + GPR	Low	Possible undiscovered sites.

3.4 Thresholds and Actions Matrix

A third matrix was developed to define critical thresholds that necessitate specific interventions and to identify the appropriate actions for each threshold, together with the logical rationale for the proposed response (see Table 6).

Table 6 – Thresholds and actions matrix
6-кесте – Әрекеттер мен мәндер шегі матрицасы
Таблица 6 – Матрица пороговых значений и действий

Critical Threshold	Indicator	Required Action	Rationale
Straightforward security risk	Armed activity within 10 km	Apply Remote Sensing only	Avoid exposing teams to risk
Rapid deterioration	>5% structural loss per year	Emergency documentation intervention	Preserve information before total loss
Limited resources	Budget < USD 50,000	Focus on open-source tools	Maximize efficiency with minimal cost
Weak local expertise	<3 local specialists	Intensive capacity-building program	Ensure long-term sustainability
High material sensitivity	>70% mudbrick composition	Avoid invasive techniques	Protect fragile archaeological materials
Rare stability opportunity	>6 months of security stability	Applying multi-technology approach	Leverage window for comprehensive documentation
Exceptional historical significance	World Heritage Site designation	Conduct full historical study first	Understand context before technical intervention
Stratigraphic complexity	>5 archaeological layers	Stepwise contextual analysis	Avoid loss of stratigraphic information

3.5 The Six Rules "If-Then-Because"

Six decision rules were formulated based on matrix analysis. The six principles derived from rule-based synthetic analysis: If-Then-Because statements are formulated based on the information derived from the three matrices presented above. Each rule connects the characteristics of the archaeological landscape, the stages of intervention, and the most suitable techniques, offering logical justification grounded in the evidence derived from the preceding theoretical review (see Figures 4 and 5).

• Rule 1 – Security Priority: In areas classified as high security risk (e.g., reports of armed activity within 10 km), remote sensing and GIS technologies are prioritized. These technologies offer optimal suitability in terms of access and security, delivering extensive information without jeopardizing personnel safety, as evidenced by the core matrix and local expertise.

• Rule 2 – Urgent Documentation: In cases where there is an urgent threat to the archaeological landscape, defined as a loss of structure exceeding 5% per year, the primary objective is rapid documentation utilizing drones and photogrammetry. These technologies offer an optimal combination of speed and accuracy, demonstrating moderate suitability in terms of access and security, while exhibiting high sensitivity to physical conditions. The methodology includes documentation of archaeological information.

Fig. 4. Decision matrix defining the sequence of the decision tree
4-сур. Шешімдер реттілігін анықтайтын шешім матрицасы
Рис. 4. Матрица решений, определяющая последовательность дерева решений

• Third rule: Limited Resources: When resources are limited, such as a budget of fifty thousand dollars and the number of local specialists is less than three, priority is given to using open source with geographic information systems. It can be complemented by training programs and is used to verify long-term sustainability at the lowest costs, as shown in the threshold matrix and procedures.

• The fourth rule includes physical sensitivity: it is used in fragile locations while avoiding penetrating GPR with imaging and remote sensing to protect the effects.

• Rule 5 – Long-term planning: In instances where a rare opportunity for security stability and international support arises (defined as security stability exceeding six months with adequate financial backing), a comprehensive multi-technology approach is implemented. This approach integrates all available technologies according to their priorities into matrices, recognizing the rarity of such opportunities in the Iraqi context. Its aim is to benefit from technical capabilities while creating a database of references in the future.

• Rule Six: Capacity Building: If the site is a World Heritage Site and has a great stratigraphic complexity of five or more archaeological layers, here we need a historical study with an analysis of the context before any technical intervention.

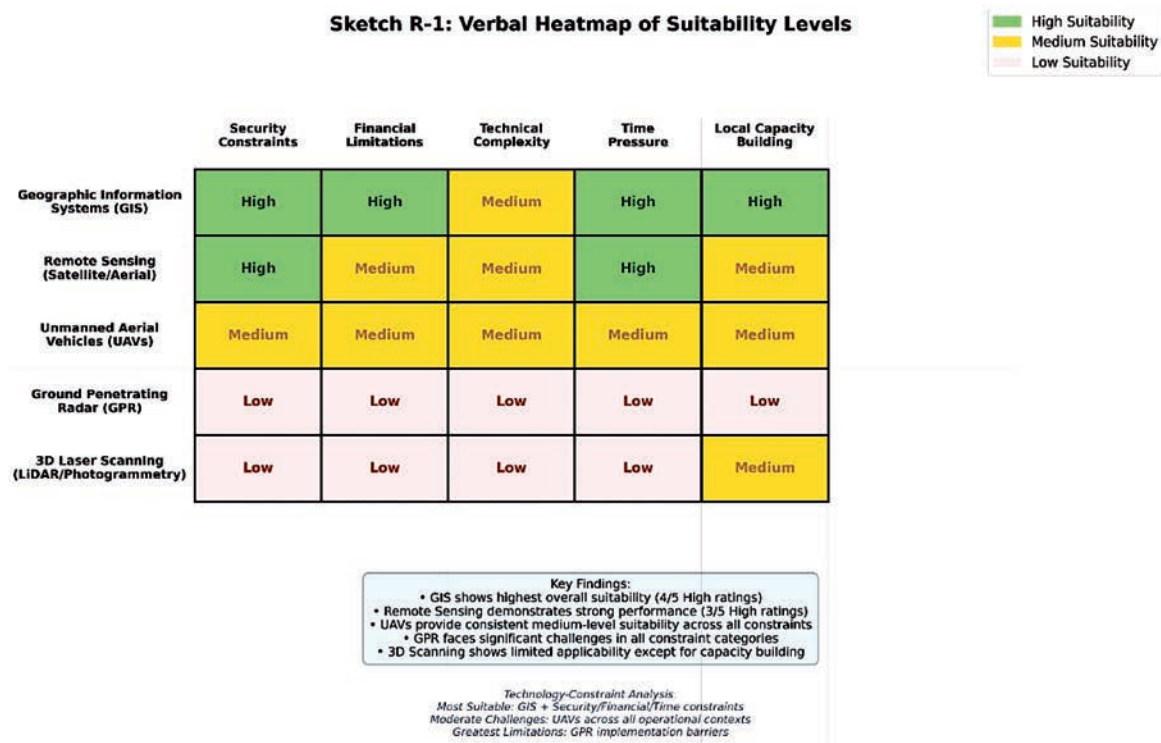

Fig. 5. Technological suitability Iraqi archaeological heritage conservation heatmap
5-сур. Ирактың археологиялық мұрасын сақтауға арналған технологиялық жарамдылықты бағалаудың жылу картасы
Рис. 5. Тепловая карта оценки технологической пригодности для сохранения археологического наследия Ирака

4 Comparison of international frameworks

The developed framework, when compared to international frameworks in heritage preservation, is characterized by its emphasis on the local context and the practical constraints inherent to post-conflict regions. International frameworks like UNESCO and ICOMOS Guidelines emphasize general principles and optimal standards; however, the developed framework offers practical solutions to real-world challenges [Australia ICOMOS 2013; Australia ICOMOS 1999; ICOMOS 1964; 2003a; 2003в; 2015; 2017; 2022; 2024; UNESCO and ICOMOS 2022; ICOMOS and ICCROM 2023].

The developed framework enhances international frameworks by offering an application mechanism that considers local constraints while maintaining scientific standards. It is considered a valuable tool for practitioners within complex environments by linking theory and practice

5 Recommendations:

The framework is applied at various levels, such as national strategic planning and operational decision-making. The matrices prioritize technology investment and training at the national and site levels. The rules and decision-making trees provide guidance for selecting the appropriate technology for each site. While urging the establishment of international partnerships to receive technical and financial support and develop a central database to document archaeological sites and their changes over time

6 Conclusion

This research led to the creation of a detailed contextual decision framework aimed at integrating modern technologies into the preservation of Iraqi archaeological landscapes. The framework comprises three interconnected matrices, six operational rules, and a practical textual decision tree. This framework offers practical solutions to the challenges encountered in heritage conservation within complex contexts, including post-conflict regions.

The findings demonstrate that remote sensing and GIS technologies exhibit optimal suitability for the Iraqi context, whereas advanced technologies like ground penetration radar and 3D scanning encounter significant application challenges. The research indicated that the effectiveness of technologies is notably influenced by five fundamental constraints: access and security, available skills, physical sensitivity, legislative framework, and cost and time.

Three key transferable principles:

• 1st Principle of contextual adaptation: It is essential to tailor advanced technologies to local constraints and context-specific conditions instead of implementing standardized solutions.

• 2nd Principle of gradual integration involves initiating technologies that align closely with existing constraints and progressively enhancing capacity towards more advanced technologies.

• 3rd Principle is decision making using evidence using explicit, proven and operational decision matrices to produce objective decisions**.**

Scientific contributions

The above study contributed to the field of preserving archaeological heritage of importance to subsequent generations. Initially, establish a novel synthetic methodology that integrates theoretical analysis with practical application via interconnected matrices. The framework provided by the study is specifically designed for Iraqi archaeological landscapes to address their ancient constraints within war-affected areas. Thirdly, to work on aligning functions with constraints, an evaluation framework was created with three technical levels, which helped prepare a usable objective evaluation tool. Fourth: Transforming theoretical analysis into practical guidelines that can be applied using six rules related to if, then, and now.

• **Recommendations**

The study proposes focusing on applied studies to evaluate the proposed framework within archaeological sites, while updating digital tools with an interactive feature that enables the use of matrices and decision trees, while conducting comparative studies within geographically different regions.

It is also recommended to develop these indicators in a practical way that can be applied within the Iraqi context in particular and similar regions globally as well to evaluate their effectiveness and study economic feasibility, with the possibility of studying and analyzing the costs and benefits desired from them, while training the community on them.

• **Limits and challenges**

One of the most important limitations of the study that it suffered from was the security restrictions with limited access to the archaeological sites and the dominance of elements from the Popular Mobilization Forces and the military over many of them, which made the researcher resort to secondary sources to address decision-making and generate a tool that enables the researcher to conduct a synthetic theoretical review without direct field documentation.

• **Final summary**

To address real challenges, our research provides a tool and framework that can be used in conflict-affected environments within an academic scientific approach based on PRISMA as a filtering tool to achieve the primary research objective of preserving archaeological landscapes by focusing on integrating technology with context within approaches that take into account local and material constraints and challenges while investing in capabilities and strengthening international relations.

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CRediT authorship contribution statement

Hamodat, Anfal Azam: Conceptualization, Methodology, Literature review, Data curation, Formal analysis, Visualization, Writing – original draft, Writing – review & editing.

Tahir, Mazlan M: Supervision, Conceptual guidance, Methodological validation, Critical review, Writing – review & editing.

Hamzah, Zabidi: Language editing, Academic proofreading.

REFERENCES

1 Abdul Huq, S., Puthuvayi, B. 2024. Assessing the performance of urban heritage conservation projects–influencing factors, aspects and priority weights. In *Built Heritage* 8 (4). DOI: 10.1186/s43238-024-00116-5

2 Aftabi, P., Bahramjerdi, S.F.N. 2023. Developing a decision-making framework within the management of historical cities: Towards integrated conservation and development of the Roudaki neighbourhood. In *Land Use Policy* 129, 106653. DOI: 10.1016/j.landusepol.2023.106653

3 Ahmed, N. 2024. Tourism impact on the cultural heritage of countries in the Middle East. In *Journal of Applied Geographical Studies* 3 (1), 41–53.

4 Al-Akkam A.J. 2013. Urban heritage in Baghdad: Toward a comprehensive sustainable framework. In *Journal of Sustainable Development* 6 (2), 39–55. DOI: 10.5539/jsd.v6n2p39

5 Al-Hamdani, A., Van de Ven, A. 2022. Archaeology in the Shadow of the Ziggurat: Initial Results of a Collaborative Programme at Ur. In *Iraq* 84, 7–23. DOI: 10.1017/irq.2022.1

6 Al-Shammari, R. 2024. Historical Centers: An exploratory comparison of sustainable applications in urban renewal projects–Najaf and Karbala, Iraq. In *Wasit Journal of Engineering Sciences* 12 (3), 55–69. DOI: 10.31185/ejuow.Vol12.Iss3.543

7 Amin Hanaw, M. Taqi, M., Adu-Ampong, E. A. 2016. Challenges to urban cultural heritage conservation and management in the historic centre of Sulaimaniyah, Kurdistan-Iraq. In *Journal of Cultural Heritage Management and Sustainable Development* 6 (3), 255–270. DOI: 10.1108/JCHMSD-03-2016-0019

8 Anderson, K. 2023. Autonomous Archaeological Authority: The Future of Drone Use and Privacy Laws in Cultural Heritage Preservation. In *Journal of Air Law and Commerce* 88, 635.

9 Australia ICOMOS. The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance. Australia International Council on Monuments and Sites, 1999.

10 Australia ICOMOS. The Burra Charter: the Australia ICOMOS Charter for Places of Cultural Significance. In: *Australia International Council on Monuments and Sites,* 2013. URL: https://australia.icomos.org/publications/burra-charter-practice-notes/

11 Azizan, M. A., Ishak, N., Desa, H. 2024. Investigating the Engineering Interventions in the Conservation of Malaysia Heritage Structures: A Review on Preserving Historical Edifices Through Advanced Civil Engineering Techniques. In: *International Conference on Artificial Life and Robotics (ICAROB2024).* HorutoHall, Oita, Japan, 701–705.

12 Balaban-Ökten, B. 2023. Heritage Building Conservation Projects Decision-Making Processes. In: *Proceedings of the International Conference of Contemporary Affairs in Architecture and Urbanism-ICCAUA* 6, no. 1, 903–909. DOI: 10.38027/iccaua2023en0371

13 Bilgin Altınöz, A. Halıcı, T., Türkfiliz, M. A., Kara, E. C., Kuş, F., Çetiner, M., Kısaer Koca, E.M., Özçakır, Ö. 2023. Utilising gis for documentation, conservation, and sustainable management of middle east technical university campus in ankara as a modern period living heritage place. In *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences* 48, 211–218. DOI: 10.5194/isprs-archives-XLVIII-M-2-2023-211-2023

14 Breen, C., Blue, L., Andreou, G. M., Safadi, C. El., Huigens, H. O., Nikolaus, J., Ortiz-Vazquez, R., Ray, N., Ash Smith, Tews, S., Westley, K. 2022. Documenting, protecting and managing endangered maritime cultural heritage in the middle east and North Africa (MENA) region. In *Journal of Maritime Archaeology* 17, 341–352. DOI: 10.1007/s11457-022-09338-z

15 Czajlik, Z., Črešnar, M., Doneus, M., Fera, M., Kramberger, A., Mele, M. 2020. *Researching archaeological landscapes across borders Strategies, methods and decisions for the 21st century.* Graz; Budapest

16 Ducke, B., Meylemans, E., Poesen, J., In't Ven, I. 2014. An integrative approach to archaeological landscape evaluation: locational preferences, site preservation and uncertainty mapping. In *The Archaeology of Erosion, the Erosion of Archaeology* 1, 13–22.

17 Fatorić, S. and Seekamp, E. 2019. Knowledge co-production in climate adaptation planning of archaeological sites. In *Journal of Coastal Conservation* 23, 689–698. DOI: 10.1007/s11852-019-00698-8

18 Haddad, N. 2024. Notes on Urban and Architectural Heritage Conservation of Historic Cores in the Middle East: A Critical Review, Evaluation and Recommendations. In *Asian Journal of Arts and Culture* 24 (1). e258370. DOI: 10.48048/ajac.2024.258370

19 Hackenbroich, A.-S., Taylor, G., Williams, R. 2023. Digging up Memories–Empowering collections at Vindolanda Museum through virtual exhibits. In *Digital Applications in Archaeology and Cultural Heritage* 29. e00267. DOI: 10.1016/j.daach.2023.e00267

20 ICOMOS. International Charter for the Conservation and Restoration of Monuments and Sites (The Venice Charter 1964). International Council on Monuments and Sites, 1964.

21 ICOMOS principles for the preservation and conservation-restoration of wall paintings (2003). International Council on Monuments and Sites, 2003a.

22 ICOMOS charter- principles for the analysis, conservation and structural restoration of architectural heritage (2003). International Council on Monuments and Sites, 2003b.

23 The ICOMOS Charter for the Protection and Management of the Archaeological Heritage // Recommendations of the First International Conference of ICOMOS on Archaeological Parks and Sites, 2015.

24 ICOMOS. Salalah guidelines for the management of public archaeological sites. International Council on Monuments and Sites, 2017.

25 ICOMOS. Guidelines for post-conflict reconstruction. International Council on Monuments and Sites, 2022.

26 UNESCO [9910] and ICOMOS. Report on the Joint World Heritage Centre/ICOMOS reactive monitoring mission to Ashur (Qal'at Sherqat). Iraq, 2022.

27 ICOMOS and ICCROM. Guidance on Post-Disaster and Post-Conflict Recovery and Reconstruction for Heritage Places of Cultural Significance and World Heritage Cultural Properties. International Centre for the Study of the Preservation and Restoration of Cultural Property, 2023.

28 ICOMOS Seminar on Sustainability and Succession. International Council on Monuments and Sites, 2024.

29 ICCROM. New publication gathers Arabic translations of major cultural heritage conservation charters. The International Charters for the Conservation and Restoration of Monuments and Sites, 2024.

30 Ivanov, S. 2022. Modern Technologies in The Study, Preservation and Management of Cultural Heritage. In *Journal Scientific and Applied Research* 23 (1), 5–25. DOI: 10.46687/jsar.v23i1.349

31 Izeta, A. D., Cattáneo, R. 2023.Towards an open digital ecosystem for archaeology in South America: The BADACor (Córdoba Archaeological Sites Database) as a case of an open digital archaeological source for heritage management in central Argentina. In *Internet Archaeology* 64, 1–24.

32 Jasim, M. A., Hanks, L., Borsi, K. 2018. Repercussions of singularity of site authorities in making heritage conservation decisions: evidence from Iraq. In *Built Heritage* 2, 77–91. DOI: 10.1186/BF03545704
33 King, R., Rico, T. 2024. *Methods and methodologies in heritage studies.* London: UCL Press.
34 Leventis, G., Argyriou, A., Cerra, D., Hadjimitsis, D. 2023. Enhancing risk assessment and monitoring for cultural heritage sites through data cubes: a multidimensional approach. In: *Ninth International Conference on Remote Sensing and Geoinformation of the Environment (RSCy2023).* Ayia Napa, Cyprus: SPIE, 541–548. DOI: 10.1117/12.2683023
35 Liang, W., Ahmad, Y., Mohidin, H. H. B. 2023.The development of the concept of architectural heritage conservation and its inspiration. In *Built Heritage* 7, 21. DOI: 10.1186/s43238-023-00103-2
36 Ntafotis, E., Zidianakis, E., Partarakis, N., Stephanidis, C. 2022. Extraction of event-related information from text for the representation of cultural heritage. In *Heritage* 5 (4), 3374–3396. DOI: 10.3390/heritage5040173
37 Pavelka, Jr K., Pacina, J. 2023. Using of modern technologies for visualization of cultural heritage. In *Stavební obzor-Civil Engineering Journal* 32 (4), 549–563. DOI: 10.14311/CEJ.2023.04.0041.
38 Pinho, M. I., Veludo, S., Lambert, M. F. 2023. Cultural heritage as a target in conflict scenarios. In: *European Realities – Power – Conference Proceedings: 5th International Scientific Conference,* 369–457. DOI: 10.59014/HLZP8057
39 Sassolini, E., Cinini, A. 2010. Cultural Heritage: Knowledge Extraction from Web Documents. In: *Proceedings of the International Conference on Language Resources and Evaluation.* LREC, Valletta, Malta, 3363–3368.
40 Westley, K., Andreou, G. 2023. Coastal archaeology and climate change in the Middle East and North Africa: contextualizing global projections. In *Near Eastern Archaeology* 86 (3), 230–239. DOI: 10.1086/725769
41 Zaina, F., Proserpio, L., Scazzosi, G. 2021. Local voices on heritage: understanding community perceptions towards archaeological sites in South Iraq. In *Journal of Community Archaeology & Heritage* 8 (4), 256–272. DOI: 10.1080/20518196.2021.1958615

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